Name:_______________________________________ Date:_____________

Day #1

Directions: The following is a two paragraph writing. You will need to write at least 2 paragraphs by answering the questions and providing examples/evidence to support your statements. Remember, one single paragraph is at least 5 sentences.

Think back to the different ancient civilizations we have talked about thus far. Which ancient civilization would you prefer to live in if you had to choose one? Why would you want to live in that ancient civilization when compared to the others? What would be the benefits? How do you think it would affect your life?

Name:____ Date:____________

Day #2

Directions:

- Read the *ScienceNewsforStudents* article that is provided.
- Using the Power Words (vocabulary words), choose five of them to use and write them below.
- Give an example of each Power Word that you would be able to find or to observe.
- Use the example below to help you. However, do not use the example as one of your own.

Power Words	**Example of Power Word**
Mr. Edmonson's example: Molecule	Mr. Edmonson's example: NaCl (Salt)

Name:____ Date:__________

Day #3

Directions: The following is a two paragraph writing. You will need to write at least 2 paragraphs by answering the questions and providing examples/evidence to support your statements. Remember, one single paragraph is at least 5 sentences.

Think back to the different ancient civilizations we have talked about thus far. Which ancient civilization would **not** want to live in if you had to choose one? Why would you not want to live in that ancient civilization when compared to the others? What would be the consequences of living in that culture? How do you think it would affect your life?

Name:____ Date:____________

Day #4

Directions: Using the *ScienceNewsforStudents* article, please answer the following questions. Take your time and read through the article to provide an accurate response. To get **full credit** you will need to respond in complete sentences.

1. What are the three processes called in which heat transfers from one place or substance to another?

____

____

2. If you eat a slice of pizza and it is too hot then you can feel that energy transfer going from the pizza to the inside of your mouth. What is this process of heat transference?

____

____

3. What are three different bands of wavelengths that radiation can be categorized as?

____

____

4. Which object in our solar system is our main contributor to radiation entering the Earth's atmosphere?

____

____

5. Underneath our surface the mantle and core help to continue the circulation of rocks and minerals. This means that a substance may be rising towards the surface as it is heated only to fall back towards the core as it cools. What is this process of heat transference?

____

____

Name:______________________________________ Date:____________

Day #5

Directions: The following is a two paragraph writing. You will need to write at least 2 paragraphs by answering the questions and providing examples/evidence to support your statements. Remember, one single paragraph is at least 5 sentences.

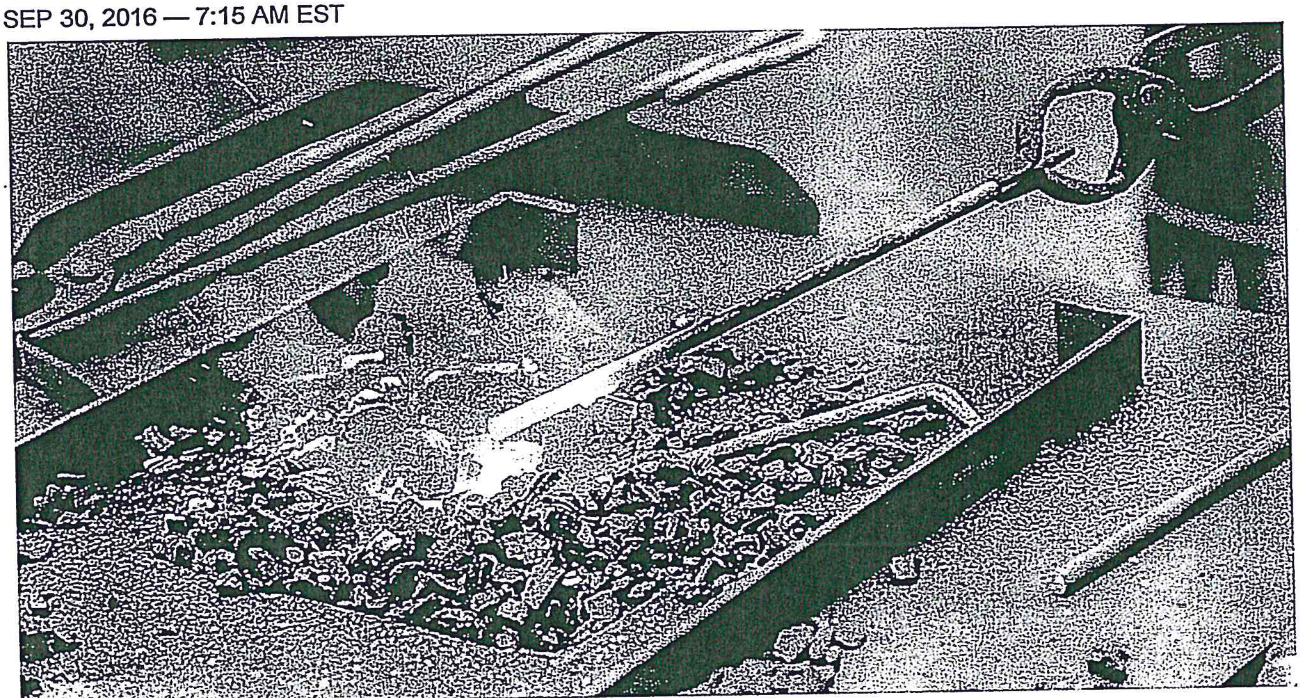
Think back to the different leaders of the different cultures that we have talked about thus far. Which leader/king/pharaoh would you want to live by under their rule? Why would the be more acceptable than other leaders of other cultures? Do you believe they would treat you fairly? What would the benefits or consequences be for living under their rule?

Explainer: How heat moves

Here are the three processes by which energy can be transferred from one place to another

SID PERKINS

SEP 30, 2016 — 7:15 AM EST



Heat is being transferred from the hot end of this rod to the cold end via conduction, but the hot end of the rod is also radiating heat via that orange glow.

DVOINIK/ISTOCKPHOTO

Throughout the universe, it's natural for energy to flow from one place to another. And unless people interfere, thermal energy — or heat — naturally flows in one direction only: from hot toward cold.

Heat moves naturally by any of three means. The processes are known as conduction, convection and radiation. Sometimes more than one may occur at the same time.

First, a little background. All matter is made from atoms — either single ones or those bonded in groups known as molecules. These atoms and molecules are always in motion. If they have the same mass, hot atoms and molecules move, on average, faster than cold ones. Even if atoms are locked in a solid, they still vibrate back and forth around some average position.

In a liquid, atoms and molecules are free to flow from place to place. Within a gas, they are even more free to move and will completely spread out within the volume in which they are trapped.

Some of the most easily understood examples of heat flow occur in your kitchen.

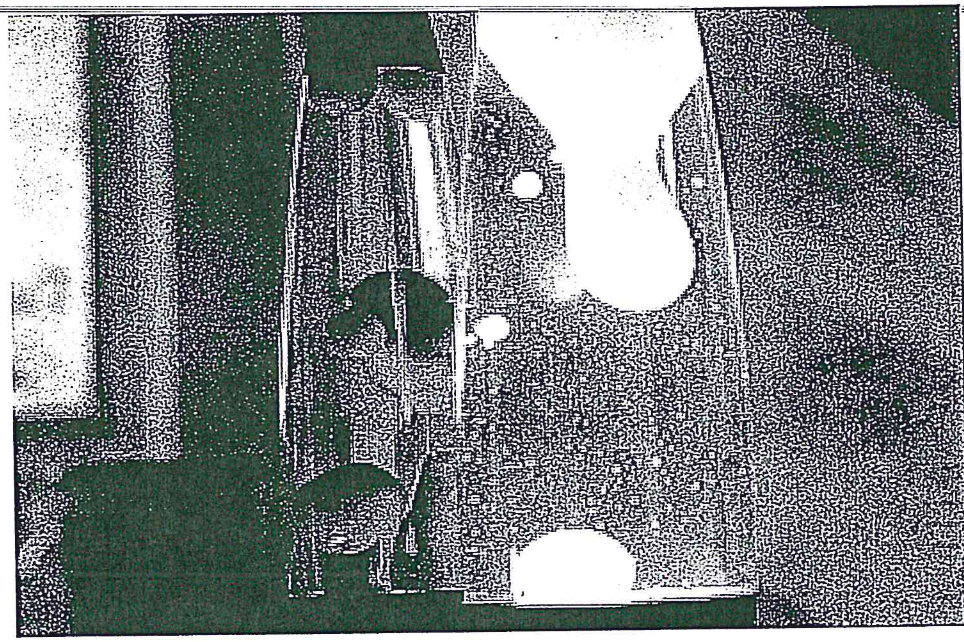
Conduction

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.

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.



Lava lamps illustrate heat transfer via convection: Waxy blobs get warmed at the base and expand. This makes them less dense, so they rise to the top. There, they give off their heat, cool and then sink to complete the circulation.

Bernardojbp/iStockphoto

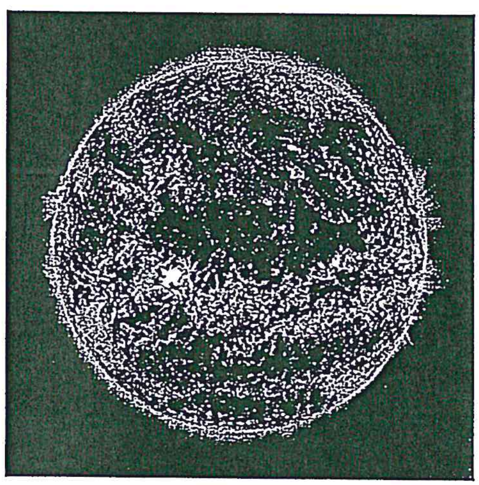
As the water warms, it now begins to expand. That makes it less dense. It rises above denser water, carrying away heat from the bottom of the pan. Cooler water flows down to take its place next to the hot bottom of the pan. As this water warms, it expands and rises, ferrying its newly-gained energy with 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.

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.



Radiation, such as the electromagnetic energy spewing from the sun (seen here at two ultraviolet wavelengths) is the only type of energy transfer that works across empty space.

NASA

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.

To complicate things, it's important to note that more than one form of heat transfer may occur at the same time. A stove's burner not only heats a pan but also the nearby air and makes it less dense. That carries warmth upward via convection. But the burner also radiates heat as infrared waves, making things nearby warm up. And if you're using a cast-iron skillet to cook a tasty meal, be sure to grab the handle with a potholder: It's gonna be hot, thanks to conduction!

Power Words

(for more about Power Words, click here)

antenna (in physics) Devices for picking up (receiving) electromagnetic energy.

atmosphere The envelope of gases surrounding Earth or another planet.

atom The basic unit of a chemical element. Atoms are made up of a dense nucleus that contains positively charged protons and neutrally charged neutrons. The nucleus is orbited by a cloud of negatively charged electrons.

circulation (in biology) A term that refers to the pumping of blood through the arteries, and smaller types of vessels (and from there into other organs and tissues).

conduction One of three major ways that energy is transferred. (The other two are convection and radiation.) In conduction, energy is transferred when atoms and molecules bump into each other, with slower, colder particles gaining energy from the warmer, faster ones that slam into them.

convection The rising and falling of material in a fluid or gas due to uneven temperatures. This process occurs in the outer layers of some stars.

current A fluid body — such as of water or air — that moves in a recognizable direction.

electromagnetic radiation Energy that travels as a wave, including forms of light. Electromagnetic radiation is typically classified by its wavelength. The spectrum of electromagnetic radiation ranges from radio waves to gamma rays. It also includes microwaves and visible light.

element (in chemistry) Each of more than one hundred substances for which the smallest unit of each is a single atom. Examples include hydrogen, oxygen, carbon, lithium and uranium.

frequency The number of times a specified periodic phenomenon occurs within a specified time interval. (In physics) The number of wavelengths that occurs over a particular interval of time.

glider A vehicle (such as a plane in air or uninhabited submarine) that takes advantage of currents to travel long distances using little or no fuel. It also tends to move smoothly, creating few disruptions in the fluid or airstream through which it moves.

liquid A material that flows freely but keeps a constant volume, like water or oil.

mass A number that shows how much an object resists speeding up and slowing down — basically a measure of how much matter that object is made from.

matter Something which occupies space and has mass. Anything with matter will weigh something on Earth.

microwaves An electromagnetic wave with a wavelength shorter than that of normal radio waves but longer than those of infrared radiation (heat) and of visible light.

molecule An electrically neutral group of atoms that represents the smallest possible amount of a chemical compound. Molecules can be made of single types of atoms or of different types. For example, the oxygen in the air is made of two oxygen atoms (O_2), but water is made of two hydrogen atoms and one oxygen atom (H_2O).

radiate (in physics) To emit energy in the form of waves.

radiation (in physics) One of the three major ways that energy is transferred. (The other two are conduction and convection.) In radiation, electromagnetic waves carry energy from one place to another. Unlike conduction and convection, which need material to help transfer the energy, radiation can transfer energy across empty space.

radio waves Waves in a part of the electromagnetic spectrum; they are a type that people now use for long-distance communication. Longer than the waves of visible light, radio waves are used to transmit radio and television signals; it is also used in radar.

smoke Plumes of microscopic particles that float in the air. They can be comprised of anything very small. But the best known types are pollutants created by the incomplete burning of oil, wood and other carbon-based materials.

solid Firm and stable in shape; not liquid or gaseous.

thermal Of or relating to heat. (in meteorology) A relatively small-scale, rising air current produced when Earth's surface is heated. **Thermals** are a common source of low level turbulence for aircraft.

universe The entire cosmos: All things that exist throughout space and time. It has been expanding since its formation during an event known as the Big Bang, some 13.8 billion years ago (give or take a few hundred million years).

vibrate To rhythmically shake or to move continuously and rapidly back and forth.

wave A disturbance or variation that travels through space and matter in a regular, oscillating fashion.

wavelength The distance between one peak and the next in a series of waves, or the distance between one trough and the next. Visible light — which, like all electromagnetic radiation, travels in waves — includes wavelengths between about 380 nanometers (violet) and about 740 nanometers (red). Radiation with wavelengths shorter than visible light includes gamma rays, X-rays and ultraviolet light. Longer-wavelength radiation includes infrared light, microwaves and radio waves.

X-ray A type of radiation analogous to gamma rays, but of somewhat lower energy.