

Science Docent -

Grade 6, Station 1

What Happens When Air is Heated?

Have you ever heard of “heat transfer”?

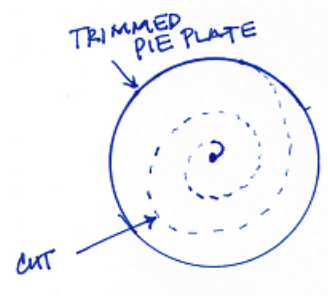
Have you ever seen the shimmery effect produced by heated air rising from the hot pavement?

Or on a hot sunny day, did you ever see cars, buildings, or other objects appear to shimmer or wave on the other side of a street or parking lot? Do you know what causes this effect? *Hot air rising from the pavement.*

The sun heats up the ground more quickly than the air, especially if the surface of the ground is dark colored. The heated air then rises and bends light waves as they pass through it, making objects on the other side shimmer.

Materials Aluminum Pie Pan (16), 5 Heavy Scissors, 1 , Dental Floss, 12“ Candle (16), Lighter (2),

- **DIRECTIONS FOR MAKING ALUMINUM SPIRAL:**
- Use heavy scissors to cut the flat part out of an aluminum pie plate; discard the sides of the pan
- Use the tip of the scissors to poke a small hole in the middle of the flat part; starting at this point, cut a continuous spiral until the outside of the pan is met
- Through the hole, tie a 12” piece of dental floss to the middle of the spiral



DIRECTIONS:

- Set the candle on the table; use the lighter to get a small flame (your heat source)
- With the string of floss in one hand, gather the aluminum spiral in your other hand (this is to prevent it from spinning before the experiment starts)
- Now dangle the aluminum spiral 5-6” above the flame of the candle. CAUTION: the underside of the aluminum spiral will get

warm

- What happened to the aluminum spiral? *The spiral will spin*
- Why do you think this happened? *The spiral spun because warm air rose from the heat source and pushed against the spiral*

Science Docent - Session 2

Grade 6 - Station 2

Warm Air Needs More Room

As its temperature rises, air starts to act a little differently. Find out what happens to a balloon when the air inside it heats up with this fun science experiment.

What you'll need:

- Empty bottle
- Balloon
- Pot of hot water (not boiling)

Instructions:

- Stretch the balloon over the mouth of the empty bottle.
- Put the bottle in the pot of hot water, let it stand for a few minutes and watch what happens.

What's happening?

As the air inside the balloon heats up it starts to expand. The molecules begin to move faster and further apart from each other. This is what makes the balloon stretch. There is still the same amount of air inside the balloon and bottle; it has just expanded as it heats up.

Warm air therefore takes up more space than the same amount of cold air, it also weighs less than cold air occupying the same space. You might have seen this principle in action if you've flown in or watched a hot air balloon.

Science Docent - Session 2

Grade 6 - Station 3

Class Demo by the docent

Materials:

Dry ice, Gloves

Class reassembles in the center of the room.

Keep the door open so the classroom is ventilated.

We have learned from the two experiments that hot air expands and rises. What do we know about cold air? (it sinks and takes the place of the hot air that rose). Is there a way to prove this or see it in action?

Let's talk about the properties of dry ice.

Carbon dioxide is a gas created when living creatures exhale. When carbon dioxide freezes at -109 degrees Fahrenheit, it forms solid dry ice. The gas rises from dry ice as the dry ice melts -- the solid ice changes directly into a gas and does not pass through a liquid phase. (Like water does).The technical term for this change is "sublimation."

Warn the children about the dangers of dry ice before you allow them to get near it. Due to the extreme cold temperature of the dry ice, it can produce serious frostbite to skin after only a second or two of contact. Never touch the dry ice with bare skin and never swallow dry ice. Use dry ice in a well-ventilated room to prevent breathing in too much carbon dioxide

Docent places the dry ice in the sink and runs the water. The dry ice will begin to sublime (“smoke” forms). Observe and explain the properties of the “smoke”..is it rising up? Because it is so cold, it actually sinks and stays low