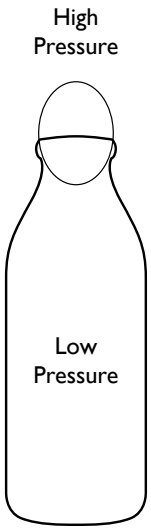
WHAT CAUSES WIND



Preliminary Observations

What do you think will happen to the egg on top of the bottle that you were observing? Why?

Student observation

Relationship between Temperature and Pressure

1. What happened to the egg on top of the bottle you were observing?

   Student observation

2&3. Why did this happen? Label pressure areas on the drawing.

   Heat inside the bottle warmed the air, causing it to expand (molecules farther apart) and escape, which created lower pressure inside the bottle. The egg then blocked the entrance, causing a barrier to form between the higher pressure outside the bottle and the lower pressure inside. As the air inside the bottle cooled, the air contracted (molecules now closer together) and the higher pressure air from outside pushed the egg into the bottle.

   Label the diagram with "Lower Pressure" on the inside of the bottle and "Higher Pressure" on the outside above the egg.

4. How does this pressure difference relate to wind?

   Wind is created because of these demonstrated pressure differentials. In the atmosphere, air always moves spontaneously from areas of high pressure to areas of low pressure. This movement is strong enough to cause the wind we feel, from light breezes to strong gusts.

Bag Experiment

5. Could you blow the bag up when it was under a book?

   Student observation

6. Why or why not?

   Explanation: As the bag is blown up, it inflates due to higher pressure introduced inside. This higher pressure exerts a force that can lift objects, such as books.

Air Can Exert a Force

14. a. On sunny days, the Sun heats the land in the morning more quickly than it heats the nearby ocean. Because of this, the air over the land will **rise / fall** and the pressure over the land will **increase / decrease**. Because of this, the wind will blow **toward / away** from the ocean and **toward / away** from the land.

On Diagram 1 below, draw in arrows to show where air is rising and falling and in which direction the wind will flow.

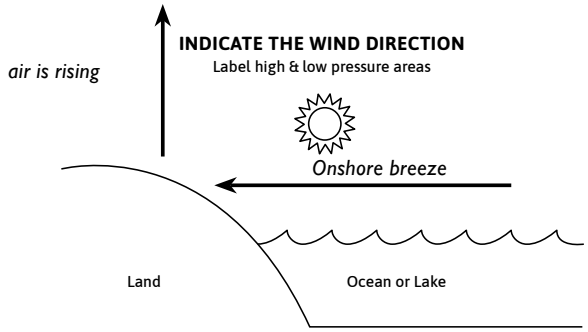


Diagram 1: 11am on a sunny day

b. In the evening, when the sun goes down, the land cools down which cools the air above it. Because of this, the air over the land will **rise / fall** and the pressure over the land will **increase / decrease**. Because of this, the wind will blow **toward / away** from the ocean and **toward / away** from the land.

On Diagram 2 below, draw in arrows to show where air is rising and falling and in which direction the wind will flow.

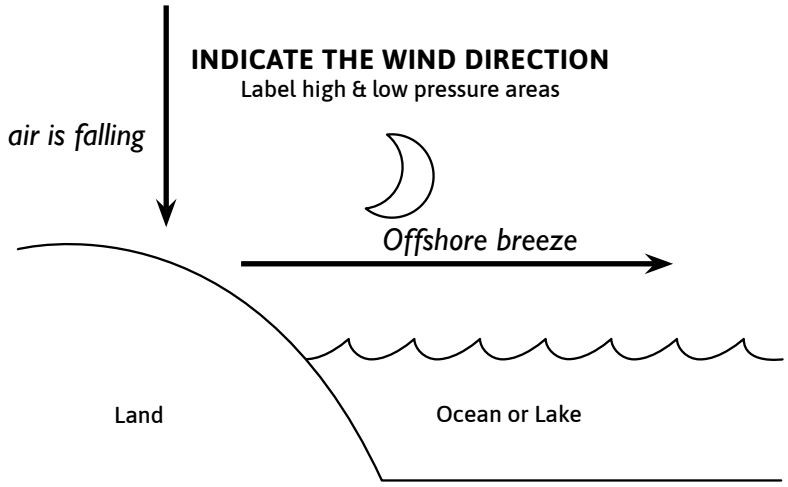


Diagram 2. 11pm on a clear moonlit night

U.S. MAP WITH ISOBARS

High pressure is over the western states centered over Wyoming with a pressure of 30.5 inches of mercury. Air is falling in this area.

Low pressure is over the Midwest centered over Michigan with a pressure of 29.6 inches of mercury. Air is rising in this area.