Getting to Know the *Kentucky Academic Standards for Mathematics*

Facilitator's Guide

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Module Overview:

Developed by the Kentucky Department of Education (KDE), this module is intended to support the successful implementation of the *Kentucky Academic Standards (KAS) for Mathematics* in classrooms across the state. This Facilitator's Guide is built to support a deep exploration of the expectations set forth within the *KAS for Mathematics* in work sessions at the district, school or team/department level or within Professional Learning Communities (PLCs).

The duration, scope and sequence of the sections may be customized to accommodate local needs and conditions. The sections are designed to provide flexibility for districts and schools and, as such, can be viewed as standalone lessons or within the progression of the module as written.

Goals:

The goals of the Getting to Know your *KAS for Mathematics* Module are for districts or schools to:

- Build a shared understanding of the *KAS for Mathematics* document.
- Strengthen the connection between the components of the *KAS for Mathematics* and the way those components can support teachers in the process of designing instruction
- Experience how the changes in the *KAS for Mathematics* can and should be reflected in student experiences within Kentucky classrooms.
- Identify and prioritize areas where future professional learning will be needed for successful implementation of the *KAS for Mathematics* and develop a plan to address those areas.

Intended Audiences:

Participants are district teams that may include, but are not limited to, department chairs, classroom teachers, special educators, intervention specialists and other staff who support mathematics learning. In addition, districts may choose to have anyone planning to conduct observations or walkthroughs of any kind within mathematics classrooms including, but not limited to, district leadership, school administrators and instructional specialists/coaches participate in this session in order to develop an understanding of the *KAS for Mathematics,* as that should be guiding the instruction witnessed in the classroom.

> ***To the facilitator:*** *It is important to realize while you are the facilitator of these work sessions, you may not have all the answers to the questions asked by participants. And that is okay. When that happens, reflect on this quote from Graham Fletcher, "Every teachable moment, doesn't need to be a teachable moment, in that moment." Throughout the earlier sessions participants may have questions that will be addressed in future work sessions. Use these moments to encourage*

participants to attend future work sessions where those questions will be addressed. If participants ask questions you are not prepared to answer, offer to follow up during the next work session.

Using This Facilitator's Guide:

This facilitator's guide provides suggestions for structuring the three-part series, including recommended activities to prompt meaningful investigation of the *KAS for Mathematics* and guidance on talking points to use alongside the provided PowerPoint presentation. The recommended discovery tasks and/or optional extension activities are provided to aid in developing participant knowledge and familiarity with the *KAS for Mathematics.* Additionally, facilitators may want to consider how to support the delivery and/or continued application of the learning within each session at the local level depending on how schools/districts plan to move forward with implementation of the *KAS for Mathematics*.

Planning Considerations:

Timeline:

- What is the timeline for the learning (number of days, etc.)? Is there adequate time for participants to reflect on new learning or apply takeaways from the previous session prior to this session?

Participants:

- Which stakeholders will be invited to participate? How might the invitation convey to participants the benefits of attending the session? Is the expectation that participants share their learning more broadly once back within schools/districts? If so, is there a way to support that effort?

Communication:

- How might you inform participants regarding any required materials prior to the meeting? How might communications be structured over the course of the three-part series (Google Classroom, etc.)?

Location:

- For in-person sessions: Is there any specific guidance for participants regarding in-person attendance? What equipment might you need available? How much space might the session require? What room/seating configuration might work best based on the activities planned within the session. Will participants have access to online resources?
- For virtual sessions: What platform will you use? How might you handle participants who may not attend all work sessions? Will there be a way for those participants to access session materials (recordings, shared drives, etc.) between work sessions in order to feel as prepared as the other participants?

Facilitator Materials:

The following materials are necessary to engage in the work of this module:

- A device with internet access, specifically to enable access to kystandards.org and the *KAS for Mathematics*
- *Getting to Know the KAS for Mathematics Facilitator's Guide*
- *Getting to Know the KAS for Mathematics* slide presentation

All materials are available on the KDE website at kystandards.org. Any facilitator materials specific to individual module sections will be listed prior to that section within the Facilitator's Guide.

Participant Materials:

Within all sections of the module, participants should plan ahead regarding how they will feel most comfortable engaging with the *KAS for Mathematics*, either:

- A device with access to the *KAS for Mathematics*
- (Optional) A hard copy of the *KAS for Mathematics*

Any participant materials specific to individual module sections will be listed prior to that section within the Facilitator's Guide. Facilitators should consider how participants will access the session materials. Facilitators may choose to print copies of the materials provided or have participants print their own copies. If participants are responsible for printing their own copies, please specify that and provide necessary links within the invitation to the work session.

Community Building

Building a community is important for any group that will work together, especially if participants have not worked together before. The concept is the same as building a safe, respectful, productive classroom climate. Incorporating community-building into each session builds trust, shows participants they are valuable as individuals and engages them in the learning process. It is also useful for creating a professional learning network where participants can be supported in their work. Community-building can be as simple as allowing participants to introduce themselves and their role in the school/district, developing or refining group norms, allowing for questions and/or the sharing of answers to reflection questions or individual discovery task items included throughout Module 1. Time allotted for community-building will allow participants to have a voice and be engaged as active contributors and learners in the sessions. Throughout this module suggestions for developing community among participants will be embedded, however facilitators should certainly feel free to personalize these strategies to make them more authentic.

Section 1A: Revision Process Overview

The *KAS for Mathematics* were adopted in 2019. Facilitators wishing to explore the standards revision process more deeply should access Section 1A, as an Appendix.

Section 1B: Understanding the Architecture

Preparation

Participants should all have access to the *KAS for Mathematics.*

Print Materials Needed:

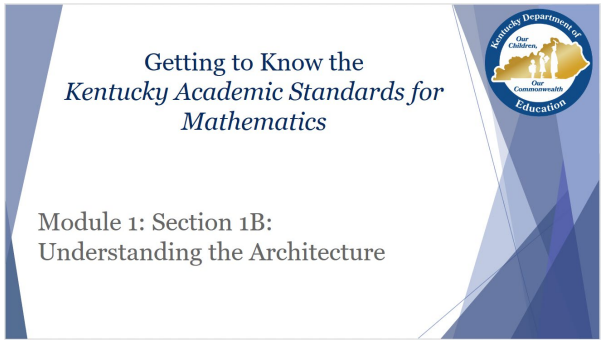
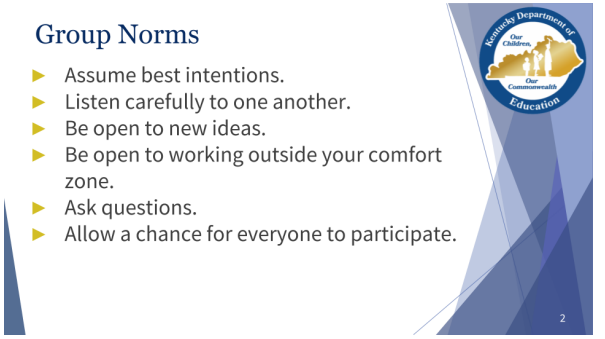
As the facilitator you can print copies of the materials at the links provided or have participants print their own copies. If participants are responsible for printing their own copies, please specify that and provide necessary links within the invitation to the work session. Ensure that you have enough copies of the following documents within each work session.

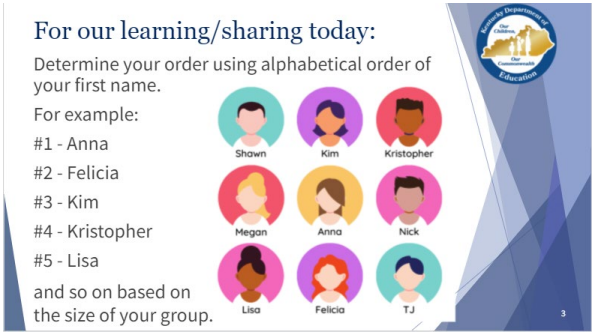
- Handout: K-5 Grade Level Overviews (optional)
- Handout: 6-8 Grade Level Overviews (optional)
- Handout: HS Conceptual Category Overviews (optional)

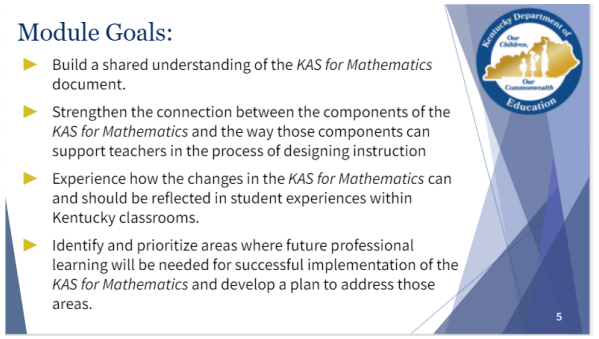
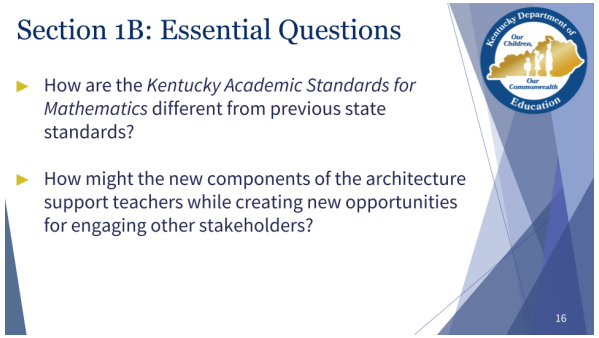
Posters to Make Ahead of Time:

- Issues Bin Poster (Optional):
  - Consider whether an in-person option (such as a poster) or an online version (such as a Google doc) might work best for your participants. A poster can just be labeled “Issues Bin”. The Issues bins can be used by the participant to note ideas, questions or issues constructively while the class continues to focus on an activity or lesson.
- Affinity Diagram Posters:
  - Consider whether an in-person option (such as the posters described here) or an online version (such as a Google doc, Jamboard, Padlet, etc.) might work best for your participants. Five posters, each labeled with one of the five stakeholder groups listed (Teachers, Administrators, Parents, Students, Citizens) should be posted in places easily accessible by participants.

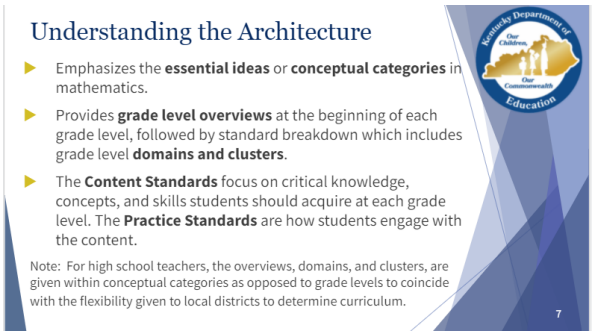
The following facilitator notes are intended as a companion to the Getting to Know the *KAS for Mathematics* PowerPoint slides.

Facilitator Notes	Accompanying Slide
Officially welcome the participants. ***Note: Participants may wonder why the presentation starts with Section 1B. Feel free to provide access to the information related to the standards revision process if needed.***	**Slide 1** 
NOTE: If participants make changes to this slide in this session, you will need to update this slide in future sections of the module to reflect those changes moving forward. *Ask if anyone would like to add other suggestions to the group norms. If you revise group norms within the session, that should be reflected across the slides within the remainder of the module. Depending on how facilitators envision this module work moving forward, it might be valuable to consider how to tailor these norms to the specific group of educators the facilitator will be working with on a continual basis. This 3.5 minute video references group norms that are really a list of qualities the group is willing to commit to as each day. The suggested group norms will likely apply across participant groups, but there is value in building community by inviting participants to provide input into those norms - especially for participants who will be meeting regularly. Co-creating group norms may help create community within and across school/district participants.* **Explain:** "Group norms can help to create a safe space where participants feel comfortable sharing their ideas and experiences. Take a moment to read the norms. *(Pause to review norms)* I realize you may not want to pose every question to the whole group, or we may not have time in the session to get to every question. Therefore, I want us to have a place to address those issues.	**Slide 2** 

Introduce participants to the Issues Bin, which provides participants with a safe way of asking questions or suggesting ideas. The Issues bin can be used by the participant to note ideas, questions, or issues constructively while the other attendees continue to focus on an activity or lesson. Participants should feel free to add to the Issues Bin throughout the module. Some issues may be answered in future sections of the module. If the question is pressing and doesn't appear to be addressed in the sections of Module 1, you may email questions/feedback to standards@education.ky.gov.	
Explain: "We want to take a moment to really engage with one another and take stock of where we are now. While there may be different levels of familiarity throughout the participants today, one of the great things about learning is that there is always more to learn - and that applies to learning about one another. It is no small thing this opportunity in front of us - to both learn **from** one another and offer our perspective/expertise **to** one another. So, let's make the most of it together. For this discussion and others throughout the day, we will use a round-robin style based on your number within your small group. Within your small group, use alphabetical order to determine your number as shown on the slide above. Make a note of your number as our discussions may start with different numbers at different points within our learning."	**Slide 3** 
Facilitators may provide cards for participants to utilize. Another option is to have participants scan the QR code with the camera on their phones. A simple deck of cards should open. **Explain:** "Before looking ahead to where we are going, there is value in looking at where we have been. Our experiences in and out of the classroom have shaped the perspectives we will share with one another throughout our learning together. Let's begin by sharing a little bit about this past year with one another. To direct our discussion, we will be using cards. If you have some handy, certainly feel free to use them. If not, if you scan the QR code with the camera on your phone it should open a simple deck of cards. To ensure a variety of cards, participants may need to click "Shuffle" a couple of times. Then tapping on the deck should make the top card appear. Based on the suit, share your perspective on this year:	**Slide 4** 

• Hearts: What is something you tried in your classroom this year for the first time? How did it go? • Diamonds: What is one way you grew professionally this year? • Spades: Who amongst your colleagues was helpful to you? Why? • Clubs: In what ways were you helpful to your colleagues this year? We will discuss in a round-robin style, allowing each participant about 1 minute to share." *Set a timer to allow for about 1 minute of sharing per person within each group.*	
Explain: Throughout Module 1, the goals are for us to: • Build a shared understanding of the *KAS for Mathematics* document. • Strengthen the connection between the components of the *KAS for Mathematics* and the way those components can support teachers in the process of designing instruction • Experience how the changes in the *KAS for Mathematics* can and should be reflected in student experiences within Kentucky classrooms. • Identify and prioritize areas where future professional learning will be needed for successful implementation of the *KAS for Mathematics* and develop a plan to address those areas."	**Slide 5** 
Explain: "Today, we will look at the architecture of the standards in order to build a shared understanding of the *KAS for Mathematics*. Outside of revisions to the mathematical standards themselves, one of the major changes you'll note is with the architecture of the document. Remember, for the revision team, determining the 'architecture' meant considering: • Clear and succinct components educators will find useful as they plan and design instruction • Clear and succinct components other stakeholders will find useful in supporting the work happening within Kentucky classrooms. • Components that come together to create a cohesive structure within the *KAS for Mathematics*."	**Slide 6** 
Explain: "The *KAS for Mathematics* will look very different from the previous state standards. The organization of the standards directly reflects the charge of Senate Bill 1 (2017) to 'Focus on critical knowledge, skills, and capacities needed for success in a global economy' and to	**Slide 7**

‘Communicate with all stakeholders’. The revision teams reviewed public feedback and considered components of architectures from 15 other states (Oklahoma, Indiana, North Carolina, Massachusetts, New York, Arizona, West Virginia, Colorado, California, Idaho, Iowa, New Jersey, Louisiana, Ohio and Kansas) to develop the architecture you’ll see in the *KAS for Mathematics.* Let’s look at the architecture of the standards and, as we go through, take note of what you see and how it can be useful in aligning your instruction to the standards.”

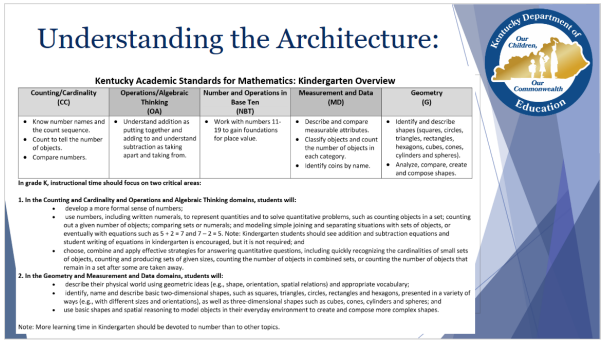


Explain: “Let’s start by locating the overviews for the content standards most relevant to your role. For grades K-8, you’ll be looking at “grade level” overviews. The standards for high school are broken into five “conceptual categories” and high school educators will need to locate each of those five overviews. Take a moment to find and familiarize yourself with the information on the overview pages relevant to your work and consider how this page will be useful to you.”

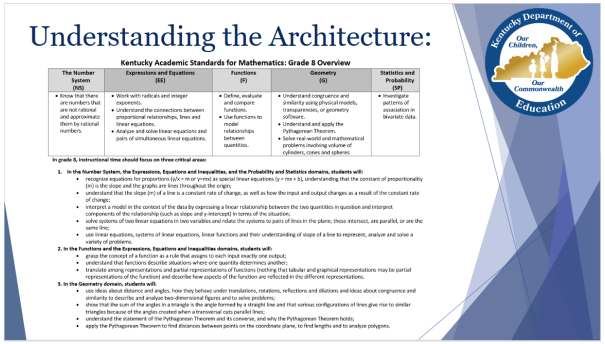
For participants who do not have a way to access the KAS for Mathematics, you may want to have copies of grade level/conceptual categories overviews. Give participants time to look through the document to find the targeted page(s). If participants are having trouble navigating to the pages they are looking for, the locations are provided.

- *If facilitating a group of **elementary** school educators, show slide 8.*
  - *Kindergarten: p. 15*
  - *First Grade: p. 28-29*
  - *Second Grade: p. 44*
  - *Third Grade: p. 59-60*
  - *Fourth Grade: p. 75-76*
  - *Fifth Grade: p. 96*
- *If facilitating a group of **middle** school educators, show slide 9.*
  - *Sixth Grade: p. 115-116*
  - *Seventh Grade: p. 134-135*
  - *Eighth Grade: p. 152*

Slide 8

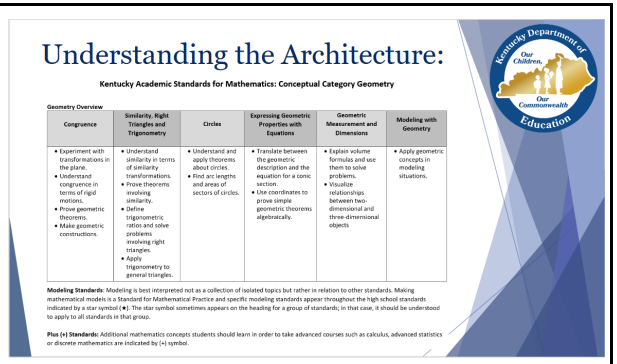


Slide 9



Slide 10

- *If facilitating a group of **high** school educators, show slide 10.*
  - *Number & Quantity: p. 169*
  - *Algebra: p. 180*
  - *Functions: p. 193*
  - *Geometry: p. 207*
  - *Statistics & Probability: p. 226*



Affinity Diagram: *Affinity diagrams can be used by participants to brainstorm information and ideas which are then organized into categories. Ask participants (individually, in pairs or in small groups) to consider how the overviews may be useful to multiple stakeholders. After participants have had time to collaborate and post their ideas, facilitate whole group discussion over the questions. Possible responses might be:*

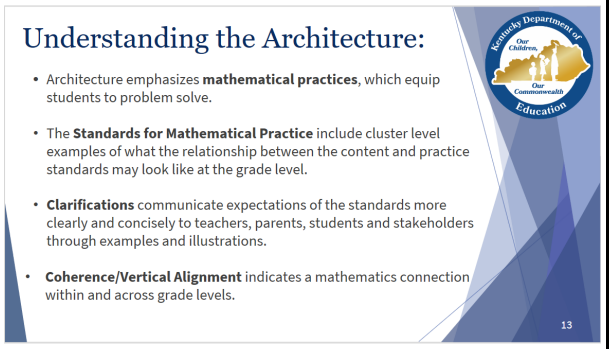
- *For a principal or district leader who may not be an expert on the specific content standards, the overview document provides a snapshot of what he or she might look for in a walk-through or formal observation.*
- *At a parent conference, a parent might be better served by seeing a general overview of how the strands work together instead of processing each of his or her child's grade-level standards.*

Slide 11

This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live. *The facilitator will want to familiarize themselves with where each of the specific components mentioned on the first slide are located within the second slide to highlight each component of the architecture.*

Explain: "Let's continue investigating the components of the *KAS for Mathematics*. One big shift in the architecture of the standards is the emphasis on the Standards for Mathematical Practice (SMPs/MPs). At each cluster level educators will see narratives on how the SMPs might be attended to in conjunction with that mathematical content. It is **CRITICAL** mathematics educators and school/district leaders realize the SMPs **are additional standards** and are part of the state

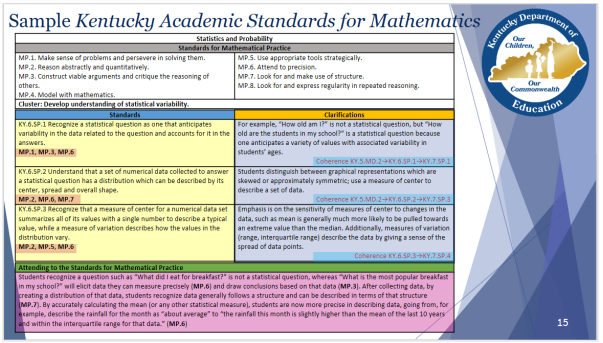
Slide 12



Slide 13

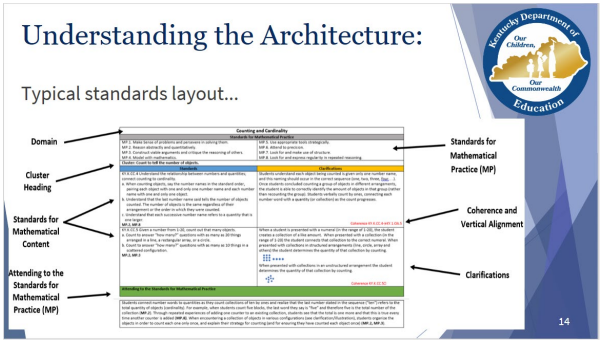
expectations as set forth in the *KAS for Mathematics.* We will take a closer look at the SMPs in Section 1C of this module.

The Clarifications reinforce the goal of Senate Bill 1 (2017) to clearly communicate the expectations of the standards to teachers, parents, students and citizens. The Coherence/Vertical Alignment component will provide additional guidance regarding horizontal and vertical alignment. Section 1E of this module will spotlight the Clarifications & Coherence."



Explain: "A sample layout with the key components labelled can be found on page 10 of the *KAS for Mathematics*."

Slide 14

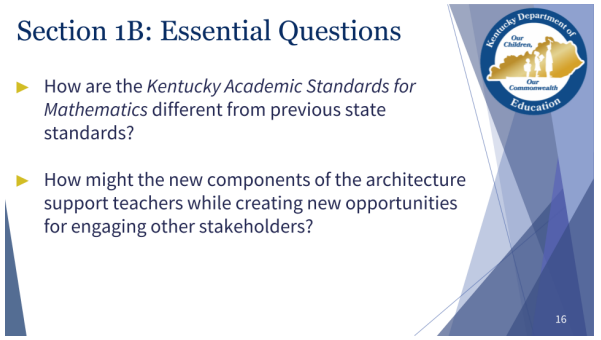


Explain: "Remember, one charge of Senate Bill 1 (2017) was for the standards to "communicate expectations more clearly and concisely to teachers, parents, students and citizens." Let's take a moment to consider how elements of the architecture relate to that statement. Return to your grade level/conceptual categories and take a closer look at the components of the architecture. Brainstorm how the components within each cluster of the standards might be useful for the various stakeholders groups."

Slide 15

Continue adding to the Affinity Diagram: *Ask participants (individually, in pairs or in small groups) to consider how the cluster level organization within the KAS for Mathematics may be useful to multiple stakeholders and add those ideas onto the Affinity Diagram. Once participants have had time to collaborate, facilitate discussion over the questions. Possible responses might be:*

- *Standards for Mathematical Practices*

*Many **teachers** are unfamiliar with the SMPs and will need guidance for how to incorporate them into instruction. The SMPs will give **administrators** insight into experiences students should consistently be having within classroom instruction. The SMPs represent skills that generate capacity within **students** throughout and beyond their K-12 experiences and are the same skills that **employers** will look for in prospective employees.* ● *Clarifications* *The Clarifications will assist **teachers**, especially those new to the profession, in understanding the intent of the standards. For **administrators** who do not have mathematics backgrounds, the Clarifications provide a way to help them better assess the teaching and learning taking place in the classroom. For **parents** and **citizens** without strong mathematical backgrounds, the Clarifications provide a tool that will help them better understand what students are learning. The Clarifications may provide support in crafting **student-friendly** learning targets.* ● *Coherence/Vertical Alignment* *The Coherence/Vertical Alignment piece will be useful for **teachers** and **administrators** as schools/districts align their curriculum to the standards. **Teachers** and **parents** can use the Coherence/Vertical Alignment to provide targeted support for **students** who need additional support.* *This discussion may be great to reference in Section 1G when planning the next steps toward implementing the KAS for Mathematics.*	
Facilitate discussion around the essential questions in order to identify whether participants understand the content of Section 1B. Potential talking points: ● *These standards differ from previous standards in that they intentionally integrate content and practices in such a way that every Kentucky student will benefit mathematically.* ● *There are supports added within the standards to assist various stakeholder groups. Refer to the Affinity Diagram if needed.*	**Slide 16** 

Pulse Check - Make the point that participants aren't expected to be experts on the standards document at this point as the remaining sections of the module will look more closely at the components introduced in Section 1B. Remind participants this is new learning. If you ask, "Do you feel you have a better understanding of the architecture and how specific components can support you in your role?" and participants say "no", offer to send the slides for this section, suggest they review the information found on pages 9-14 of the front matter in the KAS for Mathematics and take time to read/explore the document. If participants have additional questions, record them in the Issues Bin for future reference.

Explain: "The remaining sections of Module 1 concentrate on providing more information around the components of the standards and guidance for considering instructional implications moving forward. In Section 1C we'll take a closer look at the SMPs."

If you plan to continue this work session, skip these slides and proceed to the intro slide for Section 1C: A Closer Look at the Standards for Mathematical Practice.

If this is the end of your current work session, please consider asking participants to provide feedback on their experience so far with the module.

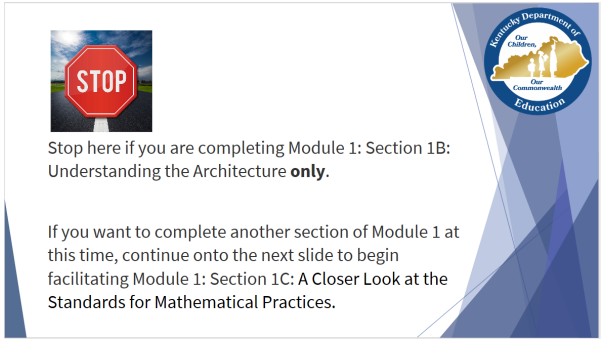
Explain: "The KDE needs your feedback on the effectiveness of this module, the learning platform and how to best support you moving forward. Please complete this short survey to provide the KDE with feedback. Feedback from the surveys will be used by the KDE to plan and prepare future professional learning."

Provide participants with the following links:

- *Participant Module 1 Survey*
- *District/Administrator Version Module 1 Survey*

Slide 17

Slide 18



Section 1C: A Closer Look at the Standards for Mathematical Practice

Session Learning Goal:

- To build a shared understanding of the Standards for Mathematical Practice (SMPs) within the *KAS for Mathematics* and how the components of the architecture provide support to educators working to make connections between the content standards and the practice standards within instruction.

Session Success Criteria:

- Describe the importance of the balance between the content standards and the practice standards within mathematics.
- Clarify the purpose of each component of the architecture related to the SMPs within the *KAS for Mathematics*.
- Identify what integrating the SMPs might look like when implementing grade level tasks.

Preparation

Participants should all have access to the *KAS for Mathematics.*

Print Materials Needed:

As the facilitator you can print copies of the materials at the links provided or have participants print their own copies. If participants are responsible for printing their own copies, please specify that and provide necessary links within the invitation to the work session. Ensure that you have enough copies of the following documents within each work session.

- Participants may benefit from having hard copies of the following materials in order to capture their rough draft thinking throughout the session:
  - Engaging the SMPs: Look fors & Question stems
- **Discovery Task - SMP Task Matchup:** Facilitators will need to consider whether they plan to engage participants in the activity using the physical task cards or using Desmos.
  - For sessions engaging with the physical task cards, facilitators will need to:
    - Print enough copies of each of the grade level task cards for the groups of participants in the session.
    - Print a Participant Guide page for each participant.
    - Have sets of the Facilitator's Guide pages to share with groups upon completing the SMP Task Match Up. Ensure these are not shared with participants prior to them matching up the tasks themselves to ensure none of the thinking is taken away.

        - Kindergarten SMP Task Matchup
        - Grade 1 SMP Task Matchup
        - Grade 2 SMP Task Match up
        - Grade 3 SMP Task Match up
        - Grade 4 SMP Task Matchup
        - Grade 5 SMP Task Matchup
        - Grade 6 SMP Task Matchup
        - Grade 7 SMP Task Matchup
        - Grade 8 SMP Task Matchup
        - High School SMP Task Matchup Set 1
        - High School SMP Task Matchup Set 2
    - For sessions engaging with the virtual task cards via Desmos, facilitators will need to:
        - Determine how to share the Desmos link or activity code with participants.
        - Consider whether you might want to select the "pacing" options to ensure participants engage in discussion prior to reviewing the Facilitator Notes slides for the tasks.
        - Consider roles for co-facilitators within the teacher dashboard.

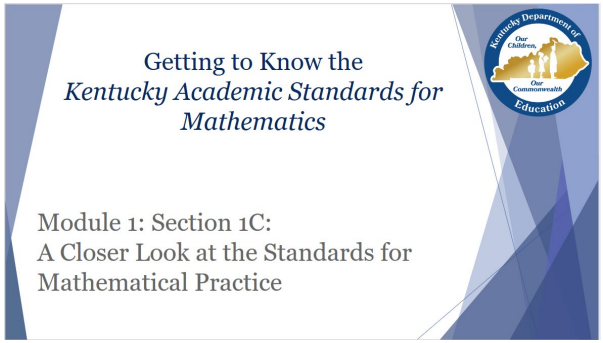
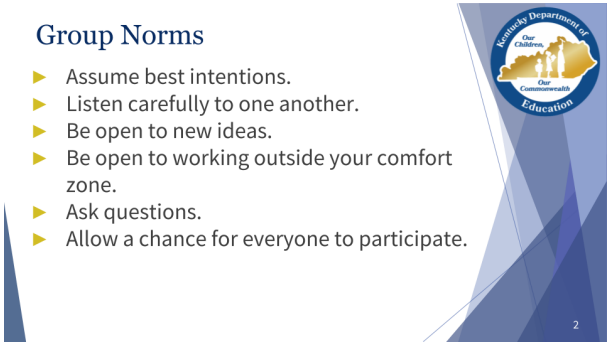
- Optional Extended Learning Opportunities:
    - SMP Task Reflection:
        - Facilitators planning to engage participants in the SMP Task Reflection should communicate prior to the session the expectation that participants bring a sample task/lesson from their classroom to the work session.
    - Attending to the SMPs Participant Guides:
        - Kindergarten Attending to the SMPs Fill-In
        - Grade 1 Attending to the SMPs Fill-In
        - Grade 2 Attending to the SMPs Fill-In
        - Grade 3 Attending to the SMPs Fill-In
        - Grade 4 Attending to the SMPs Fill-In
        - Grade 5 Attending to the SMPs Fill-In
        - Grade 6 Attending to the SMPs Fill-In
        - Grade 7 Attending to the SMPs Fill-In
        - Grade 8 Attending to the SMPs Fill-In

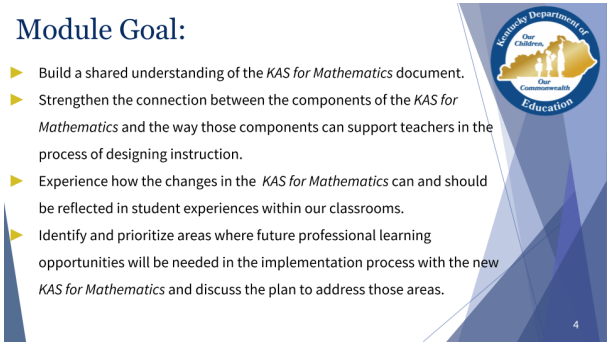
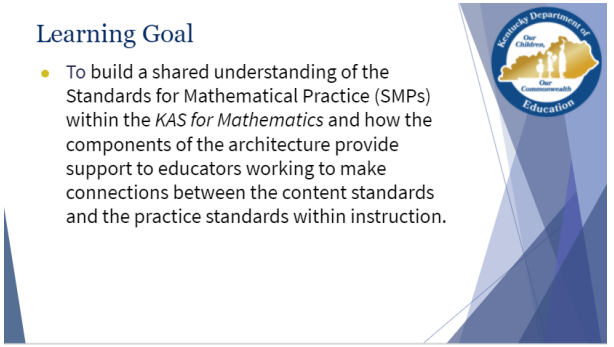
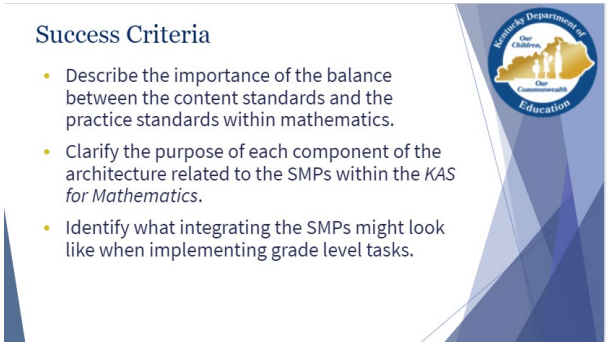
- High School Algebra Attending to the SMPs Fill-In
- High School Functions Attending to the SMPs Fill-In
- High School Geometry Attending to the SMPs Fill-In
- High School Statistics and Probability Attending to the SMPs Fill-In

Posters to Make Ahead of Time:

- Issues Bin Poster (Optional):
  - Consider whether an in-person option (such as a poster) or an online version (such as a Google doc) might work best for your participants. A poster can just be labeled “Issues Bin”. The Issues bins can be used by the participant to note ideas, questions or issues constructively while the class continues to focus on an activity or lesson.

The following facilitator notes are intended as a companion to the Getting to Know the *KAS for Mathematics* PowerPoint slides.

Facilitator Notes	Accompanying Slide
If facilitating Section 1C at the same time as Section 1B, explain: "Continuing through Module 1, Section 1C focuses on how the Standards for Practice are included and supported within the *KAS for Mathematics*." **If facilitating Section 1C at a different time from Section 1B...** *Officially welcome the participants.*	**Slide 19** 
NOTE: Any changes to group norms made during previous sessions should be reflected here. **Explain:** "Group norms can help to create a safe space where participants feel comfortable sharing their ideas and experiences. Take a moment to read the norms. *(Pause to review norms)* I realize you may not want to pose every question to the whole group, or we may not have time in the session to get to every question. Therefore, I want us to have a place to address those issues. *Introduce participants to the Issues Bin, which provides participants with a safe way of asking questions or suggesting ideas. The Issues bin can be used by the participant to note ideas, questions, or issues constructively while the other attendees continue to focus on an activity or lesson. Participants should feel free to add to the Issues Bin throughout the module. Some issues may be answered in future sections of the module. If the question is pressing and doesn't appear to be addressed in the sections of Module 1, you may email questions/feedback to standards@education.ky.gov.*	**Slide 20** 
Explain: Throughout the work sessions in Module 1, the goals are for you to: ● Build a shared understanding of the *KAS for Mathematics* document.	**Slide 21**

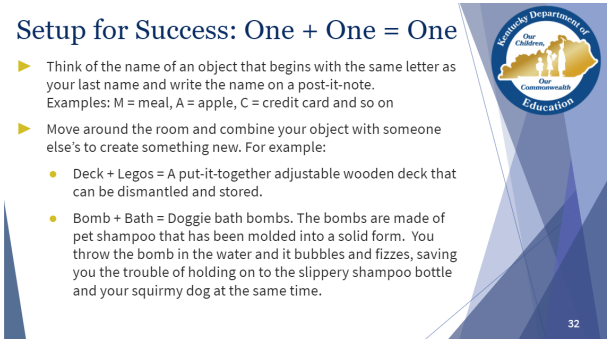
• Strengthen the connection between the components of the *KAS for Mathematics* and the way those components can support teachers in the process of designing instruction • Experience how the changes in the *KAS for Mathematics* can and should be reflected in student experiences within Kentucky classrooms. • Identify and prioritize areas where future professional learning will be needed for successful implementation of the *KAS for Mathematics* and develop a plan to address those areas. Within today's session we are going to focus on developing a deep understanding of the Standards for Mathematical Practice (SMPs/MPs) within the *KAS for Mathematics."*	
Explain: "Today we will be building a shared understanding of the SMPs/MPs within the *KAS for Mathematics* and how the components of the architecture provide support to educators working to make connections between the content standards and the practice standards within instruction."	**Slide 22** 
Explain: "We will know this part of our time together has been successful if we are able to: • Describe the importance of the balance between the content standards and the practice standards within mathematics. • Clarify the purpose of each component of the architecture related to the SMPs within the *KAS for Mathematics.* • Identify what integrating the SMPs might look like when implementing grade level tasks. We can think of these success criteria as "souvenirs" we are able to carry with us throughout our learning journey."	**Slide 23** 
Setup for Success: One + One = One	**Slide 24**

Explain: "We know that mathematically One + One = Two. However, if we think outside the box, when you add one concept to another, they make one concept not two. One + One = One involves bringing together ideas that serve very different needs or interests to form a new concept. This technique can produce some silly results, but hopefully it gives you a chance to think outside of the box. Consider how readily we understand verbal combinations such as 'conference call' or 'home page'. Later in this section, you'll apply that outside of the box thinking and to how you plan and implement instruction. You'll be asked to take tasks designed to align to one SMP and determine how, through intentional focus on language and questioning, the task could be revised to align with a different SMP."

To engage participants in One + One = One, have participants think of the name of an object beginning with the same letter as their last name (for example, M=meal, A=apple, C=credit card, D=diamond and so on) and write that name on a sticky note. Now ask the participants to move around the room and combine their object with someone else's to create something new. For example,

- *Deck + Legos = A put-it-together adjustable wooden deck that can be dismantled and stored.*
- *Bomb + Bath = Doggie bath bombs. The bombs are made of pet shampoo that has been molded into a solid form. You throw the bomb in the water and it bubbles and fizzes, saving you the trouble of holding on to the slippery shampoo bottle and your squirmy dog at the same time.*

One + One = One provides a platform to develop within educators a willingness to think differently and intentionally about how they design tasks and ask questions.



This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live.

If participants have accessed the KAS for Mathematics, the facilitator will need to make sure they are not accessing the standards (or resources listing the practices) at the time of this activity.

Explain: "While the SMPs are consistent with the previous standards, educators throughout the state have had various amounts of support relating to implementation. How well do you know the 8 SMPs? Work individually or with a partner to see how many of the mathematical practices you can list. This is a pre-assessment for your purposes only. We will not be sharing this whole group. Consider where you are in your current understanding of the SMPs so we can note progress as we move forward."

Give participants time (about 1-2 minutes) to try to list the 8 SMPs before proceeding through the animations to allow participants to self-check. Facilitate discussion around this task. Remind participants who found this task difficult or uncomfortable, they have not developed comfort with these, ***yet****. We encourage students to be patient as learners and demonstrate a growth mindset. Teachers should recognize this opportunity to self-reflect. Identifying areas of growth can empower educators to be proactive in addressing those areas moving forward. Since the SMPs are not new, some participants will have had a lot of training/support, but other participants may not have had any training/support. This activity should give facilitators an idea of the participants familiarity with the SMPs, informing how quickly to progress through this session.*

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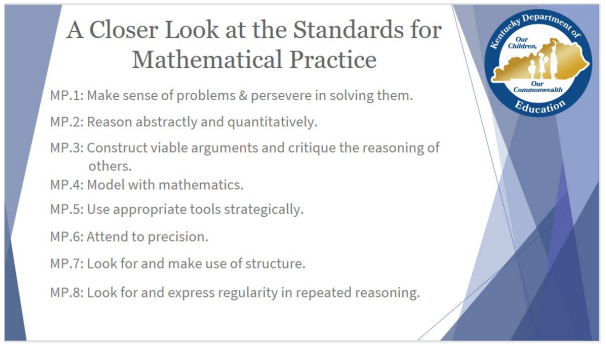
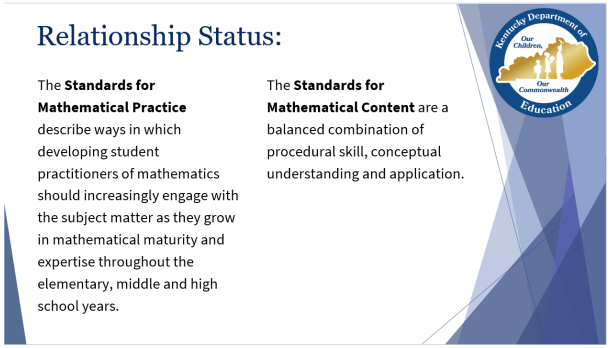
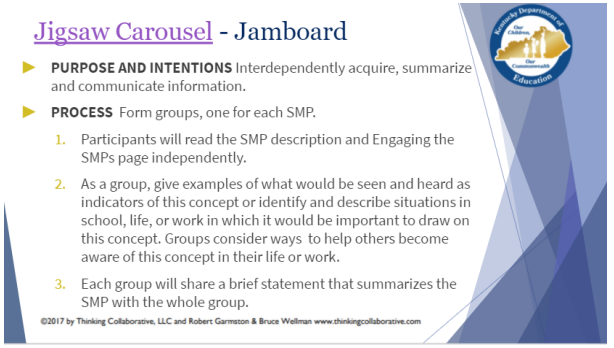
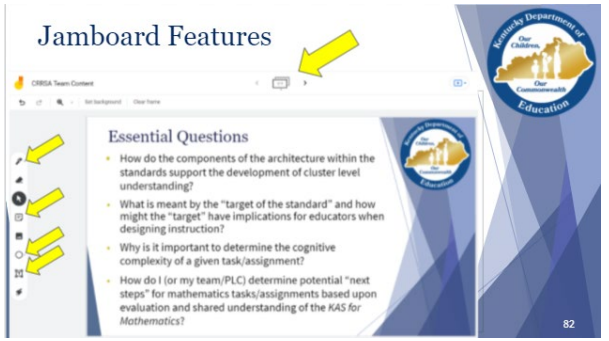
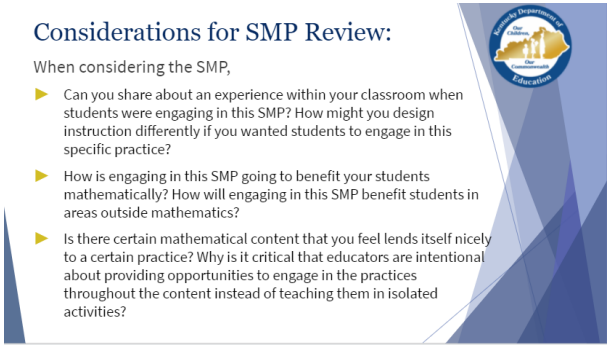


Explain: "In order to understand the purpose and function, we must first understand how the practice standards are different from the content standards. • The Standards for Mathematical Practice describe ways in which developing student practitioners of mathematics should increasingly engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years. • The Standards for Mathematical Content are a balanced combination of conceptual understanding, procedural skill/fluency and application. Students who lack understanding of a topic may rely on procedures too heavily and may be less likely to consider similar problems, represent problems coherently, justify conclusions, apply mathematics to practical situations, use technology mindfully, and explain the mathematics accurately to other students, step back for an overview and/or deviate from a known procedure to find a shortcut. In short, **a lack of understanding can prevent a student from engaging in mathematical practices**. The way students engage in mathematics is determined by the learning experiences in which they can participate. Thus, the design of those learning experiences (the questions asked, the strategies/representations used, the discussion embedded within the experience, etc.) all impact how students engage with the content. Educators might be able to engage students with the content using several (potentially even all) of the practices, but the intentional choices made throughout the lesson planning and facilitation will determine which practices the students actually engage in."	**Slide 26** 
Explain: "One reason the standards revision team embedded so much support around the SMPs within the *KAS for Mathematics* was rooted in the understanding that educators across the state would be bringing various amounts of prior learning the practices to the standards implementation process. Some may have worked extensively with the SMPs and others may not be very familiar with them at all. Please understand you all have valuable perspectives for how to approach attending to the SMPs with your students. In a moment, we are going to participate in a Jigsaw Carousel via a Jamboard. Each group will begin by reading the SMP description and	**Slide 27**

the page of the *Engaging the SMPs: Look fors & Question stems* resource that pertains to a mathematical practice which have been copied onto Jamboard frames. Look for anything that speaks to you about how that practice contributes to teaching and learning mathematics. Feel free to annotate, highlight or underline key ideas within each description that might be useful in your work to align instruction or assessments to the SMPs. Be sure to select someone from your group to share a summary of your conversation around you MP." *Facilitators should place participants in 8 groups, assigning each group one MP to explore deeply. Consider how to track which group is working with which SMP.* *Jamboard - Facilitators will want to share the link from their copy with participants. If participants are unfamiliar with Jamboard, facilitators may need to utilize slide 37.*	
Depending on how familiar participants are with Jamboard, this slide may be skipped. This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live. **Explain:** "For those unfamiliar with using Jamboard, let's look at a couple of the features. The pages within a Jamboard are "frames". The left and right arrows at the top of the page will allow you to move forward and backward in the frames. There are several different ways to demonstrate thinking within a Jamboard, the methods most likely to be utilized within this activity are pen (marker, highlighter and brush), the sticky note, the shapes option and the text box. These options will allow you to indicate your thinking on the frame for your group."	**Slide 28** 
Explain: "For now, we'll take a few moments to consider the SMP: • Can you share about an experience within your classroom when students were engaging in this SMP? How might you design instruction differently if you wanted students to engage in this specific practice? • How is engaging in this SMP going to benefit your students mathematically? How will engaging in this SMP benefit students in areas outside mathematics? • Is there certain mathematical content that you feel lends itself nicely to a certain	**Slide 29**

practice? Why is it critical that educators are intentional about providing opportunities to engage in the practices throughout the content instead of teaching them in isolated activities?"

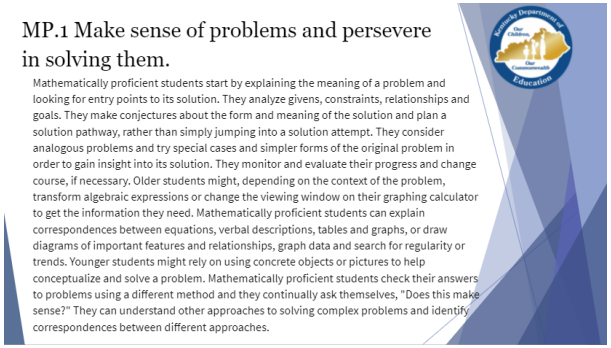
Allow participants time to read the descriptions of the SMP independently, then offer space for them to process with a partner/in small groups. If meeting online, participants could briefly pop into a breakout room for a discussion. Once participants have had time to discuss and prepare their sharing, facilitators should invite participants to share (MP.1 - MP.8) as a whole group.

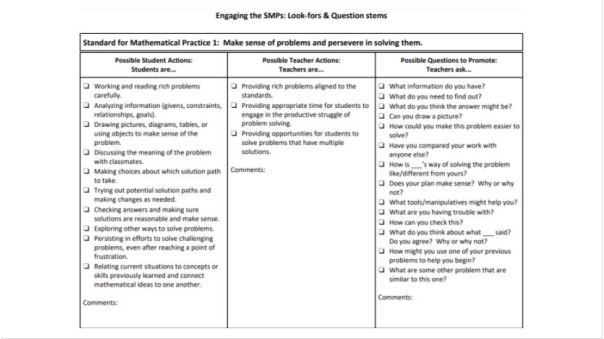


Slides 30 - 45

These slides are here for facilitators in the event they want to reference something within the discussion/sharing throughout this activity or the upcoming activity within this session. If facilitators would prefer to display the Jamboard frames throughout the discussion, slides 30 - 45 can be skipped.

SMP Description from *KAS*	Page of Engaging the SMPs Support
Slide 30	**Slide 31**
Slide 32	**Slide 33**




Engaging the SMPs: Look-fors & Question stems

Standard for Mathematical Practice 1: Make sense of problems and persevere in solving them.

Possible Student Actions: Students are...	Possible Teacher Actions: Teachers are...	Possible Questions to Promote: Teachers ask...
❑ Working and reading rich problems carefully. ❑ Analyzing information (givens, constraints, relationships, goals). ❑ Drawing pictures, diagrams, tables, or using objects to make sense of the problem. ❑ Discussing the meaning of the problem with classmates. ❑ Making choices about which solution path to take. ❑ Trying out potential solution paths and making changes as needed. ❑ Checking answers and making sure solutions are reasonable and make sense. ❑ Exploring other ways to solve problems. ❑ Persisting in efforts to solve challenging problems, even after reaching a point of frustration. ❑ Relating current situations to concepts or skills previously learned and connect mathematical ideas to one another. Comments:	❑ Providing rich problems aligned to the standards. ❑ Providing appropriate time for students to engage in the productive struggle of problem solving. ❑ Providing opportunities for students to solve problems that have multiple solutions. Comments:	❑ What information do you have? ❑ What do you need to find out? ❑ What do you think the answer might be? ❑ Can you draw a picture? ❑ How could you make this problem easier to solve? ❑ Have you compared your work with anyone else? ❑ How is ___'s way of solving the problem like/different from yours? ❑ Does your plan make sense? Why or why not? ❑ What tools/manipulatives might help you? ❑ What are you having trouble with? ❑ How can you check this? ❑ What do you think about what ___ said? Do you agree? Why or why not? ❑ How might you use one of your previous problems to help you begin? ❑ What are some other problem that are similar to this one? Comments:

MP.2. Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

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Engaging the SMPs: Look-fors & Question stems

Standard for Mathematical Practice 2: Reason abstractly and quantitatively.

Possible Student Actions: Students are...	Possible Teacher Actions: Teachers are...	Possible Questions to Promote: Teachers ask...
❑ Using mathematical symbols to represent situations. ❑ Taking quantities out of context to work with them (decontextualizing). ❑ Putting quantities back in context to see if they make sense (contextualizing). ❑ Considering units when determining if the answer makes sense in terms of the situation. ❑ Using properties of operations flexibly. Comments:	❑ Providing a variety of problems in different contexts that allow students to arrive at a solution in different ways. ❑ Using think aloud strategies as they model problem solving. ❑ Attentively listening or strategies students are using to solve problems. ❑ Encouraging the flexible use of properties, objects, and solution strategies when solving problems. Comments:	❑ What does the number ___ represent in the problem? ❑ How can you represent the problem with symbols and numbers? ❑ Can you make chart, table or graph? ❑ Can you explain what you've done so far? ❑ Why did you decide to use this method? ❑ Can you think of another method that might have worked? ❑ Is there a more efficient strategy? ❑ Do you think this may work with other numbers? ❑ Have you thought of all the possibilities? ❑ How can you be sure? Comments:

Slide 35

MP.3. Construct viable arguments and critique the reasoning of others.

Mathematically proficient students understand and use stated assumptions, definitions and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students also are able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense and ask useful questions to clarify or improve the arguments.

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Engaging the SMPs: Look-fors & Question stems

Standard for Mathematical Practice 3: Construct viable arguments and critique the reasoning of others.

Possible Student Actions: Students are...	Possible Teacher Actions: Teachers are...	Possible Questions to Promote: Teachers ask...
❑ Making and testing conjectures. ❑ Using counterexamples to explore and support ideas. ❑ Explaining and justifying their thinking using words, objects, and drawings. ❑ Listening to the ideas of others and deciding if they make sense. ❑ Asking useful questions. ❑ Identifying flaws in logic when responding to the arguments of others. ❑ Elaborating with a second sentence (spontaneously or prompted by the teacher or another student) to explain their thinking and connect it to their first sentence. ❑ Talking about and asking questions about each other's thinking, in order to clarify or improve their own mathematical understanding. ❑ Revising their work based upon the justification and elaborations of others. ❑ Comparing two arguments and determine correct or flawed logic. Comments:	❑ Posing tasks that require students to explain, argue, or critique. ❑ Providing many opportunities for student discourse in pairs, groups and during whole group instruction. Comments:	❑ Why or why not? ❑ How do you know? ❑ Can you explain that? ❑ Do you agree? ❑ How is your answer different than ___'s? ❑ What math language will help you prove your answer? ❑ What examples could prove or disprove your argument? ❑ What questions do you have for ___? ❑ How did you test whether your approach worked? ❑ Did you try a method that did not work? Why didn't it work? Would it ever work? Why or why not? ❑ How could you demonstrate a counter-example? Comments:

Slide 37

MP.4. Model with mathematics.

Mathematically proficient students can apply the mathematics they know to solve problems that arise in everyday life. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

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Engaging the SMPs: Look-fors & Question stems

Standard for Mathematical Practice 4: Model with mathematics.

Possible Student Actions: Students are...	Possible Teacher Actions: Teachers are...	Possible Questions to Promote: Teachers ask...
❑ Using mathematical models (i.e. formulas, equations, symbols) to solve problems in the world. ❑ Using appropriate tools such as objects, drawings, and tables to create mathematical models. ❑ Making connections between different mathematical representations (concrete, verbal, algebraic, numerical, graphical, pictorial, etc.) ❑ Checking to see if an answer makes sense within the context of a situation and changing the model as needed. Comments:	❑ Providing opportunities for students to solve problems in real life contexts. ❑ Identifying problem solving contexts connected to student interests. ❑ Encouraging student use of developmentally and content-appropriate mathematical models (i.e. variables, equations, coordinate grids). ❑ Reminding students that a mathematical model used to represent a problem's solution is a 'work-in-progress' and may be revised as needed. Comments:	❑ Can you write a number sentence to describe this situation? ❑ What do you already know about solving this problem? ❑ What connections do you see? ❑ Why do the results make sense? ❑ Is this working or do you need to change your model? ❑ Would it help to create a diagram? Draw a picture? Make a table? ❑ What formula might apply in this situation? Comments:

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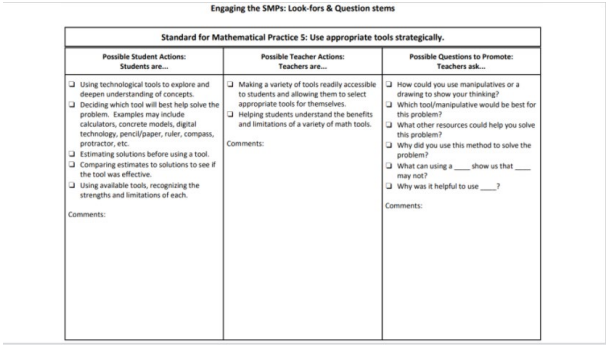
MP.5. Use appropriate tools strategically.

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package or dynamic geometry software. Proficient students are sufficiently familiar with appropriate tools to make sound decisions about when each of these tools might be helpful, recognizing both the potential for insight and limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know technology can enable them to visualize the results of varying assumptions, explore consequences and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.



Engaging the SMPs: Look-fors & Question stems

Standard for Mathematical Practice 5: Use appropriate tools strategically.

Possible Student Actions: Students are...	Possible Teacher Actions: Teachers are...	Possible Questions to Promote: Teachers ask...
❑ Using technological tools to explore and deepen understanding of concepts. ❑ Deciding which tool will best help solve the problem. Examples may include calculators, concrete models, digital technology, pencil/paper, ruler, compass, protractor, etc. ❑ Estimating solutions before using a tool. ❑ Comparing estimates to solutions to see if the tool was effective. ❑ Using available tools, recognizing the strengths and limitations of each. Comments:	❑ Making a variety of tools readily accessible to students and allowing them to select appropriate tools for themselves. ❑ Helping students understand the benefits and limitations of a variety of math tools. Comments:	❑ How could you use manipulatives or a drawing to show your thinking? ❑ Which tool/manipulative would be best for this problem? ❑ What other resources could help you solve this problem? ❑ Why did you use this method to solve the problem? ❑ What can using a ____ show us that ____ may not? ❑ Why was it helpful to use ____? Comments:

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MP.6. Attend to precision.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussions with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, and express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students provide carefully formulated explanations to each other. By the time they reach high school, they can examine claims and make explicit use of definitions.

Engaging the SMPs: Look-fors & Question stems

Standard for Mathematical Practice 6: Attend to precision.

Possible Student Actions: Students are...	Possible Teacher Actions: Teachers are...	Possible Questions to Promote: Teachers ask...
❑ Communicating precisely using clear language and accurate mathematics vocabulary. ❑ Deciding when to estimate or give an exact answer. ❑ Calculating accurately and efficiently, expressing answers with an appropriate degree of precision. ❑ Using appropriate units; appropriately labeling diagrams and graphs. Comments:	❑ Explicitly teaching mathematics vocabulary. ❑ Insisting on accurate use of academic language from students. ❑ Modeling precise communication. ❑ Requiring students to answer problems with complete sentences, including units. ❑ Providing opportunities for students to check the accuracy of their work. Comments:	❑ Did you use or learn any new mathematical words today? What do they mean? ❑ Can you explain what you did to solve the problem? ❑ Compare your answer to ___'s answer. ❑ What labels could you use? ❑ How do you know your answer is accurate? ❑ Did you use the most efficient way to solve the problem? ❑ What if you had started with ___ rather than ___? ❑ What if you could only use ____? ❑ What are the key points or big ideas in this lesson? Comments:

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MP.7. Look for and make use of structure.

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well-remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also are able to shift perspectives. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

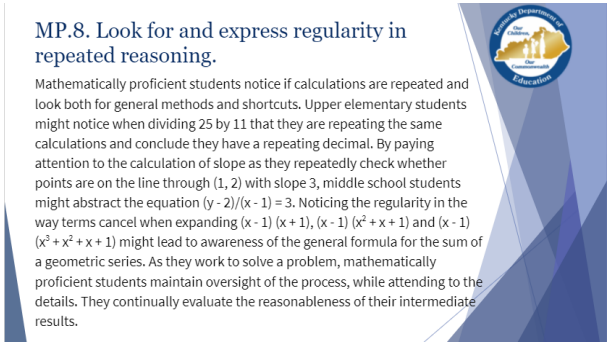
Engaging the SMPs: Look-fors & Question stems

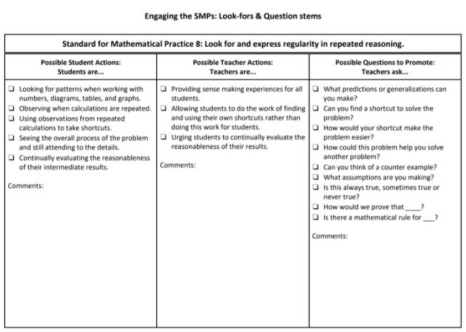
Standard for Mathematical Practice 7: Look for and make use of structure.

Possible Student Actions: Students are...	Possible Teacher Actions: Teachers are...	Possible Questions to Promote: Teachers ask...
❑ Finding structure and patterns in numbers. ❑ Finding structure and patterns in diagrams and graphs. ❑ Using patterns to make rules about math. ❑ Using these math rules to help them solve problems. ❑ Seeing complicated things as single objects or as being composed of several objects. Comments:	❑ Providing sense-making experiences for all students. ❑ Engaging students in discussions emphasizing relationships between particular topics within a content domain or across content domains. ❑ Allowing students to do the work of using structure to find the pattern for themselves rather than doing this work for students. ❑ Providing activities in which students demonstrate their flexibility in representing mathematics in a number of ways. Comments:	❑ Why does this happen? ❑ How is ___ related to ___? ❑ Why is this important to the problem? ❑ What do you know about ___ that you can apply to this situation? ❑ How can you use what you know to explain why this works? ❑ What uses of mathematics can you find in current events? ❑ Can you give an example of ___? ❑ What patterns do you find in ____? How do you know ____ is a pattern? Comments:

Slide 44

Slide 45




Engaging the SMPs: Look-fors & Question stems

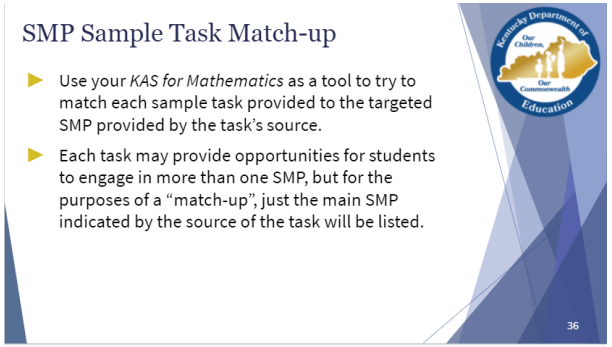
Standard for Mathematical Practice 8: Look for and express regularity in repeated reasoning.		
Possible Student Actions: Students are...	**Possible Teacher Actions: Teachers are...**	**Possible Questions to Promote: Teachers ask...**
❑ Looking for patterns when working with numbers, diagrams, tables, and graphs. ❑ Observing when calculations are repeated. ❑ Using observations from repeated calculations to take shortcuts. ❑ Seeing the overall process of the problem and still attending to the details. ❑ Continually evaluating the reasonableness of their intermediate results. Comments:	❑ Providing sense making experiences for all students. ❑ Allowing students to do the work of finding and using their own shortcuts rather than doing this work for students. ❑ Urging students to continually evaluate the reasonableness of their results. Comments:	❑ What predictions or generalizations can you make? ❑ Can you find a shortcut to solve the problem? ❑ How would your shortcut make the problem easier? ❑ How could this problem help you solve another problem? ❑ Can you think of a counter example? ❑ What assumptions are you making? ❑ Is this always true, sometimes true or never true? ❑ How would we prove that ___? ❑ Is there a mathematical rule for ___? Comments:

Explain: "Now we want to make connections between what the practices are and what the mathematical practices look like "in practice". In order to relate the components provided in the *KAS for Mathematics* regarding SMPs to classroom instruction, you'll have the opportunity to examine sample tasks in order to identify which mathematical practice might be the most closely aligned to each task. Each task might address multiple SMPs (especially if you consider moves you might make facilitating the task instead of just the task itself). As teachers, sometimes our minds tend to gravitate to that line of thinking (how we would structure the task, questions we would ask students, etc.). It is okay if you indicate more than one SMP for each task as you work. Remember, this is part of a larger professional learning experience, NOT a summative assessment on SMP task alignment. This activity provides additional experience using the components of the *KAS for Mathematics* to consider how we engage students in the content AND the practices."

For in person participants, facilitators will want to print the participant portion of the activities linked below. *Each activity includes 8 task cards, a Participant Guide page to capture rough draft thinking and a Facilitator's Guide with a detailed rationale for each match in the set.*

Participants can work independently or within pairs/small groups. Facilitate discussion around the indicated matches (or allowing time for participants to review the rationale pages) ***at the conclusion*** *of this discovery task. Communicate that if participants don't select the indicated SMPs, it does not indicate a "wrong" answer - perhaps participants saw the task serving a*

Slide 46



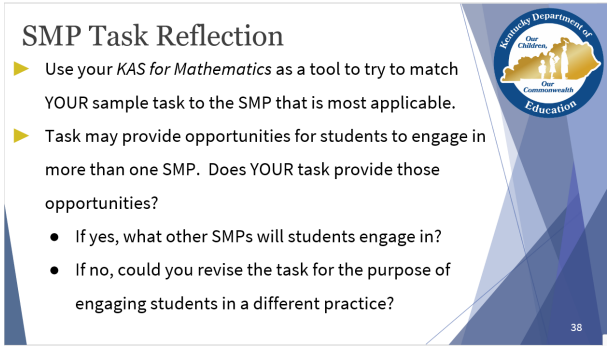
different purpose or being facilitated another way. This provides an additional talking point regarding collaborating within PLCs to review activities and discuss key aspects about the implementation in the classroom, such as questioning, etc. ***Participant Guide: SMP Sample Task Matchup links***	
For in-person/virtual participants, facilitators can provide access to this activity via Desmos. Facilitators utilizing the hard copy of the activity can skip slides 56-57. ***This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live.*** **Explain:** "Participants will need to visit www.desmos.com and select Teacher Sign-Up to create a free account. While we will be participating in the activity as students, in the future you may want to revisit other Desmos activities and it may be valuable to have a Teacher sign in."	**Slide 47** 
Facilitators may have participants join the pre-made course with each grade level SMP Task Matchup preloaded. Facilitators may contact kdemath@education.ky.gov to get access to the activities and the functionality/supports (pacing, feedback, conversation toolkits, etc.) available for Teachers in Desmos. *Step 1: Participants (working independently or in pairs/small groups) enter the code. (Facilitators can also share the link.)* *Step 2: Participants access a specific matchup. Facilitators should direct participants to specific grade level(s) based on facilitator goals for the session.* *Step 3: Work through the Desmos activity. (~20 - 30 minutes) Facilitators should allow participants the opportunity to explore the activity via Desmos while considering ideas to lift up to the whole group.*	**Slide 48** 
Slides 58-59 include options for extending the learning from Section 1C. As these activities are optional, facilitators who are not utilizing these activities with participants should skip slides	**Slide 49**

58-59 and proceed to slide 60.

Optional Extended Learning Activity - SMP Task Reflection: Have participants access the sample task/lesson they were instructed to bring to the work session.

Explain: "Every day around our state educators have to evaluate what instructional materials to employ to help students progress toward a specific goal. Take a moment to consider which SMP **your** task addresses. First, determine your targeted SMP. If you remember, you began this section of the module with the One + One = One exercise. By stretching your creativity to create relationships between items that at first glance were not related, you generated something unique and (potentially) innovative. (*Provide a specific example from the One + One = One activity if needed to remind participants.)* To engage in that practice again, could you adapt your task to more intentionally target a different SMP, maybe one you might not have considered originally but could provide a really unique and (potentially) innovative experience for students?"

Facilitate discussion around the task, the targeted SMP, and how the task could be adapted to engage students in a different practice. Allow participants to share within small groups. Consider ways to elevate ideas from the small group discussions with the whole group.

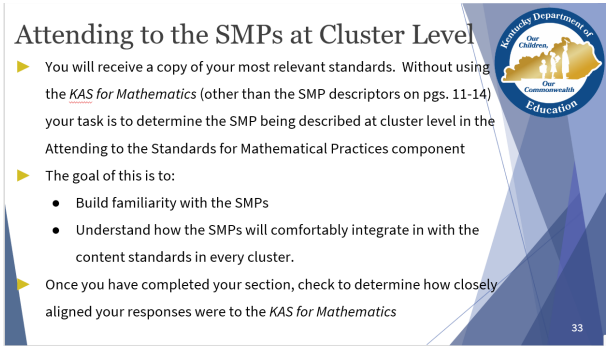


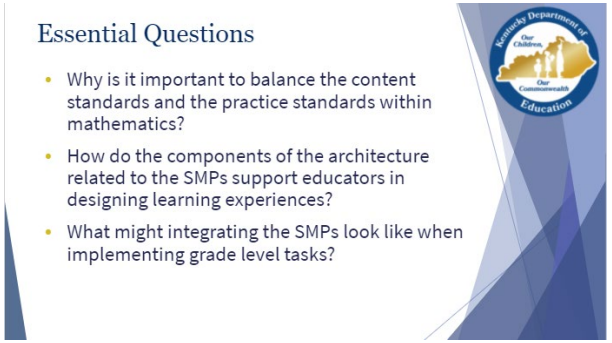
Optional Extended Learning Activity - Attending to the SMPs

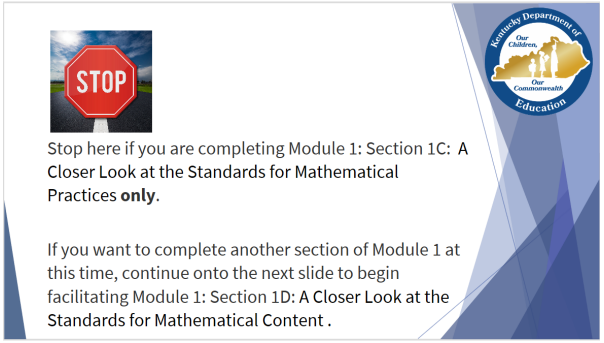
Participants need to be in grade level groups for this task. If participants are completing this activity in isolation the activity is still appropriate, but participants may take away more if given the opportunity to collaborate. This activity will encourage participants to explore the cluster level narratives written in the Attending to the SMPs component for their grade level (or most applicable conceptual category for high school educators).

Explain: "To gain more familiarity and more thoroughly explore how the SMPs might be demonstrated within each cluster, you are going to be tasked with selecting the SMP that is described within the 'Attending to the Standards for Mathematical Practice' section of the

Slide 50



standards. You may use the SMP descriptions found beginning on page 11 of your standards but no sneaking peeks at your grade level standards until you have indicated your thinking on this activity." *Distribute the appropriate documents for this activity. Allow participants to work (individually, in pairs or in small groups) to select the SMP appropriate to the narratives at cluster level. Once participants have experienced this task, encourage them to see how closely their responses matched the KAS for Mathematics. As they go through this activity, encourage participants to take note of the instructional implications that come to mind. Participants may want to consider ways in which they might add on to those cluster level narratives to indicate additional ways to engage students in the SMPs within that content.*	
Facilitate discussion around the essential questions. *Facilitator listen fors:* • *Provide opportunities for all students to cultivate reasoning and problem solving by allowing them to productively struggle* • *Pose questions and problems that prompt students to explain their thinking about the content of the lesson* • *Create conditions for student conversations about each other's thinking*	**Slide 51** 
Explain: "Coming Up Module 1: Section 1D will provide A Closer Look at the Standards for Mathematical Content." *If you plan to continue this work session, skip these slides and proceed to the intro slide for Section 1D: A Closer Look at the Standards for Mathematical Content.* *If this is the end of your current work session, please consider asking participants to provide feedback on their experience so far with the module.*	**Slide 52** 

Explain: "The KDE needs your feedback on the effectiveness of this module, the learning platform and how to best support you moving forward. Please complete this short survey to provide the KDE with feedback. Feedback from the surveys will be used by the KDE to plan and prepare future professional learning." *Provide participants with the following links:* ● *Participant Module 1 Survey* ● *District/Administrator Version Module 1 Survey*	**Slide 53** 

Section 1D: A Closer Look at the Standards for Mathematical Content

Session Learning Goal:

- To learn how the Breaking Down a Standard resource and the Assignment Review Protocol can work together to support instruction around specific standards and to ensure tasks and assignments are aligned to grade level standards.

Session Success Criteria:

- Complete the Breaking Down a Standard resource to build a shared understanding of a standard.
    - Explain and give grade appropriate examples of how the architecture/components of the standards (such as the Clarifications, Coherence/Vertical Alignment, Attending to SMPs) support the development of cluster level understanding.
    - Identify and develop a shared understanding of the "target of the standard" (conceptual understanding, procedural skill/fluency, application)
    - Describe misconceptions that may occur in relation to the standard being explored.
- Complete the Assignment Review Protocol to review and evaluate mathematics tasks.
    - Determine the cognitive complexity of any given task.
    - Determine the level of relevance within a task.
    - Consider potential "next steps" with mathematics tasks based upon evaluation and shared understanding of the *KAS for Mathematics.*

Preparation

Participants should all have access to the *KAS for Mathematics.*

Print Materials Needed:

As the facilitator you can print copies of the materials at the links provided or have participants print their own copies. If participants are responsible for printing their own copies, please specify that and provide necessary links within the invitation to the work session. Ensure that you have enough copies of the following documents within each work session.

- Participants may benefit from having hard copies of the following materials in order to capture their rough draft thinking throughout the session:

- General:
    - Breaking Down a Standard protocol
    - Engaging the SMPs: Look fors & Question stems
    - Assignment Review Protocol
    - Cognitive Complexity
- Specific to elementary participants:
    - Standard KY.4.NF.1
    - Elementary sample task
- Specific to secondary participants:
    - Standard: KY.8.SP.3
    - Secondary sample task
    - High School Mathematics Matrix

- Facilitators should hold the following resources to ensure sharing them with participants doesn't interfere with the learning within the session. Once participants have been able to craft their own thinking around each of the resources, facilitators may consider providing participants with these resources.
    - Specific to elementary participants:
        - Breaking Down a Standard Annotated Grade 4 Sample
        - Assignment Review Protocol Annotated Grade 4 Sample
    - Specific to secondary participants:
        - Breaking Down a Standard Annotated Grade 8 Sample
        - Assignment Review Protocol Annotated Grade 8 Sample

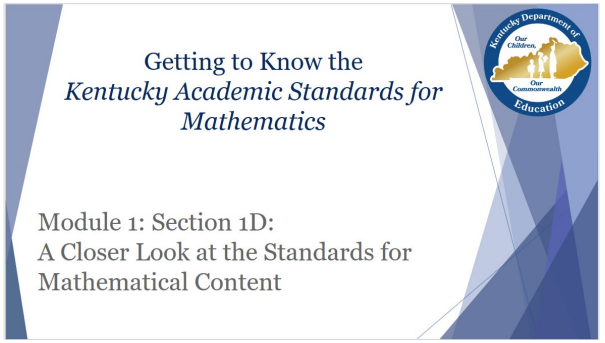
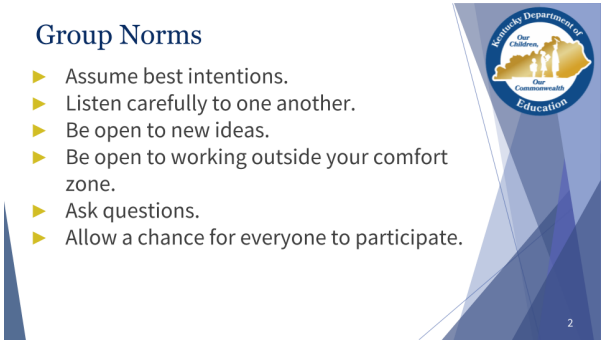
- Optional Extended Learning Opportunities:
    - Connecting with the Content Participant Guides
        - Kindergarten Connecting with the Content
        - Grade 1 Connecting with the Content
        - Grade 2 Connecting with the Content
        - Grade 3 Connecting with the Content
        - Grade 4 Connecting with the Content
        - Grade 5 Connecting with the Content

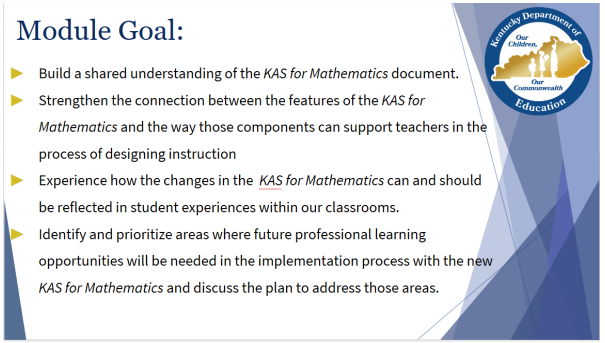
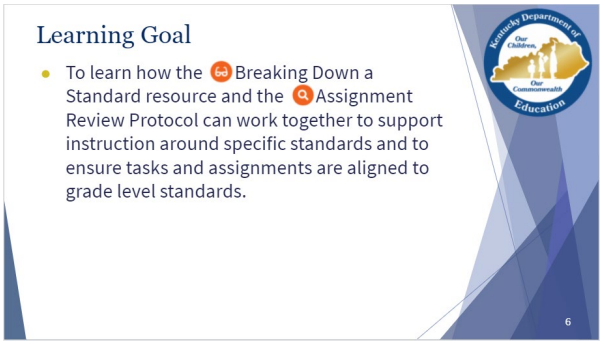
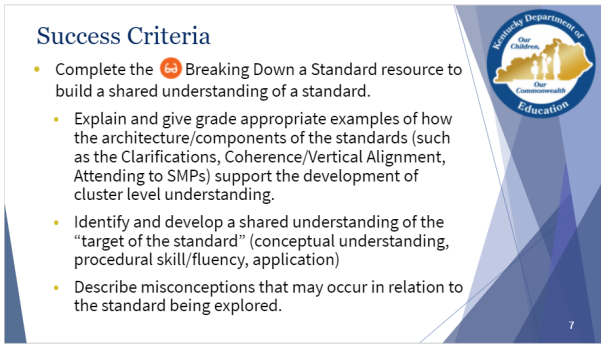
- Grade 6 Connecting with the Content
- Grade 7 Connecting with the Content
- Grade 8 Connecting with the Content
- High School Algebra Connecting with the Content
- High School Functions Connecting with the Content
- High School Geometry Connecting with the Content
- High School Statistics/Probability Connecting with the Content

Posters to Make Ahead of Time:

- Issues Bin Poster (Optional):
  - Consider whether an in-person option (such as a poster) or an online version (such as a Google doc) might work best for your participants. A poster can just be labeled “Issues Bin”. The Issues bins can be used by the participant to note ideas, questions or issues constructively while the class continues to focus on an activity or lesson.

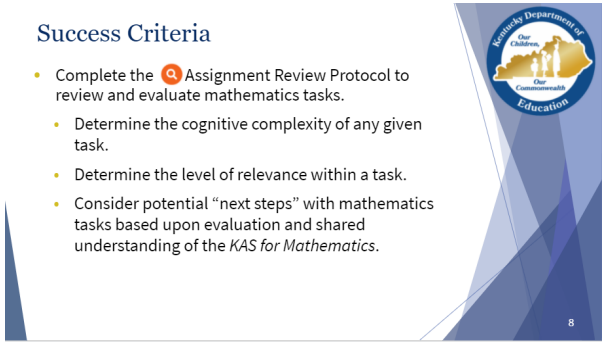
The following facilitator notes are intended as a companion to the Getting to Know the *KAS for Mathematics* PowerPoint slides.

Facilitator Notes	Accompanying Slide
If facilitating Section 1D at the same time as Section 1C, explain: "Module 1 is intended to introduce the new *KAS for Mathematics*. Section 1D takes a closer look at the Standards for Mathematical Content." **If facilitating Section 1D at a different time from Section 1C...** *Officially welcome the participants.*	**Slide 54** 
NOTE: Any changes to group norms made during previous sessions should be reflected here. **Explain:** "Group norms can help to create a safe space where participants feel comfortable sharing their ideas and experiences. Take a moment to read the norms. *(Pause to review norms)* I realize you may not want to pose every question to the whole group, or we may not have time in the session to get to every question. Therefore, I want us to have a place to address those issues. *Introduce participants to the Issues Bin, which provides participants with a safe way of asking questions or suggesting ideas. The Issues bin can be used by the participant to note ideas, questions, or issues constructively while the other attendees continue to focus on an activity or lesson. Participants should feel free to add to the Issues Bin throughout the module. Some issues may be answered in future sections of the module. If the question is pressing and doesn't appear to be addressed in the sections of Module 1, you may email questions/feedback to standards@education.ky.gov.*	**Slide 55** 
Explain: "Throughout Module 1, the goals are to: ● Build a shared understanding of the *KAS for Mathematics* document.	**Slide 56**

• Strengthen the connection between the components of the *KAS for Mathematics* and the way those components can support teachers in the process of designing instruction • Experience how the changes in the *KAS for Mathematics* can and should be reflected in student experiences within Kentucky classrooms. • Identify and prioritize areas where future professional learning will be needed for successful implementation of the *KAS for Mathematics* and develop a plan to address those areas. In this session, participants will look more closely at the standards for mathematical content within the *KAS for Mathematics*."	
Explain: "Today we will be learning how the Breaking Down a Standard and Assignment Review Protocols can work together to support instruction around specific standards and to ensure tasks and assignments are aligned to grade level standards."	**Slide 57** 
Explain: "Our learning together will be successful if we are able to complete the Breaking Down a Standard resource to build a shared understanding of a standard. • Explain and give grade appropriate examples of how the architecture/components of the standards (such as the Clarifications, Coherence/Vertical Alignment, Attending to SMPs) support the development of cluster level understanding. • Identify and develop a shared understanding of the "target of the standard" (conceptual understanding, procedural skill/fluency, application) • Describe misconceptions that may occur in relation to the standard being explored."	**Slide 58** 
Explain: "This part of our learning will be successful if we are also able to complete the Assignment Review Protocol to review and evaluate mathematics tasks. • Determine the cognitive complexity of any given task.	**Slide 59**

- Determine the level of relevance within a task.
- Consider potential next steps for mathematics tasks based upon evaluation and shared understanding of the *KAS for Mathematics*.

These success criteria serve as "souvenirs" we are able to carry with us throughout the rest of our learning journey."



Facilitators should consider ways participants will engage with one another. For virtual learning sessions, consider utilizing breakout rooms to facilitate small group sharing.

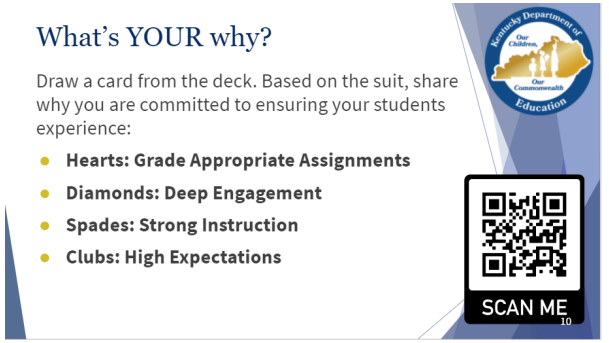
Explain: "Let's take a moment to engage with the other "passengers" on our learning journey. While there may be different levels of familiarity among the participants today, one of the great things about learning is there is always more to learn - and that applies to learning about one another. It is no small thing this opportunity in front of us - to both learn **from** one another and offer our perspective/expertise **to** one another. So, let's make the most of our time together. For this discussion and others throughout the day, we will share round-robin style based on your number within your small group. Within your small group, use alphabetical order to determine your number as shown on the slide above. Make a note of your number as our discussions may start with different numbers at different points within our learning."

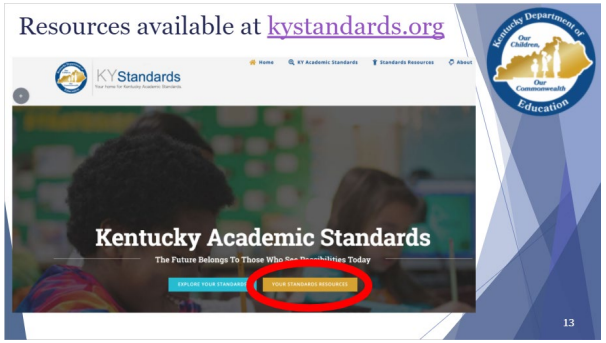
Slide 60

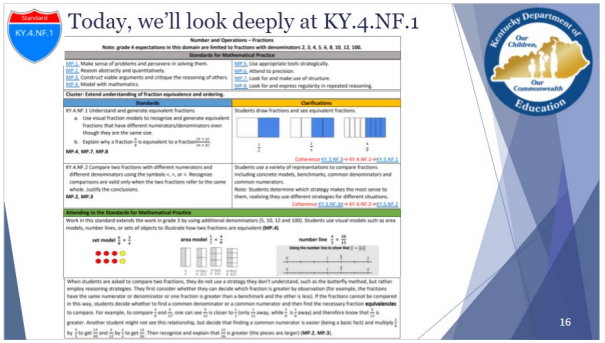
Facilitators may provide cards for participants to utilize. Another option is to have participants scan the QR code with the camera on their phones. A simple deck of cards should open. To ensure a variety of cards, participants may need to click "Shuffle" a couple of times. Then tapping on the deck should make the top card appear. Allow for 1 minute per person for sharing within groups.

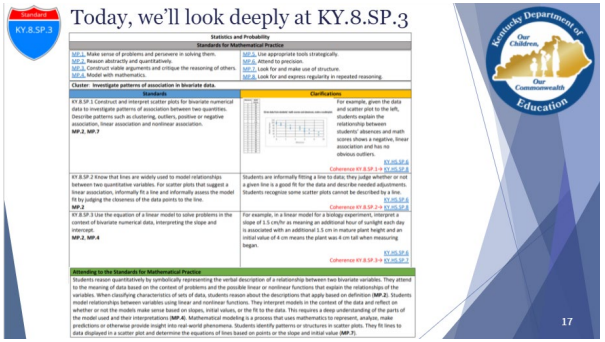
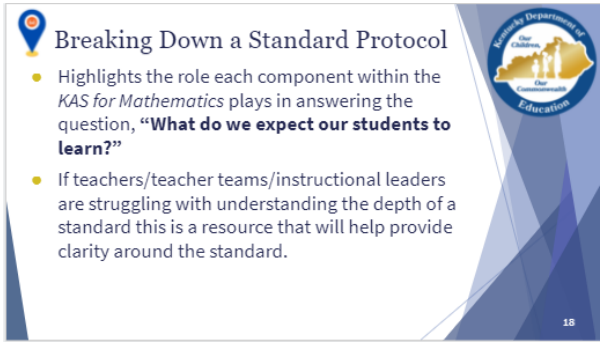
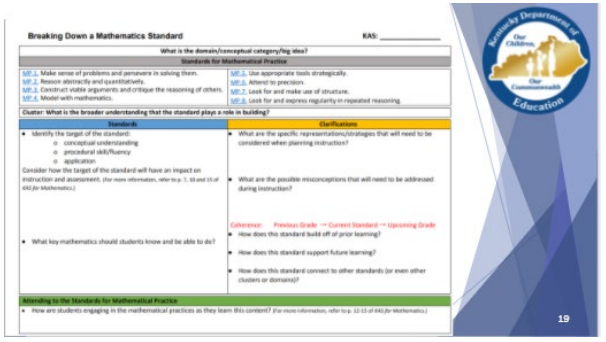
Explain: According to TNTP's Opportunity Myth, "greater access to the grade-appropriate assignments, strong instruction, deep engagement and teachers who hold high expectations can and does improve student achievement - particularly for students who start the school year behind". In considering the interconnected nature of the four commitments mentioned, it

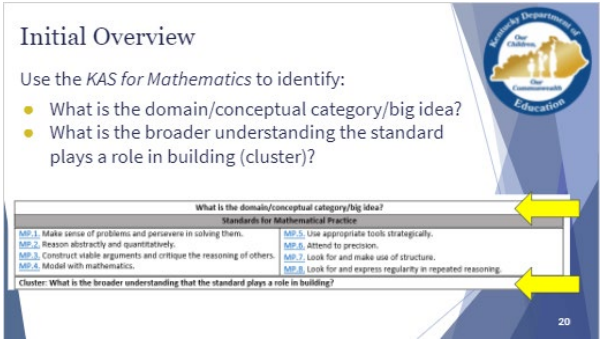
Slide 61



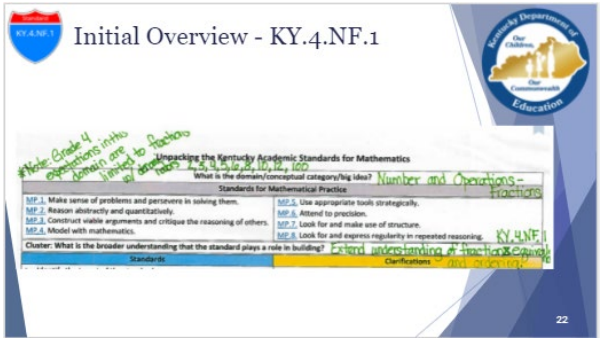
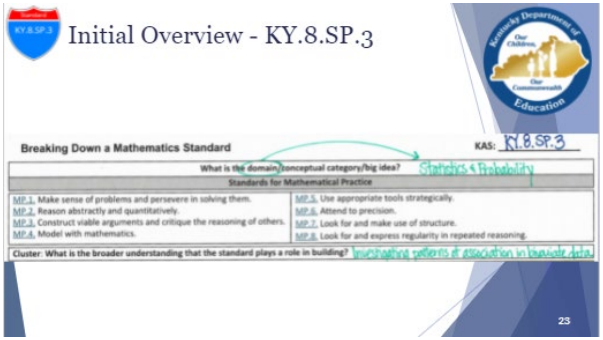
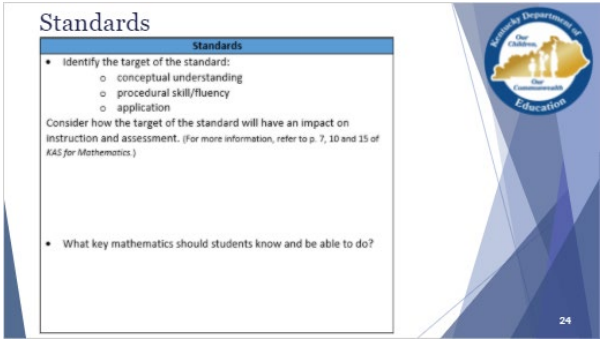
becomes evident that, while teacher clarity has always had a significant impact on student success, it is perhaps even more valuable now in considering how to address the current challenges schools face. For teachers, whose daily choices influence students' outcomes in the most visible ways, it is evident that clarity around the *KAS for Mathematics* is central to achieving "what is best for Kentucky students". As we prepare to take an in-depth look at the standards for mathematical content, we want to know "What's YOUR why?" Based on the suit, share why you are committed to ensuring your students experience: • Hearts: Grade Appropriate Assignments • Diamonds: Deep Engagement • Spades: Strong Instruction • Clubs: High Expectations."	
Explain: "The resources referenced throughout today's session can be accessed via kystandards.org. To subscribe to kystandards.org click on the gray plus sign on the left side of the page. Providing your email ensures you will be notified as new resources to support standards implementation are released. We will spend our time in the Standards Resources section for Mathematics." *Facilitators might pause to allow participants to access the website and subscribe. Materials are pictured on the slides but having access to the resources may help participants process.*	**Slide 62** 
Explain: "Specifically, within the Mathematics Standards resources page, we will be accessing the *KAS for Mathematics*, the Breaking Down a Standard resource and the Assignment Review Protocol."	**Slide 63** 

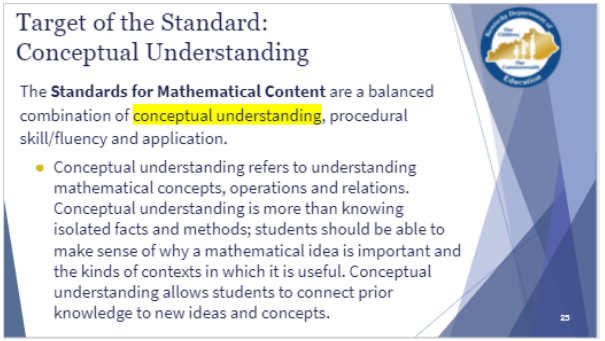
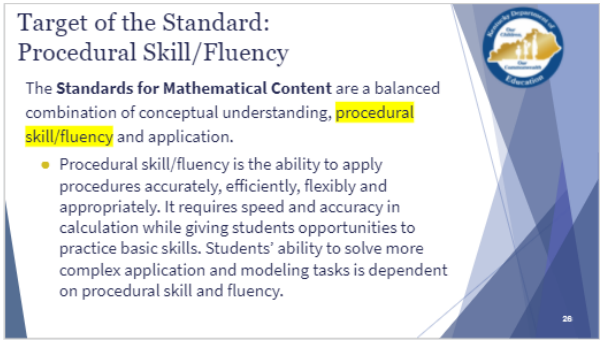
Explain: "To remain grounded in the *KAS for Mathematics* throughout our exploration today, we are going to essentially "live in" one standard together." *Facilitators should tailor the exploration of these resources to the audience. Throughout this session, specific slides will be suggested based on whether the participants are traveling the elementary "route" or the secondary "route". The slides from the other route may certainly be hidden if not applicable to the current presentation. Icons in the top left corner of the slides will also indicate which "route" the slide applies to.* ***Based on the audience of the presentation:*** *If utilizing the elementary "route" - hide 65, 71, 78-80, 87-91, 98-100, 109, 114-115, 118, 121, 123, 125* *If utilizing the secondary "route"- hide 66, 72, 81-83, 92-95, 101-103, 110-112, 116-117, 119, 122, 124, 126*	**Slide 64** 
This slide is for the elementary "route" - *Standard KY.4.NF.1* - skip this slide if not applicable to the current presentation. **Explain:** "As we look deeply at KY.4.NF.1, we will familiarize ourselves with the components of the architecture of the standards. Take a few minutes to ensure you can access the standard and familiarize yourself with the location of different components of the page. Throughout our time today we will be taking an in-depth look at each component. You'll want to keep this close (or keep this tab open) as we will reference this standard throughout our learning today."	**Slide 65** 
This slide is for the secondary "route" - *Standard: KY.8.SP.3* - skip this slide if not applicable to the current presentation. **Explain:** "As we look deeply at KY.8.SP.3, we will familiarize ourselves with the components of the architecture of the standards. Take a few minutes to ensure you can access the standard and familiarize yourself with the location of different components of the page. Throughout our time	**Slide 66**

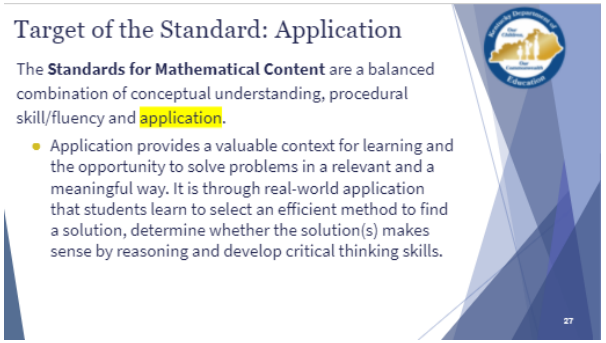
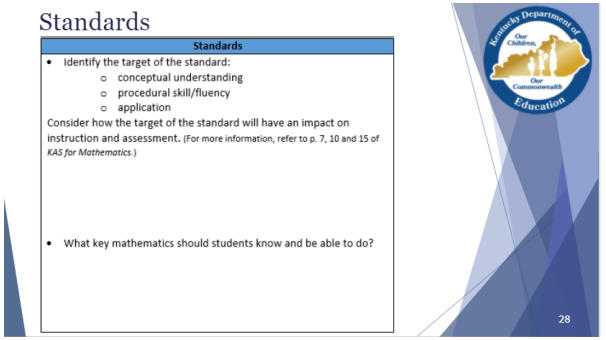
today we will be taking an in-depth look at each component. You'll want to keep this close (or keep this tab open) as we will reference this standard throughout our learning today."	
Explain: "As we ground our journey in the standards today, the Breaking Down a Standard protocol is a great way to familiarize ourselves with the architecture of the standards. The protocol guides participants through taking a deeper look at a standard in order to better understand the instructional implications and how those will impact student learning. If teachers/teacher teams/instructional leaders are struggling with understanding the depth of a standard this resource will help provide clarity around the standard. The conversations that arise throughout the process of "breaking down a standard" will be extremely valuable in building that shared understanding of the *KAS for Mathematics* and can also greatly contribute to our growth as educators. Please take a moment to access the Breaking Down a Standard protocol." *Facilitators should consider how participants might engage with the protocol - a paper copy of the protocol might facilitate engaging with the resource through the lens of rough draft thinking.*	**Slide 67** 
Explain: "As you access the Breaking Down a Standard protocol for mathematics, notice the layout of the page looks very similar to the standards document itself. The design intentionally mimics the standards page to emphasize how many supports are within the actual standards page. One key shift that came with the adoption of the *KAS for Mathematics* was to take at least a small part of external resources that may have been available with previous standards and embed elements of those external resources within the architecture of the page. While the standards page doesn't represent an exhaustive list of mathematical practices, coherence connections and clarifications, providing guidance within the standards document was important to the standards revision team. Those additional components allow us to get a deep look at the	**Slide 68** 

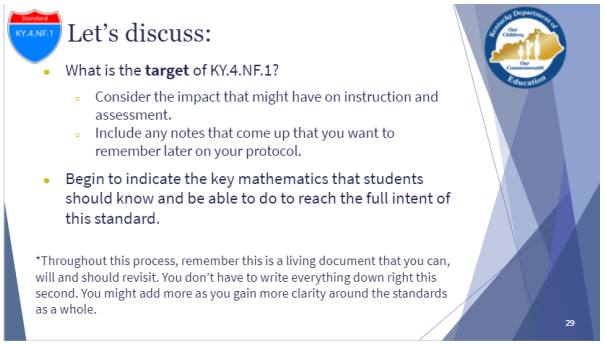
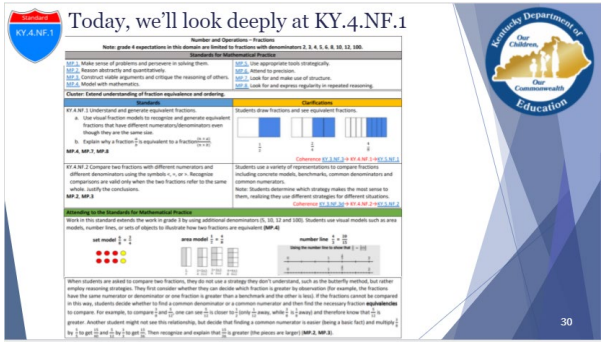
standard as we work through the Breaking Down a Standard protocol. We are excited to enter into this exploration alongside you as learners, so let's get started."	
This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live. **Explain:** "One of the first things we want to look for is for the domain, conceptual category or big idea the standard is working to develop. Within grades K through 8, the domain is listed at the very top of each of the pages within the *KAS for Mathematics*. For high school, things are just a bit different as the top of the page is the conceptual category, with the domain underneath. You'll see both of those terms used within the top question on the Breaking Down a Standard protocol. Another element we want to look for in this initial step of the protocol is the Cluster. The Cluster is the broader mathematical understanding the standard plays a role in building. In working with educators to develop an understanding of the standards, the cluster is one of the most powerful elements of the standards document, but often goes unnoticed. Standards within the same cluster work together to build broader understanding of the mathematical content. That certainly does not mean that there aren't additional connections within grade level standards. However, those standards are collectively working to build broader understanding in support of the big idea from the top of the page." ***For secondary participants, explain:*** *"The coding for previous state standards indicated each conceptual category and the various domains within that conceptual category. For example, the conceptual category of Algebra had four domains that were all an additional part of the coding.* ● *Seeing Structure in Expressions (A-SSE)* ● *Arithmetic with Polynomials and Rational Expressions (A-APR)* ● *Creating Equations (A-CED)* ● *Reasoning with Equations and Inequalities (A-REI)* *The revision team felt it would be clearer and more concise to only distinguish in the coding by*	**Slide 69** 

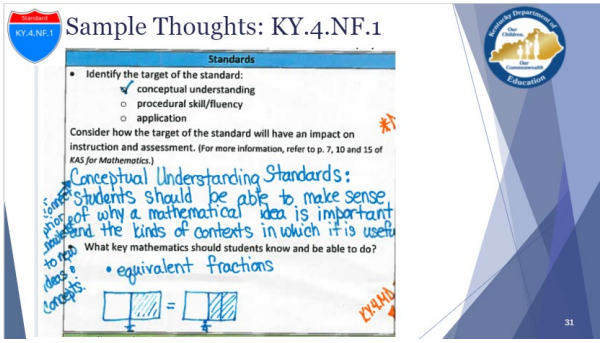
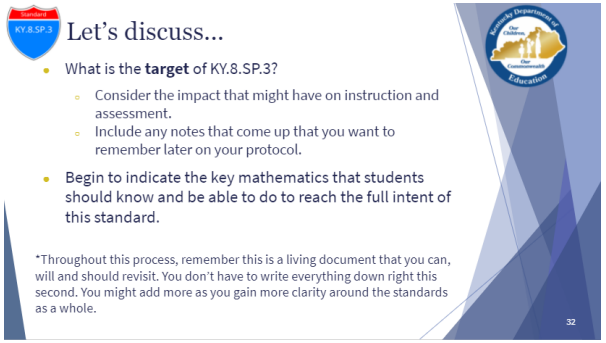
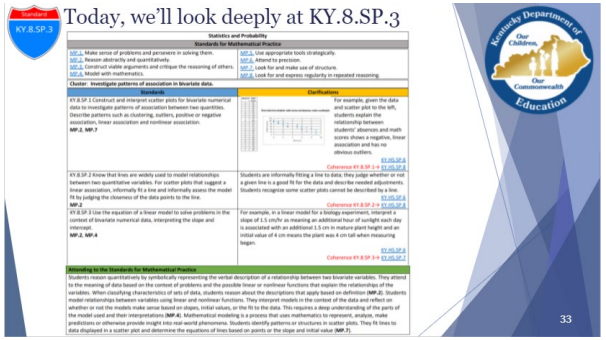
conceptual category. Thus, every standard within the conceptual category of Algebra will be labeled 'KY.HS.A.' followed by the number of the standard. The standards are still grouped by common domain and the domain is still labeled along the top of each cluster, but the domain is not also indicated within the coding of the standard."	
Explain: "As we work through the Breaking Down a Standard protocol, we want to protect time for processing new learning independently, with a partner/small group and with the larger group. For now, we'll take a few moments to consider: What is the domain/conceptual category/big idea? What is the broader understanding the standard plays a role in building (cluster)? Remember this information can be found at the top of the standards page, almost bookending the SMPs." *Provide participants with about a minute to "think" and a minute to "pair and share" before asking them to share with the whole group. If meeting online, participants could briefly pop into a breakout room for a quick discussion. It is recommended that the same breakout rooms are maintained throughout the session to allow participants to develop a level of comfort learning alongside one another throughout the session.* *Facilitators should listen for the correct domain and cluster and solicit sharing of those ideas from participants. When ready, answers can be shared from slides:* • *Elementary - 71* • *Secondary - 72*	**Slide 70** 
This slide is for the elementary "route" - [Standard KY.4.NF.1] - skip this slide if not applicable to the current presentation. **Explain:** "For this standard the domain is Number and Operations with fractions and the Cluster is 'Extend understanding of fraction equivalence and ordering.' Within this cluster is a note at the top of the standards page indicating, "Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12 and 100." This is really important when we think about how to offer students grade appropriate assignments, one of the commitments we	**Slide 71**

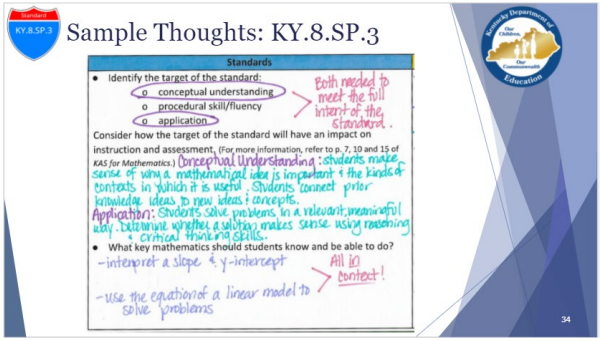
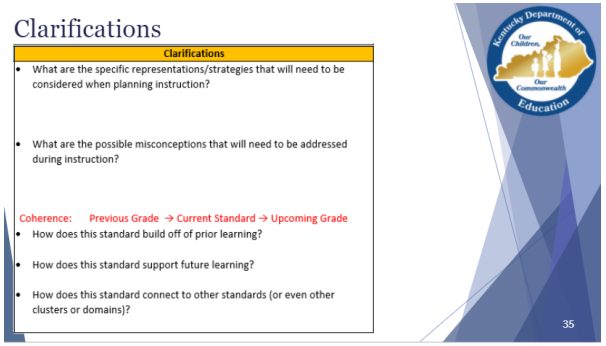
discussed earlier.”	
This slide is for the secondary “route” - *Standard: KY.8.SP.3* - skip this slide if not applicable to the current presentation. **Explain:** “This standard is in the Statistics and Probability domain. Looking initially at the standards page, standards KY.8.SP.1, 2 and 3 will work together to build a broader understanding around ‘investigating patterns of association in bivariate data’.”	**Slide 72** 
Explain: “The next part of the Breaking Down a Standard protocol is to determine the target of the standard. Within the *KAS for Mathematics*, the standards center on either building conceptual understanding, developing procedural skill/fluency or applying mathematics. In some cases, especially within middle and high school, specific parts of a standard (a, b, c, etc.) might fall into one of the three targets instead of the standard. Having the ability to discern whether a standard is targeting conceptual understanding, procedural skill/fluency and application is not only critical within the planning and delivery of instruction, it is also imperative when considering how to offer students equitable learning opportunities in mathematics classrooms across the state.”	**Slide 73** 
*For slides 25-27, facilitators should invite sharing. Participants might be encouraged to share verbally (in person/virtual) or via a waterfall chat (virtual). For a waterfall chat, invite participants to enter a word/phrase in the chat box. Specifically instruct them **not** to press enter until you*	**Slide 74**

indicate to do so (provide a countdown, set a timer, etc.). Upon pressing enter, a flood of entries will enter the chat box. Facilitators might lift up some of those responses or ask participants to elaborate on why that word/phrase resonated with them. There is an element of safe sharing when your response is going to be one among many as opposed to being singled out. **Explain:** "As we look at each of the three types of targets, we will follow a similar structure in our review. First let's look at conceptual understanding. Take a moment to read and consider a word or phrase that resonates with you about conceptual understanding. After you've had a moment to read and think, we will share as a whole group." *Listen fors might include:* • *More than isolated facts and methods - this keeps us from too heavily relying on procedures by focusing on developing foundational understanding within students* • *Make sense of "why" mathematical ideas are important - this keeps up from focusing too heavily on "what" is the right answer, instead supporting thinking around "why" is this the right answer and "how" do you know* • *Connect prior knowledge to new ideas and concepts - this keeps us from approaching mathematics in silos, building those connections among the ideas in mathematics allows us to support student thinking in a holistic way*	
Explain: "Next, let's look at procedural skill/fluency. Take a moment to read and consider a word or phrase that resonates with you about procedural skill/fluency. After you've had a moment to read and think, we will share as a whole group." *Listen fors might include:* • *Accuracy, efficiently, flexibly and appropriately - too often "fluency" is only viewed through the lens of accuracy and efficiently - you got it right and you got it right fast. Kentucky was lucky to have one of the leading national researchers on mathematical fluency (Dr. Jennifer Bay-Williams) offer clarity on the four elements of fluency. (See page 8 of the KAS for Mathematics for descriptions of each element.)*	**Slide 75** 

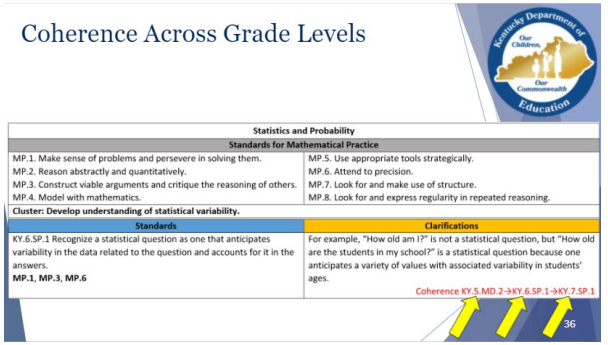
• *Procedural skill/fluency supports further complex exploration of mathematics*	
Explain: "Last, let's look at the description for application. Take a moment to read and consider a word or phrase that resonates with you about application. After you've had a moment to read and think, we will share as a whole group." *Listen fors might include:* • *Valuable context/relevant/meaningful - what is authentically relevant to one student may not be for another across the state/district/sometimes within the same classroom, but this is about providing opportunities for personal meaning to be developed through exploring mathematics in the world around them.* • *Selecting an efficient method - connection to procedural skill/fluency* • *Reasoning and critical thinking - students engage in the content (engagement was also one of the commitments we discussed at the beginning of the session)* **Explain:** "When we were reviewing each type of target, we discussed the advantages of each and how each contributes to student learning. The *KAS for Mathematics* reflect a balance of the three targets, with every grade level containing some conceptual understanding standards, some procedural skill/fluency standards and some application standards."	**Slide 76** 
Explain: "Having discussions around the target of the standard are **CRITICAL** as these discussions really contribute to offering students equitable experiences in mathematics. For example, consider how differently students might experience mathematics if one educator is teaching a standard conceptually and another is teaching it procedurally - student experiences would be vastly different. Having conversations within your team/PLC can help ensure all students have access to the *KAS for Mathematics*. As we consider how this relates to the standard we're going to "live" in today, we are going to think about the target of the standard and what impact that might have on instruction and assessment. Include any notes that come up that you want to remember later your protocol. Begin to indicate the key mathematics that students should know and be able to do to reach the	**Slide 77** 

full intent of this standard. You'll have a moment to consider this independently and then we will follow the similar Think-Pair-Share format." *Facilitators should post slide* • *Elementary - 78* • *Secondary - 81* *while participants are thinking independently and/or processing in small groups. For virtual sessions, breakout rooms could be utilized for this small group thinking.*	
This slide is for the elementary "route" - Standard KY.4.NF.1 - skip this slide if not applicable to the current presentation.	**Slide 78** 
This slide is for the elementary "route" - Standard KY.4.NF.1 - skip this slide if not applicable to the current presentation. *Elicit thoughts from participants around the target of the standard.* **Explain:** "What thoughts do you have around the target of KY.4.NF.1? Do you think this standard is targeting conceptual understanding, procedural skill/fluency or application?"	**Slide 79** 
This slide is for the elementary "route" - Standard KY.4.NF.1 - skip this slide if not applicable to the current presentation.	**Slide 80**

Explain: "KY.4.NF.1 is a conceptual understanding standard. The standard connects prior knowledge to new ideas and concepts - remember the cluster was to "Extend understanding…" so there must be a connection to prior learning. The standard also expects students to be able to make sense of why a mathematical idea is important and the kinds of contexts in which it is useful. The key mathematics students are focusing on here would be equivalent fractions, such as ½ being equivalent to 2/4. Knowing KY.4.NF.1 is developing conceptual understanding will guide us as we plan learning experiences and consider how to assess this standard."	
This slide is for the secondary "route" - *Standard: KY.8.SP.3* - skip this slide if not applicable to the current presentation.	**Slide 81** 
This slide is for the secondary "route" - *Standard: KY.8.SP.3* - skip this slide if not applicable to the current presentation. *After independent and pair/small group discussion, elicit thoughts from participants around the target of the standard.* **Explain:** "What thoughts do you have around the target of KY.8.SP.3? Do you think this standard is targeting conceptual understanding, procedural skill/fluency or application?"	**Slide 82** 
This slide is for the secondary "route" - *Standard: KY.8.SP.3* - skip this slide if not applicable to the current presentation.	**Slide 83**

Explain: "KY.8.SP.3 provides an example where the target of the standard has elements of conceptual understanding and application - BOTH are needed to reach the full intent of the standard. KY.8.SP.3 requires students to make sense of why a mathematical idea is important and the kinds of contexts in which it is useful. Students connect prior knowledge to new ideas and concepts. It also requires elements of application - students solve problems in a relevant and meaningful way and determine whether a solution makes sense using reasoning and critical thinking skills. Students should know how to interpret slope and y-intercept and should be able to use the equation of a linear model to solve problems **in context.**"	
Explain: "The next component of the architecture we are going to look closely at is the Clarifications section. The inclusion of Clarifications reinforces the goal of Senate Bill 1 (2017) to clearly communicate the expectations of the standards to teachers, parents, students and citizens. Here educators will want to consider things like: • What are the specific representations/strategies that need to be considered when planning instruction? • What are the possible misconceptions that may need to be addressed during instruction? Thinking critically about the expectations of the standard can help educators build the shared vision of the *KAS for Mathematics*. Educators at various levels of experience will be able to offer insights based on their unique experiences as teachers and learners of mathematics. The Coherence/Vertical Alignment component will provide additional guidance regarding where the standard sits within the sequence from the previous grade to the current standard to the upcoming grade. In this section of the protocol, we will examine: • How does this standard build from prior learning? • How does this standard support future learning? • How does the standard connect to other standards (or even other clusters or domains)? Let's take a closer look at how the two types of coherence might be indicated within the *KAS for Mathematics.*"	**Slide 84** 
This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live.	**Slide 85**

Explain: "To look at how Coherence/Vertical Alignment **across** grade levels might be indicated, we will look at KY.6.SP.1 - a Grade 6 standard in the domain of Statistics and Probability. You'll notice the KY.6.SP.1 is the middle standard listed in red within the Coherence. To the left is standard KY.5.MD.2. This indicates that the KY.6.SP.1 builds off the prior learning from KY.5.MD.2. Similarly, you'll notice KY.7.SP.1 listed to the right of KY.6.SP.1. This indicates KY.6.SP.1 supports the future learning found in KY.7.SP.1. Coherence across grade levels is listed: prior → current → upcoming."



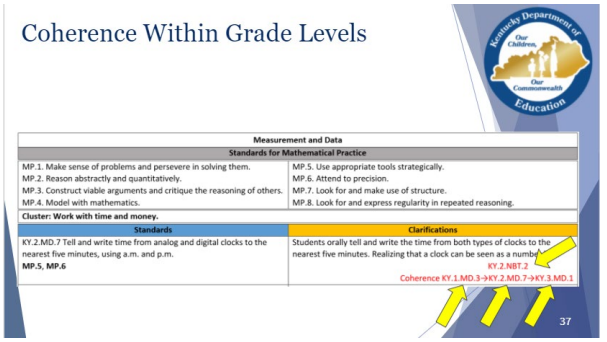
This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live.

Explain: "We'll use KY.2.MD.7 as our example for Coherence/Vertical Alignment **within** grade levels - so this is a Grade 2 standard in the domain of Measurement and Data. Notice KY.2.MD.7 builds off prior learning from KY.1.MD.3 and supports future learning in KY.3.MD.1. You'll notice another standard stacked on top of KY.2.MD.7. Stacking in this way within the *KAS for Mathematics* indicates a connection between the two grade level standards - KY.2.MD.7 and KY.2.NBT.2. Educators should make connections to ensure instruction is "cohesive", not siloed into domains.

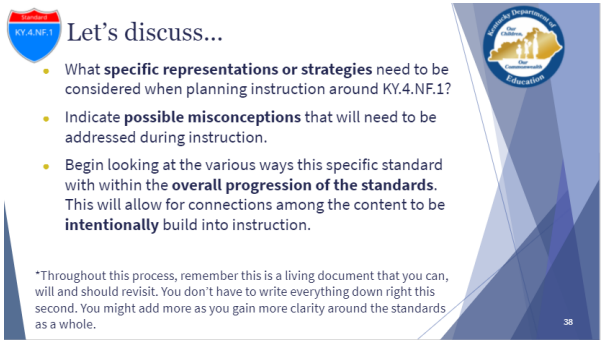
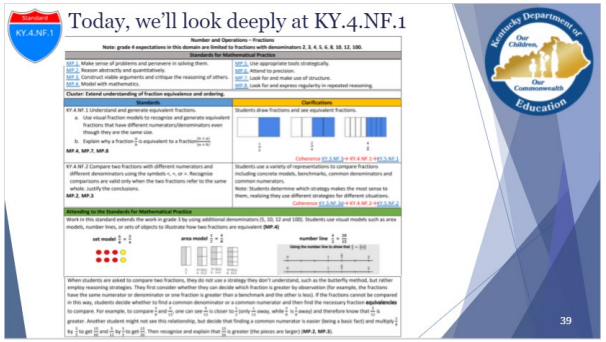
Keep in mind the coherence connections within the *KAS for Mathematics* are suggestions; however, they are not the only pathways. Mathematics is interconnected. It was important to the revision team that a teacher be able to see a connection to the previous grade and a connection to the upcoming grade to aid in planning instruction. As you notice other connections, you can certainly indicate them within our protocol."

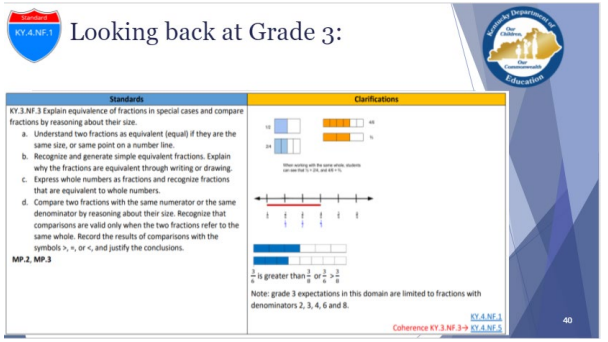
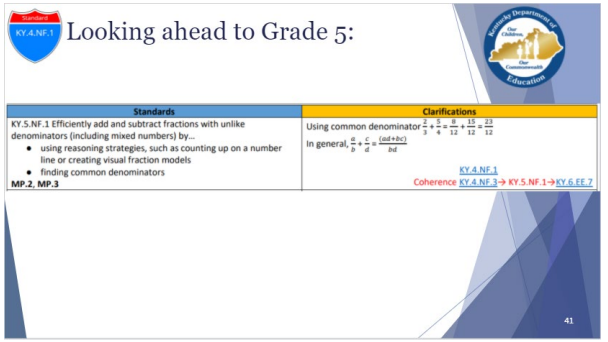
For secondary participants, explain: "Coherence is not listed for the high school standards. Coherence is listed up through Grade 8, where there is an indication of the high school standard(s) a grade 8 standard will feed into. A high school standard might be offered at different grade levels or in different courses from school to school or from district to district. For example,

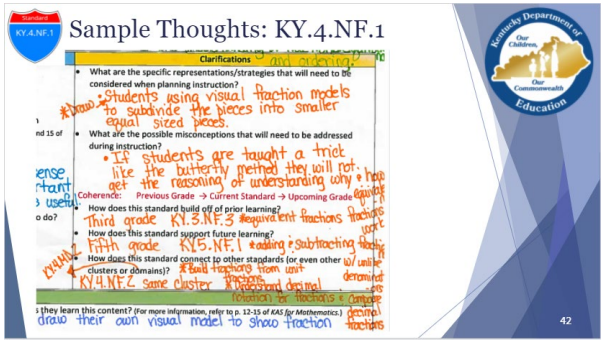
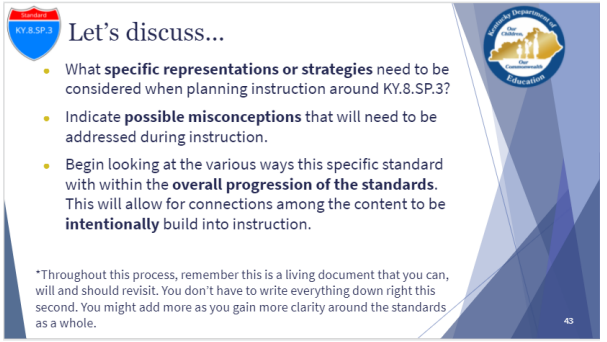
Slide 86



one grade 8 standard might feed into content that is taught in some schools during grade 9, perhaps in Algebra 1. Another grade 8 standard might feed into a class offered to students in grades 10 or 11 in another district. Those decisions will vary across the state since high school course sequencing is a local decision in Kentucky." **Explain:** "Let's take a few moments to consider the following: ● What specific representations or strategies need to be considered when planning instruction around our standard for today? ● Indicate possible misconceptions that will need to be addressed during instruction. ● How does this specific standard fit within the overall progression of the standards - this allows connections among the content to be intentionally built into instruction?" ***Facilitators may want to share the following excerpt from TNTP's Accelerate Don't Remediate:*** *"Research suggests more students have experienced more unfinished learning over the last year than ever before. With the COVID-19 pandemic waning, school systems are facing a critical choice about how to respond. Should they use the traditional approach of reviewing all the content students missed, known as remediation? Or should they start with the current grade's content and provide "just-in-time" supports when necessary, known as learning acceleration? Findings include:* ● *Students who experienced learning acceleration struggled less and learned more than students who started at the same level but experienced remediation instead.* ● *Students of color and those from low-income backgrounds were more likely than their white, wealthier peers to experience remediation—even when they had already demonstrated success on grade-level content.* ● *Learning acceleration was particularly effective for students of color and those from low-income families.* *This is strong evidence that learning acceleration works, and that it could be key to unwinding generations-old academic inequities the COVID-19 pandemic has only exacerbated."* *Facilitators should post slide*	

• *Elementary - 87* • *Secondary - 92* *while participants are thinking independently and/or processing in small groups. For virtual sessions, breakout rooms could be utilized for this small group thinking.*	
This slide is for the elementary "route" - [Standard KY.4.NF.1] - skip this slide if not applicable to the current presentation.	**Slide 87** 
This slide is for the elementary "route" - [Standard KY.4.NF.1] - skip this slide if not applicable to the current presentation. *After independent and pair/small group discussion, elicit initial thoughts from participants around the clarifications.* **Explain:** "What are some strategies and representations that came to mind when thinking about instruction aligned to KY.4.NF.1?" *Facilitator listen fors:* • *Participants should lift up the various types of models students should see - for example, bar models, number lines, etc.* • *Participants may note again the denominators specific to Grade 4* **Explain:** "What are some misconceptions students might have when they are learning around KY.4.NF.1?"	**Slide 88** 

Facilitator listen fors: • *Misconceptions around what the numerator and denominator mean* • *Misconceptions around same size whole* • *Misconceptions around "tricks" that might attempt to educate in a more procedural way without the conceptual understanding being developed*	
This slide is for the elementary "route" - Standard KY.4.NF.1 - skip this slide if not applicable to the current presentation. **Explain:** "As we look at how the Coherence/Vertical Alignment component can help clarify KY.4.NF.1, let's look back at the standard from the prior grade: KY.3.NF.1. How is this standard related to the Grade 4 standard we are looking at?" *Facilitator look fors:* • *Note from the Clarifications is important as it delineates Grade 3 and Grade 4 expectations regarding the denominators of the fractions.* • *Similar types of models within the clarifications (bar models, number lines)* • *Grade 3 also is targeting conceptual understanding - it makes sense we are "extending" that in Grade 4*	**Slide 89** 
This slide is for the elementary "route" - Standard KY.4.NF.1 - skip this slide if not applicable to the current presentation. **Explain:** "As we look at how the Coherence/Vertical Alignment component can help clarify KY.4.NF.1, let's look ahead at the standard from the upcoming grade: KY.5.NF.1. How is this standard related to the Grade 4 standard we are looking at?" *Facilitator look fors:* • *"Efficiently" showed up in the procedural skill/fluency description - Indicating students are progressing in their learning from conceptual understanding in grades 3 and 4 to*	**Slide 90** 

procedural skill/fluency in Grade 5.	
This slide is for the elementary "route" - [Standard KY.4.NF.1] - skip this slide if not applicable to the current presentation. **Explain:** "To recap, within KY.4.NF.1 students use visual fraction models to subdivide the pieces into smaller, equal-sized pieces. Students should draw visual fraction models. The learning is situated after Grade 3 (KY.3.NF.3) when students begin to develop an understanding of equivalent fractions and before Grade 5 when students are adding and subtracting fractions. There are connections within Grade 4 - the most obvious is KY.4.NF.2 from the same cluster, so we know these two standards are working together to build that broader understanding ("Extend understanding of fraction equivalence and ordering") we mentioned earlier. In Grade 4 students are building fractions from unit fractions, understanding decimal notation for fractions and comparing decimal fractions. There are also connections to Measurement and Data (KY.4.MD.2)."	**Slide 91** 
This slide is for the secondary "route" - [Standard: KY.8.SP.3] - skip this slide if not applicable to the current presentation.	**Slide 92** 
This slide is for the secondary "route" - [Standard: KY.8.SP.3] - skip this slide if not applicable to the current presentation. *After independent and pair/small group discussion, elicit thoughts from participants around the clarifications.*	**Slide 93**

Explain: "What are some strategies and representations that come to mind when thinking about instruction aligned to KY.8.SP.3?"

Facilitator listen fors:

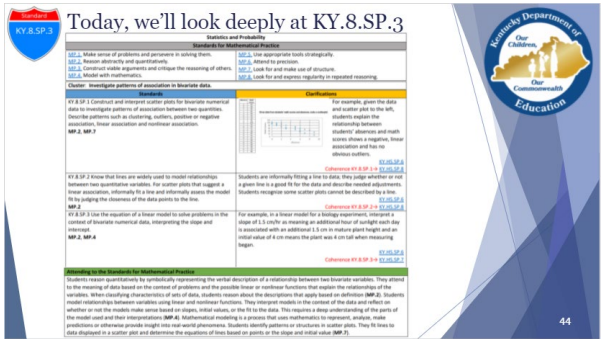
- *Emphasis in Grade 8 on linear vs nonlinear association (same cluster - KY.8.SP.1)*
- *Emphasis on interpreting "in context"*

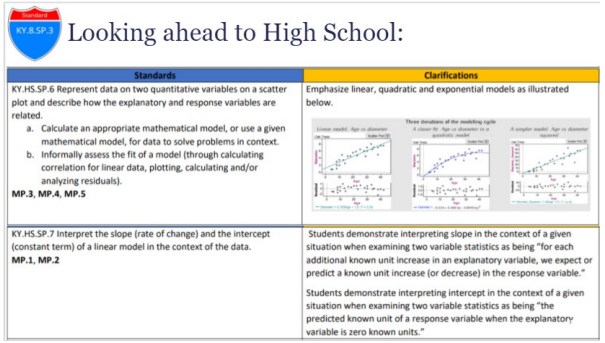
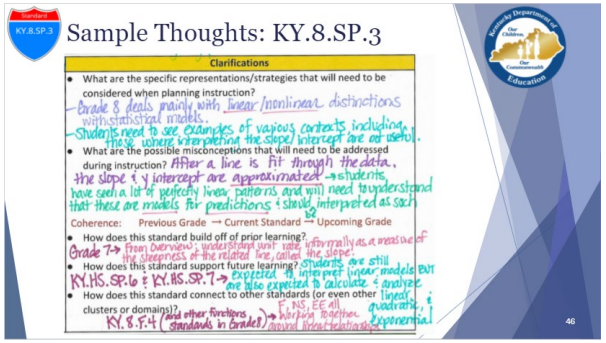
Explain: "What are some misconceptions students might have when they are learning around KY.8.SP.3?"

Facilitator listen fors:

- *Students might mix up the slope and the y-intercept*
- *Knowing linear models are approximations (KY.8.SP.2)*

Explain: "Looking at how the Coherence/Vertical Alignment component can help clarify KY.8.SP.3, you may notice there is not a standard listed to the left of our current standard - let's look more closely at what that means. There are some key mathematical ideas in this standard, such as slope and y-intercept. Since the *KAS for Mathematics* are a PDF in some cases we can gain additional understanding by searching the PDF. (Note: This often isn't a great way to gain a well-rounded understanding of the standards, but in this case, we know specifically what we are searching for - a coherent link to slope/y-intercept before Grade 8). If we CTRL+F in the PDF and search for the word "slope" we see the term is used 25 times within the *KAS for Mathematics,* a couple of times in the front matter and then the third time it shows up is within the *Grade 7 Overview*. There it states that in Grade 7 "graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope". That offers more information about our Grade 8 standard, as well. For one thing, it affirms that there is an element of conceptual understanding with KY.8.SP.3. Additionally, there must be connections between our standard and other Grade 8 standards to develop a more formal understanding of slope."



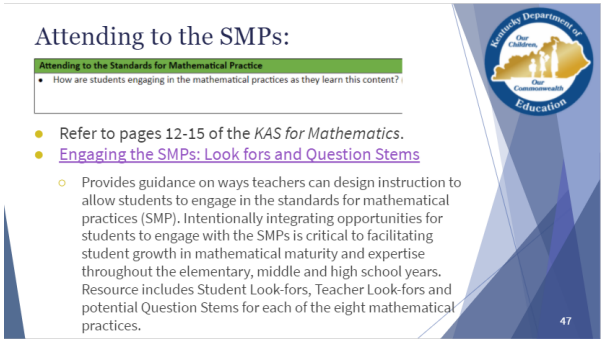
This slide is for the secondary "route" - [Standard: KY.8.SP.3] - skip this slide if not applicable to the current presentation. **Explain:** "As we look at how the Coherence/Vertical Alignment component can help clarify KY.8.SP.3, let's look ahead at the standard from the upcoming grade - KY.HS.SP.6 and KY.HS.SP.7. How are these standards related to the Grade 8 standard we are looking at?" *Facilitator look fors:* • *Grade 8 focused on linear/nonlinear - In high school the standards explicitly state linear, quadratic and exponential models.* • *In high school students are calculating the mathematical models themselves instead of being provided with models (or informally fitting a line KY.8.SP.2)* • *Some participants may note the shift in vocabulary from dependent/independent within the middle school standards to explanatory/response variables.*	**Slide 94** 
This slide is for the secondary "route" - [Standard: KY.8.SP.3] - skip this slide if not applicable to the current presentation. **Explain:** "To recap, within KY.8.SP.3 students are making distinctions between linear/nonlinear statistical models and need to see those models in various contexts. Students may mistakenly mix up the slope and y-intercept (especially when presented with equations in different forms such as y=a+bx, y=mx+b, etc.). In Grade 7 students are still developing an understanding of slope, which becomes more formalized in Grade 8. In high school students are still expected to interpret linear models but are also expected to calculate and analyze linear, quadratic and exponential models. Within Grade 8, the domains "Functions" and "Expressions and Equations" work together to develop student understanding around linear/nonlinear relationships, such as KY.8.F.4."	**Slide 95** 
Explain: "One big shift that you'll notice as you look at the general architecture of the standards is the emphasis placed on the Standards of Mathematical Practice (SMPs/MPs). Within the *KAS for Mathematics* the content and practices are intentionally integrated in such a way that every	**Slide 96**

Kentucky student will benefit mathematically. It is **CRITICAL** mathematics educators, support staff and administrators realize that the SMPs **are additional standards** and are a part of the state expectations as set forth in the *KAS for Mathematics.* The revision team recognized the shift to make the practices additional standards would require support for educators across the state. For that reason, the MPs are elevated in three areas within each cluster of the *KAS for Mathematics:*

1. All 8 MPs are bookmarked to the descriptions within the front matter (pages 12-15).
2. At each cluster level educators will see narratives on how the SMPs might be attended to in partnership with the mathematical content (Attending to the SMPs).
3. Each standard has MPs tagged in bold within the standard.

There are several misconceptions around the MPs tagged within the content standards. To clarify, those MPs included within the content standards are **only** there to provide support to educators who may need support to determine how to engage students in the practices within instruction around the content. Teaching the content standard **DOES NOT** automatically mean students have engaged in those MPs nor does it mean that instruction around that content should be limited to only engaging students in those practices.

The way students engage in mathematics is determined by the learning experiences in which they can participate. Thus, the design of those learning experiences (the questions asked, the strategies/representations used, the discussion embedded within the experience, etc.) all impact how students engage with the content. Educators might be able to engage students with the content using several (potentially even all) of the practices, but the intentional choices made throughout lesson planning and facilitation will determine which practices the students actually engage in."



Explain: "One resource to support educators in designing learning experiences that engage students in mathematics is the Engaging the SMPs resource, which has one page focused on each practice, listing possible student actions, possible teacher actions and possible questions to promote. These certainly are not an exhaustive list, but they provide a great starting point for purposefully designing instruction around the content that engages students in the practices.

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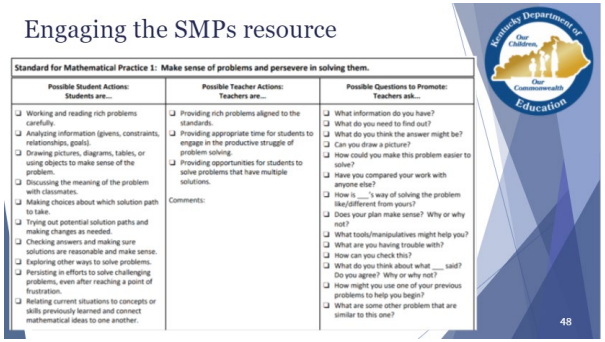
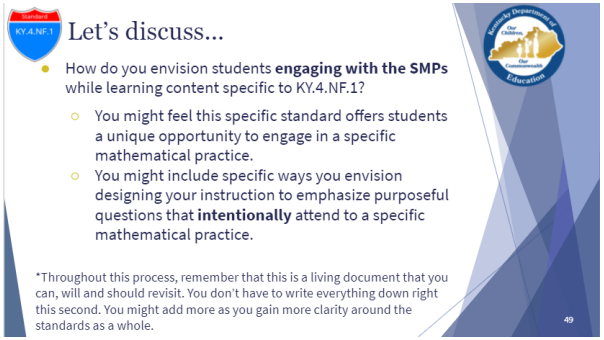
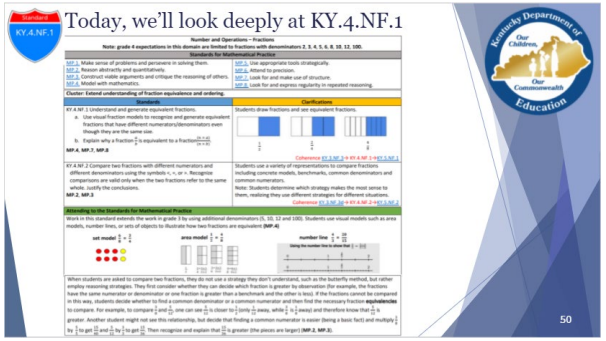
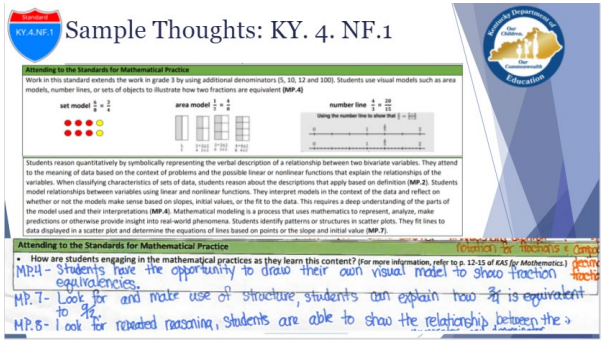
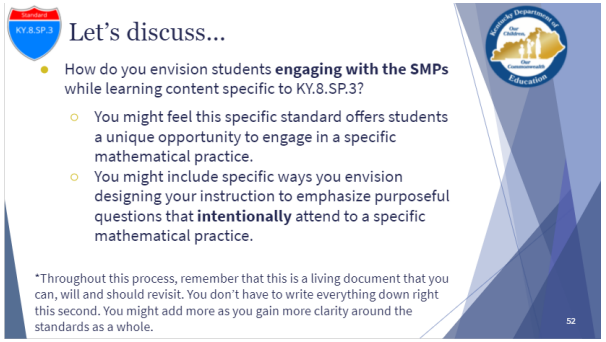
Take a moment to consider how students might engage in the content we've been discussing today. For example, you might feel this specific standard offers students a unique opportunity to engage in a specific mathematical practice or you might include specific ways you envision designing your instruction to emphasize purposeful questions that intentionally attend to a specific mathematical practice. For some, this might mean thinking "backward" - what types of questions would I want to ask students about this content? Do those questions fall within a specific page of the resource?" *Facilitators should post slide* • *Elementary - 98* • *Secondary - 101* *while participants are thinking independently and/or processing in small groups. For virtual sessions, breakout rooms could be utilized for this small group thinking.*	
This slide is for the elementary "route" - Standard KY.4.NF.1 - skip this slide if not applicable to the current presentation.	**Slide 98** 
This slide is for the elementary "route" - Standard KY.4.NF.1 - skip this slide if not applicable to the current presentation. *After independent and pair/small group discussion, elicit thoughts from participants around the clarifications.*	**Slide 99**

Explain: "How do you envision students engaging with the SMPs while learning content specific to KY.4.NF.1? *Facilitator listen fors:* • *Participants might start with MP.4, MP.7 and MP.8 as those are the practices tagged within the standard. Look for places participants may have lifted up additional practices, such as MP.3 when students are explaining their reasoning (perhaps sharing that with other students or the class as a whole and there might be opportunities to critique the reasoning of others).* • *MP.4 - Students use visual models such as area models, number lines, or sets of objects to illustrate how two fractions are equivalent*	
This slide is for the elementary "route" - [Standard KY.4.NF.1] - skip this slide if not applicable to the current presentation. **Explain:** "For this sample, we focused on the practices listed within the standard itself. Remember, those tagged practices are just guidance for initial thinking. We will come back and revisit that idea in just a moment. Let's recap our thinking around engaging students in the SMPs within KY.4.NF.1. • MP.4 - Students can draw their own visual model to show fraction equivalencies. • MP.7 - Students look for and make use of structure when explaining how ¾ is equivalent to 9/12. • MP.8 - Students look for repeated reasoning to show the relationship between the numerator and denominator. These do not have to match what you have on your list of ideas, but they should help spark ideas about how we can successfully implement the SMPs."	**Slide 100** 
This slide is for the secondary "route" - [Standard: KY.8.SP.3] - skip this slide if not applicable to the current presentation.	**Slide 101**



This slide is for the secondary "route" - [Standard: KY.8.SP.3] - skip this slide if not applicable to the current presentation.

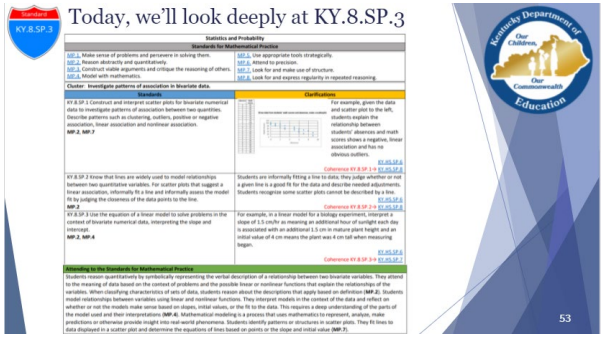
After independent and pair/small group discussion, elicit thoughts from participants around the SMPs.

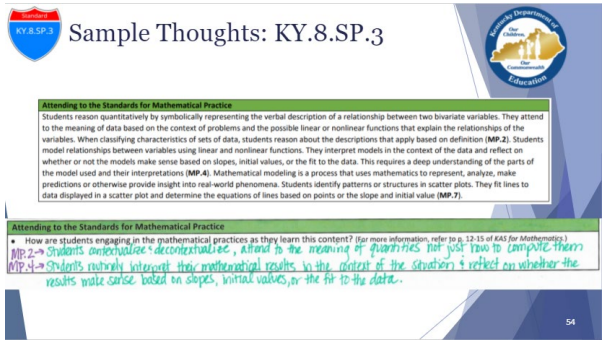
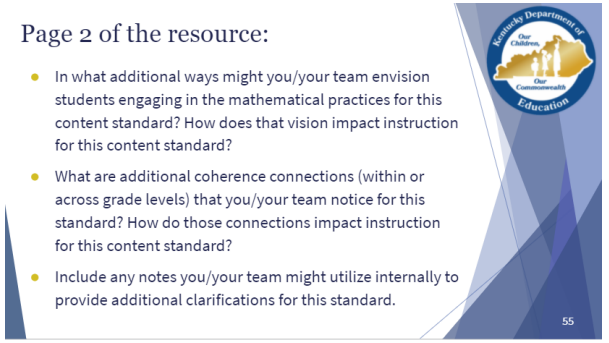
Explain: "How do you envision students engaging with the MPs while learning KY.8.SP.3?"

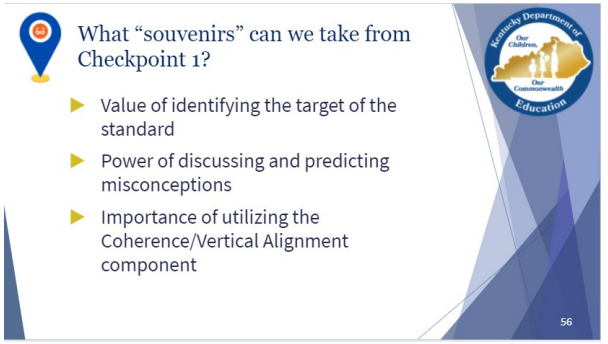
Facilitator listen fors:

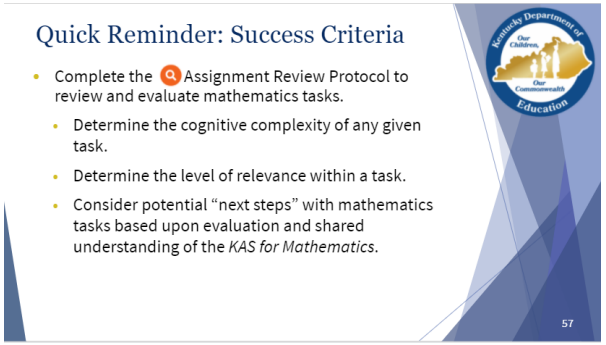
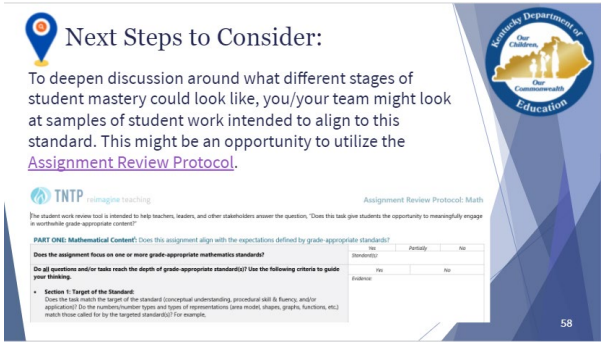
- *Participants might start with MP.2 and MP.4 as those are the practices tagged within the standard. Look for places participants may have lifted up additional practices, such as MP.3 when students are explaining their reasoning (perhaps sharing that with other students or the class as a whole and there might be opportunities to critique the reasoning of others) or MP.7 when students may be making use of the structure of how the linear model is communicated to identify the slope and y-intercept.*
- *MP.2 - Students reason quantitatively by representing the verbal description of a relationship between two bivariate variables. They attend to the meaning of data based on the context of problems and the possible linear or nonlinear functions that explain the relationships of the variables. When classifying characteristics of sets of data, students reason about the descriptions that apply based on definition.*
- *MP.4 - Students model relationships between variables using linear and nonlinear functions. They interpret models in the context of the data and reflect on whether the*

Slide 102



models make sense based on slopes, initial values, or the fit to the data. This requires a deep understanding of the parts of the model used and their interpretations (MP.4).	
This slide is for the secondary "route" - Standard: KY.8.SP.3 - skip this slide if not applicable to the current presentation. **Explain:** "For this sample, we focused on the practices listed within the standard itself. Remember, those tagged practices are just guidance for initial thinking. We will come back and revisit that idea in just a moment. If we recap our thinking around engaging students in the SMPs within KY.8.SP.3, we noted: • MP.2 - Students contextualize and decontextualize, attend to the meaning of quantities not just how to compute them. • MP.4 - Students routinely interpret mathematical results in the context of the situation and reflect on whether the results make sense based on slopes, initial values or the fit to the data. These do not have to match what you have on your list of ideas, but they should help spark ideas about how we can successfully implement the SMPs."	**Slide 103** 
Explain: "The statement, 'The identified mathematical practices, coherence connections and clarifications are possible suggestions; however, they are not the only pathways.' is at the bottom of each cluster within the *KAS for Mathematics*. The standards revision team felt as though it was important to provide guidance for educators across the state, but also did not want to limit instructional opportunities by presenting what could be an exhaustive list. The Breaking Down a Standard protocol provides a great place to start with what is on the standards page and then have professional discussions with our team around how that looks locally at the school/district level. For example, there may be additional ways might you/your team envision students engaging in the MPs for this content standard. Another example may be in looking at additional coherence connections (within/across grade levels) you/your team notice for this standard. While the standards are put forth at each grade level (K-8), the ways in which schools and districts choose	**Slide 104** 

to sequence content may mean there are opportunities for additional connections. Page 2 of the protocol provides space to capture those ideas and consider the impact those ideas may have on instruction for this content standard." **For secondary sessions, explain:** "Having these conversations becomes especially important for high school teachers as the standards document itself isn't able to provide as much guidance around coherence. In addition to the standards document, high school teachers may want to have the High School Mathematics Matrix handy for these conversations." *Facilitators may want to share the annotated samples with participants so participants can take away the rough draft thinking they developed as well as the sample annotated protocol.* • *Annotated Grade 4 Sample* • *Annotated Grade 8 Sample*	
This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live. **Explain:** "In thinking back to the beginning of the session, we wanted to consider how to ground instruction in the *KAS for Mathematics.* Using the Breaking Down a Standard protocol is a good first step in creating that shared vision. That doesn't mean you should have to break down every standard you teach using the formal process but the questions we asked along the way are important questions that need to be a part of how we design instruction. If you had to consider key takeaways or "souvenirs" of this learning, what are some things you want to be sure you take with you moving forward?" *Facilitators should elicit input from participants. Participants might be encouraged to share verbally (in person/virtual) or via a waterfall chat (virtual).* *Facilitator listen fors:* • *How important it is to identify and have a shared vision of the target of the standard.*	**Slide 105** 

• *Power of discussing misconceptions and how to plan to address them* • *The value is looking at previous and upcoming standards using the Coherence component* *Once discussion/sharing has taken place, facilitators can summarize the key ideas by sharing the elements on the slide (animated).*	
Explain: "As a reminder, this portion of our learning has been successful if we leave having built a shared understanding of the *KAS for Mathematics,* specifically by demonstrating we can: • Determine the cognitive complexity of a given task. • Determine the level of relevance within a task. • Consider potential "next steps" with mathematics tasks based upon evaluation and shared understanding of the *KAS for Mathematics*."	**Slide 106** 
Explain: "The driving question behind the development of the *KAS for Mathematics* was simple, "What is best for Kentucky students?" The standards set forth a statewide baseline of what students should know and be able to do after instruction, but do not address how learning experiences are to be designed or what resources should be used. As those decisions are left to educators within local schools and districts, grounding instruction in the *KAS for Mathematics* becomes central to the success of every student across the commonwealth. The Breaking Down a Standard protocol is a good start, but the understanding and shared vision developed through using that resource must translate to student experiences. It is in the assignment that the teacher translates the learning goal into action for the student. That idea brings us to the Assignment Review Protocol." *Facilitators should consider how participants might engage with the protocol - a paper copy of the protocol might facilitate engaging with the resource through the lens of rough draft thinking.*	**Slide 107** 
Explain: "The Assignment Review Protocol is intended to answer the question, "Does this task	**Slide 108**

give students the opportunity to meaningfully engage in worthwhile grade-appropriate content?" This four-part protocol is a way to review a single task/assignment through an investigation of:

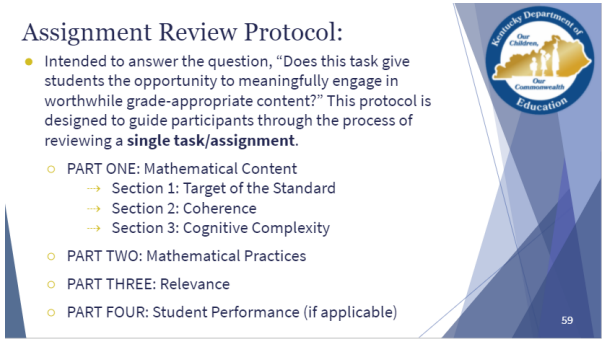
1. Mathematical Content
2. Mathematical Practices
3. Relevance
4. Student Performance

You'll notice some of these elements have been discussed already today, such as the target of the standard, coherence, practices. Since we are living in our single standard today, the assignments we are going to look at are assignments that claim to be aligned to the same standard we just examined deeply through our Breaking Down a Standard protocol. Let's get started."

Facilitators should post slide

- *Elementary - 109*
- *Secondary - 110*

while participants are thinking independently and/or processing in small groups. For virtual sessions, breakout rooms could be utilized for this small group thinking.

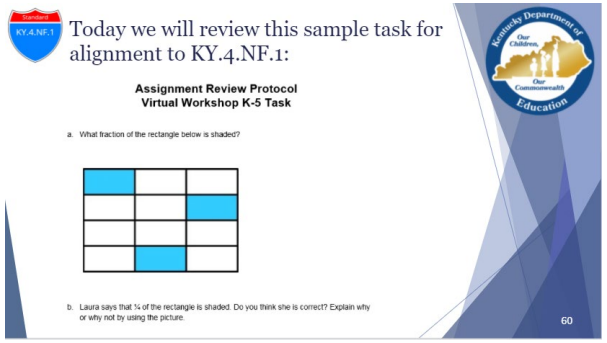


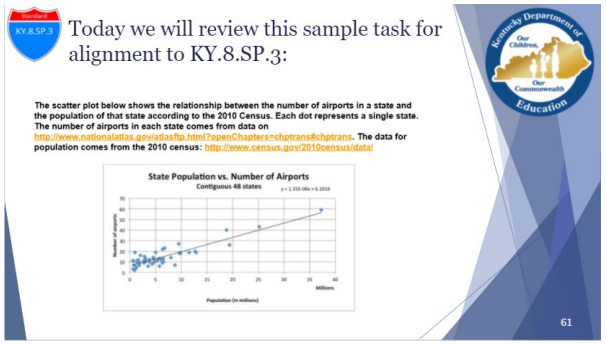
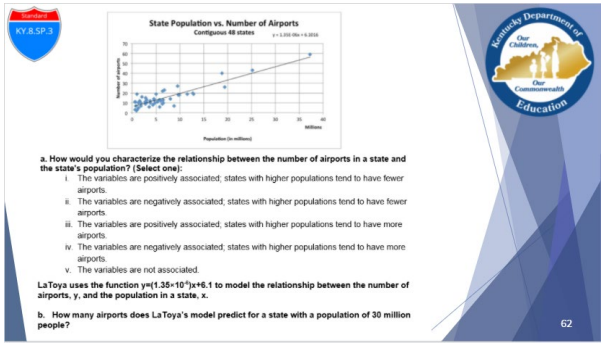
This slide is for the elementary "route" - [Standard KY.4.NF.1] - skip this slide if not applicable to the current presentation.

Explain: "There are numerous places educators might look to for instructional resources. The unfortunate reality is many of the resources that are readily available have not been vetted for quality, true alignment and/or grade-appropriateness. Being able to discern where a task stands "as is" is so important as that will be the basis for the decisions we make moving forward in instructional planning. Today we are going to review the task Fractions and Rectangles to determine how well it might align to our standard KY.4.NF.1."

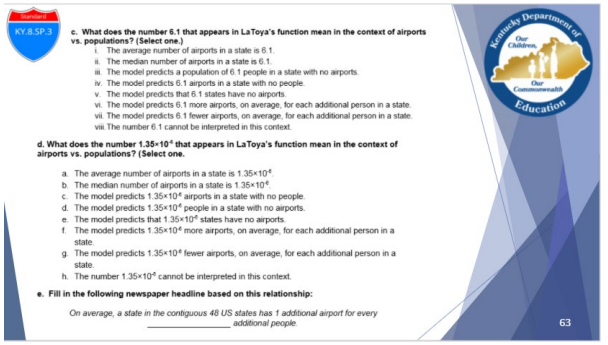
Facilitators should consider how participants might engage with the protocol - a paper copy of the protocol might facilitate engaging with the resource through the lens of rough draft thinking.

Slide 109



Facilitators should allow time for participants to access and read the task.	
This slide is for the secondary "route" - *Standard: KY.8.SP.3* - skip this slide if not applicable to the current presentation. **Explain:** "There are numerous places educators might look to for instructional resources. The unfortunate reality is many of the resources that are readily available have not been vetted for quality, true alignment and/or grade-appropriateness. Being able to discern where a task stands "as is" is so important as that will be the basis for the decisions we make moving forward in instructional planning. Today we are going to review the task: US Airports to determine how well it might align to our standard KY.8.SP.3." *Facilitators should consider how participants might engage with the protocol - a paper copy of the protocol might facilitate engaging with the resource through the lens of rough draft thinking.* *Facilitators should allow time for participants to access and read the task.*	**Slide 110** 
This slide is for the secondary "route" - *Standard: KY.8.SP.3* - skip this slide if not applicable to the current presentation. *Facilitators may reference this slide if participants want to discuss this specific part of the task throughout the work of the Assignment Review Protocol.*	**Slide 111** 
This slide is for the secondary "route" - *Standard: KY.8.SP.3* - skip this slide if not applicable to the current presentation.	**Slide 112**

Facilitators may reference this slide if participants want to discuss this specific part of the task throughout the work of the Assignment Review Protocol.

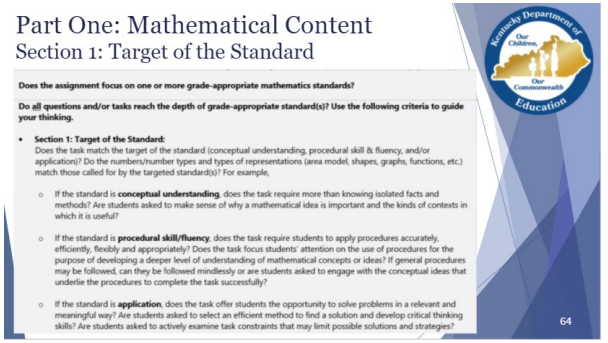


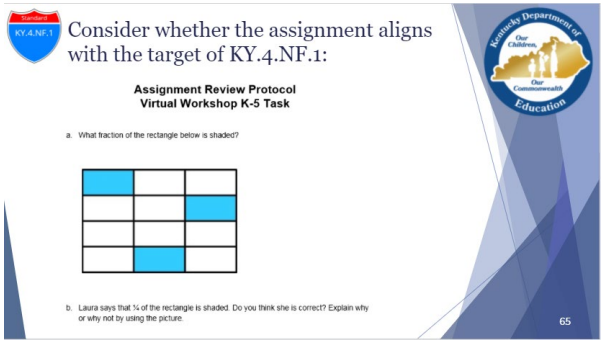
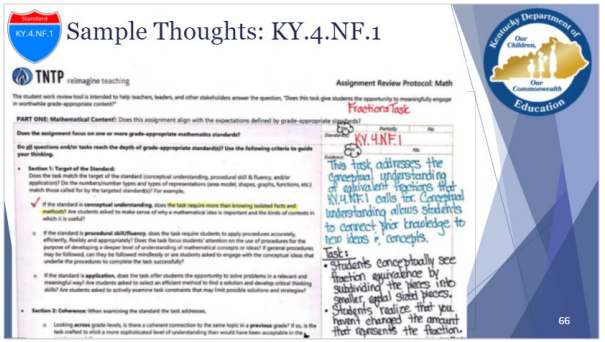
Explain: "Part One of the Assignment Review Protocol focuses on the question of "Does this assignment align with the expectations defined by grade-appropriate standards?" We start by determining whether the task matches the target of the standard (conceptual understanding, procedural skill & fluency and/or application)? Do the numbers/number types and types of representations (area model, shapes, graphs, functions, etc.) match those called for by the targeted standard(s)? For example,

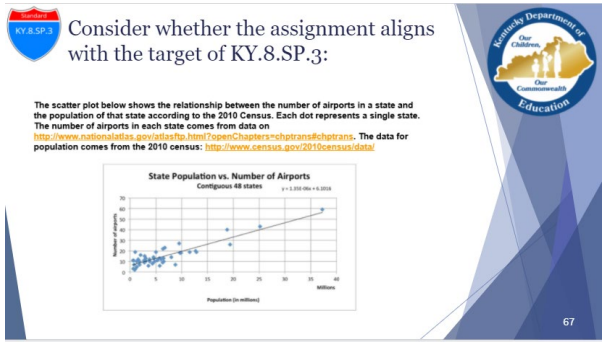
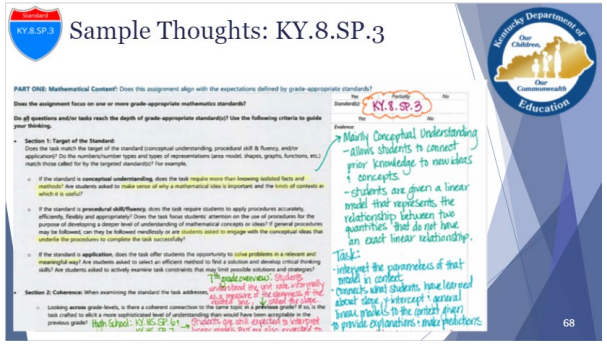
- If the standard is **conceptual understanding**, does the task require more than knowing isolated facts and methods? Are students asked to make sense of why a mathematical idea is important and the kinds of contexts in which it is useful?
- If the standard is **procedural skill/fluency**, does the task require students to apply procedures accurately, efficiently, flexibly and appropriately? Does the task focus students' attention on the use of procedures for the purpose of developing a deeper level of understanding of mathematical concepts or ideas? If general procedures may be followed, can they be followed mindlessly or are students asked to engage with the conceptual ideas that underlie the procedures to complete the task successfully?
- If the standard is **application**, does the task offer students the opportunity to solve problems in a relevant and meaningful way? Are students asked to select an efficient method to find a solution and develop critical thinking skills? Are students asked to actively examine task constraints that may limit possible solutions and strategies?

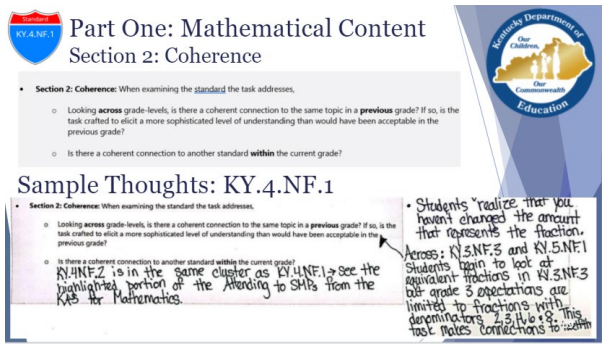
To be clear, we have already examined the standard itself. We know the target of our standard for today. The purpose of the task **MUST** match the target of the standard. So, as we look at the task, if we see a mismatch between the target of the standard and what is elicited from students

Slide 113



through the assignment, that is a substantial red flag for even moving forward with the remainder of the protocol. Let's see how the assignment aligns with the standard we are examining."	
This slide is for the elementary "route" - Standard KY.4.NF.1 - skip this slide if not applicable to the current presentation. **Explain:** "Take a moment to consider the descriptions in the Assignment Review Protocol. When we reviewed standard KY.4.NF.1, we indicated the target of the standard was conceptual understanding. Does this assignment offer students the opportunity to develop/demonstrate conceptual understanding? Take a moment to consider what you think and how you might support your thinking." *Facilitators should allow time for participants to process independently and in pairs/small groups.* *Facilitator listen fors:* • *Addressed equivalent fractions* • *Requires reasoning* • *Connecting prior knowledge to new ideas and concepts*	**Slide 114** 
This slide is for the elementary "route" - Standard KY.4.NF.1 - skip this slide if not applicable to the current presentation. **Explain:** "This task elicits the conceptual understanding of equivalent fractions that KY.4.NF.1. Conceptual understanding allows students to connect prior knowledge to new ideas and concepts. Specifically, this task requires students to see fraction equivalence by subdividing the pieces into smaller, equal-sized pieces. Students have to realize you haven't changed the amount that represents the fraction."	**Slide 115** 
This slide is for the secondary "route" - Standard: KY.8.SP.3 - skip this slide if not applicable to	**Slide 116**

the current presentation. **Explain:** "Take a moment to consider the descriptions in the Assignment Review Protocol. When we reviewed standard KY.8.SP.3, we indicated the target of the standard was both conceptual understanding and application - with both being necessary to reach the full intent of the standard. Does this assignment offer students the opportunity to develop/demonstrate conceptual understanding and application? Take a moment to consider what you think and how you might support your thinking." *Facilitators should allow time for participants to process independently and in pairs/small groups.* *Facilitator listen fors:* • *Interpreting parameters (slope/y-intercept in context)* • *More than knowing isolated facts and methods - relationship between the parameters* • *Doesn't appear to be procedural in nature*	
This slide is for the secondary "route" - *Standard: KY.8.SP.3* - skip this slide if not applicable to the current presentation. **Explain:** "Based upon our Breaking Down a Standard protocol both conceptual understanding and application are targeted in this standard. This task has elements that elicit conceptual understanding and application but leans a little more toward conceptual understanding in the way the questions are posed - however parts B and E elicit application. The task allows students to connect prior knowledge to new ideas and concepts. Students are given a linear model that represents between two quantities that do not have an exact linear relationship. Students are asked to interpret the parameters in context, connecting what students have learned about slope, y-intercept and general linear models to the context given to provide explanations and make predictions."	**Slide 117** 
This slide is for the elementary "route" - *Standard KY.4.NF.1* - skip this slide if not applicable to the current presentation.	**Slide 118**

This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live. **Explain:** "Still looking at mathematical content, Section 2 leads us to examine how well the assignment aligns to the coherence of the standard. We want to be sure this assignment is situated in Grade 4 learning. • Looking across grade-levels, is there a coherent connection to the same topic in a previous grade? If so, is the task crafted to elicit a more sophisticated level of understanding than would have been acceptable in the previous grade? • Is there a coherent connection to another standard within the current grade? *Facilitators should allow time for participants to process independently and in pairs/small groups, encouraging participants to review notes from the Breaking Down a Standard protocol as needed.* *Facilitator listen fors:* • *More sophisticated than Grade 3 - note about the denominators comes into play* • *The assignment doesn't require the procedures mentioned earlier in the session when looking ahead at Grade 5* • *Connects to the other standard within the cluster - KY.4.NF.1* *Once participants have had the opportunity to think on their own/in pairs/small groups, continue with the second portion of the animation.* **Explain:** "Looking across grade level, the assignment appears more sophisticated than what students would experience in KY.3.NF.3 since Grade 3 expectations are limited to fractions with denominators 2, 3, 4, 6 and 8. This task makes connections to twelfths, which is explicitly Grade 4. We can be assured this task is grade appropriate for our instruction around KY.4.NF.1."	
This slide is for the secondary "route" - *Standard: KY.8.SP.3* - skip this slide if not applicable to	**Slide 119**

the current presentation.

This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live.

Explain: "Still looking at mathematical content, Section 2 leads us to examine how well the assignment aligns to the coherence of the standard. We want to be sure this assignment is situated in Grade 8 learning.

- Looking across grade-levels, is there a coherent connection to the same topic in a previous grade? If so, is the task crafted to elicit a more sophisticated level of understanding than would have been acceptable in the previous grade?
- Is there a coherent connection to another standard within the current grade?"

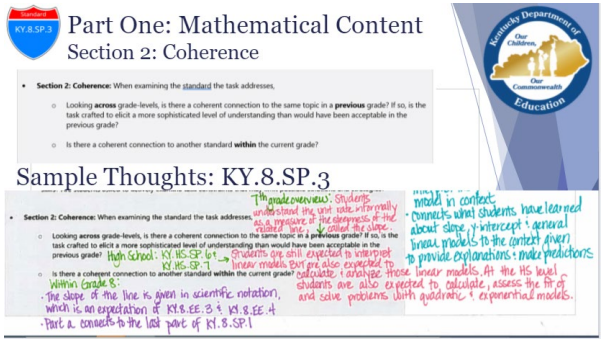
Facilitators should allow time for participants to process independently and in pairs/small groups, encouraging participants to review notes from the Breaking Down a Standard protocol as needed.

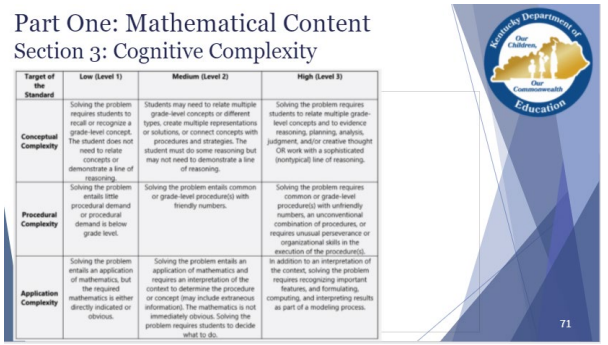
Facilitator listen fors:

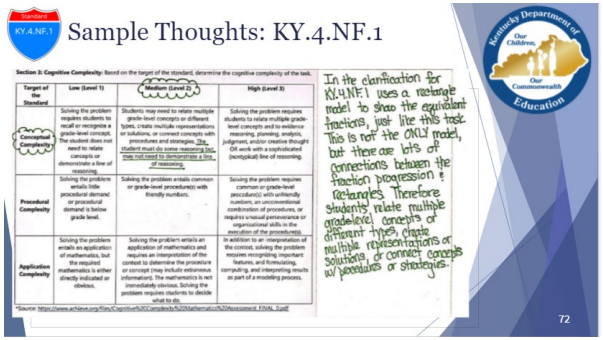
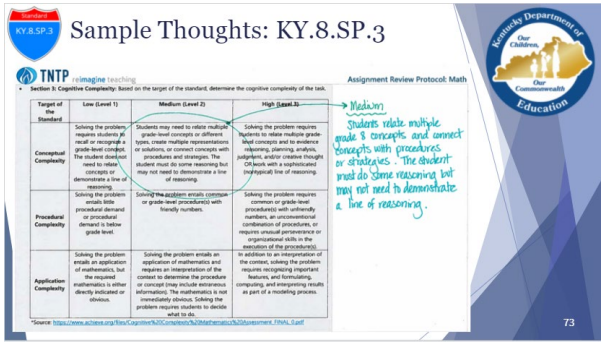
- *More sophisticated than Grade 7 when students are informally developing an idea of slope*
- *Only uses linear models and the student does not have to calculate the model so it wouldn't fit the full intent of the high school standards*
- *The linear model uses scientific notation - is that ok?*
    - *Facilitators may want to encourage participants to examine the appropriateness of scientific notation within Grade 8*

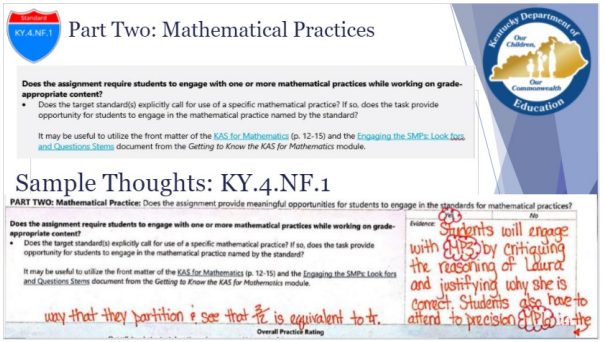
Once participants have had the opportunity to think on their own/in pairs/small groups, continue with the second portion of the animation.

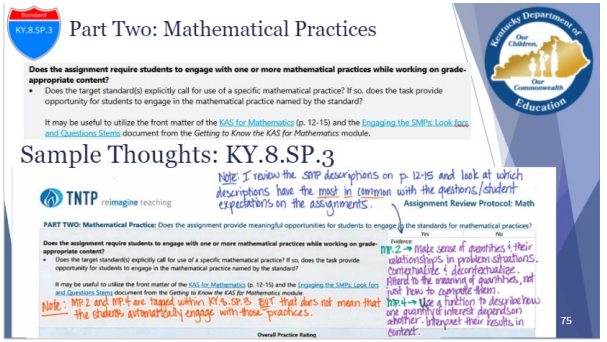
Explain: "Looking across grade levels, the assignment appears more sophisticated than what students would experience in Grade 7. Remember, in Grade 7 students are only informally developing their understanding of unit rate as the slope. We know this wouldn't meet the full



intent of the high school standards either. In high school students are expected to calculate and analyze linear models and calculate, assess the fit of and solve problems with quadratic and exponential models. One of the components of the linear model is given in scientific notation, which may be something that feels out of the norm for many linear models students may see. If we look in the *KAS for Mathematics*, scientific notation is also an expectation of Grade 8 (KY.8.EE.3 and KY.8.EE.4). Part A also connects to KY.8.SP.1, which is in the same cluster as KY.8.SP.3. In examining all those things we can be assured this task is grade appropriate for our instruction around KY.8.SP.3, but we may want to make a note to indicate students should not engage with this task prior to exploring standards related to scientific notation - something that may vary based upon how schools and districts sequence Grade 8 standards."	
Explain: "The last element of mathematical content, Section 3, deals with the Cognitive Complexity of the task. There are lots of ways to analyze task complexity, but this one is nice because we can narrow our focus to the rows that deal with the target of our standard. Take a moment to review the task and consider whether you would say the task we are looking at is a Level 1, Level 2 or Level 3." *Facilitators should allow time for participants to process independently and in pairs/small groups.* *Facilitator listen fors:* • *Language to indicate participants are focusing on the correct rows.* • *The difference between the levels* *Once participants have had the opportunity to think on their own/in pairs/small groups, continue to the appropriate slide:* • *Elementary "route" - 121* • *Secondary "route" - 122*	**Slide 120** 
This slide is for the elementary "route" - *Standard KY.4.NF.1* - skip this slide if not applicable to the current presentation.	**Slide 121**

Explain: "If we narrow in on the conceptual understanding row of the Cognitive Complexity Matrix, the task is not level one as Part B in the task specifically asks students to do some reasoning. In the clarification of KY.4.NF.1 a rectangle model is used to show the equivalent fractions, like the one in this task. While this is not the only model, it does serve as an example of the connections between the fraction progression and rectangles (area model). Students must do some reasoning here, however it is not an overly sophisticated or non-typical type of reasoning. For this reason, the task is a Level 2 or medium task. It is important to note every task is not expected to be a Level 3. Instead tasks should reflect a balance. In considering the learning experiences students are offered holistically, we should just be certain those experiences aren't living in the same cell, the same row, the same column, etc. As we mentioned previously, the standards reflect a balance of conceptual understanding, procedural skill/fluency and application; that balance should be reflected in the cognitive complexity we engage students in throughout our instruction as well."	
This slide is for the secondary "route" - *Standard: KY.8.SP.3* - skip this slide if not applicable to the current presentation. **Explain:** "If we narrow in on the conceptual understanding/application rows of the Cognitive Complexity Matrix, the task does not appear to be level one - the task specifically asks students to do some reasoning. In the parts of the task more related to application, the application is not directly indicated or obvious - students must interpret the context of the question in order to know how to solve the problem. Students relate multiple grade 8 concepts (mentioned when we just reviewed the coherence) and connect those concepts with procedures or strategies. The student must do some reasoning but may not need to demonstrate a line of reasoning. It is important to note every task is not expected to be a Level 3. Instead tasks should reflect a balance. In considering the learning experiences students are offered holistically, we should just be certain those experiences aren't living in the same cell, the same row, the same column, etc. As we mentioned previously, the standards reflect a balance of conceptual understanding,	**Slide 122** 

procedural skill/fluency and application; that balance should be reflected in the cognitive complexity we engage students in throughout our instruction as well."	
This slide is for the elementary "route" - *Standard KY.4.NF.1* - skip this slide if not applicable to the current presentation. **This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live.** **Explain:** "Moving to Part Two in the Assignment Review Protocol, we consider whether the assignment requires students to engage with one or more mathematical practices while working on grade-appropriate content. It is important to remember here, while it is certainly valuable as an educator to consider facilitator moves that would engage students in the practices during the assignment, we want to begin by looking at the task as written. Sometimes that can be tough because as teachers our brains automatically gravitate toward how we might use the assignment with our students and teacher moves we might take. We will start here by considering the task as written, not considering facilitator moves we might make as those may vary from educator to educator or class to class. However, keep those ideas in mind because those ideas will be valuable as we move forward. Take some time to consider whether the task we are looking at today is written to engage students in SMPs. If so, which one(s)?" *Facilitators should allow time for participants to process independently and in pairs/small groups, encouraging participants to review notes from the Breaking Down a Standard protocol as needed.* *Facilitator listen fors:* • *MP.3 - Part B asks students to critique Laura's reasoning.* • *MP.6 - Precision in the equivalence of ¼ to 3/12 and in communication about equivalence is important here* • *Participants may lift up other practices and that is ok - we will revisit that in the "souvenirs" section*	**Slide 123** 

Once participants have had the opportunity to think on their own/in pairs/small groups, continue with the second portion of the animation. **Explain:** "A couple of the practices are listed here, such as MP.3 - Students will critique the reasoning of Laura and justify why she is correct. Students also attend to precision (MP.6) in the way they partition and see that 3/12 is equivalent to ¼. This tells us the task already engages students in the SMPs. The great thing about that is we know the task is attending to those SMPs and anything we design within our facilitation is going above and beyond. If it is difficult to identify how a task engages students in the practices, considering ways to facilitate the task to do so becomes even more critical, and is something we will revisit soon."	
This slide is for the secondary "route" - *Standard: KY.8.SP.3* - skip this slide if not applicable to the current presentation. **This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live.** **Explain:** "Moving to Part Two in the Assignment Review Protocol, we consider whether the assignment requires students to engage with one or more mathematical practices while working on grade-appropriate content. It is important to remember here, while it is certainly valuable as an educator to consider facilitator moves that would engage students in the practices during the assignment, we want to begin by looking at the task as written. Sometimes that can be tough because as teachers our brains automatically gravitate toward how we might use the assignment with our students and teacher moves we might take. We will start here by considering the task as written, not considering facilitator moves we might make as those may vary from educator to educator or class to class. However, keep those ideas in mind because those ideas will be valuable as we move forward. Take some time to consider whether the task we are looking at today is written to engage students in the SMPs. If so, which one(s)?"	**Slide 124** 

Facilitators should allow time for participants to process independently and in pairs/small groups, encouraging participants to review notes from the Breaking Down a Standard protocol as needed. *Facilitator listen fors:* ● *MP.2 and MP.4 are tagged within KY.8.SP.3. Participants should not accept those at face value but should be critical in reviewing the SMP descriptions to ensure selections are justified. Remind participants the tagged MPs serve as guidance around the content standard and DO NOT mean students automatically engage with those practices in the assignment.* ● *Participants may lift up other practices and that is ok - we will revisit that in the "souvenirs" section* *Once participants have had the opportunity to think on their own/in pairs/small groups, continue with the second portion of the animation.* **Explain:** "A couple of the practices are listed here, such as MP.2 - Make sense of quantities and their relationships in problem situations, contextualize and decontextualize, attend to the meaning of quantities, not just how to compute them and MP.4 - Students use a function to describe how one quantity of interest depends on another and interpret their results in context. This tells us the task engages students in the SMPs. The great thing about that is we know the task is attending to those SMPs and anything we design within our facilitation is going above and beyond. If it is difficult to identify how a task engages students in the practices, considering ways to facilitate the task to do so becomes even more critical, and is something we will revisit soon."	
This slide is for the elementary "route" - *Standard KY.4.NF.1* - skip this slide if not applicable to the current presentation. **This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live.** **Explain:** "Moving to Part Three of the Assignment Review Protocol, we examine whether the task	**Slide 125**

is relevant. If the assignment connects grade-appropriate, content standards to real-world experiences, does it also allow students to apply math in a meaningful way? There are several things to consider here, such as:

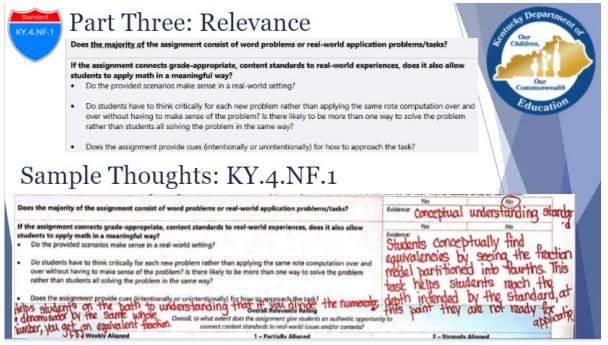
- Do the provided scenarios make sense in a real-world setting?
- Do students have to think critically for each new problem rather than applying the same rote computation over and over without having to make sense of the problem? Is there likely to be more than one way to solve the problem rather than students all solving the problem in the same way?
- Does the assignment provide cues (intentionally or unintentionally) for how to approach the task?

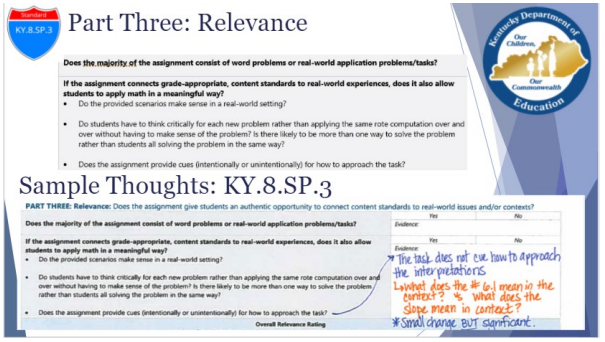
At first glance those last two questions may not appear closely related to relevance, but it is important to consider that if we select tasks that are relevant without ensuring that we are taking steps to leave the thinking with the students, we may have provided relevance but we've removed the opportunity for students to be the ones to "apply" the mathematics. For example, sometimes a "word problem" may really be a procedural problem, dressed up with words to add context that students really don't have to reason with in order to solve the problem. We want to be aware and look for those things as we review tasks. Take a moment to consider how you would view the relevance of the task we are reviewing today."

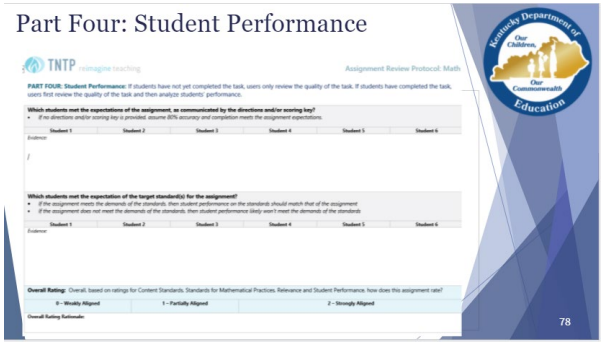
Once participants have had the opportunity to think on their own/in pairs/small groups, continue with the second portion of the animation.

Explain: "While aligned to KY.4.NF.1, the task does not really connect the content to a real-world experience. However, considering everything we know about this task holistically, we remember the target of the standard for KY.4.NF.1 is conceptual understanding. At this point, the expectation is not for students to demonstrate they are able to apply their understanding of fraction equivalence, although that is in the future based on how the learning is designed to progress, that coherence piece."

Facilitators may hear participants discuss things like, "I might bring in a tray of brownies for my



students" when thinking about this to make it more relevant. This is another place where we want to distinguish the instructional choices educators make in facilitating the task from the task as written. Considering how to show students different representations of the diagram within the task is certainly a teacher move that might be made. However, the heart of this task is not changing if a different representation is used. The students aren't really "applying" here because the task directly indicates what students are to do and students are more interacting with Laura's reasoning than interpreting/interacting with relevant context.	
This slide is for the secondary "route" - *Standard: KY.8.SP.3* - skip this slide if not applicable to the current presentation. **This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live.** **Explain:** "Moving to Part Three of the Assignment Review Protocol, we examine whether the task is relevant. If the assignment connects grade-appropriate, content standards to real-world experiences, does it also allow students to apply math in a meaningful way? There are several things to consider here, such as: • Do the provided scenarios make sense in a real-world setting? • Do students have to think critically for each new problem rather than applying the same rote computation over and over without having to make sense of the problem? Is there likely to be more than one way to solve the problem rather than students all solving the problem in the same way? • Does the assignment provide cues (intentionally or unintentionally) for how to approach the task? At first glance those last two questions may not appear closely related to relevance, but it is important to consider that if we select tasks that are relevant without ensuring that we are taking steps to leave the thinking with the students, we may have provided relevance but we've removed the opportunity for students to be the ones to "apply" the mathematics. For example, sometimes a "word problem" may really be a procedural problem, dressed up with words to add	**Slide 126** 

context that students really don't have to reason with in order to solve the problem. We want to be aware and look for those things as we review tasks. Take a moment to consider how you would view the relevance of the task we are reviewing today." *Once participants have had the opportunity to think on their own/in pairs/small groups, continue with the second portion of the animation.* **Explain:** "While aligned to KY.8.SP.3, this task does ask students to connect the content to a real-world setting, despite the fact this might not be the most engaging context for every Grade 8 student. Although many parts of the task are multiple-choice, students are required to think critically for each new problem. One thing of specific note is that the task does not cue how to approach the interpretations. For example, the language in the task says things like, "What does the number 6.1 mean in context" instead of "What does the slope mean in context". That is a small change, but significant in the fact that the task does not provide that connection for students. Students have to reason what the number 6.1 represents by first identifying it as the slope and then considering how that has implications on the interpretation."	
Explain: "If we had samples of student work to look at today, we could use Part Four of the Assignment Review Protocol. Keep in mind that if the assignment meets the demands of the standards, then student performance should also meet the demands of the standards. **However, if the assignment does not meet the demands of the standards, then student performance likely won't meet the demands of the standards either.**" *Facilitators may want to share the annotated samples so participants can take away the rough draft thinking they developed as well as the sample annotated protocol.* • *Annotated Grade 4 Sample* • *Annotated Grade 8 Sample*	**Slide 127** 
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Explain: "The Assignment Review Protocol helps ensure we make decisions grounded in grade-level standards and allows us to make informed choices on how to equitably design our instruction to meet the needs of all learners. That doesn't mean teachers have to review **every** assignment using this formal process but the questions we asked along the way are important questions that need to be a part of how we design instruction. If you had to consider key takeaways or "souvenirs" of this learning, what are some things you want to be sure you take with you moving forward?"

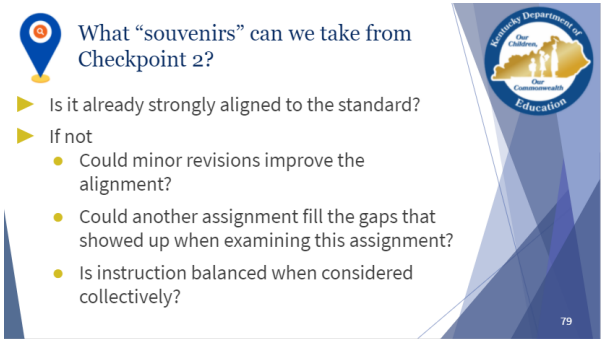
Facilitators should elicit input from participants. Participants might be encouraged to share verbally (in person/virtual) or via a waterfall chat (virtual).

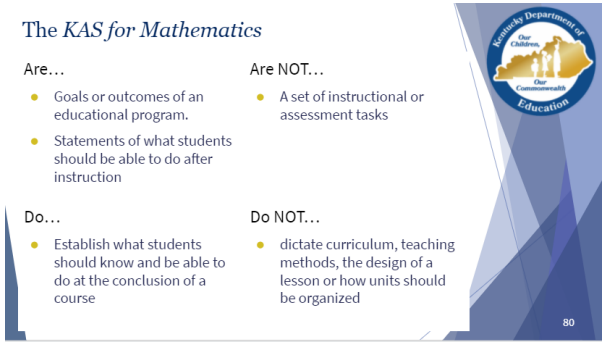
Facilitator listen fors:

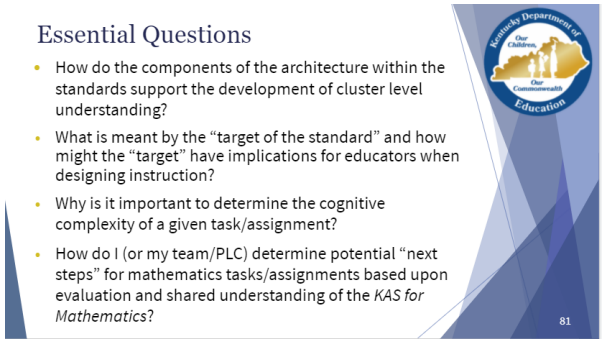
- *The value of the cognitive complexity matrix - this may be new for participants*
- *The importance of those elements we investigated when we were breaking down the standard - the target of the standard, coherence*
- *Content and practices must work together to offer students equitable access to the KAS for Mathematics - both are required standards*

Facilitators should summarize the key ideas and move discussion forward by sharing the elements on the slide.

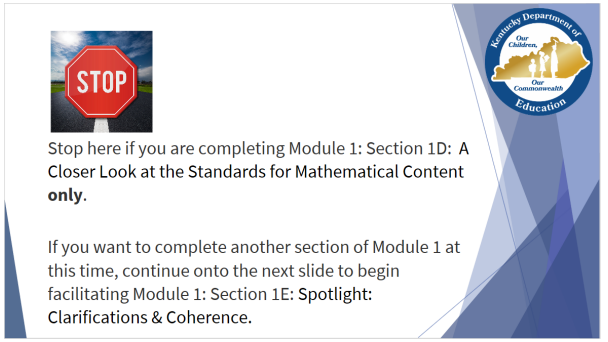
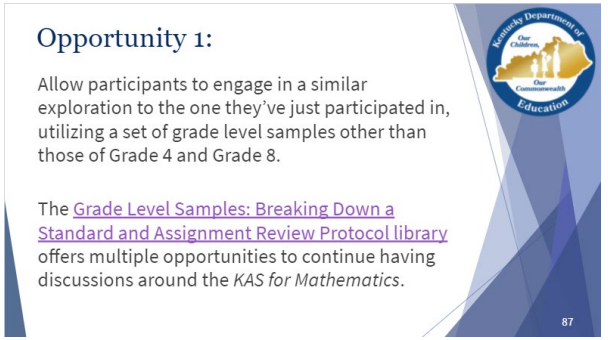
Explain: "The reality is no one program or textbook is going to be perfectly aligned to the standards. That's why it is so critical that educators have conversations around resources like the Breaking Down a Standard protocol to ensure teacher clarity around the expectations of the standards and the support for educators within the standards document itself. Same with the Assignment Review Protocol. Teachers need to know whether the instructional resources they are using are aligned to the standards. If they are - great! If not, teachers **must** consider what that means for moving forward. It likely doesn't mean educators throw out what they have, but it does mean educators are able to make informed decisions when considering instructional next steps.

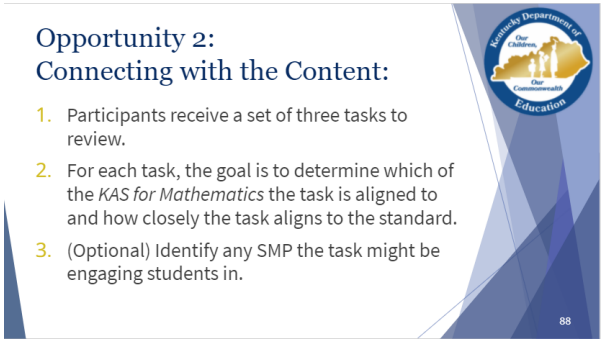


• Could minor revisions be made to improve the alignment? • Could another assignment fill the gaps that showed up when examining this assignment? • Could instructional moves on the part of the teacher attend to some of the issues with alignment? All of those could be potential ways to move forward if the task has elements educators don't want to lose. It's also important to remember we are looking for balanced instruction. Every task may not have strong relevance, but some should. Every task shouldn't sit in the same section of the complexity matrix. There should be a balance within our instruction to ensure students have access to engaging in all eight mathematical practices, perhaps not in one lesson, but throughout their collective learning experiences. These protocols provide a way to thoughtfully process what we are offering students."	
Explain: "On pages 8 and 9 of the *KAS for Mathematics*, there is an important distinction regarding what the standards are, and just as importantly, what the standards are not. The standards set forth a statewide baseline of what students should know and be able to do after instruction, but do not address how learning experiences are to be designed or what resources should be used. As those decisions are left to educators within local schools and districts, having a shared understanding of the expectations within the *KAS for Mathematics* is imperative. The standards are not the curriculum. Learning opportunities and pathways will continue to vary across schools and school systems and educators should make every effort to meet the needs of individual students, based on their pedagogical and professional impressions and information. The order in which the standards are presented within each grade band (or conceptual category) is not the order in which the standards need to be taught. Standards from various domains are connected (as we've seen with the standards we've looked at today) and educators will need to determine the best overall design and approach, as well as the instructional strategies needed to support their learners to attain grade-level expectations and the knowledge articulated in the standards. The instructional program should emphasize the development of students' abilities to	**Slide 129** 

acquire and apply the standards. The curriculum must assure appropriate accommodations are made for diverse populations of students found within Kentucky schools. Decisions on how best to help students meet these program goals are left to local school districts and teachers. **However, it is CRITICAL that the curriculum is aligned to the standards.** The tools we discussed today are designed to help with that.**"**	
Explain: "Let's take a moment to reflect on the learning goals for today's session. With your partner/small group, let's consider: ● How do the components of the architecture within the standards support the development of cluster level understanding? ● What is meant by the "target of the standard" and how might the "target" have implications for educators when designing instruction? ● Why is it important to determine the cognitive complexity of a given task/assignment? ● How do I (or my team/PLC) determine potential "next steps" for mathematics tasks/assignments based upon evaluation and shared understanding of the *KAS for Mathematics*? We will capture these reflections in a Jamboard. " *The following link will provide access to a Jamboard with frames designed as per the slide:* *https://jamboard.google.com/d/1nrdFK0BXjcTMp3_2VNoZyNJIMrUmQscESUpBJqNhAJ0/copy* *Facilitators will want to share the link to their copy with participants. Facilitators may tailor the frame labels to fit the session participants.*	**Slide 130** 
This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live. **Depending on how familiar participants are with Jamboard, this slide may be skipped.** **Explain:** "For those unfamiliar with using Jamboard, let's look at a couple of the features together. First, the pages within a Jamboard are referred to as "frames". The left and right arrows at the top of the page will allow you to move forward and backward in the frames. While there	**Slide 131**

are several different ways to demonstrate thinking within a Jamboard, the methods most likely to be utilized within this activity are pen (marker, highlighter and brush), the sticky note, the shapes option and the text box. These options will allow you to indicate your thinking on the frame for your group."	
Invite participants to share around how the resources they engaged with today might support ensuring students have access to grade appropriate assignments, deep engagement, strong instruction and high expectations. *If you plan to continue this work session, skip these slides and proceed to the intro slide for Section 1E.* **Explain:** "Coming up in Section 1E we take a closer look at the Coherence/Vertical Alignment within the *KAS for Mathematics*." *If this is the end of your current work session, please consider asking participants to provide feedback on their experience so far with the module.* **Explain:** "The KDE needs your feedback on the effectiveness of this module, the learning platform and how to best support you moving forward. Please complete this short survey to provide the KDE with feedback. Feedback from the surveys will be used by the KDE to plan and prepare future professional learning." *Provide participants with the following links:* ● *Participant Module 1 Survey* ● *District/Administrator Version Module 1 Survey*	**Slide 132**  **Slide 133**  **Slide 134**

	
The following slides include options for extending the learning. As each facilitator may have different plans for this work within their school/district, we have provided options that might create further learning opportunities for communities of practice. *These extended learning opportunities are optional. Facilitators who do not plan to facilitate these extensions may skip to slide 139.*	**Slide 135** 
The standards explored throughout today's session are part of a broader resource library. Facilitator's might consider offering additional learning opportunities during which other standards (outside of Grade 4 and Grade 8) might be explored more deeply. *Grade level sample library - Breaking Down a Standard and Assignment Review Protocol*	**Slide 136** 
NOTE: The link for each guide includes a key with a detailed rationale for each assignment at each level. Facilitators will want to share the tasks initially without including the rationales. However, there is also value in allowing teachers to see the facilitator's guide for all three	**Slide 137**

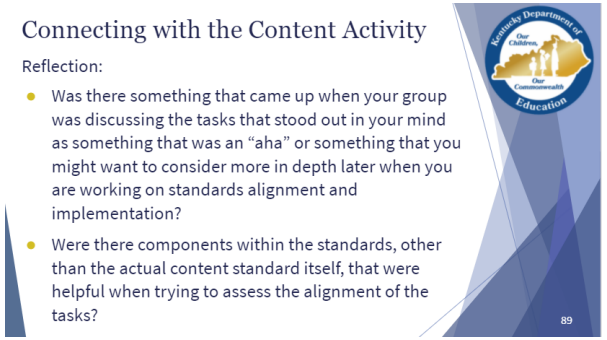
levels at the conclusion of this discovery task. *Participant Guides: Connecting with the Content* **Explain:** "You're going to receive a set of three tasks to review. For each task, your goal is to determine which of the *KAS for Mathematics* the task is aligned to and how closely the task aligns to expectations within the standard. It may help to start with the relevant grade level (or conceptual category) overviews to determine which cluster the task would align with as that may provide direction as to which standards might warrant a closer investigation. As you complete this task, take note of any instructional implications that come to mind that you may want to keep in mind when considering the next steps for implementation of the *KAS for Mathematics*." *You may elect to have participants work individually, with a partner or in small grade-level groups.* *Optional: You could have them select the targeted SMP for each task as well. Note: It is **CRITICAL** that facilitators reinforce that the **TASKS** need to be analyzed to determine what mathematical practice students are asked to engage in. Participants **SHOULD NOT** simply list the mathematical practices written with the standard. Remember those mathematical practices were tagged simply to guide educators in considering how to integrate the practices with the content. Those tagged practices do not represent the only way or the expected way that content standard should be taught.*	
Bring the participants back together. Facilitate discussion around the activity as needed. *Potential Talking Points:* ● *Was there something that came up when your group was discussing the tasks that stood out in your mind as something that was an "aha" or something that you might want to consider more in depth later when you are working on standards implementation?* ○ *The facilitator's guide may reference prior standards that would have been taught*	**Slide 138**

to build the foundation for the targeted standard and specifically point out what that standard requires that makes it an extension of the previous grade level. How often do the participants use prior learning targets to ensure that their instruction and assessment is grade-appropriate?

- *Have the participants reflect on some of their own tasks and consider for themselves how their own instruction would measure up within a tool like this.*

- *Were there components within the standards, other than the actual content standard itself, which were helpful when trying to assess the alignment of the tasks?*
  - *Did participants use the grade level overviews to determine which cluster the task addressed?*
  - *Did participants use the Clarifications component to provide additional understanding?*

***Critical Extension**: Participants could extend this learning by analyzing one of their own tasks/assignments for the degree of alignment or even trading tasks/assignments and determine the degree of alignment for a partner's task/assignment and provide a rationale.*



Section 1E: A Closer Look at the Coherence/Vertical Alignment within the *KAS for Mathematics*

Session Learning Goal:

- To build a shared understanding of the Coherence/Vertical Alignment within the *KAS for Mathematics* and how that component provides guidance for teachers on sequencing content to align with the developmental progressions and the target of the standard.

Session Success Criteria:

- Explain why it is important for educators to know the standards for their grade as well as for the grades before and after theirs.
- Identify the target of a standard (conceptual understanding, procedural skill/fluency or application) and explain how that supports where the standard is placed within the learning progression.
- Describe the connections that relate standards within and across grade levels.

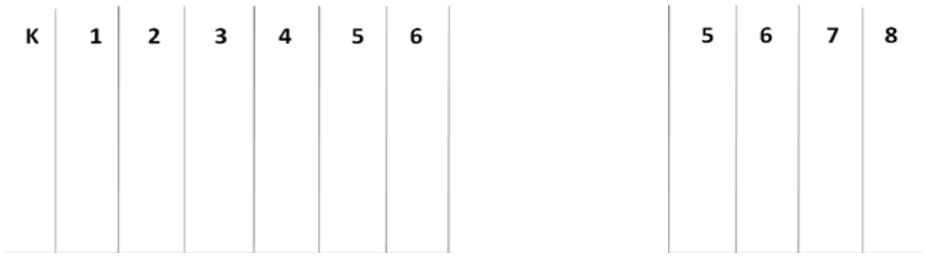
Preparation

Participants should all have access to the *KAS for Mathematics.*

Print Materials Needed:

As the facilitator you can print copies of the materials at the links provided or have participants print their own copies. If participants are responsible for printing their own copies, please specify that and provide necessary links within the invitation to the work session. Ensure that you have enough copies of the following documents within each work session.

- **Discovery Task - Coherence Card Sort:** Facilitators will need to consider whether they plan to engage participants in the Coherence Card Sort using the physical card sort or using Padlet.
    - **For sessions engaging with the physical card sort, facilitators will need to:**
        - Print the cards participants will engage with and have the decks shuffled available for participant groups to select and explore. The decks available for each grade band may be printed separately and then combined once cut to allow participants to explore and discuss all standards for their grade band. The decks are presented separately to allow facilitators to utilize them as time allows.
        - Each group will need one large poster with individual columns for each of the grades included in the card sort they will be participating in (either Kindergarten through Grade 6, Grades 5 through 8 or Grades 8 through High School), written or printed like the ones pictured below.



- Participants will need to be able to see the standards together as they experiment with ordering the cards and placing them in different grades.
  - Grades K-6 Card Sorts
    - Domains: Counting/Cardinality, Number and Operations in Base Ten, Number and Operations Fractions, Ratios and Proportional Relationships and The Number System
    - Domains: Operations/Algebraic Thinking, Expressions and Equations
    - Domains: Measurement and Data, Statistics and Probability
    - Domain: Geometry
  - Grades 5-8 Card Sorts
    - Domains: Number and Operations in Base Ten, Number and Operations Fractions, Ratios and Proportional Reasoning, The Number System
    - Domains: Operations/Algebraic Thinking, Expressions and Equations, Functions
    - Domains: Measurement and Data, Statistics and Probability
    - Domain: Geometry
  - Grades 8-HS Card Sorts
    - Domains: Expressions and Equations, The Number System - Conceptual Categories: Algebra, Number and Quantity
    - Conceptual Category: Statistics and Probability
    - Conceptual Category: Functions
    - Conceptual Category: Geometry

- **For sessions engaging with the virtual task cards via Padlet, facilitators will need to:**
  - Facilitators will need to familiarize themselves with sharing via Padlet. Participants will need to see the standards together as they experiment with ordering the cards and placing them in different grades - Padlet should allow them to do that via sharing on a projector screen or sharing screens virtually. As participants begin their discussion, facilitators should listen for ideas to lift up later in whole group discussions.

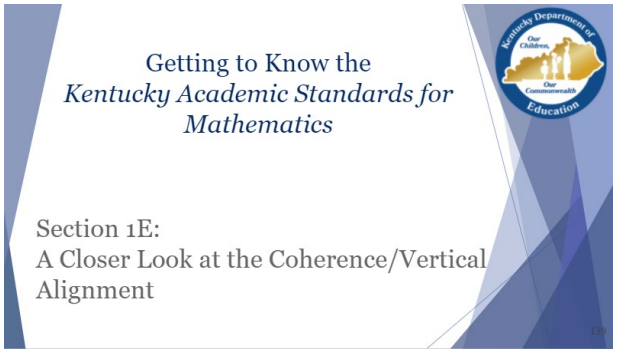
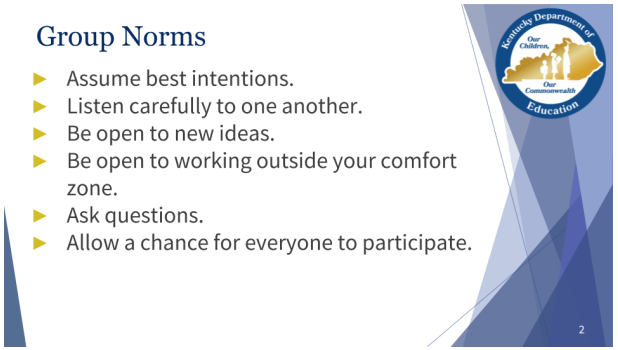
- Facilitators will need to open the Padlets below and **MUST** click to **REMAKE** the Padlet prior to modifying the Padlet. Then facilitator's will share the link **to their specific remake** with participants. Otherwise everyone statewide will be trying to access the same Padlet. Facilitators can share the links or QR codes for **the remade Padlets** participants should engage in during the session.
  - Grades K-6 Padlet Card Sorts
    - Domains: Counting/Cardinality, Number and Operations in Base Ten, Number and Operations Fractions, Ratios and Proportional Relationships and the Number System
    - Domains: Operations/Algebraic Thinking, Expressions and Equations
    - Domains: Measurement and Data, Statistics and Probability
    - Domain: Geometry
    - Combined Grades K-6 Standards
  - Grades 5-8 Card Sorts
    - Domains: Number and Operations in Base Ten, Number and Operations Fractions, Ratios and Proportional Reasoning, The Number System
    - Domains: Operations/Algebraic Thinking, Expressions and Equations, Functions
    - Domains: Measurement and Data, Statistics and Probability
    - Domain: Geometry
    - Combined Grades 5-8 Standards
  - Grades 8-HS Card Sorts
    - Domains: Expressions and Equations, The Number System - Conceptual Categories: Algebra, Number and Quantity
    - Conceptual Category: Statistics and Probability
    - Conceptual Category: Functions
    - Conceptual Category: Geometry
    - Combined Grades 8-HS Standards

  This is adapted from the work within the Coherence Card Sort developed by Student Achievement Partners.

Posters to Make Ahead of Time:

- Issues Bin Poster (Optional):
  - Consider whether an in-person option (such as a poster) or an online version (such as a Google doc) might work best for your participants. A poster can just be labeled "Issues Bin". The Issues bins can be used by the participant to note ideas, questions or issues constructively while the class continues to focus on an activity or lesson.

The following facilitator notes are intended as a companion to the Getting to Know the *KAS for Mathematics* PowerPoint slides.

Facilitator Notes	Accompanying Slide
If facilitating Section 1E at the same time as Section 1D... Explain: "Module 1 is intended to introduce the new *KAS for Mathematics*. Section 1E focuses on Coherence/Vertical Alignment." ***If facilitating Section 1E at a different time from Section 1D...*** *Officially welcome the participants. Introduce yourself (if necessary).*	**Slide 139** 
NOTE: Any changes to group norms made during previous sessions should be reflected here. **Explain:** "Group norms can help to create a safe space where participants feel comfortable sharing their ideas and experiences. Take a moment to read the norms. *(Pause to review norms)* I realize you may not want to pose every question to the whole group, or we may not have time in the session to get to every question. Therefore, I want us to have a place to address those issues. *Introduce participants to the Issues Bin, which provides participants with a safe way of asking questions or suggesting ideas. The Issues bin can be used by the participant to note ideas, questions, or issues constructively while the other attendees continue to focus on an activity or lesson. Participants should feel free to add to the Issues Bin throughout the module. Some issues may be answered in future sections of the module. If the question is pressing and doesn't appear to be addressed in the sections of Module 1, you may email questions/feedback to standards@education.ky.gov.*	**Slide 140** 
Explain: "We want to take a moment to really engage with the other "passengers" on our journey and take stock of where we are now. While there may be different levels of familiarity	**Slide 141**

throughout the participants today, one of the great things about learning is that there is always more to learn - and that applies to learning about one another. It is no small thing this opportunity in front of us - to both learn **from** one another and offer our perspective/expertise **to** one another. So, let's make the most of it together.

For this discussion and others throughout the day, we will use a round-robin style based on your number within your small group. Within your small group, use alphabetical order to determine your number as shown on the slide above. Make a note of your number as our discussions may start with different numbers at different points within our learning."

Explain: "Coherence is all about following the progressions. Knowing where the mathematics is coming from and looking ahead to where it is going. Before looking ahead to where we are going, there is value in looking at where we have been. Our experiences in and out of the classroom have shaped the perspectives we will share with one another throughout our learning together. Let's begin by sharing a little bit with one another."

Facilitator's choice in activity. If slide 142 is used, skip slide 143.

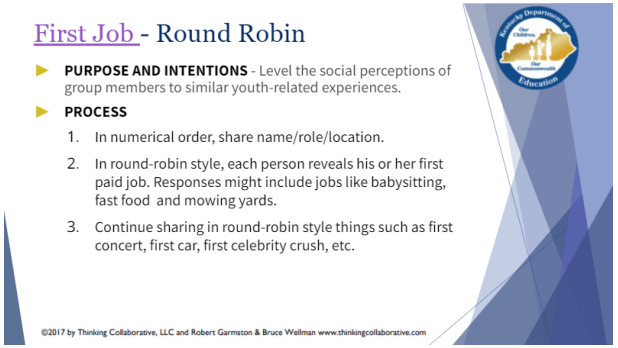
Potential modification: Instead of asking about "firsts" consider switching to "favorites" and utilize similar prompts or a series of "Would You Rather" prompts. In some activities, have groups start at a specific number and cycle around, so that person #1 does not always have to be the first responder.

Facilitator's choice in activity. If slide 143 is used, skip slide 142.

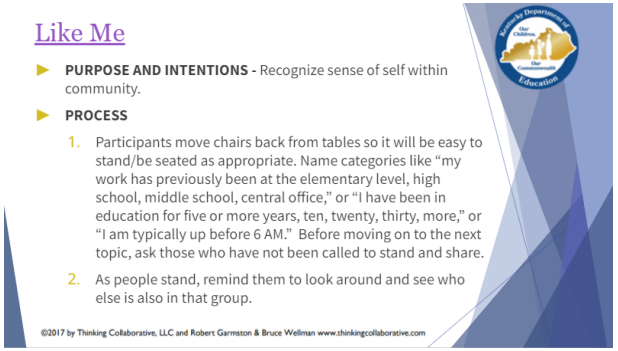
Potential modifications: Select a different set of prompts such as "I speak a language other than English", etc. that are more personal in nature to include as well.

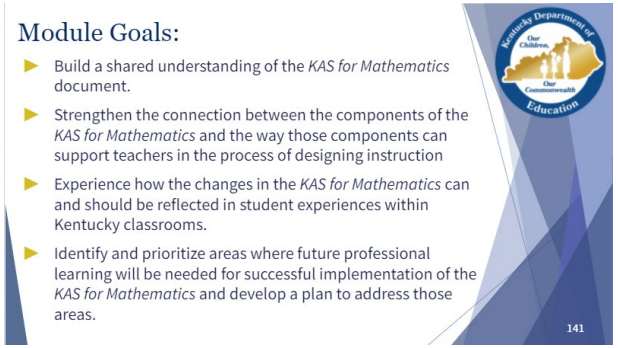
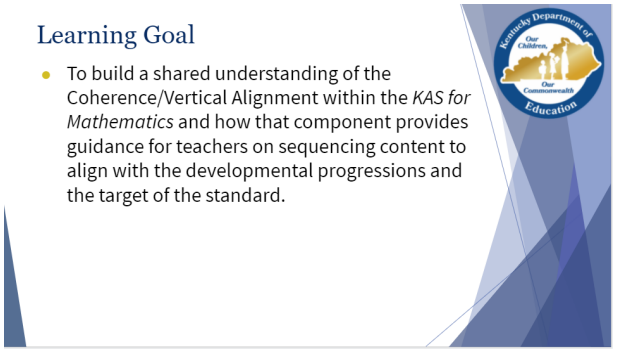
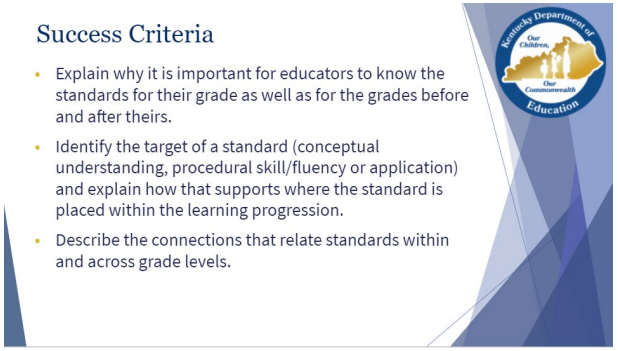
TIPS - Because this strategy is done as an inclusion strategy when you do not yet have relationship with the group, it is important to state the multiple purposes of inclusion activities like this: They include setting norms of participation, focusing mental energy inside the room, answering the questions who am I in relation to others in the room and beginning the journey from an aggregate of individuals to a group. The category "other" is essential. People feel left

Slide 142



Slide 143

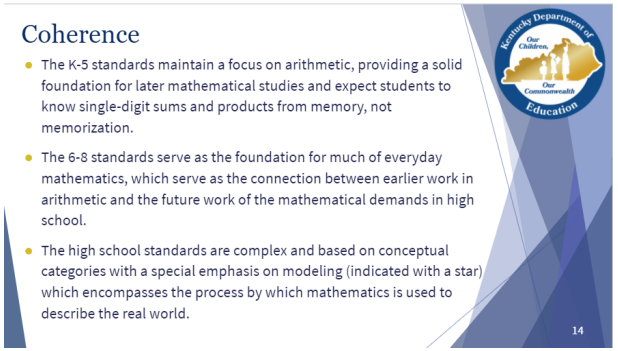


out if their role is not acknowledged.	
Explain: "Throughout the work sessions in Module 1, the goals are for you to: ● Build a shared understanding of the *KAS for Mathematics* document. ● Strengthen the connection between the components of the *KAS for Mathematics* and the way those components can support teachers in the process of designing instruction ● Experience how the changes in the *KAS for Mathematics* can and should be reflected in student experiences within Kentucky classrooms. ● Identify and prioritize areas where future professional learning will be needed for successful implementation of the *KAS for Mathematics* and develop a plan to address those areas."	**Slide 144** 
Explain: "For today's learning journey, we will be building a shared understanding of the Coherence/Vertical Alignment within the *KAS for Mathematics* and how that component provides guidance for teachers on sequencing content to align with the developmental progressions and the target of the standard."	**Slide 145** 
Explain: "We will know this part of our journey together has been successful if we are able to: ● Explain why it is important for educators to know the standards for their grade as well as for the grades before and after theirs. ● Identify the target of a standard (conceptual understanding, procedural skill/fluency or application) and explain how that supports where the standard is placed within the learning progression. ● Describe the connections that relate standards within and across grade levels. We can think of these success criteria as "souvenirs" we are able to carry with us throughout our learning journey."	**Slide 146** 

Explain: "Coherence is about math making sense. The standards are sequenced in a way that makes mathematical sense and are based on the progressions for how students learn. Early numeracy trajectories provide mathematical goals for students based on research through problem solving, reasoning, representing and communicating mathematical ideas. Students move through these progressions in order to view mathematics as sensible, useful and worthwhile to view themselves as capable of thinking mathematically. Within the *KAS for Mathematics*,

- The K-5 standards maintain a focus on arithmetic, providing a solid foundation for later mathematical studies and expect students to know single-digit sums and products from memory, not memorization.
- The 6-8 standards serve as the foundation for much of everyday mathematics, which serve as the connection between earlier work in arithmetic and the future work of the mathematical demands in high school.
- The high school standards are complex and based on conceptual categories with a special emphasis on modeling (indicated with a star) which encompasses the process by which mathematics is used to describe the real world."

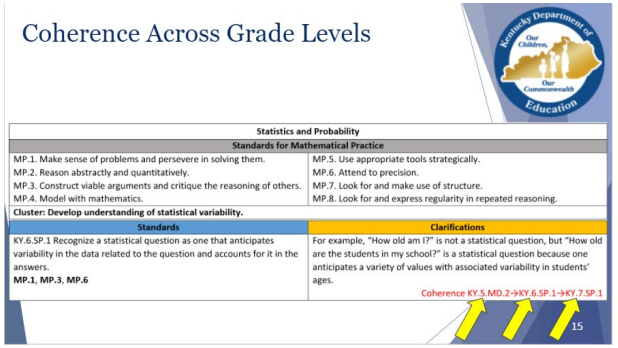
Slide 147



This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live.

Explain: "As a reminder from our initial learning session, one way to look at Coherence/Vertical Alignment is by looking at the relationship **across** grade levels. We looked at KY.6.SP.1 - a Grade 6 standard in the domain of Statistics and Probability. You'll notice the KY.6.SP.1 is the middle standard listed in red within the Coherence. To the left is KY.5.MD.2. This indicates that the KY.6.SP.1 builds off the prior learning from KY.5.MD.2. Similarly, you'll notice KY.7.SP.1 listed to the right of KY.6.SP.1. This indicates KY.6.SP.1 supports the future learning found in KY.7.SP.1. Coherence across grade levels is listed in that manner: prior → current → upcoming."

Slide 148



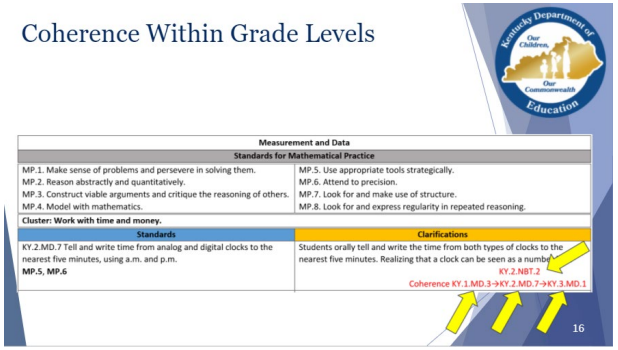
Explain: "At our initial session we used KY.2.MD.7 as our example for Coherence/Vertical Alignment **within** grade levels - a Grade 2 standard in the domain of Measurement and Data. Notice KY.2.MD.7 builds off prior learning from KY.1.MD.3 and supports future learning in

Slide 149

KY.3.MD.1. You'll notice another standard stacked on top of KY.2.MD.7. Stacking in this way within the *KAS for Mathematics i*ndicates a connection between the two standards from the same grade level - KY.2.MD.7 and KY.2.NBT.2. Educators can use this to make additional connections for students and ensure their instruction is "cohesive" and not siloed into domains.

At the end of each cluster in the *KAS for Mathematics* is the statement, 'The identified mathematical practices, coherence connections and clarifications are possible suggestions; however, they are not the only pathways.' Classroom teachers on the standards revision team did not intend for the Coherence/Vertical Alignment component to be restricting for teachers because so much of mathematics is interconnected. Instead, this component was included to support teachers and provide some guidance for planning and designing instruction."

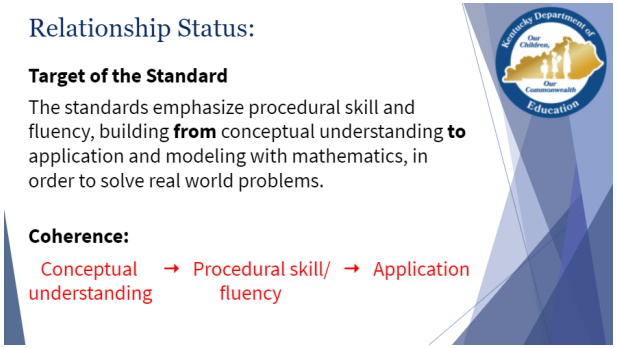
For secondary sessions: "Remember from our initial session, the Coherence/Vertical Alignment component is only listed up through Grade 8. Within the Grade 8 standards, there is an indication of a high school standard that the Grade 8 grade standard will feed into, but that high school standard might be offered at different grade levels or in different courses locally. For example, one Grade 8 standard might feed into content that is taught in some schools at the 9th grade level in Algebra 1. Another Grade 8 standard might feed into a class offered to 10th-12th graders in another school. Those decisions will vary around the state as course sequencing at the high school level is a local decision in Kentucky. For that reason, the standards are presented within Conceptual Categories and Coherence is not listed for the high school standards."

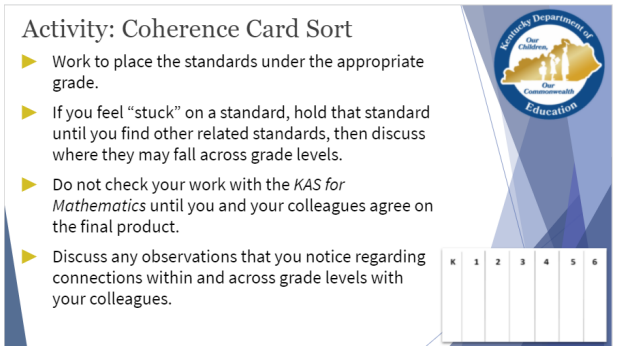


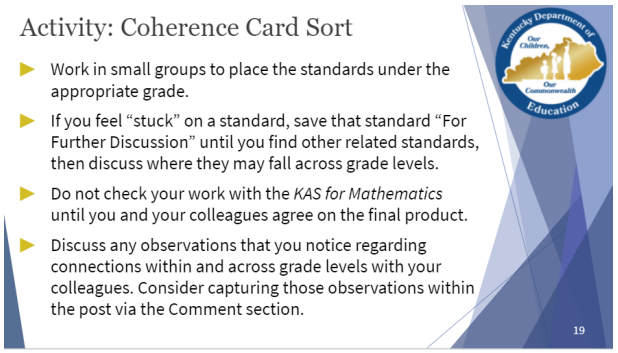
Explain: "Within the *KAS for Mathematics*, the standards emphasize procedural skill and fluency building **from** conceptual understanding **to** application and modeling with mathematics, in order to solve real world problems. The relationship between the target of the standard and the coherence within the standards is one in which gaining understanding of one works in support of gaining understanding of the other and resulting in a deeper understanding of the standard. The mathematical content standards are already written in a mathematical progression.

Let's look more closely at that relationship from both directions. First, recognizing the target of

Slide 150



the standard can support understanding where a standard sits within the coherence/vertical alignment. For example, students would not be expected to demonstrate the ability to apply a standard before developing conceptual understanding. Understanding where a standard sits within the coherence/vertical alignment can also provide insight into the target of the standard. For example, the first time the vocabulary of "function" appears within the standards is in Grade 8 - so there must be some work toward building conceptual understanding of what a function is within Grade 8."	
Facilitators will need to familiarize themselves with the options for this Discovery Task. Both options require pre-work on the part of facilitators. ***This slide is for in-person sessions where participants are sorting the cards - If facilitating the Coherence Card Sort through actual card sorting, slides 152-157 can be skipped when presenting.*** *This activity gets educators involved in uncovering some of the thoughtful progressions within the KAS for Mathematics while also familiarizing themselves with grade level standards. Participation in this activity makes vivid the concept of coherence within and across grades. It is recommended that participants get to explore the entirety of the standards progression from K-12, however, that may need to take place across multiple work sessions or in follow up sessions at the local school/district level.* **Explain:** "The goal is to correctly place the standards within the appropriate grade level. • You may not use the standards during the activity - only at the very end to check your team's work. • The objective is to see how topics and themes within the *KAS for Mathematics* progress vertically and horizontally. • Use the language of the standards as guides for which standard would be placed before or after another standard within the same progression.	**Slide 151** 

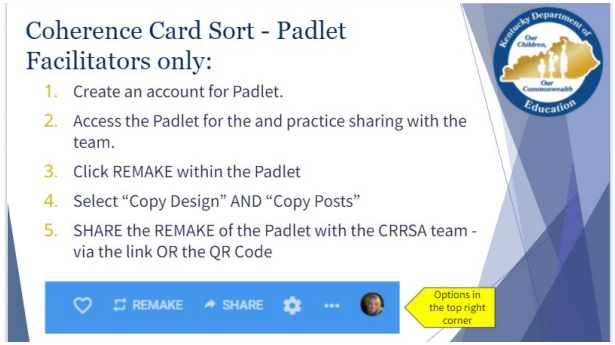
For the coherence activity, we really want you to dig into multiple standards. There are so many examples of coherence in the standards, just looking deeply at one of them is not enough. Pay attention to how the topics progress from one grade to another. See why it is important for educators to know the standards for their grade as well as for the grades before and after. This activity is most beneficial when not using the standards as a guide. We want you to have to mull over these standards and hash out tough decisions with your colleagues. If you feel "stuck" on a standard, hold that standard until you find other related standards, then discuss where they may fall across grade levels. Consider this an opportunity to engage in MP.1 and demonstrate perseverance. When you are finished and comfortable with your choices, use the *KAS for Mathematics* to check your work." ***Note for facilitating high school groups:*** *Since high school courses are not defined by grade level, participants may choose to call 9th grade - Algebra 1/Integrated Math 1, 10th grade - Geometry/Integrated Math 2 and the remaining grades - whatever is the most common course within the progression at the local level to make the activity more meaningful. This activity may support educators in considering how the remaining required standards will be taught to all students across the 3rd course, 4th course or a combination of the 3rd/4th courses.* ***Coherence Card Sort Paper Activity***	
This slide is for In Person/Virtual sessions where participants are engaging with the Coherence Card Sort via Padlet. In this case, slide 151 can be skipped when presenting. *This activity gets educators involved in uncovering some of the thoughtful progressions within the KAS for Mathematics while also familiarizing themselves with grade level standards. Participation in this activity makes vivid the concept of coherence within and across grades. It is recommended that participants get to explore the entirety of the standards progression from K-12, however, that may need to take place across multiple work sessions or in follow up sessions at the local school/district level.*	**Slide 152** 

Explain: "The goal is to correctly place the standards within the appropriate grade level. ● You may not use the standards during the activity - only at the very end to check your team's work. ● The objective is to see how topics and themes within the *KAS for Mathematics* progress vertically and horizontally. ● Use the language of the standards as guides for which standard would be placed before or after another standard within the same progression. For the coherence activity, we really want you to dig into multiple standards. There are so many examples of coherence in the standards, just looking deeply at one of them is not enough. Pay attention to how the topics progress from one grade to another. See why it is important for educators to know the standards for their grade as well as for the grades before and after. This activity is most beneficial when not using the standards as a guide. We want you to have to mull over these standards and hash out tough decisions with your colleagues. If you feel "stuck" on a standard, hold that standard until you find other related standards, then discuss where they may fall across grade levels. Consider this an opportunity to engage in MP.1 and demonstrate perseverance. When you are finished and comfortable with your choices, use the *KAS for Mathematics* to check your work." ***Note for facilitating high school groups:*** *Since high school courses are not defined by grade level, participants may choose to call 9th grade - Algebra 1/Integrated Math 1, 10th grade - Geometry/Integrated Math 2 and the remaining grades - whatever is the most common course within the progression at the local level to make the activity more meaningful. This activity may support educators in considering how the remaining required standards will be taught to all students across the 3rd course, 4th course or a combination of the 3rd/4th courses.*	
This slide is for In Person/Virtual sessions where participants are engaging with the Coherence Card Sort via Padlet. This slide is for facilitators only. Skip this slide when presenting. In this case, slide 151 can be skipped when presenting. *Facilitators will need to:*	**Slide 153**

1. *Create an account for Padlet (if they do not already have an account).*
2. *Access the Padlet participants will be utilizing*

The order here is EXTREMELY IMPORTANT!

3. *Click REMAKE within the Padlet and name the REMAKE appropriate to the audience utilizing it.*
4. *Select BOTH "Copy Design" and "Copy Posts" to ensure all the content transfers.*
5. *SHARE the REMAKE of the Padlet in order to engage participants with the card sort.*

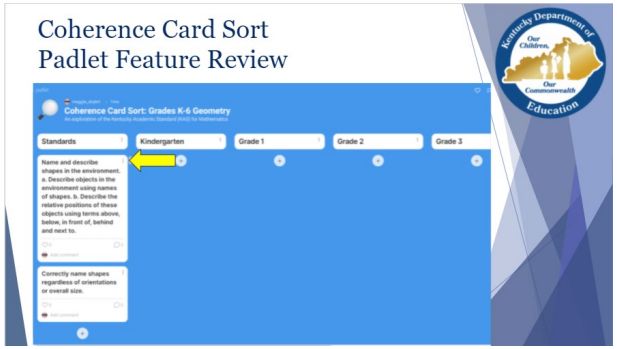


This slide is for In Person/Virtual sessions where participants are engaging with the Coherence Card Sort via Padlet. In this case, slide 151 can be skipped when presenting.

Explain: "In a moment we are going to engage in the Coherence Card Sort in pairs/small groups. We're going to do a quick demo of what you might see when you access the Padlet. The Padlet style is a "Shelf" style - with the sections being labelled things such as Standards, grade levels, For Further Discussion, etc. I know all of those don't show in the image above, but the Padlet does scroll over to the right to include those additional sections.

As you work to place the standards within the appropriate grade level, there are a couple of ways to go about that. You can drag and drop the standards into the appropriate grade (or course for high school participants)."

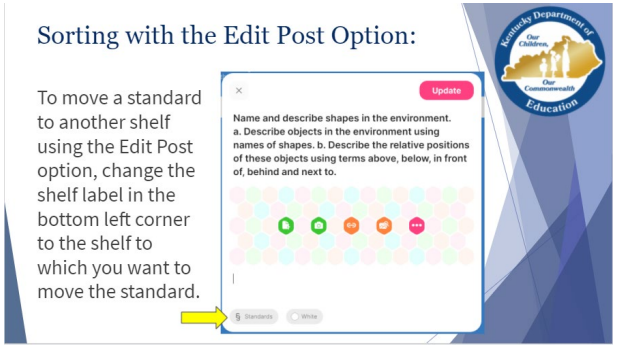
Slide 154

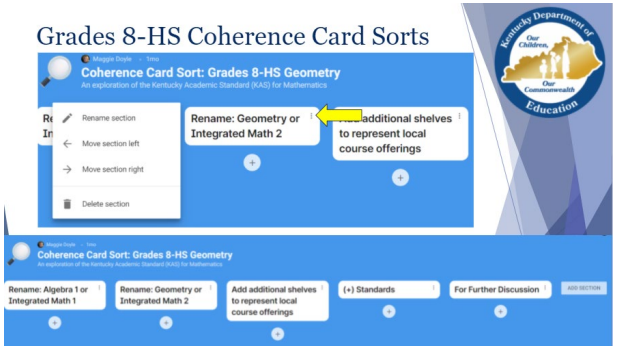


This slide is for In Person/Virtual sessions where participants are engaging with the Coherence Card Sort via Padlet. In this case, slide 151 can be skipped when presenting.

Explain: "To move a standard to another shelf using the Edit Post option, change the shelf label in the bottom left corner to the shelf you want to be the destination. To ensure the standard moves to that new spot, you'll need to select Update. When you return to the Padlet, the post should have moved to the destination "shelf" and a new post will rise to the top of the Standards section."

Slide 155

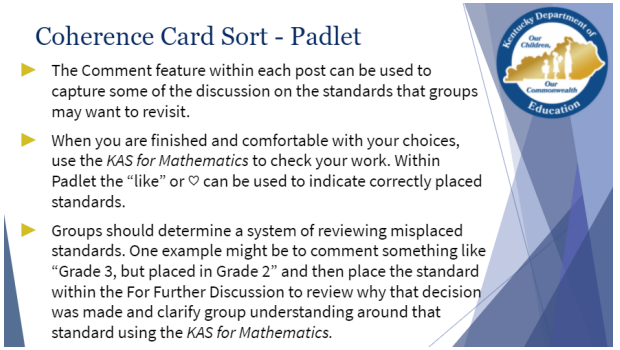


This slide is for In Person/Virtual sessions where participants are engaging with the Coherence Card Sort via Padlet. In this case, slide 151 can be skipped when presenting. **This slide is for secondary sessions where participants may access the card sorts from Grade 8-HS.** *Since high school courses are not defined by grade level, participants may choose to call 9th grade - Algebra 1/Integrated Math 1, 10th grade - Geometry/Integrated Math 2 and the remaining grades - whatever is the most common course within the progression at the local level to make the activity more meaningful. This activity may support educators in considering how the remaining required standards will be taught to all students across the 3rd course, 4th course or a combination of the 3rd/4th courses.* **Explain:** "Within the Grade 8 - high school card sorts, the sections will not be listed by grade level unless participants make that change within their own Padlet. Instead these card sorts will be labeled with headings such as Rename: Algebra 1 or Integrated Math 1. By selecting the three vertical dots on the top right of the "shelf" label you can rename that section to reflect how you offer courses locally - as that is not the same statewide. There is an instruction to add additional sections based on local course offerings. While there may be a variety of elective options, schools may want to consider focusing on the courses containing the additional required standards that must be addressed within the standards through the 3rd course, 4th course or through a combination of the 3rd and 4th courses. It is important to consider where students are given access to the required standards, it is also important for educators to be aware of the content that is not required statewide - indicated within the high school standards with the (+) symbol. There is a section for educators to place those standards within the Padlet."	**Slide 156** 
This slide is for In Person/Virtual sessions where participants are engaging with the Coherence Card Sort via Padlet. In this case, slide 151 can be skipped when presenting.	**Slide 157**

Explain: If you feel "stuck" on a standard, save that standard "For Further Discussion" until you find other related standards, then discuss where they may fall across grade levels.

- The Comment feature within each post can capture some of the discussion on the standards groups may want to revisit or connections within/across grades noted during the discussion. Participants should feel free to include anything they want to remember or come back to reflect on independently or as a group at the end of the activity.
- When you are finished and comfortable with your choices, use the *KAS for Mathematics* to check your work.
    - One way to indicate when standards have been "checked" may be to use the "like" or ♡. Groups should determine a system that works for reviewing misplaced standards. One example might be to comment something like "Grade 3 but placed in Grade 2" and then place the standard within the For Further Discussion to review why that decision was made and clarify group understanding around that standard using the *KAS for Mathematics."*

Coherence Card Sort Padlet Activity



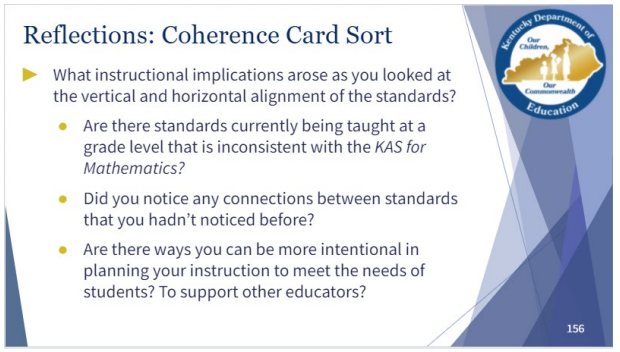
Discussions about how standards are related within and across grade levels and the instructional implications of those connections are ESSENTIAL. ***If the activity is only left as a card sort without any discussion, it loses its impact.***

Consider how to share these questions (before participants begin, posting for participants to consider while engaging in the card sort or as an activity "wrap up"). Facilitator can share these questions and provide time for small group discussion/whole group sharing.

Once teams have had "checked" their work, invite them to capture any reflections via Jamboard. Facilitators will want to share the link to their copy with participants. Facilitators may tailor the frame labels to fit the session participants.

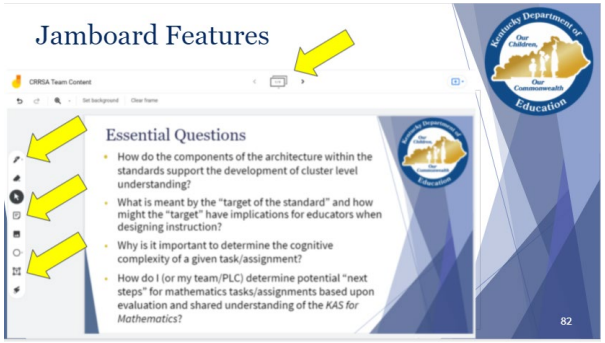
Facilitator listen fors:

Slide 158



● ***What instructional implications arose as you looked at the vertical and horizontal alignment of the standards?*** ○ *When you have a breakdown in student understanding, having a clear understanding of the progression of the standards aids you in identifying where the misunderstanding occurred* ○ *Bridging common transition years within the Coherence Card Sort is important!* ○ *Hyperlinked coherence/vertical alignment helps build teacher clarity and provide info critical to instruction. The vertical and horizontal coherence outlines the progression of the standards.* ● ***Are there standards currently being taught at a grade level that is inconsistent with the KAS for Mathematics?*** ○ *Understanding the grade level expectations within the KAS is critical as standards may not be at the grade level where teachers have taught it historically - Is the standard taught at a grade level consistent with what SHOULD be taught at that grade?* ● ***Did you notice any connections between standards that you hadn't noticed before?*** ○ *Realization that some standards in high school are (+) meaning not required for ALL students.* ○ *Noticed connections between standards across grade levels, with different levels of complexity or different types of models for various grade levels.* ● ***Are there ways you can be more intentional in planning your instruction to meet the needs of students? To support other educators?*** ○ *Time- it's useful for teachers to look at the KAS for Mathematics to determine whether their instructional resources align with KAS.* ○ *Teachers need to go through resources and determine whether they are high quality and aligned with the standards.*	
This slide is animated. Facilitators should familiarize themselves with the animations within this slide prior to facilitating live. **Depending on how familiar participants are with Jamboard, this slide may be skipped.**	**Slide 159**

Explain: "For those unfamiliar with using Jamboard, let's look at a couple of the features together. First, the pages within a Jamboard are referred to as "frames". The left and right arrows at the top of the page will allow you to move forward and backward in the frames. While there are several different ways to demonstrate thinking within a Jamboard, the methods most likely to be utilized within this activity are pen (marker, highlighter and brush), the sticky note and the text box. These options will allow you to indicate your thinking on the frame for your group."

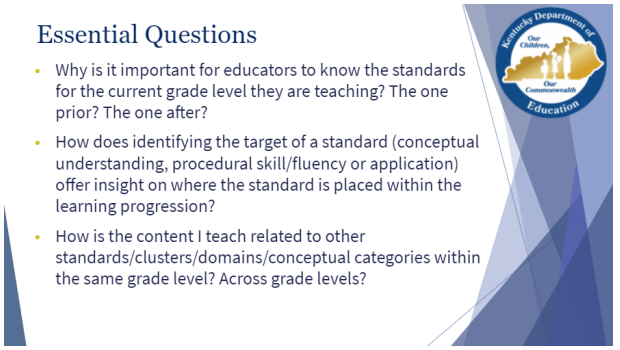


Facilitate discussion around the essential questions.

Facilitator listen fors:

- *The Coherence components should help guide teachers when determining what standards students might need additional support with if they are struggling to understand certain content.*
- *What is the value of exposing students to grade appropriate content? Did participants find evidence that there are standards currently being taught outside of the grade appropriate expectation? If so, how might that be addressed when planning and designing instruction?*

Slide 160



If you plan to continue this work session, skip these slides and proceed to the intro slide for Section 1E.

Explain: "Coming Up Section 1F will provide a "Spotlight" on the resources found in the Front Matter and the Appendices."

If this is the end of your current work session, please consider asking participants to provide feedback on their experience so far with the module. These instructions will be provided at the end of each section to offer participants the opportunity to provide feedback that will be used by the KDE to plan and prepare future professional learning.

Slide 161

Slide 162

Explain: "The KDE needs your feedback on the effectiveness of this module, the learning platform and how the consultants may best support you as you take the next steps. We are going to complete a short survey to share our thinking and provide them with feedback on how the KDE can best meet our needs. Feedback from the surveys will be used by the KDE to plan and prepare future professional learning."

Provide participants with the following links:

- Module 1 Survey: https://www.surveymonkey.com/r/WDVSF6N
- District/Administrator Module 1 Survey: https://www.surveymonkey.com/r/WD9THPG

Section 1F: Spotlight: Front Matter and Appendix A

Preparation

Participants should all have access to the *KAS for Mathematics.*

Print Materials Needed:

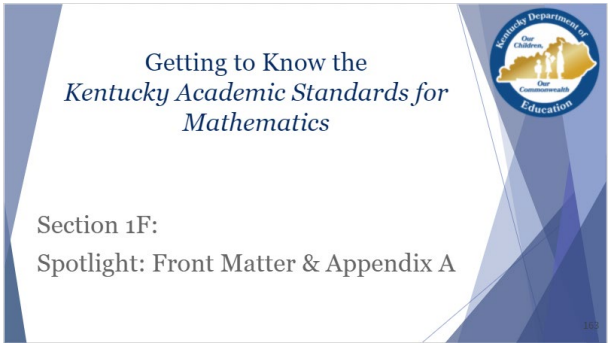
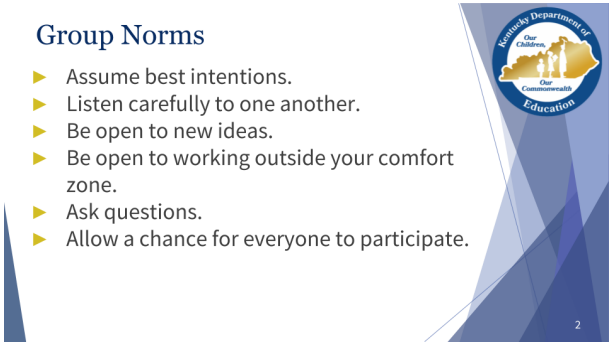
As the facilitator you can print copies of the materials at the links provided or have participants print their own copies. If participants are responsible for printing their own copies, please specify that and provide necessary links within the invitation to the work session. Ensure that you have enough copies of the following documents within each work session.

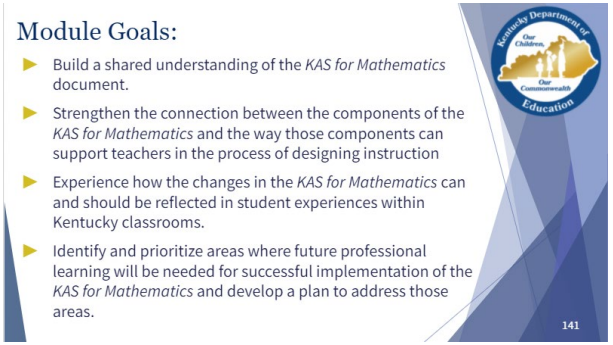
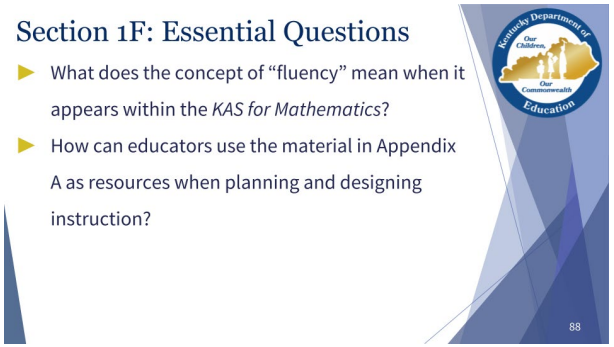
- No print materials needed

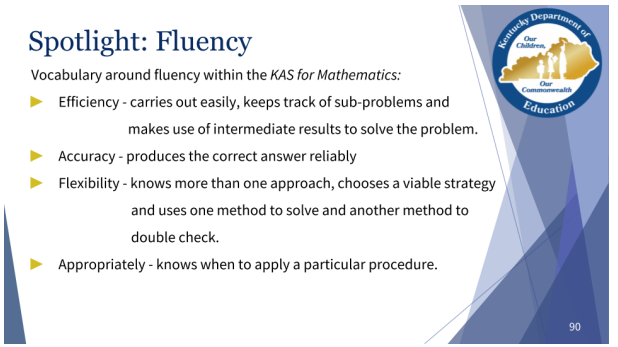
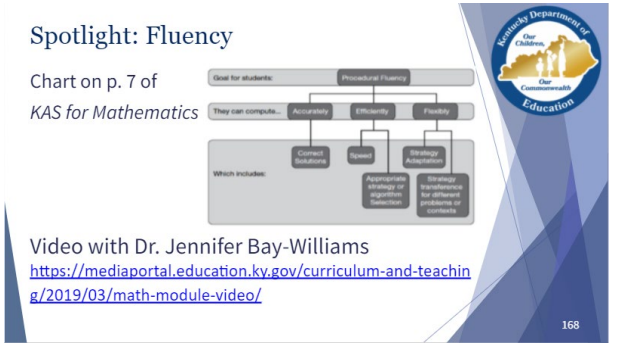
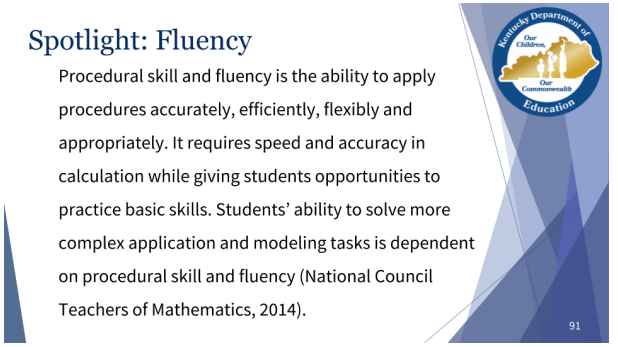
Posters to Make Ahead of Time:

- Issues Bin Poster (Optional):
  - Consider whether an in-person option (such as a poster) or an online version (such as a Google doc) might work best for your participants. A poster can just be labeled “Issues Bin”. The Issues bins can be used by the participant to note ideas, questions or issues constructively while the class continues to focus on an activity or lesson.

The following facilitator notes are intended as a companion to the Getting to Know the *KAS for Mathematics* PowerPoint slides.

Facilitator Notes	Accompanying Slide
If facilitating Section 1F at the same time as Section 1E... Explain: "Module 1 is intended to introduce the new *KAS for Mathematics*. Section 1F shines a spotlight on the Front Matter and the Appendices." ***If facilitating Section 1F at a different time from Section 1E...*** *Officially welcome the participants. Introduce yourself (if necessary).*	**Slide 163** 
NOTE: Any changes to group norms made during previous sessions should be reflected here. **Explain:** "Group norms can help to create a safe space where participants feel comfortable sharing their ideas and experiences. Take a moment to read the norms. *(Pause to review norms)* I realize you may not want to pose every question to the whole group, or we may not have time in the session to get to every question. Therefore, I want us to have a place to address those issues. *Introduce participants to the Issues Bin, which provides participants with a safe way of asking questions or suggesting ideas. The Issues bin can be used by the participant to note ideas, questions, or issues constructively while the other attendees continue to focus on an activity or lesson. Participants should feel free to add to the Issues Bin throughout the module. Some issues may be answered in future sections of the module. If the question is pressing and doesn't appear to be addressed in the sections of Module 1, you may email questions/feedback to standards@education.ky.gov.*	**Slide 164** 
Explain: "Throughout the work sessions in Module 1, the goals are for you to:	**Slide 165**

• Build a shared understanding of the *KAS for Mathematics* document. • Strengthen the connection between the components of the *KAS for Mathematics* and the way those components can support teachers in the process of designing instruction • Experience how the changes in the *KAS for Mathematics* can and should be reflected in student experiences within Kentucky classrooms. • Identify and prioritize areas where future professional learning will be needed for successful implementation of the *KAS for Mathematics* and develop a plan to address those areas. In this session, participants will look more closely at the front matter and Appendices within the *KAS for Mathematics* and will recognize the intentional supports given by these components to ensure classroom instruction is aligned to the content standards."	
Have participants take a self-sticking note and ask them to write down how they would define fluency in mathematics. Give participants a moment to think and write. **Explain:** "Take a moment to share your definition and compare your thinking with the people around you." *Allow time for this then bring the group back together.* **Explain:** "The *KAS for Mathematics* reflect a balance of conceptual understanding, procedural skill/fluency and application. When you do a Google search for the definition of 'fluency in mathematics', in less than a second you'll get a little over 1.7 million results. The idea of 'fluency' is often misunderstood. Moving forward, it is important that we have a shared understanding of what 'fluency' will refer to in the *KAS for Mathematics.*"	**Slide 166** 
Explain: "From p. 7, 'Whenever the word 'fluently' appears in a content standard, the meaning denotes efficiency, accuracy, flexibility and appropriateness. Being fluent means students flexibly choose among methods and strategies to solve contextual and mathematical problems, understand and explain their approaches and provide accurate answers efficiently.'"	**Slide 167**

	
This slide has an embedded video. If you are unable to access the video through the accompanying PowerPoint the link can also be accessed here: https://mediaportal.education.ky.gov/curriculum-and-teaching/2019/03/math-module-video/	**Slide 168** 
Explain: "On p. 6 of the *KAS for Mathematics*, the importance of procedural skill and fluency is spelled out. 'Procedural skill/fluency is the ability to apply procedures accurately, efficiently, flexibly and appropriately. It requires speed and accuracy in calculation while giving students opportunities to practice basic skills. Students' ability to solve more complex application and modeling tasks is dependent on procedural skill and fluency (National Council Teachers of Mathematics, 2014)."	**Slide 169** 
Explain: "Table 6 within Appendix A of the *KAS for Mathematics* is an additional resource dedicated to the standards focused on fluency across all grade levels. Take a moment to look at the fluency standards listed, for your grade level or collectively. Discuss why being fluent in these	**Slide 170**

standards is so important to mathematical proficiency."

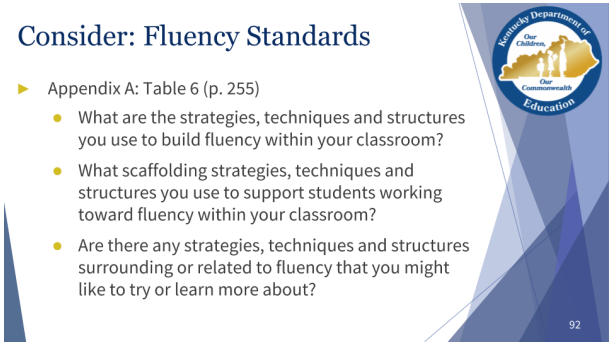
Direct participants to Appendix A within the KAS for Mathematics.

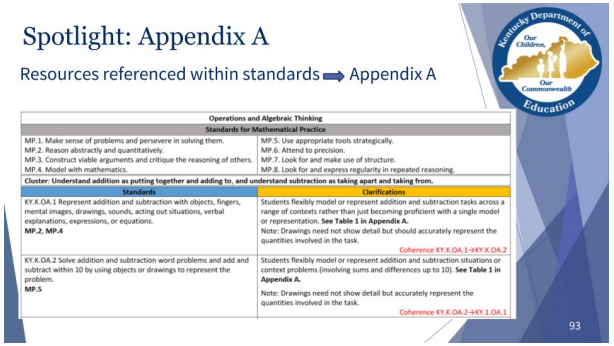
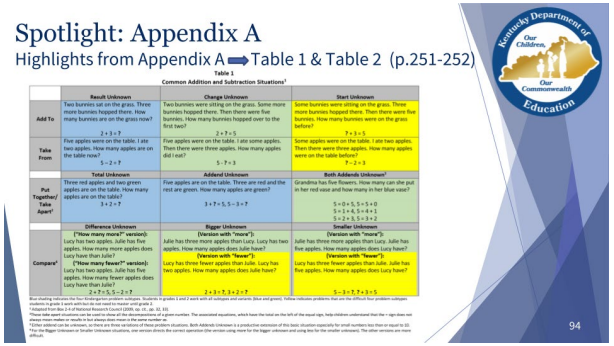
"Effective teaching practices provide experiences that help students to connect procedures with the underlying concepts and provide students with opportunities to rehearse or practice strategies and to justify their procedures. Think of instructional strategies, techniques or structures that are already in place in your classroom or those that you would like to implement."

Potential Talking Points:
Our students enter school believing the myth that the goal in math is to be fast and be right. Do we unintentionally promote that thinking in our teaching? Do we praise students who get the right answer quickly? Do we become impatient with students who need a little more time?

- *What are the strategies, techniques and structures you use to build fluency within your classroom?*
  Teachers might use manipulatives or provide intentional opportunities for students to talk about their work. Teachers might analyze students' procedures to reveals insights and misunderstandings that help teachers in planning next steps in instruction. Teachers might consider creating a tool to help parents during at-home instruction?

- *What scaffolding strategies, techniques and structures you use to support students working toward fluency within your classroom?*
  - *Teachers might refer to some of the strategies here:* https://tntp.org/student-experience-toolkit/view/scaffolding-strategies
  - *Teachers might refer to some of the practices here:* https://www.nctm.org/Conferences-and-Professional-Development/Principles-to-Actions-Toolkit/Resources/7-EffectiveMathematicsTeachingPractices
- *Are there any strategies, techniques and structures surrounding or related to fluency that you might like to try or learn more about?*

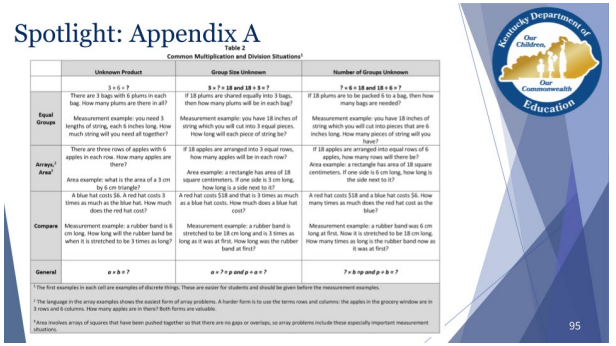


Remind teachers that there is always something new to learn about and put into practice. It is widely believed that the more a teacher knows about his subject matter, the more effective he will be as a teacher. Encourage teachers to share professional learning opportunities with one another. Is there a newsletter, podcast, twitter feed, etc. they use to stay informed on current issues regarding teaching mathematics? For example, NCTM has a Tips for Teachers page.	
Explain: "In addition to the resource for Fluency, there are other resources that provide valuable information for stakeholders in Appendix A. We will look at a couple of those resources that are referenced throughout the K-5 standards in the *KAS for Mathematics.* The example here is of two Kindergarten standards. Notice the bold text in the Clarifications section for these standards, which directs readers to Table 6 in Appendix A."	**Slide 171** 
Direct participants to Appendix A within the KAS for Mathematics. **Explain: "**When readers examine Table 6, there is really valuable information which should be guiding the Kindergarten instruction and assessment for those two standards. The table itself provides readers with categories of questions that students should be learning. There is a lot of information here. First, take note of the information the shading gives the reader: ● Blue shading indicates the four Kindergarten problem subtypes. ● Blue and green shading indicates students in grades 1 and 2 work with all subtypes and variants. ● Yellow indicates problems that are the difficult four problem subtypes students in grade 1 work with but do not need to master until grade 2. Next, the problem types are labeled and have examples (with and without context) with them."	**Slide 172** 

Explain: "A similar table including similar information but with multiplication and division is on page 252. Take a moment to consider how these might be useful to teachers. Are there other stakeholders who might benefit from knowledge of these two resources? Take a moment to discuss how you might use these tools with your table."

If you are facilitating a group that does not consist of K-5 educators, this idea is not unique to those grade levels. The intentionality behind including these two resources really models the type of intentionality that would be valuable when planning instruction over any set of content. Consider this hypothetical situation: Teacher teaches a lesson. Students engage and seem to learn content. Students are assessed over content. Some students (who previously seemed to understand the content) do not show mastery of the content. The teacher is wondering, "What happened?" Is it possible that multiple types of questioning weren't intentionally built into the lesson during instructional planning? Is there an intentional focus on asking multiple question types throughout instruction in order to make sure students can flexibly apply the content in a variety of contexts? Students can sometimes struggle to identify the questions they have when they aren't asked to process content in a variety of ways, like the question types in the chart provided. Non K-5 participants might be able to think of topics that students struggle to handle and how they could build support into their instruction.

Slide 173

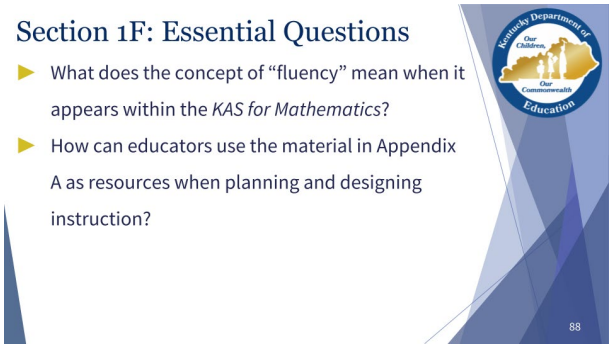


Facilitate discussion around the essential questions as needed.

Potential talking points:

- *What does the concept of "fluency" mean when it appears within the KAS for Mathematics?*
    - *Procedural skill/fluency is the ability to apply procedures accurately, efficiently, flexibly and appropriately. It requires speed and accuracy in calculation while giving students opportunities to practice basic skills.*
- *How can educators use the material in Appendix A as a resource when planning and designing instruction?*
    - *Would this resource be useful to parents/guardians or could it be used to create*

Slide 174



an easy to use instructional aid for parents/guardians? ○ *How might this be useful when planning and designing instruction?* ○ *How might this be useful when planning and designing assessment?*	
If you plan to continue this work session, skip these slides and proceed to the intro slide for Section 1G. **Explain:** "In the next section of Module 1 we will recap what we've covered so far about the new *KAS for Mathematics* and begin planning for the "next steps" that need to be taken to successfully implement the standards. Next up: Section 1G: Wrap up and Next Steps." *If this is the end of your current work session, please consider asking participants to provide feedback on their experience so far with the module. These instructions will be provided at the end of each section to offer participants the opportunity to provide feedback that will be used by the KDE to plan and prepare future professional learning.* **Explain:** "The KDE needs your feedback on the effectiveness of this module, the learning platform and how the consultants may best support you as you take the next steps. We are going to complete a short survey to share our thinking and provide them with feedback on how the KDE can best meet our needs. Feedback from the surveys will be used by the KDE to plan and prepare future professional learning." *Provide participants with the following links:* ● Module 1 Survey: https://www.surveymonkey.com/r/WDVSF6N ● District/Administrator Module 1 Survey: https://www.surveymonkey.com/r/WD9THPG	**Slide 175**  **Slide 176** 

Section 1G: Spotlight: Wrap Up & Next Steps

Preparation

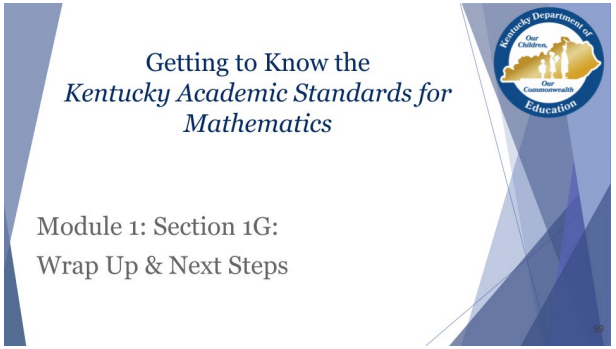
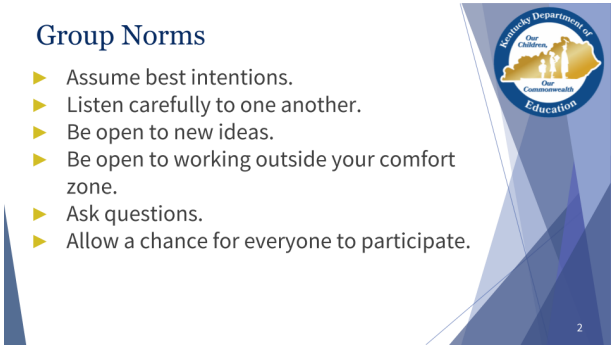
Participants should all have access to the *KAS for Mathematics.*

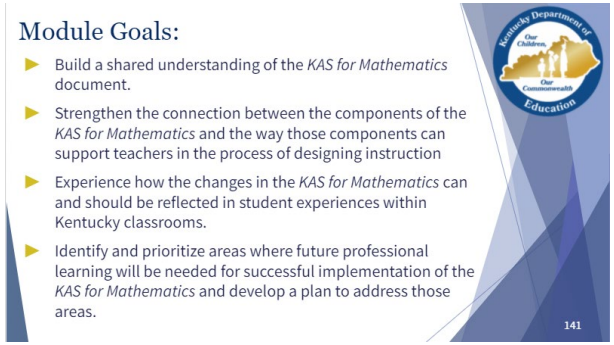
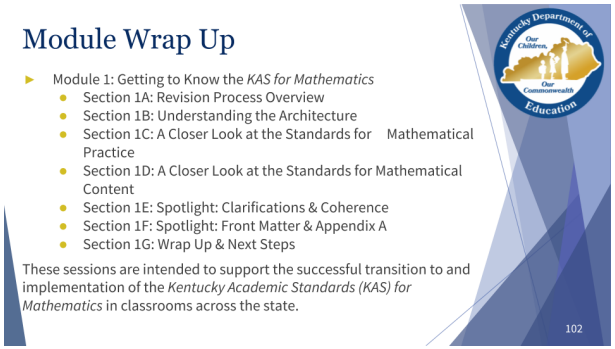
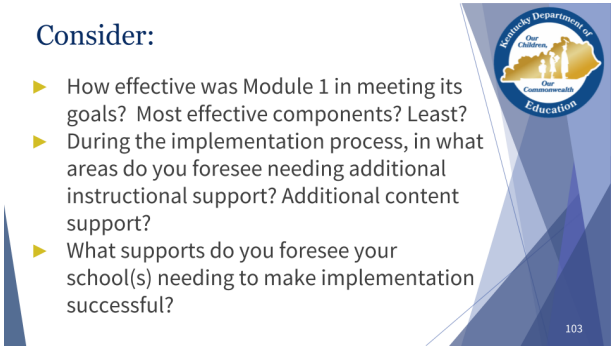
Print Materials Needed:

As the facilitator you can print copies of the materials at the links provided or have participants print their own copies. If participants are responsible for printing their own copies, please specify that and provide necessary links within the invitation to the work session. Ensure that you have enough copies of the following documents within each work session.

- Participant Guide: Teachers
- Participant Guide: School Leadership
- Participant Guide: District Leadership

The following facilitator notes are intended as a companion to the Getting to Know the *KAS for Mathematics* PowerPoint slides.

Facilitator Notes	Accompanying Slide
If facilitating Section 1G at the same time as Section 1F... **Explain:** "Module 1 is intended to introduce the new *KAS for Mathematics*. Section 1G focuses on a wrap up of Module 1 and determining next steps for professional learning." ***If facilitating Section 1G at a different time from Section 1F...*** *Officially welcome the participants. Introduce yourself (if necessary).*	**Slide 177** 
NOTE: Any changes to group norms made during previous sessions should be reflected here. **Explain:** "Group norms can help to create a safe space where participants feel comfortable sharing their ideas and experiences. Take a moment to read the norms. *(Pause to review norms)* I realize you may not want to pose every question to the whole group, or we may not have time in the session to get to every question. Therefore, I want us to have a place to address those issues. *Participants have added to the Issues Bin throughout Module 1. This work session will give participants a chance to reflect upon the module and plan for next steps. It may be helpful for them to access the Issues Bin in planning the work ahead.*	**Slide 178** 
Explain: "Before we take time today to consider our next steps, let's revisit the overall goals for Module 1. Throughout Module 1, the goals are for you to: ● Build a shared understanding of the *KAS for Mathematics* document. ● Strengthen the connection between the components of the *KAS for Mathematics* and the way those components can support teachers in the process of designing instruction ● Experience how the changes in the *KAS for Mathematics* can and should be reflected in student experiences within Kentucky classrooms.	**Slide 179**

• Identify and prioritize areas where future professional learning will be needed for successful implementation of the *KAS for Mathematics* and develop a plan to address those areas.	
Explain: "The seven sessions were designed to meet the four goals of Module 1 and to support teachers, school leaders and district leaders in transitioning to and implementing the new *KAS for Mathematics*."	**Slide 180** 
Explain: "In light of the purpose and function of Module 1, consider these questions. Take 5 minutes to reflect individually and take notes you will be willing to share with a partner." *After 5 minutes, ask participants to find a partner. Identify who should begin (person with the longest hair, person who is the tallest, person whose name comes first alphabetically, etc.). Partner A should answer question 1 while Partner B listens. Then Partner B shares answer 1 while Partner A listens. Partners should take turns answering the questions until both have shared their responses for all three questions. Use a countdown timer to give them 2 minutes to get through the questions. You may provide an additional minute if the conversations are lively and engaging.*	**Slide 181** 
Setup for Success: Pain-Gain Map	**Slide 182**

Explain: "The implementation of the *KAS for Mathematics* will mean that there are changes for educators across the state. To help with generating and prioritizing the next steps in the implementation process, we're going to do a Pain-Gain map. This is an opportunity to collaborate within your work group to create a plan for how you are going to move forward. Essentially, now that you've gotten to know the *KAS for Mathematics*, where do you go from here? Districts and schools will need to prepare and prioritize the next steps in the implementation process. Understanding the *KAS for Mathematics* and its components is just the first step, **actions determine impact**. To help with that process, we're going to do a Pain-Gain map. Most decisions people make are situations where some trade-off exists.

First consider:

- What "**pains**" or obstacles will exist that you will need to plan to address?
- What are your fears?

Then consider:

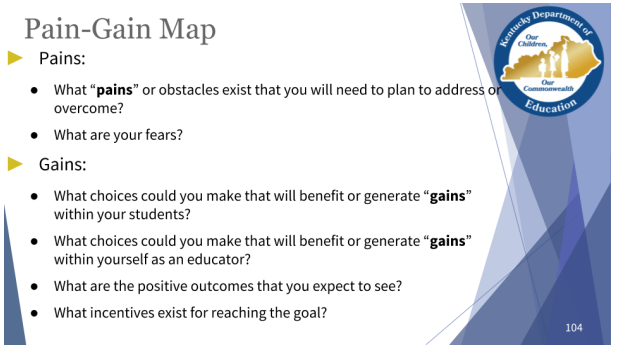
- What choices could you make that will benefit or generate "**gains**" within your students?
- What choices could you make that will benefit or generate "gains" within yourself as an educator?
- What are the positive outcomes that you expect to see?
- What incentives are there for reaching the goal?

It will also be valuable to think about the **support** that you, your department, your school, or your district will need to move forward:

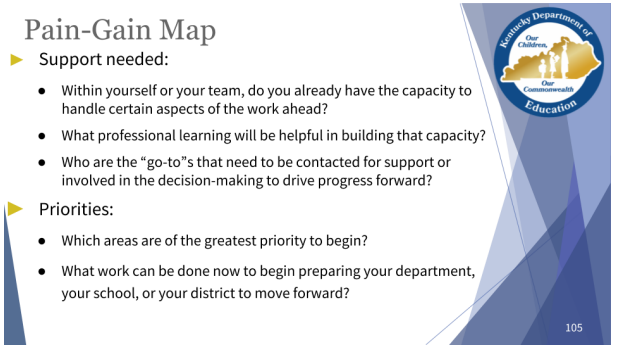
- Within you or your team, do you already have the capacity to handle certain aspects of the work ahead?
- What professional learning will be helpful in building that capacity?
- Who are the "go-to"s that need to be contacted for support or involved in the decision-making to drive progress forward?

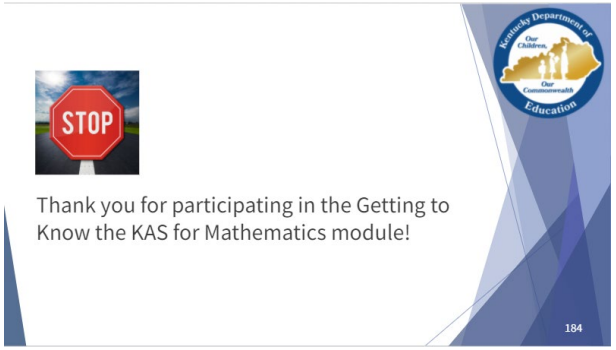
Lastly, consider which of the items are priorities within your department, your school, or your district will need to move forward:

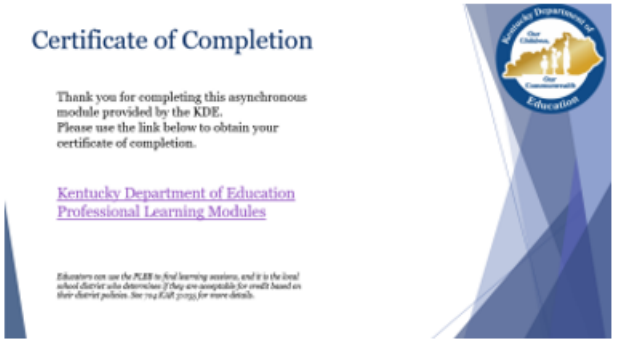
- Which areas are of the greatest priority to begin?



Slide 183



• What work can be done now to begin preparing your department, your school, or your district to move forward? This is an opportunity to collaborate within your work group to create a plan for how you are going to move forward. Essentially, now that you've gotten to know the *KAS for Mathematics*, how do you take your relationship to the next level? What are the next most critical, manageable steps? By framing your understanding of your "work ahead" or the next steps in the process, in this way, your team (whether at the PLC, department or district level) can collaborate to outline a plan to ensure you are addressing these issues." *NOTE: Be sure participants understand they are to list or bullet the next steps for implementation relating to the principle for action in the "Work Ahead" box. Then, they will continue to frame the "Work Ahead" in the process by considering the pains, gains, supports needed and priorities for each element of the "Work Ahead."* *Allow participants to work individually, with a partner or in group to reflect, brainstorm, plan and/or discuss. If time allows, guide participants into prioritizing the next steps so that work continues after this meeting.* *Pass out the Participant Guide: Thinking Back to Plan for the Future. Participants can use this guide as a planning tool. There is a Participant Guide for Teachers, a Participant Guide for School Leaders and a Participant Guide for District Leaders.*	
Bring the group back together. **Explain:** "The KDE needs your feedback on the effectiveness of this module. Please complete this short survey. Feedback from your survey will be used by the KDE to plan and prepare future professional learning." *Provide participants with the survey links:* • *Module 1 Survey: https://www.surveymonkey.com/r/WDVSF6N*	**Slide 184** 

• *District/Administrator Module 1 Survey: https://www.surveymonkey.com/r/WD9THPG* *Be sure to thank participants for their work throughout this module as it has provided a foundation for future knowledge.* *To you, the facilitator, thank you for providing participants with knowledge and support throughout this process. The KDE greatly values your role in facilitating Module 1. We appreciate your time and effort in leading your school and district in the successful implementation of the KAS for Mathematics. Thank you!*	
Be sure to thank participants for their work throughout this module as it has provided a foundation for future knowledge and work. Direct participants to this slide containing a link to a Microsoft Form to obtain a certificate of completion for this module. To you, the facilitator, thank you for providing participants with knowledge and support throughout this process. The KDE greatly values your role in facilitating Module 1. We appreciate your time and effort in leading your school and district in the successful implementation of the KAS for Reading and Writing. Thank you!	

Appendix: Revision Process Overview

Preparation

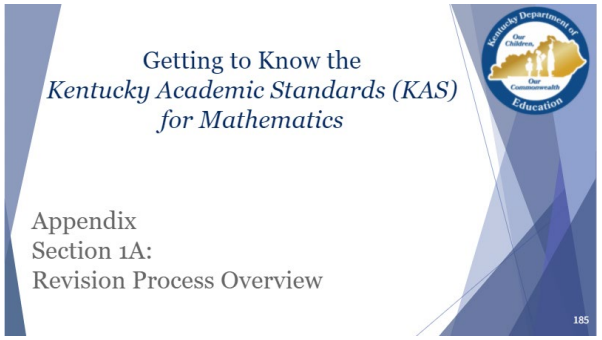
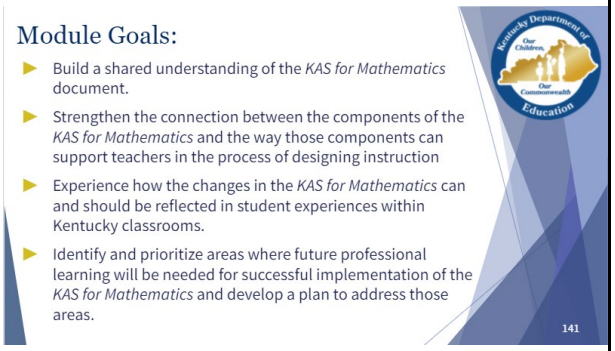
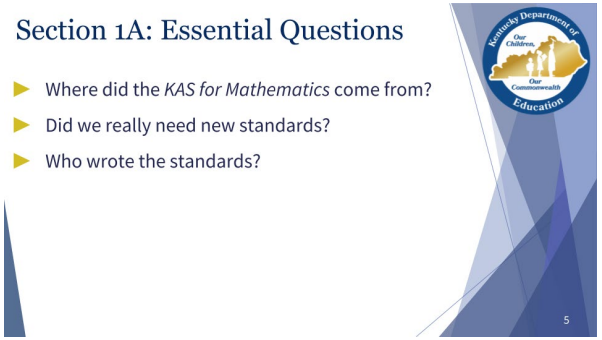
Participants should all have access to the *KAS for Mathematics.*

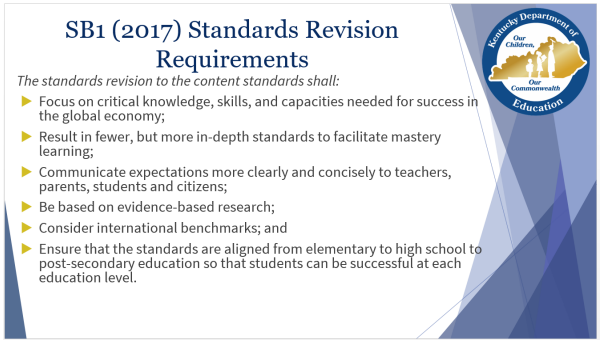
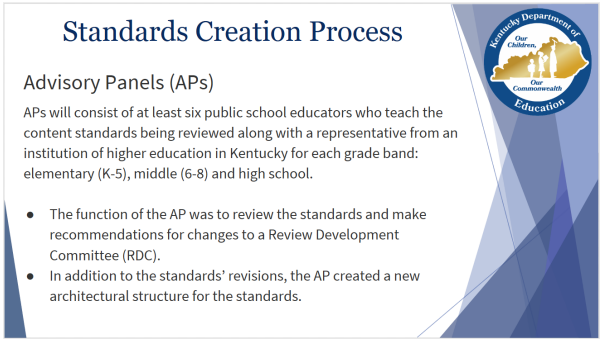
Print Materials Needed:

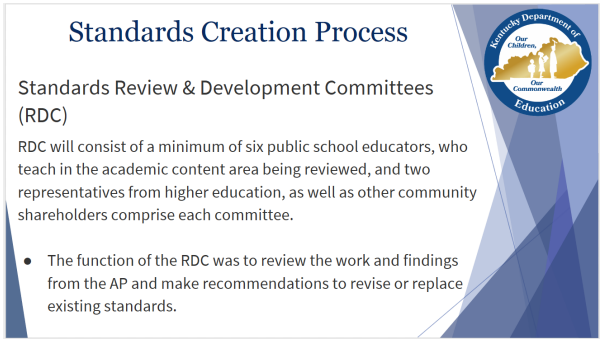
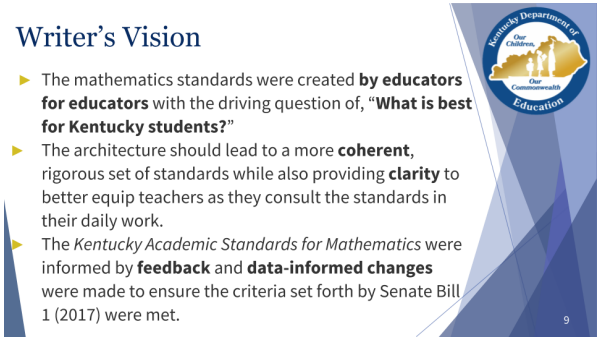
As the facilitator you can print copies of the materials at the links provided or have participants print their own copies. If participants are responsible for printing their own copies, please specify that and provide necessary links within the invitation to the work session. Ensure that you have enough copies of the following documents within each work session.

- Standards Revision Process Critical Fact Sheet July 2019 (optional)

The following facilitator notes are intended as a companion to the Getting to Know the *KAS for Mathematics* PowerPoint slides.

Facilitator Notes	Accompanying Slide
Officially welcome the participants. **Explain:** "Module 1 is intended to introduce the *KAS for Mathematics.* The implementation of the *KAS for Mathematics* will mean that there are changes for educators and students across the state."	**Slide 185** 
Explain: "Throughout Module 1, the goals are for you to: ● Build a shared understanding of the *KAS for Mathematics* document. ● Strengthen the connection between the components of the *KAS for Mathematics* and the way those components can support teachers in the process of designing instruction ● Experience how the changes in the *KAS for Mathematics* can and should be reflected in student experiences within Kentucky classrooms. ● Identify and prioritize areas where future professional learning will be needed for successful implementation of the *KAS for Mathematics* and develop a plan to address those areas."	**Slide 186** 
Explain: "This section of Module 1 is intended to introduce the new *KAS for Mathematics*. Section 1A provides an overview of the standards revision process as required by Senate Bill 1 (2017) and the role that classroom teachers played in the revision process."	**Slide 187** 

Explain: "The standards revision process occurs on a 6-year rotation per the directive of Senate Bill 1 (2017). Throughout this module, you'll notice the standards revision team was very intentional and thoughtful in meeting the requirements of the law. The revision team took great care in communicating expectations clearly and concisely to all stakeholders, while at the same time providing support to aid educators in aligning their instruction to the standards. The requirements listed guided the work." *Allow participants to read the slide. Some talking points might be...* ● *The revision team considered what "critical knowledge, skills and capacities were needed for success". The baseline is building the capacity for success within our students.* ● *Students raised in Kentucky will be participating in a "global economy" and many Kentucky students need to demonstrate a mastery of "international benchmarks" in order reach the goals they've set for themselves.* ● *Current research governed choices throughout the revisions process, along with feedback from the public.*	**Slide 188** 
Explain: "Several committees were formed as a result of this legislative charge. Members of the Advisory Panels (AP) and Review and Development Committee (RDC) were selected based on their expertise in the area of mathematics and were practicing educators in the field of mathematics. Members were chosen to ensure statewide representation in the standards revision process. Part of the work of the AP was to determine the 'architecture' of the *KAS for Mathematics.* For the revision team, determining the 'architecture' meant considering how to include: ● Clear and succinct components educators will find useful as they plan and design instruction. ● Clear and succinct components other stakeholders will find useful in supporting the work happening within Kentucky classrooms. ● Components that come together to create a cohesive structure within the *KAS for Mathematics*."	**Slide 189** 
Explain: "Part of the work of the RDC was to review the work and findings from the AP and make recommendations to revise or replace existing standards. Over 100 Kentucky teachers applied to	**Slide 190**

be on the writing teams. A list of the revision team members is found in Appendix B of the *KAS for Mathematics.*" *Participants interested in more information on the standards revision process, should be directed to the following sites:* ● *Standards Revision Process Critical Fact Sheet July 2019* ● *KDE's Kentucky Academic Standards Revision Process page* ● *Kentucky Academic Standards Review/Revision Timeline*	
Explain: "In order to equip students with the knowledge and skills necessary to succeed beyond K-12 education, the revision team consistently placed students at the forefront of the Mathematics standards revision and development work. The driving question was simple, 'What is best for Kentucky students?' As practicing educators, the revision team saw value in providing support for educators embedded within the standards document itself as opposed to having various external resources in other stand-alone documents. Through this module you'll get an introduction to the supports embedded within the *KAS for Mathematics.* More information on the revision process and the writers' vision statements are found on page 5 of the document."	**Slide 191** 
Facilitate discussion around the essential questions as needed in order to identify whether participants understand the content of Section 1A. Potential Talking Points: ● *Each committee member worked to enhance the standards' clarity and function so Kentucky teachers would be better equipped to provide high quality mathematics for every student. The resulting document is the culmination of the standards revision process: the production of a high-quality set of mathematics standards to enable graduates to live, compete and succeed in life beyond K-12 education.*	**Slide 191**