**Lesson Topic**

## Waves

## State Standard

1-PS4-1

**Lesson Goal**

Students observe how waves and the tide affect the earth.

**Relation to USS Kidd**

The USS Kidd served in the Atlantic and Pacific. It had to travel through waves and understand the effect wave had on the ships travel.

**Objectives**

The student knows that scientists make the results of their investigations public, and they describe the investigations in ways that enable others to repeat the investigation.

**Materials needed for lesson**

-1 Pan per 4 students  
-1 Water jug per 4 students  
-1 Fan per 4 students  
-1 Paper plate per 4 students  
-1 Slinky  
-6 Marbles per 4 students  
- paper for recording observations and reflections

Lesson

1. Divide the class into groups. Give each group a pan, a paper plate, and a jug of water. Fill the pans with about 2 inches of water. Pose the question to the class, “What causes waves?” Have a class discussion, record the answers on the board.

2. Place a fan in front of a pan of water. Have the student’s prediction what they think will happen when the fan is turned on. Turn the fan on low. Have the students observe what happens. Have the students use their paper plate to fan the water. Have the students record their observations? Instruct the students to experiment with waving the plate slower and faster, have them record the difference. Make sure that students do not fan too quickly that water sloshes out of the pan.   
  
3. Ask students, “what did you observe”? Did the water bunch up at the far end of the pan?” Discuss the connection between wind and waves. Ask students, “Why didn’t the water bunch up at the far end of the pan?”   
  
  
4. Discuss with students, the misconceptions about the nature of water waves. Bring up the common misconception that waves are generated from within the water. Explain how most waves are actually generated by wind. As wind travels across the water’s surface, it pushes against the water and energy in the wind is absorbed by the water. Another misconception is that as a wave moves the water itself moves with the wave. In fact, a wave is the movement of energy through water.”   
  
5. Distribute to each group 5 marbles. Have the students place 4 of the marbles on a table. lined up in a row. Pose the question, “What do you think will happen if a marble is gently rolled at the marble at one end of the row?” Have the students record then discuss their ideas? Have each group roll the fifth marble at the end of the row. The marble at the far end of the row will roll away and the others will not move. Have students repeat the experiment several times. Discuss the idea that the energy in the rolling marble is transferred into the marble it hit, and from that marble to the next on down the line, until the energy reached the last marble. The energy made that marble roll away. Explain how wave energy moves through water the same way.

6. Demonstrate the way that water moves by using a slinky. Have students experiment with the slinky. Next, I will introduce the generalization, “Water in the oceans is constantly moving in different patterns,” and the concepts, “waves and tides,” telling them what I expect them to understand at the end.

**Assessments**

As the students are experimenting with wind and waves, walk around the classroom to monitor individual comprehension. Also, have the students write in their journals to assess what they learned.