

# Wind Pathways

Model how heating, pressure, and rotation shape winds.

**S6E4.c** “Develop a model demonstrating the interaction between unequal heating and the rotation of the Earth that causes local and global wind systems.”

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## 1 READ AND MARK \_\_\_\_\_ Read it twice

**YOUR JOB** Underline every sentence containing *pressure*, circle every sentence containing *rotates*, *rotation*, or *Coriolis*, write L next to the sentence containing *local winds*, and write G next to each sentence containing *global*.

### Why Wind Changes Direction

- ① Sunlight does not warm every place equally. Near the equator, sunlight arrives more directly, so land and air usually gain more energy than they do near the poles. Warm air expands, becomes less dense, and rises. Cooler, denser air sinks. These vertical moves create differences in air pressure. Air begins to move from areas of higher pressure toward areas of lower pressure. Unequal heating therefore supplies the energy that starts wind in the atmosphere.
- ② Along a coast on a sunny afternoon, land warms faster than nearby water. Air over the land warms and rises, leaving lower pressure near the surface. Cooler air over water is denser and has relatively higher pressure. It moves toward the land as a sea breeze. At night, land cools faster than water, so the pressure pattern can reverse and air can move from land toward water. These are local winds because they affect a limited area.
- ③ On a global scale, warm air rises often near the equator, while cooler air sinks at higher latitudes. This circulation creates broad pressure differences and moves air across large distances. As air travels long distances, Earth rotates beneath it. This rotation does not begin the wind, but it changes the wind's path, an effect called the Coriolis effect. In the Northern Hemisphere, moving air bends to the right; in the Southern Hemisphere, it bends to the left. Together, unequal heating, pressure differences, and the Coriolis effect shape global wind patterns.

**2 ANSWER WITH EVIDENCE** \_\_\_\_\_ Use the passage

**1** Explain the chain of events that causes a daytime sea breeze. Include heating, pressure, and the direction of air movement.

---

---

---

**2** What changes at night along the coast, and which way can the wind move?

---

---

**3** What starts wind, and what does Earth's rotation do to wind that is already moving?

---

---

---

**4** How does the Coriolis effect change the path of moving air in the Northern and Southern Hemispheres?

---

---

**3 YOUR TURN** \_\_\_\_\_ Your own words

Create a three-panel model of wind. In Panel 1, model a daytime sea breeze. In Panel 2, model unequal heating between the equator and a higher latitude. In Panel 3, show how Earth's rotation bends moving air in both hemispheres. Label temperatures, pressure, rising or sinking air, and arrows for air movement. Under the panels, write two sentences explaining how unequal heating and rotation work together.

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

---

---

---

**PART 1 • READ AND MARK**

Underline every sentence containing *pressure*, circle every sentence containing *rotates*, *rotation*, or *Coriolis*, write L next to the sentence containing *local winds*, and write G next to each sentence containing *global*. Accept any marking that follows this job and points at the right text.

**PART 2 • ANSWERS**

| # | QUESTION                                                                                                                    | ANSWER                                                                                                                                                                   |
|---|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Explain the chain of events that causes a daytime sea breeze. Include heating, pressure, and the direction of air movement. | <b>Land warms faster than water, so air over land rises and creates lower pressure. Cooler, denser air over water has higher pressure and moves toward the land.</b>     |
| 2 | What changes at night along the coast, and which way can the wind move?                                                     | <b>Land cools faster than water at night. The pressure pattern can reverse, so air can move from land toward water.</b>                                                  |
| 3 | What starts wind, and what does Earth's rotation do to wind that is already moving?                                         | <b>Unequal heating creates pressure differences that start wind moving from higher pressure toward lower pressure. Earth's rotation changes the path of moving wind.</b> |
| 4 | How does the Coriolis effect change the path of moving air in the Northern and Southern Hemispheres?                        | <b>Moving air bends to the right in the Northern Hemisphere and to the left in the Southern Hemisphere.</b>                                                              |

**PART 3 • YOUR TURN (SAMPLE ANSWER)**

Panel 1 labels: sunny land, warm rising air, low pressure; cool water, higher pressure; arrow from water to land. Panel 2 labels: equator, warm rising air, lower pressure; higher latitude, cooler sinking air, higher pressure; arrow toward lower pressure. Panel 3 labels: moving air and Earth rotation; an arrow bending right in the Northern Hemisphere and an arrow bending left in the Southern Hemisphere. Unequal heating makes pressure differences that move air from higher pressure toward lower pressure. Earth's rotation changes the direction of moving air, so it helps shape global wind patterns.

Accept accurate labeled models that show unequal heating causing pressure differences and air moving from higher pressure toward lower pressure. The model must show that rotation changes wind direction, not that rotation starts the wind.