

# Ducks overboard! What happens to goods lost at sea?

Headline Story: <http://edition.cnn.com/2013/10/09/business/goods-lost-at-sea/index.html>



Picture: <https://www.theguardian.com/environment/2012/feb/12/great-escape-bath-toys-pacific>



3. Our group decided that we were going to try the following strategies to make waves.

4. We decided to observe what happens using the following steps. Please make sure you are clear and write them in order.

Strategy #1 \_\_\_\_\_

Trial	Description of what happened	Sketch of what happened
1		
2		
3		

Strategy #2 \_\_\_\_\_

Trial	Description of what happened	Sketch of what happened
1		
2		
3		



Station #2: What are the parts of a wave? How do waves make objects move?

1. Explain how waves are made. Use your observations and sketches from station #1 to support your answer.

2. Ideas that we will try to create each type of wave.

Tall

Short

Further apart

Close together

Strategy \_\_\_\_\_ to try and make this type of wave \_\_\_\_\_.

Trial	Description of what happened	Sketch of what happened
1		
2		
3		



3. What did you notice about the rope when you moved your arm up and down?

4. Compare what your waves looked like and the rope waves.

Part 2:

What happened to the location of your duck as you created waves?





Station #3: What happens when the ocean floor is sloped or has other features?

1. Sketch out what happened to your duck when you first put it in the water and then again after making waves. Make sure you label your diagram.

Before	After

2. How is this model of the ocean similar to the ocean? Different from the ocean??

3. Now that you have tipped the bin of water so that there is a slope, sketch out what happened to your duck when you first put it in the water and then again after making waves. Make sure you label your diagram.

Before	After
Before	After





## Station #1: How are waves made?

Materials: Plastic bin with water; straws, small ball, large ball, Making Waves student sheet

At this station, we are investigating how waves are made. There are materials provided that will allow you to investigate possible causes of waves.

1. Using your student data sheet, begin by explaining or sketching your initial idea about how waves are created.
2. Discuss your ideas with your group members. After discussing, your ideas, brainstorm ways you could try and make waves using the materials provided. Write out the strategies you are going to try.
3. Before you try to make waves using the materials provided, decide how you are going to observe what happens and if a wave is created. Write out your strategy for doing this.
4. Try each of your strategies three times. Between each try, let the water in your bin settle down.
5. Make sure you are providing details about how you made the wave on your student sheet. You should also write down your observations of what happened for each try and sketch your result.
6. Answer the prompt on your student sheet to explain your understanding of how waves are created.





Station #2: What are the parts of a wave? How do waves make objects move?

Materials: Plastic bin with water, Making Waves student sheet, small rubber duck, Styrofoam meat tray cut in half,

At this station, we are investigating what different types of waves look like and how they are created. We are also making observations about how waves make object move. There are materials provided that will allow you to investigate both of these questions.

Part 1:

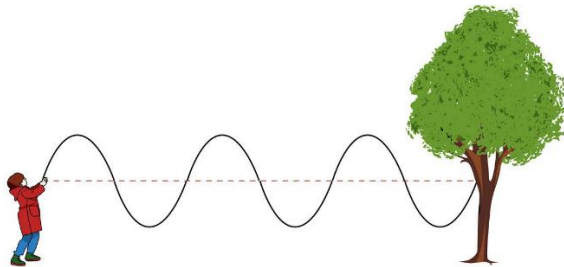
1. Begin by discussing two ways that waves can be made with your group members and summarizing them on your student sheet.
2. Discuss your ideas with your group members.
3. In the first station you created waves by trying different ideas. At this station, you are going to use the Styrofoam tray to try and create the following types of waves:
  - a. Tall Waves
  - b. Short Waves
  - c. Waves that are further apart
  - d. Waves that are close together
  - e. Combinations of these such as tall waves that are close together
4. One member of your group should be responsible for trying to create the waves while others observe what the waves look like.



Position for the person trying to create the waves.

Those watching the waves should watch through the side of the container.

5. Try each of your strategies three times. Between each try, let the water in your bin settle down.
6. Keep a record of your observations and sketches for each try on your student sheet.
7. Now pick up the piece of rope and have team members hold each end. One person should move their arm holding the rope up and down in front of them to see what happens similar to the diagram below.



8. Discuss if there is a pattern similar to this image that you see developing with the waves in the water.

#### Part 2:

1. Now that you have had a chance to create waves and see their motion, let's see how they make objects move.
2. Place your duck in the center of the bin when the water is calm. Notice where it is placed.
3. Create waves using the strategies you tried above and make observations about what happens to the duck.



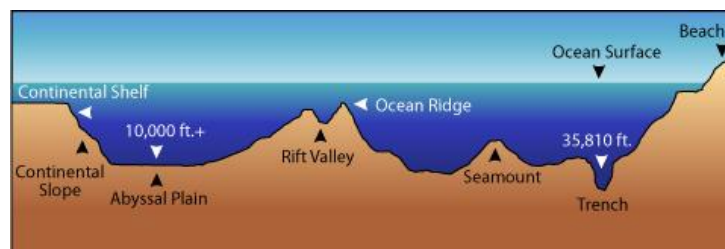


Station #3: What happens when the ocean floor is sloped or has other features?

Materials: Plastic bin with water, Making Waves student sheet, small rubber duck, Styrofoam meat tray cut in half,

At this station, we are investigating how waves make objects move when the ocean floor is sloped. There are materials provided that will allow you to investigate.

1. In the last station, you placed your duck in the middle of the bin with calm water and made observations.
2. Discuss those observations and sketches with your group members.
3. Consider the question: How is this plastic bin similar to the ocean? How is it different? Have you ever walked into the ocean? Or a lake? What happens as you walk further into the water?
4. The ocean floor has a variety of different features similar to the diagram below which makes the floor of the ocean not level.



5. What could we do to the plastic bin to create a model that has different elevations for the ocean floor? Try to place one end of the bin about 5-6 inches off of the table.
6. Repeat the steps for placing your duck in the center and making waves. You should do this from both ends of the bin and record what happens. Record your observations.

