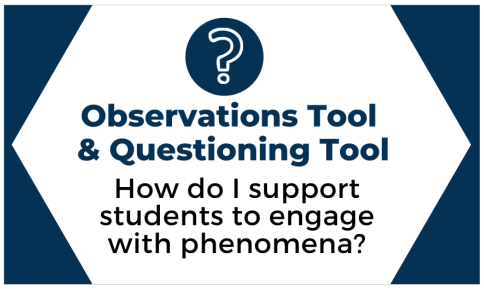
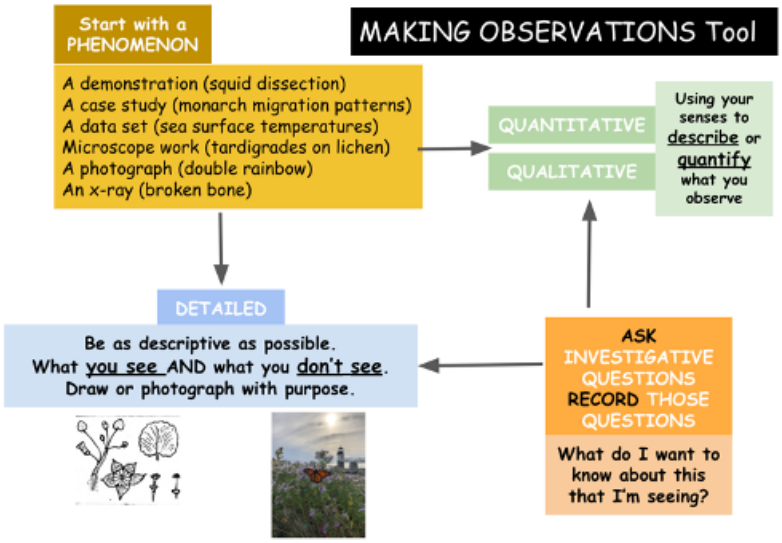
Best Practices Tool 1: Observations and Questioning

Learning Goal
Owl Pellets – Predator/Prey Relationships and Dissection



Origin Lesson
Learning About (What)

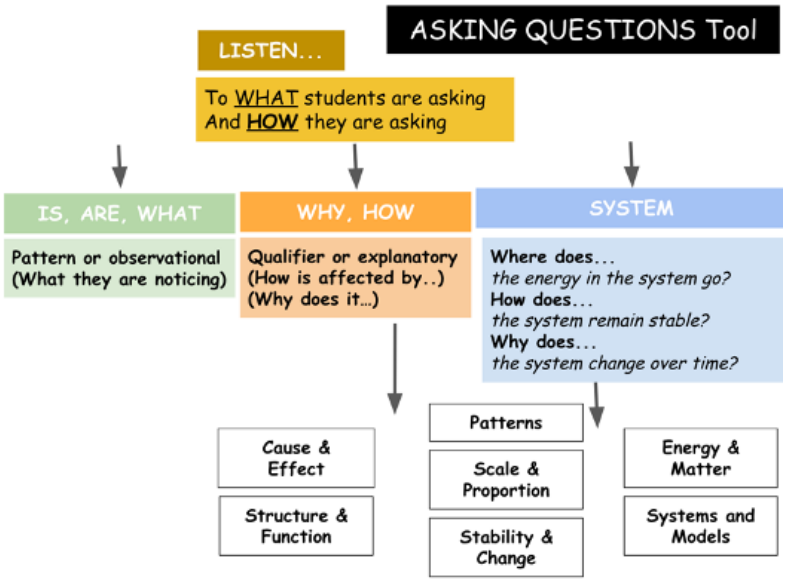
Educators pass out the owl pellets and students are working with partners. A worksheet describing what an owl pellet is and identifying what is inside the pellet is provided. Students begin to remove the hair from the pellet and pull out what they find. They try to match what is inside the pellet to what is on the worksheet and are asked to try and assemble the bones into a semi-complete rodent/bird skeleton. The class talks about what owls eat.



Best Practices Modified Lesson
Figuring Out (Why and How)

Before starting their dissection, have students spend 5 minutes observing the **Phenomenon**: their owl pellet. During this time, students should make a two-column table with the headers, "I Notice and I Wonder" to help stimulate observations and questions. Once the students have had time to come up with noticings and wonderings about their owl pellet, discuss as a class ways to group those observations into quantitative (numerical) and qualitative (descriptive) categories.

This portion of the lesson connects to the Practice of **Making Observations** and **Asking Questions** because students generate their own questions about owl pellets through firsthand observations using the "I Notice" and "I Wonder" prompts. Questions that are generated from student's firsthand observations help them to develop their own ideas and explanations for phenomena in the natural world. Students' questions can be recorded on a worksheet or



whole class chart paper. Students use those questions to guide their dissection of the pellets.

Listen for the types of questions students are coming up with. Besides the expected, "What is it?", most questions will probably be "why" and "how" questions. Depending on the phenomenon, those "why" and "how" questions may cross into "system why" and "system how" questions* which are higher order thought and can be encouraged the more practice students have with this approach.

Students' questions can now be grouped** into the seven Cross Cutting Concept (CCC) categories in the tool to the left.

These concepts are taught in every grade level with increasing sophistication. Knowing "what" your students are thinking is important but knowing "where" they are thinking provides you with a learning gain measurement context and a growth mindset continuum.

* IS, ARE, WHAT: Pattern or Observational Questions
What are students noticing?

*WHY, HOW: Qualifier or Explanatory Questions
How is it affected by…?
Why does it…?

*SYSTEM: Parts of a Larger Whole Questions
Where does…the energy in the system go?
How does…the system remain stable?
Why does…the system change over time?

** Grouping questions can be done during class or after class by the educator in preparation for the next day

Prompting Notes
If the content you are teaching is not interesting to you, it will not be interesting to the students. You must put the information into a context that is interesting, so students understand why they are learning it, and will want to learn it. Begin with a phenomenon where students can notice things happening and wonder about them.

Guiding Discussion Lessons/Questions

1. An easy and consistent 2-step move you can do in any lesson is to start with an observation of a phenomenon and then ask students what they **Notice and Wonder** about that phenomenon. Talk with your colleagues about lesson examples you currently teach that could be adapted to include these 2 steps.

Use this space to workshop an existing lesson to incorporate "Noticings" and "Wonderings."

Additional Resources:

The Driving Question Board. A Visual Organizer for Project Based Science. November 2008. By Ayelet Weizman, Yael Schwartz, David Fortus.

Scientific and Engineering Practices in K-12 Classrooms. Understanding A Framework or K-12 Science Education. NSTA *Science Scope.* December 2011. By Roger Bybee.