

Lesson Plan: Introducing The Gulf Stream

Grade 6: California Content Standards for Science

4a The sun is the major source of energy for the phenomena of Earth's surface, it powers winds, ocean currents, and the water cycle

4e differences in pressure, heat, air movement, and humidity result in changes of weather

Objectives:

1) Students will engage in problem solving activities to predict ways that the Sun's heat can cause movement in the ocean (currents) that carries heat from one part of the planet to another.

2) Students work cooperatively in groups to create explanations of their own based on prior knowledge, evidence, and revision.

3) Students will check their predictions of temperature on different parts of the Earth's surface using models created by scientists and other public resources.

4) Students will explore variations in temperature and investigate the specific conditions and interactions that create the weather that we experience.

Vocabulary

Radiation, convection, heat transfer, Gulf Stream, rotation, current, Coriolis Effect, gyre

Materials

Map of the planet for each student with latitude and longitude, colored pencils, globe or beach ball, flashlight for each student group, (or one if the activity is done as a demonstration) video clip from the "teacher's Domain" website (will need an s-cable connection from the computer for the classroom TV)

Procedure;

Activity 1 15 minutes

-Students will use a map or draw their own representation of the Earth's surface predicting the temperature of each band of the latitudes across the planet. Using a gradation of red as warmest and blue as coolest, students will include a key for their map. Students will also explain their temperature predictions.

-Students will share their predictions with a table partner.

-Students may share their maps or their partner's maps with the whole class or in a gallery walk.

Activity 2 15 minutes

-student groups will model how the light from the sun hits the surface of the spherical Earth using a flashlight in a darkened room. They will need a flashlight and a globe or ball. The light represents the energy from the sun which heats the planet.

-Students will write observations and share their ideas about how this model of the Earth may provide support for their prediction. Students may revise their predictions after observing and discussing the model.

-Student groups will share their observations with the whole class in a discussion.

Activity 3 class period in the Computer Lab

-students will research the average high and low temperature for London, Oslo, New York. The NOAA site and the Weather Channel are good resources for this information.

-students will answer the question “Given the predictions that you made about temperatures on the surface of the Earth, do these cities follow the expected patterns? What are the temperatures of other cities near them? Are they the same? (Most students will predict that the cities in the northern hemisphere will be much colder than they are.)

-Students watch a short video on the Gulf Stream (3 minutes). Partners discuss their new information and make changes to their predictions creating a new model if necessary.

Key Questions: What new information did you learn? How do landforms affect the circulation of water in the ocean? How does this impact the movement of heat from the equator? How does Earth’s rotation affect the movement of heat around the planet? What would happen to the temperature of the cities affected if the Gulf Stream stopped?

Assessment

Student groups will create a poster explaining the Gulf Stream and showing the temperature of the Earth. The poster will include the models used, their predictions, observations, and their new ideas. Students will share their posters and make comments on other posters in a gallery walk.

Students will write a short explanation of how the Sun’s energy moves around to change the temperature of the Earth’ surface.

Total Time: 1-3 class periods

Set-Up Gather materials, open an account with Teacher’s Domain (takes only a few moments.) copy maps for students if you choose to use them.

Next steps: Students will follow the same procedure of predicting how heat might be moving through the ocean, sharing information with other students, researching actual temperatures using the SCOOS system, then revising their predictions. They will view “Examine Global Surface Currents” from Teacher’s Domain, and explore ocean currents at the shoreline on a field trip to track floating objects and time their movement.