Distance Learning Activities

April 27 - May 1 Lesson Plan for Grade 6, Science

Prepared by Mr. Reis

Contact Information:

Google Classroom Class Code: usduqmt
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OVERVIEW & PURPOSE

The student will be able to review and identify the different types of heat transfer.

MONDAY

Review these definitions for the different types of heat transfer. Ask a family member and see how many they know!

Conduction: The transfer of heat through contact (hot object touching a cooler object)

Radiation: The transfer of heat over distance (hot object sends heat waves out)

Convection: The transfer of heat through gas or liquid (hot object sends heat waves through liquid or gas)

TUESDAY

Identify 2 examples of each heat transfer:

Conduction:_____

_____

Convection:_____

_____

Radiation:_____

_____

WEDNESDAY

Explain what role heat transfer plays in states of matter changing. Minimum of 5 sentences.

_____
_____
_____
_____
_____
_____
_____

THURSDAY

Pick one type of heat transfer and draw/describe a model that represents it.

FRIDAY

Pick one type of heat transfer and draw/describe a model that represents it.

Distance Learning Activities

May 4 - May 8 Lesson Plan for Grade 6, Science

Prepared by Mr. Reis

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OVERVIEW & PURPOSE

The student will be able to review the states of matter and how they change.

MONDAY

Read the article titled “Heat or thermal energy, can be transferred in 3 ways”. Please number the paragraphs, but do not mark the text.

TUESDAY

Reread the article titled “Heat or thermal energy, can be transferred in 3 ways” and mark the text. Look for the most important information from each paragraph and circle words you do not know.

WEDNESDAY

Complete the reading comprehension questions that accompanied the article.

THURSDAY

Explain the difference in thermal energy between the Sun and the Moon.

FRIDAY

Quiz a family member about heat transfer. Can they identify 3 examples for each different type?

Heat, or thermal energy, can be transferred in three ways

By National Geographic Society, adapted by Newsela staff on 02.13.20
Word Count **903**
Level **940L**

Image 1. Radiation is one way that heat transfer occurs. All objects radiate some amount of heat as electromagnetic waves, even humans. Hotter objects, like light bulbs and campfires, radiate higher-energy light that we can see. Photo by National Geographic

Thermal energy is the energy that matter has due to the movement of its atoms. All matter is made of atoms, so every gas, liquid and solid has thermal energy. Atoms are constantly moving, whether they are zipping around in a gas or vibrating in a solid.

Even though all objects have thermal energy, they do not all have the same amount. Extremely hot objects such as the sun have more thermal energy than cold objects like ice. The sun can transfer some of its thermal energy to ice, and this is what causes an ice cube to melt on a warm, sunny day. The movement of thermal energy from a hotter object to a colder object is called heat transfer.

Heat transfer can happen in three different ways: through conduction, convection and radiation. All three forms of heat transfer happen constantly in your daily life.

Conduction

Conduction is a type of heat transfer that requires contact between the objects that are involved. For conduction to happen, there must be a temperature difference between the objects. This is true for all forms of heat transfer. Thermal energy is always transferred from the hotter object to the colder one. Once the objects reach the same temperature, the heat transfer stops. This is called thermal equilibrium.

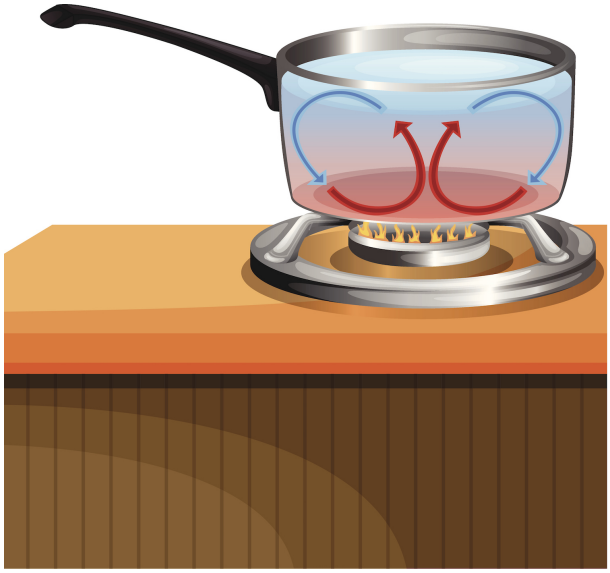
Solids, liquids and gases can all conduct heat. Conduction happens when particles bump into each other. Consider a cold metal spoon in a hot cup of coffee: The molecules in the coffee move freely and the metal molecules in the spoon vibrate. Since the coffee is hotter than the spoon, its molecules move more. The coffee molecules bump up against the spoon, transferring some of their energy to the spoon molecules. The spoon gets warmer and the coffee gets slightly cooler until both are at the same temperature. They are now in thermal equilibrium.

The two objects will remain at the same temperature unless something else adds or subtracts heat from them. In most cases, that something is the air in the room, which draws heat from the coffee. If allowed to sit, the coffee cup, the coffee and the spoon will all reach the same temperature as the surrounding air. They are once again at thermal equilibrium, but this time with their surroundings.

Some materials conduct heat better than others. Materials that conduct heat well, like metals, are called conductors. Materials that do not conduct heat well, like wood and plastic, are called insulators. This is why people choose wooden or plastic-handled spoons when cooking – they do not get as hot as metal spoons.

Convection

Convection is another type of heat transfer. It happens when heated molecules move from one place to another, taking heat with them. This only happens in fluids, such as liquids and gases.



Consider a pot of water heating on a stove. Water near the bottom of the pot heats up first. Fluids expand when they heat up, so the water near the bottom expands. This means its molecules spread out and it becomes less dense.

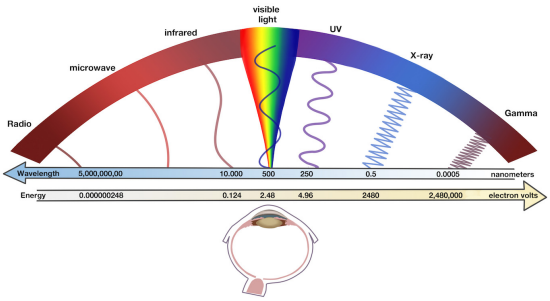
Hotter, less-dense water begins to rise and takes the place of colder, denser water at the top. The colder, denser water sinks to the bottom. There, it is heated and the cycle gets repeated. The repeated movements of water are called convection currents. As time goes on, more of these convection currents develop, transferring heat throughout the liquid.

You can see these currents when you boil rice in water. Convection currents also allow heated air to circulate through a room.

Radiation

The third type of heat transfer is radiation, which involves the science of light. Scientists know that light can act as both a particle and a wave. When it acts as a wave, the waves are referred to as

electromagnetic waves. There are many different types of electromagnetic waves. The waves have different amounts of energy based on how fast they vibrate up and down. Fast-vibrating waves have more energy than slow-vibrating waves.



Radiation is the transfer of heat through electromagnetic waves. All objects radiate some amount of heat as electromagnetic waves. Humans radiate energy as infrared light, which is too low-energy for us to see. However, we still feel it as heat – in fact, infrared radiation is commonly referred to as "heat rays." Hotter objects, like light bulbs and campfires, radiate higher-energy light that we can see.

Radiation can even transfer heat through space. The sun radiates heat through millions of miles of empty space down to Earth. Since the sun has a lot of thermal energy, it radiates many kinds of electromagnetic waves, including infrared light, visible light, ultraviolet light and X-rays. Ultraviolet light and X-rays are high-energy forms of light that we cannot see.

This article is available at 5 reading levels at https://newsela.com.

Quiz

1 What is MOST likely the reason the author included the description of the spoon in the hot coffee cup?

(A) to indicate that heat transfer always requires a liquid and a solid to work together

(B) to explain the process of heat transfer by conduction through an everyday situation

(C) to provide advice about using conduction to quickly cool down a hot beverage

(D) to compare the effectiveness of heat transfer in liquid with heat transfer in air

2 How does the author build understanding of convection?

(A) The author quotes the observations of scientists and teachers.

(B) The author lists the types of liquids that can become gases.

(C) The author describes the way currents develop in a pot of water.

(D) The author compares the materials that make the best conductors.

3 Which selection from the article is BEST illustrated by Image 1?

(A) The sun can transfer some of its thermal energy to ice, and this is what causes an ice cube to melt on a warm, sunny day. The movement of thermal energy from a hotter object to a colder object is called heat transfer.

(B) Materials that do not conduct heat well, like wood and plastic, are called insulators. This is why people choose wooden or plastic-handled spoons when cooking – they do not get as hot as metal spoons.

(C) Radiation is the transfer of heat through electromagnetic waves. All objects radiate some amount of heat as electromagnetic waves. Humans radiate energy as infrared light, which is too low-energy for us to see.

(D) However, we still feel it as heat – in fact, infrared radiation is commonly referred to as "heat rays." Hotter objects, like light bulbs and campfires, radiate higher-energy light that we can see.

4 How do Image 3 and the text in the section "Radiation" help the reader develop an understanding of light?

(A) by indicating the differences between light acting as a particle and light acting as a wave

(B) by indicating that fast-vibrating waves of light have more energy than slow-vibrating waves

(C) by illustrating the distance that UV light and X-rays must travel from the sun down to Earth

(D) by illustrating the range of colors that are within the spectrum of light visible to humans