



TEACHER GUIDE

CLIMATE ZONES AND OCEAN CURRENTS GRADES 6-8

COMMON MISCONCEPTIONS

- **Oceans are unrelated to weather.**
Oceans play an important role in Earth's weather and climate. Oceans cover more than 70% of Earth's surface and absorb large amounts of solar radiation. They release this energy much more slowly than land, which allows for heat to be distributed across the globe via air and water currents.
- **The salinity of the ocean is the same everywhere and never varies.**
The salinity of the ocean varies by location and by season. In areas where freshwater is being added to the ocean by rivers or streams the salinity can be lower. In areas where evaporation is occurring or sea ice is being formed, salinity can increase.
- **Sunlight determines the temperature of Earth.**
While the Sun does play an important role in the temperature of Earth, it does so with the help of oceans and ocean currents. Oceans cover 70% of Earth's surface and absorb large amounts of solar energy. Because bodies of water release stored heat more slowly than the land, this stored heat can be distributed around the world by ocean currents.

CLIMATE

Climate describes what the weather is like over a long period of time in a specific area. Long-term averages (30 years or more) of precipitation, temperature, humidity, sunshine, and wind are all considered when describing the climate of a particular region. *Climate* provides general information about what to expect about a particular region but it does not provide specific details about a given day.

CORIOLIS EFFECT

The Coriolis effect is a global wind pattern that is caused by the rotation of Earth, which rotates on its axis every 24 hours. Because of the rotation and tilt of Earth's axis, certain latitudes move faster than others. For example, the North and South poles have less distance to move to make a complete rotation and are moving at a slower rate. The Equator has the furthest distance to move and is moving at the fastest rate. As air currents move from one latitude to another, they begin moving at the same rate of speed as their point of origin. However, the latitude that they are moving towards may be moving faster or slower. Consequently, the air currents "bend" because Earth under them is moving at different rates. Air currents are deflected to the right in the Northern Hemisphere and to the left in the Southern Hemisphere.

DENSITY

Density is a characteristic that helps determine one type of matter from another. The density of an object is the relationship between its mass and volume. Or, more simply put, it is a measure of how tightly the atoms or molecules that make up an object are packed together.

TEACHER TIPS

- Encourage student questions from the investigation to motivate their gathering of evidence for arguments. This lesson is most authentic if it is generated by student questions.
- Facilitate student discourse among each other and publicly with the class to support consensus-building. It is important for the class to take stock in competing ideas and then use evidence to figure out science ideas.
- Be sure to remind students of important lab safety considerations when engaging in the lab investigations.

ABOUT THIS LESSON

This lesson was created by the National Science Teaching Association (NSTA) to pair with the Generation Genius video and support NGSS.

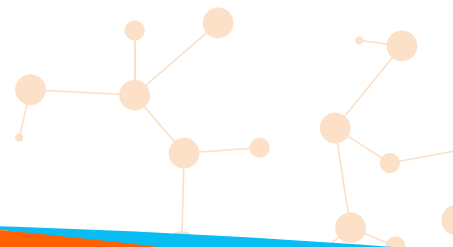
They have requested we provide the following background with this lesson:

The Next Generation Science Standards (NGSS) are the national standards on how students learn science, and they are based on contemporary research presented in *A Framework for K–12 Science Education (the Framework)*. The shift in science teaching and learning required by the Framework is summarized in this infographic: [A New Vision for Science Education](#).

At the start of each Generation Genius lesson, students are presented with a phenomenon, then they try to explain it. Students will notice they have gaps in their knowledge and ask questions, which motivates them to build ownership of science ideas they need in order to explain how or why the phenomenon occurred. The way students build ownership of science and engineering ideas is through active engagement in the science and engineering practices (SEPs). This process of sensemaking, or doing science to figure out how the world works, is one of the major shifts the *Framework* encourages.

To engage in the SEPs, students should be part of a learning community that allows them to share their ideas, evaluate competing ideas, give and receive critiques, and reach consensus. Students can start by sharing ideas with a partner, then with a small group, and finally, with the whole class. This strategy creates opportunities for all students to be heard, build confidence, and have something to contribute to whole-class discussions. Each Generation Genius lesson provides conversational supports to facilitate such productive student discussions to contribute to sensemaking.

Excited to continue your shift toward the new vision for science education? Check out the [Generation Genius Teacher Guide](#) page on the NSTA website for resources and strategies to engage every student in your classroom in **doing** science.



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