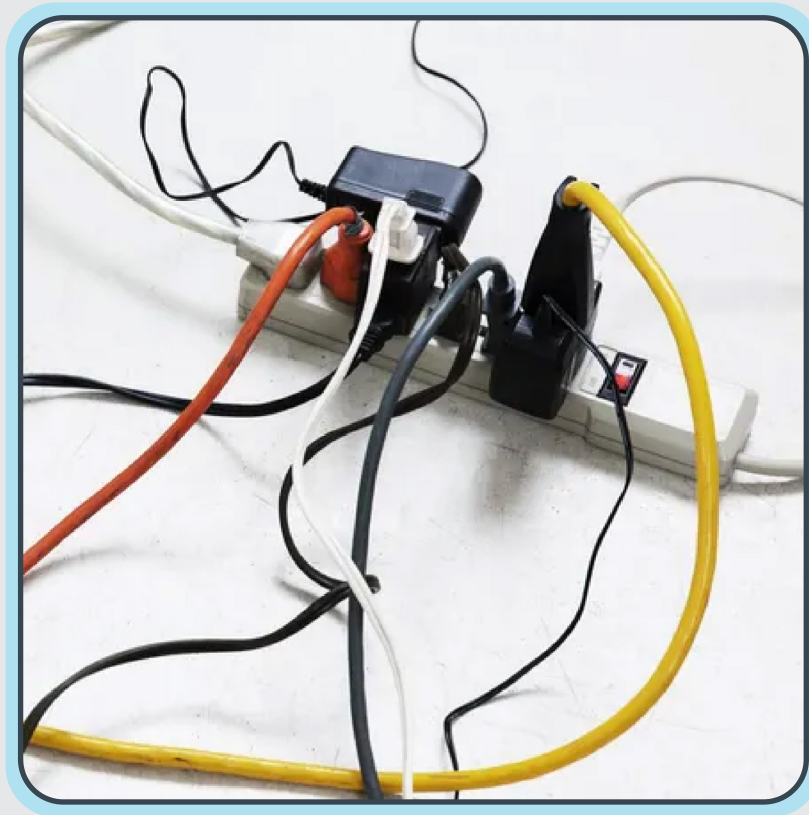


Changing Energy



Changing Energy

**Do you need an idea for a scientific study?
Try out one of our ideas or make one of your own.**

You might have heard people say things like: “We are in the middle of an energy crisis right now!” How is this possible when the Law of Conservation of Energy states that energy cannot be created or destroyed? Take the following brief quiz to see how much you already know about energy. See the bottom of page 4 to check your answers.

1. If all the energy produced by the sun in one hour could be harnessed by people, how long could this amount of energy supply all the people on Earth’s current energy needs?
 - a. one hour
 - b. one day
 - c. one month
 - d. one year
2. The term “energy” is derived from the Greek word “energeia.” Who is credited for creating this word?
 - a. Aristotle
 - b. Plato
 - c. Archimedes
 - d. Socrates
3. About how many homes can be powered by one typical wind turbine?
 - a. 140
 - b. 1,400
 - c. 14,000
 - d. 140,000
4. When natural gas is transported, the gas is liquified. By how much does the liquification process reduce the volume of the gas?
 - a. 6
 - b. 60
 - c. 600
 - d. 6000
5. About how many miles of gas and oil pipelines are there currently in the world?
 - a. 20,000
 - b. 200,000
 - c. 2,000,000
 - d. 20,000,000



A Change of Energy

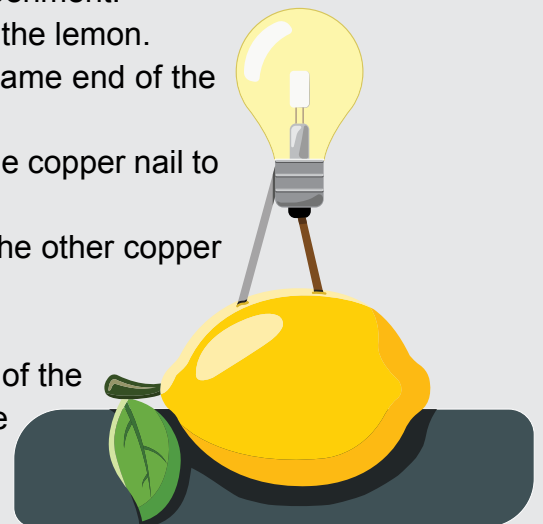
People use lemons in a variety of ways. Some people flavor foods, while others use lemons for cleaning. Still others use lemons to lighten their hair color. But can lemons be used to make light? Don't be sour, try this investigation instead.

Materials

- 1 - lemon
- 2 – copper nails
- 2 – small pieces of masking tape
- 1 – iron nail
- 1 – flashlight bulb

Directions

1. Make sure that you get permission before conducting this experiment.
2. Carefully insert the copper nail about halfway into one end of the lemon.
3. Carefully insert the other copper nail about halfway into the same end of the lemon.
4. Use one piece of the masking tape to attach the free end of the copper nail to the bottom of the bulb.
5. Use one piece of the masking tape to attach the free end of the other copper nail to the side of the bulb.
6. Wait a few minutes and describe your results.
7. Repeat the same experiment only for step #5, use one piece of the masking tape to attach the free end of the iron nail to the side of the bulb instead of using the copper nail.
8. Wait a few minutes and describe your results.



Nails in the lemon		Did the bulb light?	
		Yes	No
copper nail	copper nail		
copper nail	iron nail		

Questions

1. Describe the energy changes that occurred between the lemon and the flashlight bulb.
2. Predict what would happen if two iron nails were used instead of one copper and one iron nail.

Changing Energy

Energy Exchange

One of the major problems with electrical energy is that it is very hard to store. Unlike gasoline and other energy products, unless converted to chemical energy stored in batteries, electricity must be used as it is generated. Since demands for electricity are ever-changing, networks had to be created to share energy from one area to another area when electrical demands are lower or higher than normal. North America has two major and three minor electrical power grids that share electricity to meet current customer demands.

When electrical systems cannot keep up with customer demands, brownouts or blackouts may occur. Brownouts reduce the available voltages supplied to customers. This reduces the load on the power generation plants. While everyone in a brownout condition still has power, some devices may not operate if their required voltages are not supplied by the power company.

Blackouts are a total loss of electrical power to an area. Extreme system overloads may cause blackouts. Also, the loss of transmission lines and associated devices due to bad weather and other factors can cause blackouts. Rolling blackouts occur when one area intentionally loses power for a short time, then a different area, and so on. Again, this process reduces the overall load on the power generation system.



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Answers: Page 2 Answers: (1) d, (2) a, (3) b, (4) c, (5) c. Page 3 Answers: A Change of Energy (1) Chemical energy is converted to electrical energy to light energy. (2) The bulb would not light. Two dissimilar metals along with the acidic lemon juice are required to make the bulb light.

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