The Education Program at the New Jersey Sea Grant Consortium

22 Magruder Road, Fort Hancock, NJ 07732 (732) 872-1300
www.njseagrant.org

UNDERSTANDING STORM SURGE

ACTIVITY # 4: THE CORIOLIS EFFECT

Adapted from *:* <*http://www.carolina.com/teacher-resources/Interactive/modeling-the-coriolis-effect/tr10643.tr>*

OVERVIEW Students will explore how air moves around the Earth while it is spinning on its axis creating the Coriolis effect.

MATERIALS

- A large round object such as a ball, balloon or globe
- Two (2) dry erase markers.

PROCEDURE

1. Around the middle of the ball, balloon or globe draw a line representing the Equator. Label the top and bottom of the ball, balloon, or globe to represent the North and South Poles.
2. Ask a student to hold the ball, balloon or globe at eye level and rotate it from left to right, simulating the rotation of the Earth.
3. While one student rotates the ball, balloon, or globe ask the others to examine movement from the perspective of the labeled North and South Poles. All students should answer questions 1 & 2.
4. While one student continues to rotate the ball, balloon or globe from left to right, ask another student to slowly draw a line straight from the North Pole to the equator. Switch students and while one student continues to rotate the ball, balloon or globe, ask another student draw a line straight from the South Pole towards the Equator. Answer questions 3 and 4.

Students may struggle with understanding that the direction of the Earth's movement is based on their point of view. When they describe the

direction (left or right) in which the “straight” lines veer, make sure the students determine this direction from the perspective of the beginning point of the line. Take a few minutes to discuss this as a class. You may also address common misconceptions concerning the Coriolis effect, such as the notion that the direction of swirl in a flushing toilet differs in the northern and Southern Hemispheres.

Ask students to relate the directional movement of large air masses, ocean currents, and hurricanes to the Coriolis effect. They may find maps that depict the prevailing winds and ocean currents in the Northern and Southern Hemispheres.

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Student Questions:

1. As you look down from the "North Pole" towards the "Equator," in which direction is the ball, balloon, or globe spinning-- clockwise or counterclockwise?

2. When you look up from the "South Pole" toward the "Equator," which way is the ball, balloon or globe balloon spinning? Clockwise or counterclockwise?

3. What happened when you tried to draw a straight line from the "North Pole" to the "equator"?

4. What happened when you tried to draw a straight line from the "South Pole" to the "equator"?

5. Predict what would happen if you again drew lines in the Northern and Southern Hemispheres but with the Earth rotating in the opposite direction.

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Student Answers:

1. The ball, balloon or globe appears to be spinning counterclockwise.

2. The ball, balloon or globe appears to be spinning clockwise.

3. The line was not straight but instead veered west of the intended path (to the right, when examining the line from the “North Pole” to the “Equator”).

4. The line was not straight but instead veered west of the intended path (to the left, when examining the line from the “South Pole” to the “Equator”).

5. The curving of the lines in the Northern and Southern Hemispheres would be reversed. The line from the “North Pole” to the “Equator” would veer to the left, and the line from the “South Pole” would veer to the right (toward the east, in both cases).