

Creating a Sea Breeze

Age Range: 11+

Skills/Subjects:

- Meteorology
- Earth science

Materials:

- Two metal pans
- Ice
- Hot sand
- Candle
- Matches or lighter
- Cardboard box (if necessary)



Directions

1. Set up the experiment in an area where it will be protected from drafts. If you need to, you can make a three sided screen by cutting off one side of the cardboard box.
2. Pour the hot sand into one of the pans. You can heat it by leaving it out in direct sunlight for a few hours or putting it in the oven at 300 degrees for 5 minutes.
3. Light a candle and then blow it out. Which direction does the smoke flow? If you have protected your area from drafts, it should flow straight up (just like convection current).
4. Fill the second pan full of ice.
5. Place the pan of hot sand and the pan of ice side by side.
6. Light the candle again and blow it out, then hold it in between the two pans, right above the edge of the ice pan. Which direction does the smoke flow now?

Explanation

An area full of light, warm air is called a low-pressure zone. Areas with cool, denser air are called high-pressure zones. What happens when a low-pressure zone and a high-pressure zone are right next to each other? When you set the pans side by side, the ice cooled the air around it, creating a mini high-pressure zone, and the sand warmed the air around it to create a mini low-pressure zone. Air always flows from a high-pressure zone to a low-pressure zone to even up the pressure - this is what causes wind. You made a tiny breeze between the pan of ice and the pan of sand, and the smoke floated sideways in the breeze. The same thing happens between cold ocean water and hot beach sand, which is why there is almost always a breeze at the beach!

Air pressure changes cause wind, but they are responsible for other types of weather too. A low-pressure zone usually causes clouds and rain, because as the hot air rises it carries with it evaporated moisture that can condense into clouds. A high-pressure zone usually results in clear skies and sunny days because sinking currents prevent moisture from rising up and forming clouds.