



Science Assessment System Through Course Task

Fishy Fortuneteller

Grade Level:

6

Phenomena:

Hygroscopic Material

Science & Engineering Practices:

Asking Questions and Defining Problems

Planning Carrying Out Investigations

Crosscutting Concepts:

Patterns

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



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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.

Fishy Fortuneteller Task Annotation

After **making observations and collecting the data** *about the behavior of the fish*, **generate questions and identify the best testable question to** explore the potential cause for the *observable actions of the fish*.

Overall intent

The task is designed to get students to record observations, and from these observations, generate a list of questions about what could be causing the behavior based on observed patterns. From this list, students will identify one that can be scientifically investigated.

The assessment intent of the task is to elicit evidence of students' ability to generate investigable questions about what could be causing the recorded behavior based on observed patterns.

Phenomenon within the task

This task begins with a mysterious little slip of material sold as a "Fortune Teller Fish." This strange little fish grabs students' attention with its engagingly weird behavior. When students place it on the palm of their hands, the desk, their wrist, or any other surface that they dream up, the fish may move wildly, even flipping over at times, or not. The surprising motions of the fish lead to authentic wonderings by students. These fish are easy to purchase from the link below, or from many sources online. The red and white versions tend to work the best.

For more information about the Fortune-teller fish, visit Steve Spangler's [website](#).

Ideas for setting up the task with students

Added Note: Remove each fish from its wrapper and let students observe ONLY the fish. Keep the wrappers for a possible extension later.

In Part A, students are writing down their own observations for this task, which then serve as data. They may need scaffolding to help them generate a variety of observations, such as the facilitation questions below:

- *“What motions do you notice? Are there any patterns to the motions?”*
- *“Can you change something (such as location, position, or any other variables) to get a more complete picture with your observations?”*
- *“What do you predict would happen if....”*
- *“How can you organize your observations in a systematic way?”*

In Part B, students are brainstorming - generating a list of possible questions whose answers might lead to the possible cause of the phenomenon of the erratic motion of the fish. For this reason, they should be encouraged to generate several questions. In this step, students may also need scaffolding, such as the facilitation questions/directives below:

- *“What questions could you ask along the way to figuring out the cause and effect here?”*
- *“Can you ask a question about a possible cause for the patterns that you see?”*
- *“What are other possible causes? Can you turn those into questions?”*
- *“If you tested this, what follow-up questions might be useful?”*
- *“What could you ask and find out next to help figure out the cause of the motion?”*
- *“Try asking ‘what if’, or ‘how does changing ____ cause ____?’”*

Although this scaffolding is getting to the intent of the task (ask testable questions), students will select one of the 5 questions generated for part C of the task, and explain what data would be collected in an investigation and why that data would be evidence to answer the selected question. Teachers should note what kind/how much scaffolding is provided to individual students in order to address learning needs.

In Part C, students will first circle a question that can be investigated. Students should have prior knowledge of characteristics of a testable question; however, this should not be “spoon fed” prior to the task. Students need to know what “evidence” is in relation to answering a question.

Part C is an extension to allow students to think about designing an investigation to answer their question.

Intent of the Task for Assessment

The Fishy Fortune Teller task intends to gather evidence about a student's ability to collect and organize observations in a systematic way, to ask thoughtful questions about a phenomenon, and to practice selecting effective questions to investigate. It is important that students engage with the phenomenon and ask questions in an authentic way, leading their own exploration through their own observations and questioning practice, rather than a teacher-guided investigation. The facilitation questions provided above are not required, but simply available for students who might be struggling and in need of scaffolding. The scaffolding supports should be documented per student, so that student needs can be captured.

Equally important to the scientific wondering and noticing process is the identification of a question that is fertile ground for finding a potential cause to the phenomenon (or finding what is *not* the cause). Selecting a testable question seems to be a process that middle school students often have trouble with. Identifying a question that is scientifically relevant as well as feasible to investigate is an important and sometimes challenging process. This task is designed to lead students up to this point.

List components of the task / resources used with the task.

Fishy Fortune Teller Task – Revised (Students will need additional paper to complete the task.)

For more information about the Fortune Teller fish, visit Steve Spangler's [website](#)

Success Criteria

Evidence of Learning Desired based on Progression from Appendices

Planning and carrying out investigations

- Collect data to serve as evidence to answer scientific questions.

Asking Questions and Defining Problems

- Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify. and/or seek additional information
- Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles.

Patterns

- Patterns can be used to determine cause and effect relationships.

Success Criteria

Part A: Students record observations in an organized way.

Part B: Students develop questions that are based on observations of the phenomena.

Student developed questions are related to the observations that students have made. The questions will relate to investigating a possible causal effect to the observed behaviors.

Part C:

Students will...

1. Identify a question to be investigated within the scope of the classroom to answer the question of “What could cause this phenomenon?”
2. Accurately describe the data collected by an investigation to provide evidence needed from determine the cause of the fish’s behavior.

Possible Student Responses

- Part A
 - *“The fish moved more on my hand than on the table.” “When we rubbed our hands together, the fish moved more quickly!” “The fish moved more on my hands than on ____’s hands.”*
 - Evidence of High Level Responses - written tables or charts, labeled information, showing systematic observation (*right hand, left hand, repeated observations instead of just 1 each, testing different variables for cause and effect such as temperature, static electricity, moisture*)
- Part B
 - *“What substance is this fish made of?” “What are the properties of this substance?” “Why is the fish moving?” “What causes it to act differently on my hand than on ____?” “How does changing the _____ (temperature, light level, moisture content, etc) affect the fish?” “What causes the fish to move faster when it is warmer?”*

- Evidence of High Level Responses- Questions that are increasingly specific, focused on cause and effect. Not all questions will be high level, but the thinking process becomes evident as the brainstormed list progresses.
- Part C: Student responses will vary.
 - Low level – Student does not identify a testable question.
 - Acceptable response - Student selects the question, “How does heat affect the motion of the fish.” The evidence required from the investigation would be data from different temperatures and the effect on the fish.
 - High level responses would include more detailed responses and control of variables with explanation of how the collected data would provide evidence to answer the question.

Through Course Task – Fishy Fortuneteller



<http://www.fortunetellerfish.com/>

Summary: Observe and record the behavior of the “fortune teller fish” carefully. Create a list of questions from your observations that could help you identify the cause and effect relationship for the behavior of the fish.

Part A: Observations

These mysterious little toy fish have been sold in vending machines to children across the world for many years. Your own teachers probably played with them when *they* were kids!

Place the fish on various surfaces (hand, desk, floor, etc) to observe the behavior of this “fortune teller fish.” Write down any observations that you consider to be important to understanding this phenomenon. Be sure to record your observations in an organized way.

Part B: Generating Questions

Now that you’ve seen the mysterious toy fish in action, think about what might be causing its strange motion.

Based on your observations from Part A, write a list of at least five questions that could help you identify the cause and effect for the behavior of the fish.

Part C: Evidenced Based Question

Look back over your questions and circle one that could be scientifically investigated in the classroom to determine a potential cause of the fish’s behavior. Suppose you were to actually conduct a classroom investigation. Describe what data you would collect in the investigation and why that data would be evidence to answer your question.