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Module Overview:

The *Kentucky Academic Standards for Science: An Overview* Module, developed by the Kentucky Department of Education (KDE), contains the materials to be used in work sessions at the district, school, or department level. This module is intended to support the implementation of the *Kentucky Academic Standards (KAS) for Science* in classrooms across the state.

The duration and scope may be customized to accommodate local needs and conditions. However, it is intended that participants engage in all sessions to gain an understanding of the complexity and rigor of the *KAS for Science*.

Materials:

- KDE developed materials that are part of this module:
  - The KAS for Science: An Overview Facilitator’s Guide
  - The KAS for Science: An Overview slide presentation

These materials are available at [KYStandards](http://KYStandards).

- Materials also needed for this module:
  - Appendix E: Disciplinary Core Idea Progressions in the Next Generation Science Standards
  - Appendix F: Science and Engineering Practices in the Next Generation Science Standards
  - Appendix G: Crosscutting Concepts in the Next Generation Science Standards
  - Appendix I: Engineering Design in the Next Generation Science Standards

Goals:

The goals of *The KAS for Science: An Overview* Module are for districts or schools to:

- Build a shared understanding of the architecture and components of the KAS for Science.
- Strengthen the understanding of the three dimensions of science and recognize how they work together to support highly effective science teaching and learning.
• Identify and prioritize areas where future professional learning will be needed for successful implementation of the KAS for Science and develop a plan to address those areas.

At the completion of this module, participants will be able to develop an argument as to how instruction of the *KAS for Science* is the same/different as is generally observed during science instruction.

**Intended Audiences:**

**Participants**
Module participants are district teams that may include, but are not limited to, district leadership, school administrators, instructional specialists/coaches, intervention specialists, department chairs, special educators and active or pre-service classroom teachers. In addition, districts may choose to have anyone planning to conduct observations or walkthroughs in science classrooms participate in this session in order to develop an understanding of the standards that should be guiding the instruction observed in the classroom.

**Facilitators**
Module session facilitators may include, but are not limited to, district leadership, school administrators, instructional specialists/coaches, intervention specialists, department chairs, special educators, classroom teachers and higher education faculty.

**Using This Facilitator’s Guide:**

This facilitator’s guide provides suggestions for structuring each section of this module, recommended learning experiences to prompt meaningful discourse of the *KAS for Science* and guidance on talking points to use with the provided presentation.

As you work through the module, there will be learning experiences provided to aid in developing, or reinforcing, participant knowledge of the *KAS for Science*. Facilitators may need to revise specific tasks in order to meet the needs of the participants or to be respectful of the time planned within the work session.

• **Helpful Hint**
It is important to realize that 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 this happens, reflect on this quote from Graham Fletcher, *“Every teachable moment, doesn’t need to be a...”*
teachable moment, in that moment.” Use these moments to encourage participants to engage in discussion with other participants so that a shared understanding may be developed. If participants ask questions you are not prepared to answer, offer to seek out answers to those questions and share with the larger group.

- Setup for Success
This module begins with a “Setup for Success” intentionally embedded to promote an environment of trust between facilitators and participants and among the participants themselves. Throughout the module, participants will be expected to collaborate in a variety of ways. Using the “Setup for Success” will be critical for participants to actively participate and accept collective responsibility for the successful attainment of the module goals. Facilitators should feel free to adapt these activities to fit the size of the audience and the space of the work session, but they should be mindful that the Setup for Success activities are not randomly chosen ‘icebreaker’ activities; they have been intentionally chosen within the purpose and scope of the entire module.

- Planning Ahead:

- Determine which stakeholders to invite as participants. In the invitation, describe how the work session will benefit them.
- A few days before the meeting, you may want to remind participants to bring their documents to the meeting (see below for Participant Documents Needed).
- Reserve adequate space and equipment. Tables should be set up to support small-group discussion.
- Access to the internet for the facilitator will be necessary in order to access the videos embedded within this module.
- Access to the Internet for participants is helpful but may not be necessary depending on how participants plan to engage with the KAS for Science.

- Preparation:
  - Participant Documents Needed:

Ask participants to plan ahead regarding how they will feel most comfortable engaging with the KAS for Science, either:
  - A device with access to the KAS for Science
  - A hard copy of the KAS for Science (at least one per team)
Facilitator Work Session Supplies Needed:

These items will be needed with this module.

- Computer with access to the KAS for Science: An Overview slide presentation
- Technology with projection capability including a speaker system
- Copies of handouts needed for the session
- Paper or journal to record responses to thought questions/reflectio ns
- Issues Bin - 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. This may be a poster or you may prefer to have a digital Issues Bin where participants can access a Google document, for example, to post questions and that you can modify as the participants work through the sections of the module.
- Poster paper (optional unless otherwise indicated)
- Self-Sticking Notes (optional unless otherwise indicated)
- Colored markers (optional unless otherwise indicated)

Work Session Consideration:

Building a Community

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 that 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 that are included in the module. Again, time allotted for community-building will allow participants to have a voice and be engaged as active contributors and learners.
Module 1: The Kentucky Academic Standards (KAS) for Science: An Overview

Preparation for Session A: Understanding the Architecture and the Components

Posters to Make Ahead of Time:

- Issues Bin Poster:
  - 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. This may be a poster or you may prefer to have a digital Issues Bin where participants can access a Google document, for example, to post questions and that you can modify as the participants work through the sections of the module.

- Setup for Success: Brainwriting
- Prepare four posters with one the following questions written per poster:
  - What is something you tried in your classroom this year for the first time? How did it go?
  - What is one way you grew professionally this year?
  - Who amongst your colleagues was the most helpful to you? Why?
  - In what ways were you helpful to your colleagues this year?
**Session A: Understanding the Architecture and the Components**

<table>
<thead>
<tr>
<th>Facilitator Notes</th>
<th>Accompanying Slide(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Officially welcome the participants. Introduce yourself (if necessary).</td>
<td></td>
</tr>
<tr>
<td>Explain:</td>
<td></td>
</tr>
<tr>
<td>“This module is intended to provide an overview, or reinforce your understanding of, the <em>KAS for Science</em>.“</td>
<td></td>
</tr>
<tr>
<td>Facilitator Notes:</td>
<td></td>
</tr>
<tr>
<td>This slide shows the content incorporated within this module.</td>
<td></td>
</tr>
<tr>
<td>Explain:</td>
<td></td>
</tr>
<tr>
<td>“Group norms can help to create a safe space where participants feel comfortable sharing their ideas and experiences. This slide is a starter. Take a moment to read the norms.”</td>
<td></td>
</tr>
<tr>
<td>Facilitator Notes:</td>
<td></td>
</tr>
<tr>
<td>After people are finished, ask if anyone would like to revise, edit or add any norms to the list. If so, make changes on the slide; if not, move on to your discussion of the Issues Bin.</td>
<td></td>
</tr>
<tr>
<td>Explain:</td>
<td></td>
</tr>
</tbody>
</table>
Facilitator Notes

“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 for to address those issues, questions, or ideas.”

Facilitator Notes:
Introduce participants to the Issues Bin. 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. This may be a poster or you may prefer to have a digital parking lot where participants can access a Google document, for example, to post questions and that you can modify as the participants work through the sections of the module. The purpose of the Issues Bin is to provide participants with a safe way of asking questions or suggesting ideas. Participants should feel free to add to the Issues Bin throughout the module.

Remember that you may not know all of the answers to the questions, and that is okay. Some issues may be addressed in future sections of this module. If the question is pressing and doesn’t appear to be addressed in this module, talk to your district team and determine who would be the best person to contact at the KDE. You may also e-mail questions or feedback to KDEScience@education.ky.gov

Setup for Success: Brainwriting

Explain:
There are undoubtedly great things happening in schools across our state. The process of aligning classroom instruction to the KAS Science will be at the center of the continuous improvement we strive for within our teaching practice and, as a result, within our students. Before you can know where you are going, it is helpful to consider where you’ve been. We are going to begin with that today.”
<table>
<thead>
<tr>
<th>Facilitator Notes</th>
<th>Accompanying Slide(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The goal of this activity is for educators to understand that cultivating something better within our classroom doesn’t mean forgetting or taking value away from the progress made up until this point. To engage in “Brainwriting” have participants answer three of the four questions from the slide on self-sticking notes (one note per question) and then stick them to the appropriate poster. Have participants do a quick “gallery walk” to see the responses of others to the questions. Facilitate discussion of the responses (if needed). Explain: As we progress throughout this module, we hope you will embrace the opportunity to grow professionally and consider how you can work with your colleagues to help one another build off of their current successes to continuously improve the classroom experience for students. Facilitator Note: Letting participants choose which three questions to answer gives them choice while also allowing educators new to the profession to focus on the last three questions which would still apply in the teacher preparatory experience. Explain: “Throughout this module, the goals are for you to: ● Build a shared understanding of the architecture and components of the <em>KAS for Science</em>. ● Strengthen the understanding of the three dimensions of science and recognize how they work together to support highly effective science teaching and learning. ● Identify and prioritize areas where future professional learning will be needed for successful implementation of the <em>KAS for Science</em> and develop a plan to address those areas.”</td>
<td></td>
</tr>
<tr>
<td>Module Goals:</td>
<td></td>
</tr>
<tr>
<td>- Build a shared understanding of the architecture and components of the <em>KAS for Science</em>.</td>
<td></td>
</tr>
<tr>
<td>- Strengthen the understanding of the three dimensions of science and recognize how they work together to support highly effective science teaching and learning.</td>
<td></td>
</tr>
<tr>
<td>- Identify and prioritize areas where future professional learning will be needed for successful implementation of the <em>KAS for Science</em> and develop a plan to address those areas.</td>
<td></td>
</tr>
</tbody>
</table>
Facilitator Notes

Let participants know that at the completion of all four sessions within this module, they will be asked to develop an “elevator speech” around this statement.

Explain:
“Today, we will look at the architecture and components of the standards to build a shared understanding of the *KAS for Science*. Outside of revisions to the science standards themselves, one of the major changes you’ll note is with the architecture of the document and inclusion of various components to support stakeholders. Remember, for the revision team, determining these changes 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 Science.*”

Explain:
“Remember, one charge of KRS 158.6453 is for the standards to “communicate expectations more clearly and concisely to teachers, parents, students and citizens.” Let’s consider how elements of the architecture relate to that statement. As we examine each of the components of the *KAS for Science*, please consider how the new components may support teachers and create new opportunities to engage other stakeholders.”

Facilitator Note:
### Facilitator Notes

Have the participants record this question on their paper/journal and explain that we will come back to this question at the end of the session. As they think of responses throughout the session, they may choose to record them as they go.

Explain:

“These are the key components provided to support the KAS for Science. Take some independent time to browse through the standards document, focusing on the components listed on the slide. We will look at each of these components more intentionally as we progress through this session.”

Explain:

On page 3, you will see the Background and Kentucky’s Vision for Students. Take a moment to read through those 2 sections with these questions in mind:

1. What do you notice and wonder about?
2. How might this information help us understand the rationale for these Three-Dimensional Standards?”

Facilitator Notes:

Have the participants draw a t-chart. On the left side, have them write what they notice and on the right side, have them write wonderings.

Example below:

<table>
<thead>
<tr>
<th>Notice</th>
<th>Wonderings</th>
</tr>
</thead>
</table>

### Accompanying Slide(s)

#### Components to the Kentucky Academic Standards for Science
- Background (page 3)
- Kentucky Vision for Students (page 3)
- Writers’ Vision Statement (page 6)
- Standards Use and Development (page 9)
- How to Read the Standards (page 12)
- Grade Level Overviews
- Grade Level Standards

#### Background and Kentucky Vision for Students
- Go to page 3 of the Kentucky Academic Standards for Science to read the Background and Kentucky’s Vision for Students.
- With these 2 sections in mind:
  1. What do you notice and wonder about?
  2. How does this information help us understand the rationale for these Three-Dimensional Standards?
Facilitator Notes

Have the participants share out in their table groups and use keep track of what is shared in the group by adding a +1 to similar ideas and recording the different responses of others in a different color. The alternate color will still honor the work of the individual while showing how the other’s ideas added to their thinking.

Explain:

“The Writers’ Vision is stated on page 6 of the *Kentucky Academic Standards for Science*. The Writers’ Vision aligns with KRS 158.6453 requirements and public feedback.” Please use this silent time to closely read the Writers’ Vision. As you read, write down or highlight the foundational beliefs of the writers.

Facilitator Notes:

Once participants are finished reading and identifying the foundational beliefs, have a quick conversation around those foundational beliefs. This slide has animation to underline those foundational beliefs.

Some foundational beliefs to pull out are:

- Receive equitable science education.
- Experience science learning beginning in kindergarten.
- Learning progresses yearly.
- Possess sufficient understanding of the science and engineering practices, crosscutting concepts and core ideas of science.
- Able to engage in public discussions on science-related issues.
<table>
<thead>
<tr>
<th>Facilitator Notes</th>
<th>Accompanying Slide(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Become critical educated consumers of scientific information related to their everyday lives.</td>
<td></td>
</tr>
<tr>
<td>• Experience multiple sustained and authentic learning opportunities.</td>
<td></td>
</tr>
<tr>
<td>• Investigate phenomena.</td>
<td></td>
</tr>
<tr>
<td>• Engage in collaborative conversations.</td>
<td></td>
</tr>
<tr>
<td>• Reflect the diversity encountered within the classroom in the local community and across the globe.</td>
<td></td>
</tr>
<tr>
<td>• Work with and develop the ideas that underly science and engineering practices.</td>
<td></td>
</tr>
<tr>
<td>• See connections of science ideas over a period of years.</td>
<td></td>
</tr>
<tr>
<td>• Engage with the interconnectedness of the three dimensions of science.</td>
<td></td>
</tr>
<tr>
<td>• Make sense of the natural world.</td>
<td></td>
</tr>
<tr>
<td>• Have access to high-quality professional learning and resources.</td>
<td></td>
</tr>
</tbody>
</table>

**Explain:**
Take a minute to record the title, “Writers’ Vision” in your notebook. Finish the sentence stem:
These foundational beliefs would mean the student experience in K-12 should...
These foundational beliefs would mean the teacher should...

**Facilitator Notes:**
Some things to look for in their responses are:
• Students should receive science instruction every year.
• Students should understand and be able to use the science and engineering practices and cross cutting concepts and the disciplinary core ideas.
• Students should engage in collaborative discussions on science related issues.
• Students should be critical consumers of scientific information.
• The learning should be authentic.
### Facilitator Notes

- Students should be investigating phenomena.
- Students should be able to see how science ideas are interconnected over the years.
- Teachers should have ongoing access to high quality professional learning.
- Teachers should have high-quality resources about science.

Provide time for some discussion in small groups. As you walk around and listen in to discussions, ask some to share if they specifically target one of the ideas above. Allow the participants to share out in whole group.

### Explain:
Here we see the intended use for standards. It is important to note that standards are the **baseline** of what students should know and be able to do and are not to be used as a set of assessment tasks nor curriculum. The standards are a responsibility of the Kentucky Board of Education and the Kentucky Department of Education. The curriculum addresses **how** learning experiences are designed at the local level.

### Background for Facilitator:
This information is found in the Kentucky Academic Standards for Science At a Glance Document and highlights some key features of the architecture.

### Standards Use and Development

<table>
<thead>
<tr>
<th>Standards are:</th>
<th>Standards are NOT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Statewide baseline of what students should know and be able to do after instruction</td>
<td>✗ A set of instructional or assessment tasks</td>
</tr>
<tr>
<td></td>
<td>✗ Curriculum</td>
</tr>
</tbody>
</table>

“The standards address a foundational framework of what is to be learned, but do not address how learning experiences are to be designed or what resources should be used.”

### Understanding the Architecture

- Standards place an equal importance on the mastery of important science concepts and the use of science and engineering practices.
- Arranged in grade-levels with a breakdown that provides clarity to the depth of the required content.
- Overviews were added for Kindergarten through high school. These provide an overview of key disciplinary science ideas at each grade level as well as the science and engineering practices and crosscutting concepts students are expected to use to demonstrate their understanding of these ideas.

Note: For high school teachers, the overviews are provided for each discipline as opposed to grade levels to coincide with the flexibility given to local districts to determine curriculum.
Explain:
Grade level overviews were added for kindergarten through high school. These provide an overview of the key disciplinary science ideas at each grade and, for high school, each discipline. The science and engineering practices and crosscutting concepts students are expected to use to demonstrate their understanding of these ideas are also included in the overview. In addition to grade level overviews, grade-band overviews for engineering design describe the key components of the engineering design process. These can be found on pages 47, 96, 158 and 164 of the KAS for Science. Additional examples of the specific overviews are identified in the Table of Contents.

Facilitator Notes: You may consider grouping participants according to the grade level they teach so that participants can support one another as they examine the overview. Circle back around to the essential question for Session A recorded in your notebook and add ideas for how the overviews are useful in communicating with different stakeholders. You can facilitate some discussion around question 2 using the Think-Write-Pair-Share strategy. The traditional Think-Write-Pair-Share strategy is designed to differentiate instruction by providing participants with time and structure for thinking about a given topic, enabling them to formulate individual ideas and share these ideas with a peer. Allow time for participants to share ideas in whole group.
Explain:
“Each one of the performance expectations are three-dimensional. This means that the performance expectations are made up of a science and engineering practice, cross cutting concept, and a disciplinary core idea.

Science and Engineering Practices refer to what the students do and describes the way in which scientists and engineers engage in their work. They engage in wonder, design, modeling, argumentation, communication, and engineering thinking. While a specific practice may be identified in each performance expectation, students should engage in all practices because this helps them understand how scientific knowledge develops and the links between science and engineering.

Disciplinary Core Ideas refer to what the students know. Core ideas found in the Kentucky Academic Standards for Science are foundational understandings so that students may later acquire additional information on their own. The core ideas are organized by discipline: physical science, life science and earth/space science. Also found here are the ideas used in the engineering design process, identified as ETS (engineering, technology, and application of science).

Crosscutting Concepts are conceptual tools that are used as lenses for understanding the natural/designed world. They provide ways of thinking and reasoning about phenomena across disciplines, uniting core ideas throughout the fields of science and engineering. While specific crosscutting concepts may be identified in each performance expectation, explicit instruction and engagement in all of the crosscutting concepts is expected. This will help deepen students’ sensemaking across a range of disciplinary contexts.”
Facilitator Notes

Explain:
“Think of the three components of three-dimensional learning as three intertwining stands of a rope. While the rope can be separated into its three different strands, the strength of the rope is determined by the strands working together; separating the strands weakens the rope so that it is no longer effective for our intended use.

Likewise, while in the past we may have separated out the knowledge and skills students need in the study of science. Knowing and doing cannot be separated if our goal is the kind of usable, conceptual understanding students need to think, act, and learn like scientists.

Three-dimensional learning (science and engineering practices, core ideas, and crosscutting concepts working together ) is therefore a non-negotiable for science lessons and units.”

Facilitator Note:
Have the participants read the quote on the slide to help them understand how the students use each of the three dimensions to make sense of the world around them.

Explain:
“This table provides a summary of each science dimension. We will have the opportunity in the future sessions to gain a more in depth understanding of each of the dimensions.”

<table>
<thead>
<tr>
<th>Three-Dimensional Standards</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>It is through engaging the students in the science and engineering practices and having them look through the lens of the cross-cutting concepts that the students learn the disciplinary core ideas to make sense of phenomena or design solutions to problems.</td>
<td></td>
</tr>
<tr>
<td>Three-Dimensional Standards</td>
<td></td>
</tr>
<tr>
<td>Science and Engineering Practices</td>
<td>Disciplinary Core Ideas</td>
</tr>
<tr>
<td>Engaging in scientific and engineering practices involves students engaging in the practices of doing science and engineering. Examples include: Investigating, Planning and Carrying Out an Investigation, Analyzing and Interpreting Data, Developing and Using Models, Planning and Carrying Out an Investigation, Engaging in Argument from Evidence, and Obtaining, Evaluating, and Communicating Information.</td>
<td>Investigating the properties of matter, describing the properties of matter, investigating the interactions between matter and energy, investigating the changes that occur in the environment, and investigating the changes that occur in the environment.</td>
</tr>
</tbody>
</table>
### Facilitator Notes:

Allow some reflection time after learning about the three-dimensionality of the KAS for Science. Use the Think-Write-Pair-Share strategy once again to allow some small group discussion prior to whole group discussion. This allows all participants to have a voice and provides a space for all to feel comfortable sharing in a whole group setting.

### Accompanying Slide(s)

**Reflection on the Three-Dimensionality of the Standards**

- How is three-dimensional instruction the same and different from what you have experienced in the past as a student and as a teacher?

**How to Read the Standards**

Sample Kentucky Academic Standards for Science

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**Background for the Facilitator:**

The NGSS are based on A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas (Framework) developed by the National Research Council (NRC). In
putting the vision of the Framework into practice, the NGSS have been written as performance expectations (PEs), that depict what students must do to show proficiency in science. To show alignment and coherence to the Framework, the NGSS include the “foundation boxes” in ensure that curriculum and assessment developers would not be required to guess the intent of the PEs.

Facilitator Notes:
For this discussion, you may wish participants to have access to the KAS for Science, especially if they are unfamiliar with the layout.

Facilitators may note here that teachers may choose to go beyond the state boundary in instruction, especially if it will meet the needs of their students.

Explain:
“The KAS for Science are adapted from the Next Generation Science Standards. They were officially adopted on June 5, 2013 by the Kentucky Board of Education and then revised July 5, 2023.”

Talking Points:
- Due to the structure, the PEs depict what students must do to demonstrate their ability to utilize science and engineering practices and cross cutting concepts to understand the science concepts.
- An engineering design component means that there is an application of science to solve some human need.
Facilitator Notes

Explain:
“The codes for the performance expectations were derived from the Framework for K-12 Science Education. The first digits indicate a grade K-8 or HS (high school).”

Talking Points:
- All components of the KAS for Science are grade-banded
- Kentucky determined into which grade the Middle School PEs would be divided into
- Kentucky has associated the High School PEs with some courses that schools may offer. These can be accessed at the Course Standards webpage.
- While some PEs may incorporate engineering design principles, there are specific engineering design standards for each grade band.

Explain:
“The next alpha-numeric code specifies the discipline. The chart on the screen shows the 4 disciplines in science. Since this performance expectation (PE) contains the PS code, this PE falls under the Physical Science Discipline.”
Facilitator Notes

Explain:
“After the discipline, you see an addition number, corresponding to a specific core idea in that discipline. The core ideas can be seen on slide 19. Since this has the number 4 following the PS, that means that this PE addresses Waves.”

Explain:
“Finally, the number at the end of each code indicates the order in which that statement appeared as a DCI in the Framework.”

Facilitator Notes:

Allow participants 2-3 minutes to explore the standards page for their grade/grade level/course identifying the:

- Performance Expectation
- Foundation Boxes
- Clarification Statements
- Assessment Boundaries
- Performance Expectations with an * (Note: the Performance Expectations marked with an * signify an engineering design component.)
<table>
<thead>
<tr>
<th>Facilitator Notes</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Explain:</td>
<td><strong>Exploration and Connections</strong></td>
</tr>
</tbody>
</table>
| “With others in your [grade/grade band/course] share some findings you had. Discuss any surprises or concerns you may have.” | - Now that you have explored the standards for your grade level, go back to your grade level overview.  
- How does the grade level overview capture what you noticed during the standards exploration? |
| Facilitator Notes: | |
| During this time, you may wish to walk around and listen to the conversations. If there are few people present, you may wish to have one group discussion. When sharing out, have participants share their findings, surprises, ah-ha’s, concerns, etc. | **Exploration and Connections** |
| Explain:         | |
| “Now that you have had the opportunity to explore your grade level standards, take some time to compare this will your grade level overview. How does the grade level overview capture what you noticed in your standards?” Discuss your thoughts with others in your [grade/grade band/course]. | |
| Facilitator Notes: | |
| Again, you may wish to walk around and listen to the conversations. You should ensure that everyone sees the connection between the grade level overview and the standards. They should see that the overview is simply a high-level summarization of the standards. The overview only includes disciplinary core ideas, science and engineering practices and cross cutting concepts found within the standards of that particular grade level. | **Exploration and Connections** |
### Facilitator Notes

**Explain:**
“We have spent some time investigating the general architecture of the *KAS for Science*. In future sessions we will look at each of the dimensions of science in more detail.”

**Explain:**
“At this time we are going to Stop and Reflect on the learning from Session A. Using your paper/journal, answer the questions on the slide.”

**Facilitator’s Notes:**
You may decide to allow participants to share or this may just be for the participants self-reflection. You can ask the participants to post their questions to the Issues Bin created at the beginning of this module.

### Accompanying Slide(s)

**During this session we have:**
- Investigated the general architecture and components of the *KAS for Science*

Future sections will investigate the dimensions in more detail.

**Reflection for Session A**
Now that you have completed Session A on the general architecture and components of the *KAS for Science*, complete the reflection below.

- What three concepts are I taking away from this session?
- What about the session squares with my beliefs?
- What questions are still on my mind?

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**Module 1: The Kentucky Academic Standards (KAS) for Science: An Overview**

**Preparation for Session B: Dimensions of Science: Disciplinary Core Ideas (DCIs)**

**Facilitator Work Session Supplies Needed:**
These items will be needed with this module.

- Computer with access to the KAS for Science: An Overview slide presentation
- Technology with projection capability including a speaker system
- Appendix E (paper or electronic)
- Appendix I (paper or electronic)
• Poster paper (if facilitator chooses a gallery walk for DCI sharing)
• Self-sticking notes (if facilitator chooses a gallery walk for DCI sharing)
Session B: Dimensions of Science: Disciplinary Core Ideas (DCIs)

<table>
<thead>
<tr>
<th>Facilitator Notes</th>
<th>Accompanying Slide(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain:</td>
<td></td>
</tr>
<tr>
<td>“We will now be investigating the three dimensions of the <em>KAS for Science</em>. We will begin with the Disciplinary Core Ideas, or DCIs.”</td>
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</tbody>
</table>

Background Information for Facilitator:

The Framework focuses on a limited number of core ideas in science and engineering both within and across the disciplines. This decision was made in order to avoid the shallow coverage of a large number of topics and to allow more time for teachers and students to explore each idea in greater depth. Reduction of the sheer sum of details to be mastered is intended to give time for students to engage in scientific investigations and argumentation and to achieve depth of understanding of the core ideas presented. Delimiting what is to be learned about each core idea within each grade band also helps clarify what is most important to spend time on, and avoid the proliferation of detail to be learned with no conceptual grounding. (NRC, 2012)

There is an additional section on Engineering Design, which also falls under the DCIs. Facilitators may wish to combine the two concepts together or keep them as separate discussions.
<table>
<thead>
<tr>
<th>Facilitator Notes</th>
<th>Accompanying Slide(s)</th>
</tr>
</thead>
</table>
| **Facilitator Notes:**  
Briefly review learning and experiences from the previous learning, using information on this slide for guidance. You may also bring out any discussions that came out in the previous session. | **Previous Learning**  
- Standards depict what students must do to show proficiency in science  
- Architecture and components of the KAS for Science  
- Three-dimensionality of the standards |

| Explain:  
“Because of the easy access of information, or facts, an important role of science education is to prepare students with sufficient core knowledge so that they can acquire additional information on their own. Therefore, a small set of core ideas that meet these criteria were developed. These core ideas, or elements of them, appear across science domains.” | **Session B Essential Question**  
- What are the Disciplinary Core Ideas (DCIs) and why are they important? |

|  | **Disciplinary Core Ideas (DCI)**  
- Key scientific ideas that  
  - Have broad importance across multiple science disciplines  
  - Work together to support students in explaining phenomenon or designing solutions.  
  - Provide key conceptual tools for understanding more complex ideas  
  - Be accessible to younger students but broad enough to go into depth and sophistication over time |

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This video highlights the DCIs and why they are important. After watching the video, participants will be asked to reflect on what they saw and heard. Facilitators may wish to share the questions shown on the next slide in order to set the stage for the video. Video can be found at [https://www.nextgenscience.org/resources/video-ngss-disciplinary-core-ideas](https://www.nextgenscience.org/resources/video-ngss-disciplinary-core-ideas).

After watching the video, participants should reflect on these two questions. How this reflection could occur is up to the facilitator. However, it is recommended that participants be provided time to reflect individually first before whole group reflection/discussion occurs.

Ideas to listen for:
- Teaching is not around specific scientific “facts”
- Instruction is around “Big Ideas”
- Student discourse assists in leading toward understanding
- Application of the “big ideas” are readdressed within the same school year and across years
**Facilitator Notes**

**Explain:**

“To see how these core ideas progress across grade bands, a progressions document, Appendix E, was developed. The information provided here is not exhaustive of all the elements of the DCIs, but does provide a general overview of how an idea increases in depth and sophistication over time.”

Slides 36-38 provide further background about the DCIs and the progressions from K-HS. Participants will need access to Appendix E as they will be using this during the exploration described in Slide 37. You should determine when would be best for participants to access Appendix E.


**Accompanying Slide(s)**

**Appendix E**

- Demonstrates a progression of understanding of core ideas across grade levels

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This is a sample page showing the progression of some of the Physical Science progressions.

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**Facilitator Notes**

Explain:
“Take a few moments to explore the DCI progressions.”

Facilitator Notes:
Allow participants two or three minutes to individually explore Appendix E. After this time, lead a discussion of the large group, sharing their findings, surprises, ah-ha’s, etc.

Some findings to point out:
- Some sub-DCIs at particular grade-bands contain an “N/A” (e.g., PS3.A for K-2)
- Some sub-DCIs are combined into a single statement for some grade bands (e.g., LS3.A & LS3.B for K-2 and 3-5)
- Some content for a given sub-DCI is located elsewhere (e.g., LS2.B for K-2)

*Important Note: The progressions shown in this Appendix provide a big picture of the core ideas presented. In addition, these are expectations at the end of the grade band. More detail about each core idea is provided in the Framework. A resource that goes into further detail for each progression is *Disciplinary Core Ideas: Reshaping Teaching and Learning*.

**Explain:**
“We will now explore the progression in a bit more depth.”

Possible Set-ups for this exploration:
- Whole group looking at the same sub-DCI(s)
- Small heterogeneous groups having discussions about different sub-DCIs. Findings could be posted and a gallery walk/carousel could follow.
Facilitator Notes

- Small homogeneous (same grade/grade and/course) groups having discussions about different sub-DCIs and the implications for their curriculum. A jigsaw protocol could be used to share across the entire group.

If small groups are chosen, the facilitator may wish to walk around and listen to the conversations.

Explain:
Also incorporated within the DCIs are standards defining Engineering Design, which we will now explore.”

Background Notes for Facilitators:
The term “engineering design” has replaced the older term “technological design,” consistent with the definition of engineering as a systematic practice for solving problems, and technology as the result of that practice. According to the Framework: “From a teaching and learning point of view, it is the iterative cycle of design that offers the greatest potential for applying science knowledge in the classroom and engaging in engineering practices” (NRC, 2012, pp. 201-202).

In the NGSS, engineering design is integrated throughout the document. First, a fair number of standards in the three disciplinary areas of life, physical and earth and space sciences begin with an engineering practice. In these standards, students demonstrate their understanding of science through the application of engineering practices. Second, the NGSS also include separate standards for engineering design at the K-2, 3-5, 7-8, and 9-12 grade levels. This multi-pronged approach, including engineering design both as a set of practices and as a set of core ideas, is consistent with the original intention of the Framework.
Facilitator Notes
It is important to point out that the NGSS do not put forward a full set of standards for engineering education, but rather include only practices and ideas about engineering design that are considered necessary for literate citizens.

Explain:
“To ensure that we have a common understanding of what is meant by engineering and technology, these definitions were presented in the Framework. These are the definitions we will be using as we think about engineering and technology as used in the KAS for Science.”

Facilitator Notes:
The Framework’s definitions address two common misconceptions. The first is that engineering design is not just applied science. As described in Appendix F, the practices of engineering have much in common with the practices of science, although engineering design has a different purpose and product than scientific inquiry. The second misconception is that technology describes all the ways that people have modified the natural world to meet their needs and wants. Technology does not refer to just computers or electronic devices.

The purpose of defining “engineering” more broadly in the Framework and the NGSS is to emphasize engineering design practices that all citizens should learn. For example, students are expected to be able to define problems—situations that people wish to change--by specifying criteria and constraints for acceptable solutions, generating and evaluating multiple solutions, building and testing prototypes, and optimizing a solution.

<table>
<thead>
<tr>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Engineering: Any engagement in a systematic practice of design to achieve solutions to particular human problems</td>
</tr>
<tr>
<td>• Technology: All types of human-made systems and processes. Technologies result when engineers apply their understanding to the natural world and of human behavior to design ways to satisfy human needs and wants</td>
</tr>
</tbody>
</table>

MCC 2013, pp. 11-12
<table>
<thead>
<tr>
<th>Facilitator Notes</th>
<th>Accompanying Slide(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explain:</strong></td>
<td><img src="image" alt="The Design Cycle" /></td>
</tr>
<tr>
<td>“Engineering design is based upon the design cycle. Notice how this cycle is iterative and not moving in a single direction. What implications does this have for science education?”</td>
<td></td>
</tr>
<tr>
<td>The question posed is a thought-question. Facilitators may wish to have people share out their ideas to the whole group, share at a table, or have an individual think time.</td>
<td></td>
</tr>
<tr>
<td>Facilitator Notes:</td>
<td><img src="image" alt="Exploration" /></td>
</tr>
<tr>
<td>The emphasis here is on the idea that there is no clear-cut solution to any problem, and that such solutions can possibly become “better” (optimized). The classic example is the cleaning product, Formula-409. The number “409” represents the 409th formula developed that solved the defined problem.</td>
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<tr>
<td><strong>Explain:</strong></td>
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<tr>
<td>“We will now take some time to explore Appendix I, which shows the progression of engineering design for each grade band.”</td>
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<tr>
<td>Facilitator Notes:</td>
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<tr>
<td>All participants 2-3 minutes to individually explore Appendix I. After this time, lead a discussion with the large group, sharing their findings and thoughts to the questions posed in this slide.</td>
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<tr>
<td>Link to Appendix I:</td>
<td></td>
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</tbody>
</table>
Facilitator Notes: Remind participants of the learning experienced in this section, using information on the slide as guidance. You may also bring out any points or ideas that were brought out during any of the discussions.

Explain: “This is the end of Session B. Please take time to Stop and Reflect on how your thinking has changed since the beginning of this learning experience.”

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**Module 1: The Kentucky Academic Standards (KAS) for Science: An Overview**

**Preparation for Session C: Dimensions of Science: Science and Engineering Practices (SEP)**

**Facilitator Work Session Supplies Needed:**
These items will be needed with this module.
- Computer with access to the KAS for Science: An Overview slide presentation
- Technology with projection capability including a speaker system
- Appendix F (paper or electronic)
- Poster paper (if facilitator chooses posting of findings and sharing)
**Facilitator Notes**

**Explain:**
“We will now be looking at the next dimension: The Science and Engineering Practices. These are often referred to as the SEPs or the Practices.

**Background Notes for Facilitator:**
Engaging in the practices of science helps students understand how scientific knowledge develops; such direct involvement gives them an appreciation of the wide range of approaches that are used to investigate, model, and explain the world. Engaging in the practices of engineering likewise helps students understand the work of engineers, as well as the links between engineering and science. Participation in these practices...makes students’ knowledge more meaningful and embed it more deeply into their worldview.

The actual doing of science or engineering can also pique students’ curiosity, capture their interest, and motivate their continued study; the insights thus gained help them recognize that the work of scientists and engineers is a creative endeavor—one that has deeply affected the world they live in. Students may then recognize that science and engineering can contribute to meeting many of the major challenges that confront society today.

Any education that focuses predominantly on the detailed products of scientific labor—the facts of science—without developing an understanding of how those facts were established or what ignores the many important applications of science in the world misrepresents science and marginalizes the importance of engineering. (NRC, 2012, pp. 42-43)

**Accompanying Slide(s)**
An additional resource that goes into further detail about the Science and Engineering Practices is *Helping Students Make Sense of the World*.

Facilitator Notes:
Briefly review learning and experiences from the previous learning, using information on this slide for guidance. You may also bring out any discussions that came out in the previous session.

Explain:
“Key to the vision expressed in the *Framework* is that students learn the Disciplinary Core Ideas (DCIs) in the context of science and engineering practices. Students are expected to be able to use understanding of the DCIs to investigate the natural world through the practice of science inquiry, and can solve meaningful problems through the practices of engineering design.”

**Previous Learning**
- The KAS for Science depict what students must do and know to show proficiency in science.
- The KAS for Science is composed of three dimensions.
- The Disciplinary Core Ideas (DCIs) are the broad ideas of science.
- The DCIs include Principles of Engineering Design.

**Session C Essential Question**
- How do the practices help us move beyond “knowing about” science to making sense of the world around us?

**Science and Engineering Practices (SEPs)**
- Major practices scientists use to investigate, model and develop theories about the natural world
- Key practices engineers use to design and build systems
This explains the rational by the Framework committee as to why we speak about practices of science instead of science inquiry.

Explain:
These are the eight Science and Engineering Practices. It is important to remember that these are practices in which students are engaged with during the course of instruction.

This video describes the reasons for the practices and why they are important. After watching the video, participants will be asked to reflect on what they saw and heard. Facilitators may wish to share the questions shown on the next slide in order to set the stage for the video.
After watching the video, participants should reflect on these three questions. How this reflection could occur is up to the facilitator. However, it is recommended that participants be provided time to reflect individually first before whole group/reflection/discussion occurs.

Ideas to listen for:
- Engagement of the practices is more than just “doing” them, but leads to further questioning and depth of understanding
- “Traditional” science labs often do not lead towards explanation or argumentation that demonstrates true understanding of a concept
- Instruction with the practices is beyond confirming information, but often leads to further questioning.

Explain:
“To see how the SEPs progress across grade bands, a progression document, Appendix F, was developed. Here you can see the characteristics of each SEP at each grade band.

Talking Points:
- Even through specific SEPs are identified for each PE, students should have experiences utilizing all of the SEPs.
- While the SEPs are identified, they actually work with one another such that it is often hard to distinguish one from another.

Slides 53-55 provide further background about the SEPs and the progressions from K-HS. Participants will need access to Appendix F as they will be using this during the exploration described in slide 55. You should determine when would be best for participants to access Appendix F.
<table>
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<tr>
<th>Facilitator Notes</th>
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<tbody>
<tr>
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<td><strong>Accompanying Slide(s)</strong></td>
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<tr>
<td>Explain:</td>
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<tr>
<td>“This is a sample page showing the progression of the SEP Asking Questions and Defining Problems.”</td>
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<td>Facilitator Notes:</td>
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<tr>
<td>There are two different layouts for the progressions: a table form (pp. 4-15) and a chart form (pp. 17-32). Both layouts have the same information. The chart layout, however, shows how each element of the SEP progresses across grade-bands.</td>
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<tr>
<td>Explain:</td>
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<tr>
<td>“We will now explore the progressions in a bit more detail.”</td>
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<tr>
<td>Possible Set-ups for this exploration:</td>
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<tr>
<td>• Whole group discussion looking at the same SEP from K-HS</td>
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<tr>
<td>• Small groups looking at different SEP progressions from K-HS. Small groups would then share out how depth and sophistication progress, jigsaw findings, post on chart paper, etc.</td>
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<tr>
<td>If small groups are chosen, the facilitator may wish to walk around and listen to the conversations.</td>
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<tr>
<td>Facilitator Notes</td>
<td>Accompanying Slide(s)</td>
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<td><strong>Facilitator Notes:</strong>&lt;br&gt;Remind participants of the learning experienced in this section, using information on the slide as guidance. You may also bring out any points or ideas that were brought out during any of the discussions.</td>
<td><strong>In this Session We Learned...</strong>&lt;br&gt;• How the practices help us make sense of the world around us.</td>
</tr>
<tr>
<td><strong>Explain:</strong>&lt;br&gt;“This is the end of Session B. Please take time to Stop and Reflect on your learning about the science and engineering practices. What is your key take away from today?”</td>
<td><strong>Reflection for Session C</strong>&lt;br&gt;It's all in a Tweet:&lt;br&gt;The great thing about Twitter is that it limits our ability to waffle and helps us cut to the chase. Think about the learning from this session. Compose a tweet consisting of 280 characters to share your key take away. Consider sharing it on twitter along with the link to the resource!</td>
</tr>
<tr>
<td><strong>Facilitator Notes:</strong>&lt;br&gt;Encourage participants to share their tweets along with the resource on Twitter. This will help others find this resource to support them in learning more about the KAS for Science.</td>
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Module 1: The Kentucky Academic Standards (KAS) for Science: An Overview

Preparation for Session D: Dimensions of Science: Crosscutting Concepts (CCC)

Facilitator Work Session Supplies Needed:<br>These items will be needed with this module.<br>• Computer with access to the KAS for Science: An Overview slide presentation<br>• Technology with projection capability including a speaker system<br>• Appendix G (paper or electronic)
• Poster paper (if facilitator chooses posting of findings and sharing)
• Self-sticking notes (if facilitator chooses posting of findings and sharing)
### Facilitator Notes

**Explain:**

“We will now be looking at the third dimension: the crosscutting concepts, or CCCs.”

**Background Notes for Facilitators:**

According to the Framework, the purpose of the CCCs is to help students deepen their understanding of the disciplinary core ideas and develop a coherent and scientifically based view of the world. While “crosscutting ideas” have been featured in other framework documents over the past two decades, the Framework recognizes that “students have often been expected to build such knowledge without any explicit instructional support. Hence the purpose of highlighting them as Dimension 2 of the Framework is to elevate their role in the development of standards, curricula, instruction, and assessments” (NRC, 2012, p. 83).

**Facilitator Notes:**

Briefly review learning and experiences from the previous learning, using information on this slide for guidance. You may also bring out any discussions that came out in the previous session.
“The Framework identifies seven CCC that bridge disciplinary boundaries, uniting core ideas throughout the fields of science and engineering. Their purpose is to help students deepen their understanding of the DCIs and develop a coherent and scientifically based view of the world.”

“These are the seven crosscutting concepts. Much like the practices, the CCCs are often intertwined and hard to distinguish.”

Talking Points (some examples to share):
- Students may use patterns in data in order to identify cause and effect relationships.
- Students may study a system at different scales.
This video describes the importance of the crosscutting concepts in the understanding of science and the natural world at large. After watching the video, participants will be asked to reflect on what they saw and heard.

After watching the video, participants should reflect on these three questions. How this reflection could occur is up to the facilitator. However, it is recommended that participants be provided time to reflect individually first before whole group reflection/discussion occurs.

Ideas to listen for:
- CCC are used by students to organize ideas and make sense of the science around a phenomenon
- CCC are ideas that can be used within disciplines or across disciplines
- CCC are used in conjunction with the practices in the understanding of phenomena

Explain:
“To see how the CCCs progress across grade bands, a progressions document, Appendix G, was developed. Here you can see the characteristics of each CCC at each grade-band.

Facilitator Notes:
Slides 63-65 provide further background about the CCC and the progressions from K-HS. Participants will need access to Appendix G as they will be using this during the exploration described in slide 65. You should determine when would be best for participants to access Appendix F.
Facilitator Notes

Explain:
“This is a sample page showing the progression of the two CCCs Patterns, and Cause and Effect”

Facilitator Notes:
There are two different layouts for the progressions: a narrative (pp. 3-11) and a chart form (pp. 15-17). The chart form is where you will find the specific characteristics for each CCC.

<table>
<thead>
<tr>
<th>Facilitator Notes</th>
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</thead>
<tbody>
<tr>
<td><strong>Explain:</strong></td>
<td></td>
</tr>
<tr>
<td>“We will now explore the progressions in a bit more depth.”</td>
<td></td>
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<tr>
<td><strong>Possible Set-ups for this exploration:</strong></td>
<td></td>
</tr>
<tr>
<td>• Whole group discussion looking at the same CCC from K-HS</td>
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</tr>
<tr>
<td>• Small groups looking at different CCC progressions from K-HS. Small groups would then share out how depth and sophistication progress, jigsaw findings, post on chart paper, etc.</td>
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</tr>
<tr>
<td>If small groups are chosen, the facilitator may wish to walk around and listen to the conversations.</td>
<td></td>
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<tr>
<td><strong>Facilitator Notes:</strong></td>
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<tr>
<td>Remind participants of the learning experienced in this section, using information on the slide as guidance. You may also bring out any points or ideas that were brought out during any of the discussions.</td>
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</tr>
<tr>
<td><strong>Explore</strong></td>
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</tr>
<tr>
<td>Choose a CCC to explore (e.g., Cause and Effect):</td>
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</tr>
<tr>
<td>• How does the depth and sophistication progress from K-2 to HS?</td>
<td></td>
</tr>
<tr>
<td>• What are the characteristics of this CCC for your grade band?</td>
<td></td>
</tr>
<tr>
<td><strong>In this Session We Learned...</strong></td>
<td></td>
</tr>
<tr>
<td>• The role of the crosscutting concepts in the KAS for Science.</td>
<td></td>
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<tr>
<td>Facilitator Notes</td>
<td>Accompanying Slide(s)</td>
</tr>
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</tbody>
</table>
| **Explain:**     | **Reflection for Session D**  
| “You have now completed Session D, the final session of this module. Take a moment to stop and reflect on your learning around the cross cutting concepts using the reflection task on the slide.” | After completing Session D, pick an emoji that describes how you feel about your learning from this session. Explain why you chose that emoji. |
| **Facilitator’s Notes:** | **Overall Key Takeaways from this Module**  
| “You may wish to have the participants share out their learning from this session with a shoulder partner, then share out as a group.” | • The standards are composed of 3 dimensions.  
• The dimensions are not “taught” in isolation from one another.  
• Instruction is the integration of these 3 dimensions. |
| **After completing the learning experiences within this module, these are the three key takeaways participants should walk away with. You may wish to ask to probe participants as to their big takeaways and/or ideas from the learning.** | **Final Reflection**  
What is one thing you experienced that makes you happy?  
What is one idea that is stirring in your head that you will focus on?  
What is one thing that “irritates” you that you feel you need to learn about more?  
This is a reflection exercise called “rose, bud and thorn”. The rose is used to represent a learning that is “blossoming” in the participant’s understanding. The bud represents something that is forming but not yet blossomed into something meaningful. The thorn represents some learning that is “hurtful”; an idea that a participant may need more information. Facilitators can use this information to determine what supports educators may need or what further information may be needed to help bring clarity to the science dimensions. This reflection is intended for participants to think about all of the learning that has occurred throughout the course of this module. |
<table>
<thead>
<tr>
<th>Facilitator Notes</th>
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</thead>
<tbody>
<tr>
<td>After participants have engaged with all sessions within this module, they will develop an “elevator speech” addressing this statement. And elevator speech is a quick 1 or 2 minute talk that provides a quick synopsis of a particular topic. As participants are writing this in the form an argument, their elevator speech should have a claim, evidence to support their claim and how that evidence supports their claim.</td>
<td>By the end of this module.....</td>
</tr>
<tr>
<td>As time permits, you may wish to have participants share their speech with one another in order to receive feedback to clarify any points in support of their claim.</td>
<td>You will be able to develop an argument as to how instruction for the Kentucky Academic Standards for Science is the same/different as is generally observed during science instruction.</td>
</tr>
<tr>
<td>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 our surveys will be used by the KDE to plan and prepare future professional learning.”</td>
<td>Certificate of Completion</td>
</tr>
<tr>
<td>Provide participants with the survey links: Kentucky Department of Education Professional Learning Modules Feedback Survey</td>
<td>Thank you for completing this asynchronous module provided by the KDE. Please use the link below to obtain your certificate of completion.</td>
</tr>
<tr>
<td>Be sure to thank participants for their work throughout this module as it has provided a foundation for future knowledge.</td>
<td>Kentucky Department of Education Professional Learning Modules</td>
</tr>
<tr>
<td>To you, the facilitator, thank you for providing participants with knowledge and support throughout this process. The KDE greatly values your role in facilitating this Getting to Know the KAS for Science Module. We appreciate your time and effort in leading your school and district in the successful implementation of the KAS for Science. Thank you!</td>
<td></td>
</tr>
</tbody>
</table>