



# Science Virtual Learning

# 8th Grade Science

May 5, 2020

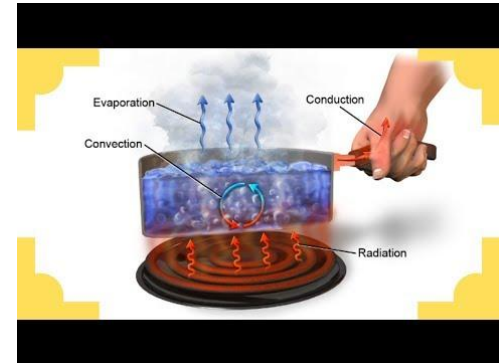


8th Grade Science  
Lesson: May 5, 2020

**Objective/Learning Target:**  
**I can differentiate between conduction, convection and radiation.**

# Bellwork

1. Watch the “Hot 2 Cold” video and sing along!
2. Then watch the “Conduction, Convection and Radiation” video.  
Answer these questions as you watch.
  - a. How does conduction, convection and radiation work?
  - b. Give real life examples of each.





# Today

## Conduction

Put a pan on a stovetop and turn on the heat. The metal sitting over the burner will be the first part of the pan to get hot. Atoms in the pan's bottom will start to vibrate faster as they warm. They also vibrate farther back and forth from their average position. As they bump into their neighbors, they share with that neighbor some of their energy. (Think of this as a very tiny version of a cue ball slamming into other balls during a game of billiards. The target balls, previously sitting still, gain some of the cue ball's energy and move.)

As a result of collisions with their warmer neighbors, atoms start moving faster. In other words, they are now warming. These atoms, in turn, transfer some of their increased energy to neighbors even farther from the original source of heat. This *conduction* of heat through a solid metal is how the handle of a pan gets hot even though it may be nowhere near the source of heat.



# Today

## Convection

Convection occurs when a material is free to move, such as a liquid or a gas. Again, consider a pan on the stove. Put water in the pan, then turn on the heat. As the pan gets hot, some of that heat transfers to the molecules of water sitting on the bottom of the pan via conduction. That speeds up the motion of those water molecules, they are warming.

As the water warms, it now begins to expand. That makes it less dense. It rises above denser water, carrying away heat from the bottom of the pan. Cooler water flows down to take its place next to the hot bottom of the pan. As this water warms, it expands and rises, ferrying its newly-gained energy with it. In short order, a circular flow of rising warm water and falling cooler water sets up. This circular pattern of heat transfer is known as *convection*.

It's also what largely warms food in an oven. Air that's warmed by a heating element or gas flames at the top or bottom of the oven carries that heat to the central zone where the food sits. Air that's warmed at Earth's surface expands and rises just like the water in the pan on the stove. Large birds such as frigate birds (and human flyers riding engineless gliders) often ride these *thermals* — rising blobs of air — to gain altitude without using any energy of their own. In the ocean, convection caused by heating and cooling helps to drive ocean currents. These currents move water around the globe.



# Today

## Radiation

The third type of energy transfer is in some ways the most unusual. It can move through materials, or in the absence of them. This is radiation. Consider visible light, a form of radiation. It passes through some types of glass and plastic. X-rays, another form of radiation, readily pass through flesh but are largely blocked by bone. Radio waves pass through the walls of your home to reach the antenna on your stereo. Infrared radiation, or heat, passes through the air from fireplaces and light bulbs. But unlike conduction and convection, radiation doesn't *require* a material to transfer its energy. Light, X-rays, infrared waves and radio waves all travel to Earth from the far reaches of the universe. Those forms of radiation will pass through plenty of empty space along the way.

X-rays, visible light, infrared radiation, radio waves are all different forms of *electromagnetic radiation*. Each type of radiation falls into a particular band of wavelengths. Those types differ in the amount of energy they have. In general, the longer the wavelength, the lower the frequency of a particular type of radiation and the less energy it will carry.



## Today

1. Now complete this [quiz](#) over what you just read (when you click the link click the big blue start button to get started)
2. Complete [this worksheet](#) on your own piece of paper and check your answers when you're done!



## Review

1. Play this [quizizz](#) at least two times to review what we have learned.
2. Go over this [quizlet](#) set and play the matching and gravity games.
3. Play this [game](#) as a review of conduction, convection and radiation.





# Answers

## 1. Bellwork

- a. Conduction- Heat transfer because of direct contact. Convection- heat rises, as it cools it falls, then heats again and rises and cools and falls. Radiation- Heat transfer by no contact
- b. Conduction- Heat of the frying pan going to the eggs to be cooked. Convection- Lava Lamps. Radiation- Ice cream melting on a hot summer day.

## 2. [Heat Transfer Worksheet Answers](#)