

Morgan Clark
Formal Lesson Plan 3
10.19.16

Location: Woodland Hills Academy
Master Teacher: Maricela Ojeda-Perez
Class: "Success" Period- Marine Biology & Zoology

Topic: Symmetry in the Animal Kingdom

Lesson Objective

- **"Students will understand symmetry in animal body plans by completing diagrams requiring construction of bilateral, radial, and asymmetrical objects."**
- **State Standard Addressed: Structure and Function**
 - *Next Generation Science Standards for California Public Schools (MS-PS1-3)* Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.

Instructional Procedures:

a) Anticipatory Set-

- a. When students are seated, stand at the front of the class holding 2 objects, one that is bilaterally symmetrical, one that is radially symmetrical. Hold up some string and ask for a volunteer that could hold the string on the bilateral object so that it creates two equal halves. Once that volunteer demonstrates, ask for another volunteer to come do the same with the radially symmetrical object. Once they chose how to divide the object, have them be seated and ask if there are any other ways they could divide it to achieve the same result; have one last volunteer come up and demonstrate the alternative.
- b. Review that these two objects are divided into two equal halves in two different ways because they have different *symmetry*, that is what we will discuss today!

b) Perceived Objective and Rationale-

- a. Today we are going to learn about the different ways we as zoologists categorize the body plans of different animals!
- b. Over the past couple of days we have been learning what exactly an animal is, and how very different animals can look from one another
- c. Every single animal is really complex, but every animal in the animal kingdom can fall into only several different body types
- d. We classify body types at the most basic level by their symmetry
- e. First we're going to learn what symmetry is and what different types of symmetry there are, and then we're going to look at different objects and see if we can classify them in this way

c) Input-

- a. After stating the objective of the lesson, instruct the class to take out their scientific notebooks
- b. (See attached PowerPoint for information on slides) First discuss the definition of symmetry
 - Symmetry: being made up of exactly similar parts facing each other or around an axis.
 - Symmetry in biology: Three distinct patterns seen in all animal body forms
 - Bilateral Symmetry: A line of symmetry that divides an object into halves that are mirror images
 - Explain how “cutting an organism down the middle” will always produce two identical halves
 - Many things can be bilateral e.g. open notebooks, rulers, desk chairs, humans have bilateral symmetry!
 - Ask students if they can think of other items with bilateral symmetry
 - Radial Symmetry: Many lines of symmetry that all go through a central point (any way you slice it, the halves will be identical!)
 - Explain that only marine organisms exhibit radial symmetry in the animal kingdom
 - Explain that many non living things can be radially symmetrical e.g. pizza, fruits, nail heads, Ferris wheels, bicycle spokes etc. etc.
 - Asymmetry: Not having any symmetry! You will never have two identical halves
 - Explain that the only good example of this in the animal kingdom is with sea sponges
 - Not very many things outside of the animal kingdom are entirely asymmetrical either!
- c. Think, Pair, Share:
 - Have the students pair up with their table partners, and give them 30 seconds each to discuss the question (see power point)
 - Call on one or two students to share what they discussed with a partner
- d. Activity-
 - Pass out handouts (see attached)
 - Instruct each student to complete the handout by drawing in the missing half of each picture, and then writing the type of symmetry displayed in that object
 - Students will work until the end of the period
 - Worksheets will be attached in their notebook, and they will review the correct answers in the following class period

d) Modeling-

- a. Practice doing one example completion activity and show the class the finish product

- b. Instructions for the activity will be on the PowerPoint for students to reference during the period

e) Guided Practice-

- a. For the lecture: after each information rich slide, ask for student examples of places or things they have seen that display different types of symmetry. When they are done sharing look around the room and point out different objects that display each type
- b. For the think pair share: do an example with Mrs. Ojeda of what a conversation in the think pair share style would look like

f) Check for Understanding-

- a. Asking for student examples during the PowerPoint ensures that students fully understand the different terms
- b. Ask questions such as “If I took this computer and cut it in half, what type of symmetry would it display? How do you know?” Do this after the think pair share, but before independent practice so you can be sure they understand the material
- c. Ask questions like, “What can we do to determine what type of symmetry something has?” (Imagine folding the object in half, try it with your paper- do the two sides match exactly? Are they mirror images? For radial objects, if you cut the object like a pizza, or into quarters, would the halves look the same each time? If not, why?”
- d. The independent practice will serve as their form of performance assessment. Their ability to understand and apply the different types of biological symmetry will be evident with their completion of each object in the activity

g) Independent Practice-

- a. This will be the time in which students are working independently, or with their table partner, to determine how they should fill in the missing halves of the handout items

h) Closure-

- a. Now that we have identified and applied the three main types of symmetry seen in the animal kingdom, we know that...
 - Bilateral symmetry is seen in many living things, we as humans have bilateral symmetry. “Who can tell me one thing they found to have bilateral symmetry in their worksheet? How did you know?”
 - Radial symmetry is only seen in animals that live in where? (the ocean), but we see radial symmetry all around us in non-living things
 - Who has one item that is radial on their sheet?
 - Very few organisms are asymmetrical. Who can tell me the most common sea organism that doesn't have symmetry?
 - Did anyone else find something on his or her sheet that is asymmetrical? How do you know??

i) In case you have extra time:

- a. Pass out the handout entitled “Symmetry: understanding main ideas”
- b. Pass out the handout “Symmetry: Section Summary”
- c. Instruct the students to review their notes and then read the section summary, highlighting and circling key and supporting information. (a type of informal guided reading activity)
- d. Use both the notes and the section summary to complete the reinforcement activity
- e. Work with the material until the end of the period
- f. It will not be homework, they will complete it next class if they don't finish today

j) Differentiation:

- a. Lesson differentiation and adaptation will include:
 - A variety of teaching techniques cater to a variety of learners: there are listening, kinesthetic, visual, and tactile components to this lesson which will be useful for students with IEP's- especially those that have trouble focusing on a single task
 - The lesson is structured so that students will never have to go more than a few minutes without interacting by talking. This breaks the lesson up and creates a more engaging environment for students who might have trouble participating in other ways
 - All necessary directions will be put in the PowerPoint. This allows students to reference them more than once to gain understanding