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One Big Bite: Teaching Elementary Students to Classify Objects Using Animal Teeth

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One Big Bite

Photo by Karin Steiner. Additional graphic work by Joe Taylor

TEACHING ELEMENTARY STUDENTS TO CLASSIFY OBJECTS USING ANIMAL TEETH

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ABSTRACT: This activity helps students learn the skills of sorting, organizing and classifying using images or models of various animal teeth. The authors used this activity in a Second Grade classroom, however it could be modified for other primary grades. *This activity promotes National Science Education Content Standards A and C, and Iowa Teaching Standards 1, 2, 3,4, and 5.*

The Iowa Core Curriculum states that second grade science students are to "understand and apply knowledge of the characteristics of living things' and know that "different species of plants and animals have different observable characteristics by which they can be classified." To help students reach these goals, we have students classify animals by their teeth. Because children can actually see the differences in tooth shape, the activity described below creates concrete experiences on which student understanding of how living things differ can be built. Not only do students observe animal teeth, but also manipulate objects that model the function of teeth. Such models help students make sense of tooth function as well as accurately demonstrate how scientists use models to make sense of the natural world.

Exploration

Ideally, we would have students explore using real animal teeth. However, obtaining real teeth or casts of teeth may be difficult for many teachers. Fortunately, we have found that using pictures of teeth works well. We begin by asking students to sort ten pictures of animal teeth. We give the students no suggestions of how to separate the pictures into two groups, but wander around posing questions to groups of students to understand their thinking. We gain insight into student ideas by asking

- "Why did you put these pictures together?"
- "If these pictures all have a certain shape, why did you not put this picture in the group?"

For this initial activity, we have students work in teams of three. We also assign the teams to different areas of the room so they can focus on what their team is doing and not what others are doing. Having students work in teams helps us promote more collaboration amongst the students while also accurately modeling the social nature of science. As we walk around and pose questions, we listen to students' dialogue about different types of animal teeth. Some possible student solutions include: sharp teeth versus dull teeth, meat-eaters versus plant eaters, a lot of teeth versus few teeth, dirty teeth versus clean teeth, water animals versus land animals and molar teeth versus pointy teeth.

Activity Supply List

Provide to each team:

- a set of 10 pictures of animal teeth (5 herbivores, 4 carnivores, and 1 omnivore)
  Examples of teeth images (see end of article for full URLs):

  Tooth #1 Tooth #2 Tooth #3
  Tooth #4 Tooth #5 Tooth #6
  Tooth #7 Tooth #8 Tooth #9

- a plastic bag containing:
  - 2 blocks
  - 1 staple remover
  - 2 strips of beef jerky
  - 10 M&Ms
- optional: if possible, several animal skulls for students to examine the teeth.

After the teams divide their pictures into groups we discuss as a class the different groups that were made and why they chose those groups. Rather than having each team share, we ask for volunteers to explain their grouping system. Once one team shares their system, we ask the rest of the class to share how what they did was similar to or different from the first team. When asking students to explain their thinking we encourage the students to talk to each other rather than just to the teacher. However, we (the teachers) are sure to continually invite more dialogue until each group has contributed in some way.

During the discussion, students are typically confused by one or two of the pictures. That is, the students typically struggle to sort one or two pictures. We draw students attention to such difficulties so that we can push their thinking. For example, we ask

- "One of your pictures seems like it could go in more than one category. How did you decide where to put that picture?"

Students' explanations in this situation reveal how very well young students can reason. Importantly, we encourage them to work through their explanations rather than interrupting them with our own ideas. Once a students explains their thinking, we look around at the rest of the students to encourage them to comment. If, after several seconds, no one comments, we ask

- "How is what Sally said like the thinking you had to do in your groups?"

Addressing the Nature of Science

Before moving on, we want to draw students' attention to some aspects of the nature of science that they just experienced. We ask

- "How do you think what you've done so far with animal teeth is like what a real scientist does?"

If students struggle with this question, we ask scaffolding questions such as,

- "You worked in groups to create your sorting system. Why do you think real scientists work in groups?" or
- "Not all of you came up with the same system, why do you think scientists sometimes disagree on the best way to do something?"

Focusing the Lesson

After discussion of various strategies for grouping, we want students to focus in on how teeth might be related to the food an animal eats. To focus students we ask,

- "How do you think an animal's teeth might be related to what the animal eats?"

When asking this question to the class we make sure to allow for wait time before having students answer. Once one student is finished answering the question we allow for another period of wait time to allow other students to add any additional comments. Then we ask students how they would group the teeth if they were only thinking about what the animals eat. With this scaffolding students pretty quickly sort the teeth into two groups - one with "pointy" teeth and one with "flat" or "dull" teeth.

Modeling Tooth Function

Students typically believe that the "pointy" teeth belong to carnivores and the "flat" teeth belong to herbivores. Since they have such strong ideas, we ask them to provide some evidence for these ideas using models. We introduce the activity by saying,

> *"You have some interesting ideas about how different kinds of teeth are used for eating different things. However, scientists use both ideas AND evidence. Since we don't want to harm any animals, we are going to study teeth by using something like teeth, but not quite the same. This is called a model. Models are one way scientists can get evidence about things they are studying."*

We hold up a kit of materials containing a staple remover, 2 blocks, beef jerky, and M&Ms. We explain that each group

will get a kit to be used to test their thinking about animal teeth. But before doing so, we show them the staple remover. We hold up the staple remover and ask

- "How could this device hurt you?"

Students are quick to note that being pinched by such a device could be harmful, so we ask

- "How will you avoid getting hurt?"

Again, students are quick to note that they should be careful where they put their fingers and to not use the staple remover in a dangerous manner. We then make clear that any one using the device inappropriately will no longer be able to use the materials and will have to just watch. After this brief warning, we send students back to their groups of three and hand out the kits. As we hand them out, we remind students that their task is to use the materials in the kit to explore and find evidence for their ideas about animal teeth.

We purposefully do not give students too many directions for this activity. However, we circulate around the room to monitor student progress and provide scaffolding when needed. Importantly, we do not simply explain things to struggling students. Instead, we pose questions such as:

- How would you describe the teeth you use to eat M&Ms?
- How do these teeth help with eating vegetables/plants?
- How do you eat beef jerky?
- How are the teeth you'd use similar to either the blocks or the staple remover?
- Why do you think the blocks work best for the M&Ms?
- How could you demonstrate or test your ideas?

These questions encourage students to connect what they are learning to their prior experiences with their own teeth. These questions also encourage students to use their resources and seek new knowledge and test their ideas. The students have to support their ideas using evidence from the models and explain their thinking to their group.

After 7-10 minutes of exploration, we ask students to put their kits back together, bring them to us and then gather for a group discussion. The students very quickly shared that the blocks worked best with the M&Ms because the blocks could easily crush them, and the staple remover could rip the beef jerky apart. Some students are even able to compare the blocks to their molar teeth and the staple remover to their front teeth.

We then ask students what type of food the beef jerky represents and what type of food the M&Ms represent. Some students struggle with this because they do not immediately relate the substances to plants and animals. When students struggle we ask

- "What do you already know that some animals eat?"

A more guiding questioning sequence is

- "How are the teeth of a lion and a cow different?
- "What does each of these eat?
- "How are each of these animals' teeth like the models you were using?"

After some scaffolding, students realize that the beef jerky represents meat and the M&Ms represent plants.

To further reinforce the relationship between form and function of teeth we revisit the teeth pictures. We go through each of the ten animals on the ELMO and have students identify what type of food each animal would eat and why they would eat that food. Whether students answer correctly or not, we always ask for elaboration or clarification. Often, the students who do not accurately note the relationship between form and function can not explain their rationale or realize their error while trying to explain. By having students explain, we gain deeper insight into their thinking and encourage students to self-assess rather than simply rejecting their ideas. Furthermore, when students explain their thinking, we encourage other students to add to the first student's ideas. Through this dialogue, most problematic ideas are remedied.

To conclude the lesson we ask students

- "What types of foods do we eat?"

They say we eat plants and animals. Then as a class we discuss what type of teeth humans have and how that connects to the other animal teeth we have been observing in class. We put a picture of chimpanzee teeth on the ELMO so students can see teeth that are similar to ours. The students point out the sharp teeth and the flat teeth on this picture and we ask,

- "How do these different kinds of teeth help the chimpanzee eat different kinds of food?" and
- "How are the chimpanzee teeth similar to our teeth?"

The students conclude that humans use the their back teeth to eat M&Ms and their front teeth to rip beef jerky - indicating they are able to apply their thinking to new situations.

Assessing Student Thinking

After the lesson, we give students a lined note card and instruct them to represent something they had learned using words and/or pictures. This strategy provides us with insight into student thinking without solely relying on their ability to write. Students typically draw very detailed pictures and their writing makes more clear what aspects of the lesson they are trying to demonstrate through their pictures. If some students only draw a picture, we ask them to verbally explain their picture to us as we walk around while students are working.

Final Thoughts

This lesson provides a concrete experience that engages students in making sense of their observations. The lesson helps build students' background knowledge that will benefit their understanding of future science content rather than focusing on vocabulary alone. That is, students are well set up to deeply understand the differences and similarities among carnivores, herbivores, and omnivores in future lessons. Not only do students learn a lot through this lesson, they really enjoy their investigations.

URLs for Teeth Image Examples

Teeth #1: http://www.australiazoo.com.au/our-animals/animal-diaries/images/1136one_600.jpg
Teeth #2: http://www.prehistoricstore.com/newitems/m2171.jpg
Teeth #3: http://static.ddmcdn.com/gif/shark-teeth-2.jpg
Teeth #4: http://trekking-hiking-outdoors.co.uk/images/Majungasaurus%20Tooth.jpg
Teeth #5: http://img2.etsystatic.com/003/0/5452951/il_fullxfull.382442706_bais.jpg
Teeth #6: http://3.bp.blogspot.com/-kOnTzGiBRaY/T2C3ZVd-VvI/AAAAAAAADAE/rZw36n_dAFY/s1600/teeth.jpg
Teeth #7: http://thumbs.dreamstime.com/thumblarge_58/1146860361Ny6qd2.jpg
Teeth #8: http://www.stockvault.net/data/s/99257.jpg
Teeth #9: http://jaimejofisher.com/blog/wp-content/uploads/2010/06/teeth.jpg

References

Iowa Core Curriculum. *Iowa Core Curriculum - Home*. Accessed 20 Mar. 2011. http://www.corecurriculum.iowa.gov/Discipline.aspx?C=Science

Science Lesson Plans for First Grade. *Discovery Science Center*, Orange County California Science Center web site. Accessed 20 Mar. 2011. http://www.discoverycube.org/education/teacherresources/science-lesson-plans/