Science Assessment System Through Course Task

Just Passing Through

Grade Level:
1

Phenomena:
Interaction of Light with Materials

Science & Engineering Practices:
Planning Carrying Out Investigations
Engaging in Argument from Evidence

Crosscutting Concepts:
Patterns

Designed and revised by Kentucky Department of Education staff
in collaboration with teachers from Kentucky schools and districts.

Preparing to implement Through Course Tasks in the Classroom

What is a TCT?

- TCTs are 3-dimensional tasks specifically designed to get evidence of student competency in two dimensions, Science and Engineering Processes (SEPs) and Crosscutting Concepts (CCC), untethered from Performance Expectations (PEs)/standards. Tasks are sense-making experiences.
- Tasks are to be used formatively. The goal is for both students and teachers to understand areas of strength and improvement for the SEP(s) and CCC assessed within the task.

How do I facilitate a Through Course Task (TCT)?

- TCT facilitation is a collaborative process in which teacher teams calibrate understanding of the expectations of the task and refine strategies to be used during task facilitation.

Before the task:

1. Complete the TCT as a learner – compare understanding of task through the lens of success criteria (identified in the task) in order to understand expectations.
   Success criteria include:
   - What is this task designed to get evidence of?
   - What is the task asking the students to do?
   - What might a student response look like?
2. Identify the phenomenon within the task. Consult resources to assure teacher teams have a deep understanding of associated science concepts.
3. Collaborate to generate, review and refine feedback questions during facilitation.
4. Identify potential "trouble spots" and plan for possible misconceptions.

During the task:

5. Collect defensible evidence of each student's competencies in 3-dimensional sense-making for the task.
6. Ask appropriate feedback questions to support student access and engagement with the task in order to elicit accurate evidence of student capacities.

After the task:

7. Reflect on the task as a collaborative team.
8. Review student work samples to identify areas of strength and areas of need.
9. Determine/plan next steps to move 3-D sense making forward through the strengthening of the use of SEPs and CCCs.

Using the materials included in this packet:

- **Task Annotation:**
  - The task annotation is a teacher guide for using the task in the classroom. Additionally, the annotation gives insight into the thinking of developers and the task overall.

    - Each task has science and engineering practices, disciplinary core ideas, and crosscutting concepts designated with both color and text style:
        - **Science and Engineering Practices**
        - *Disciplinary Core Ideas*
        - Crosscutting Concepts
- **Student Task:** The materials to be used by students to complete the TCT.

Just Passing Through Task Annotation

After gathering and sorting information from observations about the *clarity with which an object can be seen through various materials,* **state a claim** about which of three groups an object belongs based on identified patterns.

Phenomenon within the task

Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach.

How the phenomenon relates to DCI

PS4.B: Electromagnetic Radiation (Grade 1)

Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach.

The content of this task promotes foundational understanding for PS4.B at grade 4. Also, students will begin to think about the properties/usefulness of matter. It also supports content related to PS4.B, "An object can be seen when light reflected from its surface enters the eyes."

A progression of this DCI from grade K-12 is shown below:

	K-2	3-5	6-8	9-12
PS4.B **Electromagnetic radiation**	Objects can be seen only when light is available to illuminate them.	Objects can be seen when light reflected from their surface enters our eyes.	The construct of a wave is used to model how light interacts with objects.	Both an electromagnetic wave model and a photon model explain features of electromagnetic radiation broadly and describe common applications of electromagnetic radiation.

What information/data will students use within the task?

Information Needed:

- Data collected from a collaborative investigation

Prior experience with the following:

- Reading a chart (familiarity with terms like row and column)
- Familiarity with the terms data table & investigation
- Experience sorting and classifying items based on common features or characteristics.
- An understanding of what it means to find "patterns in the data"
- Familiarity with the terms "make a claim," and "support with evidence"
- An understanding of what the word "pattern" means when referring to data (not the mathematical reference to a pattern that repeats), discussion that a pattern in the data can be a relationship and/or comparisons used to guide organization or classification, that we notice in the data. A pattern does not need to repeat. It can be same/different, has/doesn't have, etc.

Discussion of what objects students may or may not be able to see through.

> What are the properties the object are made of will be beneficial (cardboard, glass, plastic, wood, paper, and other terms students may use at this grade level) Vocabulary is not the focus of this task, and is not an intended outcome. You should not focus on the words transparent, translucent and opaque. These terms are not appropriate for use at this grade level. Also note, it is critical that misconceptions are not perpetuated by using words like solid for object that do not allow light to pass through. All of the objects suggested in this task are solids. Students may label objects as "see through, clear, sort of see through, cloudy," etc.

Ideas for setting up the task with students

Note: *This task is intended to be completed over several days. If administered all in one day, the entire task will likely take several hours, so PLEASE break it up so that your students will be able to focus on the learning that takes place.*

Students engage in guided experiences in order to ensure that they understand the DCI in the task. The first part of the task requires students to engage in observations (appropriate SEP for grade K-2) as part of an investigation. The teacher will be able to gather

formative information regarding students' ability to sort and classify. If students are not supported during this part of the task they will not be successful when they are asked to state a claim based on evidence they found.

- ❑ In preparation for the investigation, ask the students questions such as:
    - Why can we see objects? (Because objects can be seen when light is available to illuminate them. PS4.A)
    - What would happen if all of the lights were turned off? (We couldn't see them. There must be a light source.)
    - Could we still see the objects if the lights were off? (Perhaps if there is a light source other than the overhead lights, e.g., because of the light from the window, we might still see the object.)
    - Why can't you see an object with other things are in front of it?
- ❑ The teacher should demonstrate how different materials block light by shining a flashlight through some example materials. For instance, place a toy on the table, and put a book in front of it. Point the flashlight at the book and turn it on. Explain to the students that the book blocks the light from shining on the toy, so we are unable to see the toy. Continue by placing something such as saran wrap in front of the toy. Shine the flashlight on the toy. Discuss with students that the saran wrap does NOT block the light from shining on the toy, so we can see the toy. Finally, place a translucent object in front of the toy. Shine the flashlight toward the toy. Discuss how you can "somewhat" see the toy…..you can tell what it is, but can't see all of the details of its appearance.
- ❑ The teacher should choose a small item (such as an action figure, a wooden block, a small toy with small details such as polka dots or freckle) for the students to use during the investigation. This will be the object that students hope to see as they look through different materials.
- ❑ Suggest that students be divided into small groups with a basket containing the materials to be tested.
- ❑ Students will hold the different materials in front of the toy to see if they can see the toy with detail through the material being tested.
- ❑ Students will then record the observation on the provided data collection sheet. Ask questions such as…
    - How do the column titles help us understand the data we collected?
    - What do you notice about the objects you observed?
    - Did the test object look the same when you look through ____ and ___?
    - Did any of the objects allow you to see the test object (name the actual object here) in the same way?

- ❑ Once data is collected, the students are ready to sort the objects into groups based on their findings. It is essential that students be supported during this piece of the task. If students struggle with the concept, the teacher should provide more experiences that enable students to investigate different materials as to whether light passes through in order to see the toy clearly, somewhat or not at all. Ask questions such as….
    - Do you need to rethink your groups?
    - What do you notice about the things in your groups?
    - Did you use the data from the table to help you make your groups?
    - What can you name your groups?
    - How are the items in each group the same?
- ❑ After sorting the objects into groups, students will choose a new object from around the classroom. Students will make a claim about which group the new object belongs to, and use evidence from their data collection to support their claim. Ask questions such as…..
    - How does the data help you find which were the same?
    - Were there any objects that did not allow you to see the test object (name the actual object here) the same way?
    - How can your data help you sort your objects into groups?
    - How are these objects in this group alike?
    - What did you notice about these objects when you tested them?
    - How did you decide where to put your pictures?

Note: *A suggested lesson plan for facilitating this task is provided in an accompanying document (please see Optional Lesson Plan). Explicit directions are included for those teachers who may want guidance on the TCT process. However, if you are familiar with how to facilitate the TCT process, conduct the task at your discretion, being sure to maintain the focus and intent of the task.*

Reflection and modification based on task implementation

When completing this task with students, it quickly became clear that students did not conceptualize that the light from the classroom was not able to travel through certain materials. So, we revised the task and now recommend the use of a flashlight to demonstrate that the light had been blocked. Students need to be able to communicate the depth of clarity with which they are able to see the object

- Clear object: All details of the toy are seen.
- Opaque object: No part of the toy is seen.
- Translucent object- Toy is seen as an outline...no specific details are seen.

Intent of the Task for Assessment

The focus here is on students making and recording observations, looking for patterns in the data they collect through their observations and then constructing a claim supported with evidence. The intent of this task is **NOT** to assess students ability to classify object in terms of opaque, transparent and translucent.

The intent of this task is to assess student ability to make observations to collect data. The SEP bullet for aligned with this task is from **SEP #3: Planning and Carrying Out Investigations:** Make observations and/or measurements to collect data that can be used to make comparisons. Students do use their observations to make comparisons of the proposed objects in order to later sort them.

Observations, as stated throughout the SEPs, can be used to construct an evidence based account, to describe patterns/relationships in order to answer questions and solve problems, to collect data that can be used to make comparisons and as a foundation for asking questions and planning investigations. Therefore, it becomes difficult to pinpoint a specific bullet from a specific practice for this task because of the connection of observations to several of the SEPs. It is more important that you understand the evidence that the developers intended to elicit through the facilitation of this task: *students must make observations that can be used to make comparisons.*

Success Criteria

Evidence of Learning Desired based on Progression from Appendices

Planning and Carrying Out Investigations

- Make observations and/or measurements to collect data that can be used to make comparisons.

Patterns

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

Engaging in Argument from Evidence

- Construct an argument with evidence and support a claim.

Success Criteria

Students use information gathered through observations to support a claim as to which of three groups an object belongs based on:

- Evidence from gathered data
- Patterns thinking/similarities identified in the observed items

Possible Student Responses

Look fors:

- Student makes a correct claim by accurately identifying the group (can see, can't see, can somewhat see) to which his/her chosen object belongs.
- Student supports his/her claim with evidence from the data table.
- Student makes a statement giving similarities of his/her chosen item to an item in the data table, and makes the connection that the items have similar properties, thus, affecting light in the same way (blocks all light, blocks some light, does not block light).

Possible student responses:

- If student chose a manila folder, he/she explains the folder would belong with the objects that he/she can't see through because and he/she couldn't see the toy when the folder was put in front.
- The child identifies that when light shines on the other objects in that group, he/she was not able to see the toy.
- The child might explain that if "clear" material was placed in front of the toy, he/she was able to see the toy really good/with details.
- The child might also say that if a "cloudy" item is placed in front of the toy, he/she can "sort of" see the toy, but not all of the details.
- Possible responses: student explains that the manila folder is like the cli board and the book because it doesn't let them see through it/blocks all of the light.

Extensions and/or other uses after the task is implemented

The following idea is a possibility for extending this task….

- Have students bring in small items from home to sort into groups as done in the investigation. Place these materials in a center and allow students to work with partners to sort the objects.

Through Course Task – Just Passing Through

Name: _____

Work with a partner. Place a toy on the table. Hold each item listed below in front of that toy. Can see the toy through the item or not? Is it clear? Can you somewhat see the toy but is not clear? Record your findings by placing an X in one of the boxes for each item.

Object	Can see	Cannot see	Cloudy or Foggy
1 Clipboard 	1	1	1
2 Book 	2	2	2
3 Plastic Baggie 	3	3	3
4 Plastic grocery bag 	4	4	4
5 Empty Cardboard Box 	5	5	5

Object	Can see	Cannot see	Cloudy or Foggy
6 Plastic Sheet Protector 	6	6	6
7 Paper plate 	7	7	7
8 Plastic water bottle 	8	8	8
9 Plastic storage bin 	9	9	9
10 Plastic cup 	10	10	10

Just Passing Through

Think: What does the data in the table tell you about each of the items you investigated? What do you notice about the items you observed? When you looked through each of items, did you see the toy in the same way? Use the data in the table to help you sort the items below.

Cut out the pictures and put these items into groups based on what you discovered in through your investigation.

Directions:

1. Based on your observations, decide how you will sort the items into groups.
2. Give each column a label that tells how the items are alike.
3. Glue each item in the matching column.

Group A Label:	Group B Label:	Group C Label:

Explain your thinking! Think about the groups you made and answer the questions below.

I sorted the items into groups based on…

_____

_____

_____

_____

How are the items in each group the same?

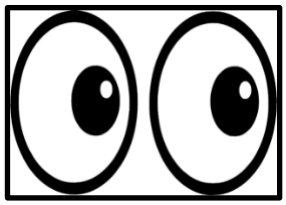
_____

_____

_____

_____

_____



Choose an object in your classroom. Make a claim to tell which of your groups this object would belong to. Then, give evidence to support your thinking. Tell how your object is similar to the other objects in the group based on your observations and the data you collected in the chart.

Draw and Label one item you will add to one of your groups.

I think this item belongs in the

_____ group.

I think this because

_____

_____

_____

_____