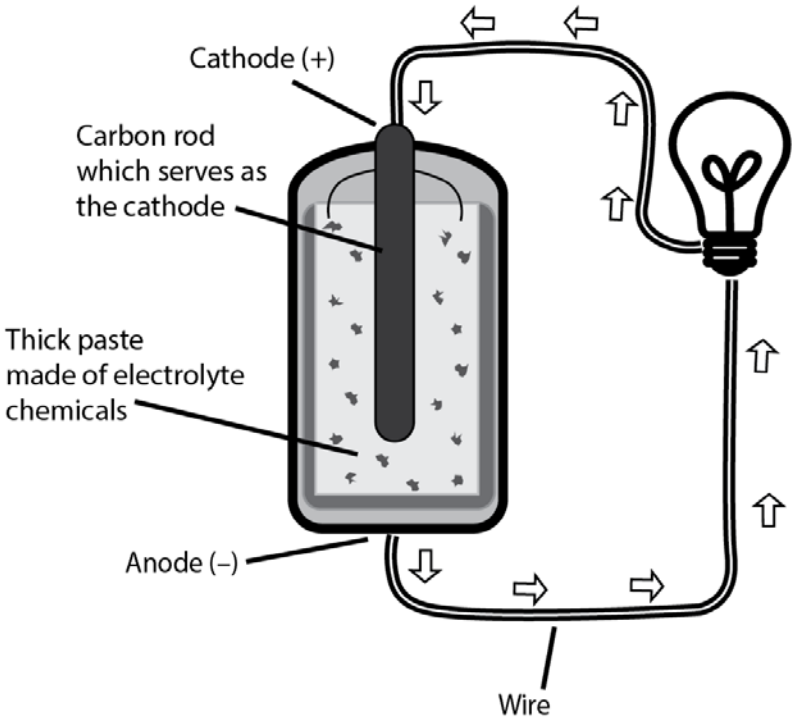
How Batteries Work

1. Imagine a world where all electric devices had to be plugged in. we would need cords for our cell phones. Wires would run from our calculators and TV remotes. We would trip over cords on the floor and get tangled in wires. We would not be able to travel far without electrical outlets to plug our cars into. Thankfully, batteries solve all these problems! Batteries give us electricity that we do not have to plug in.

2. There are 2 types of batteries: wet cells and dry cells.

3. In a wet cell, energy is made when liquids mix together. In a dry cell, energy is made from a paste of electrolytes. Most of our batteries are dry cells. Dry cells are safer than wet cells. They are also easier to use.



4. A dry cell has 3 parts: the cathode (+), the anode (-), and the electrolyte. The cathode is the tip of the battery with the + sign. The anode is the tip of the battery with the – sign. The electrolyte is a thick, chemical paste.

5. In a dry cell, the electrolyte moves electrons. It takes them from the cathode (+) to the anode (-). When the electrons reach the anode (-), they move through the wire to get back to the cathode. As the electrons move through the wire, they light up the bulb. This is electricity.

6. Every battery is either disposable or rechargeable.

7. When the electrons stop moving, the battery "dies." When a disposable battery runs out of energy, we throw it away. When a rechargeable battery dies, we can still use it again. All we have to do is recharge it. To charge a dry cell, we plug it into a power source. The power sends electrons back into the electrolyte. Once the battery is charged, we use it all over again.

How Batteries Work

Directions: Fill in the blanks and circle the appropriate answers.

1. Give example of devices that use batteries._____

2. What are the two types of cells? _____

3. Why are dry cells more common than wet cells? _____

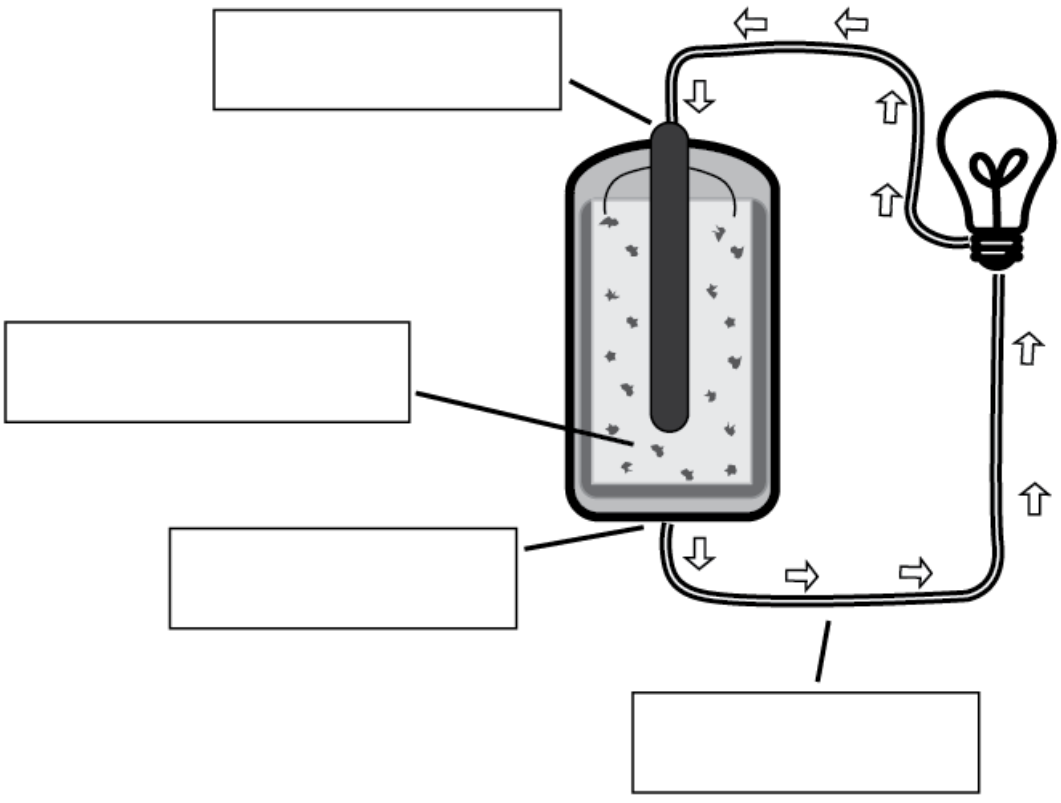
4. Put the correct sign next to the parts of a battery: cathode_____ anode_____

What is the third part of a battery? _____

5. The electrolyte moves _____ from the *positive (+) / negative (-)* side of the battery to the *positive (+) / negative (-)* side. The _____ light up the bulb as they pass through the wire.

6. Batteries are either _____ or rechargeable.

7. Throw away dead _____ batteries. Charge _____ batteries.



Energy Transformation

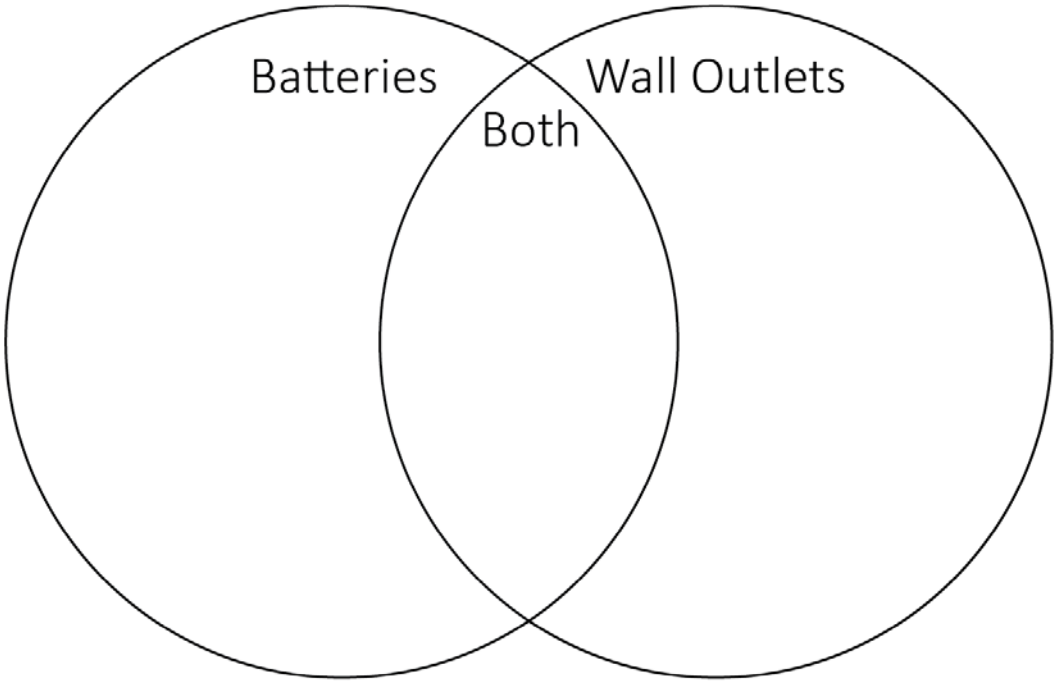
1. Faster than a jet! Quieter than light! Hotter than the sun! Electricity moves our cars, lights our lamps, and heats our homes. Look around you! Electricity powers your world!

2. Electricity is a kind of energy that can do many jobs for us. Heat, light, and motion are other forms of energy.

3. In order for electricity to be useful to us, it must change into heat, light, or motion. Think of the different places we get electricity. Batteries and wall outlets are the two most common places. When we plug a toaster into the wall, the electricity turns into heat. When we put batteries in a flashlight, electricity turns into light. When we plug in a fan, electricity turns into motion. Once electricity changes into heat, light, or motion, we can use it in so many ways!

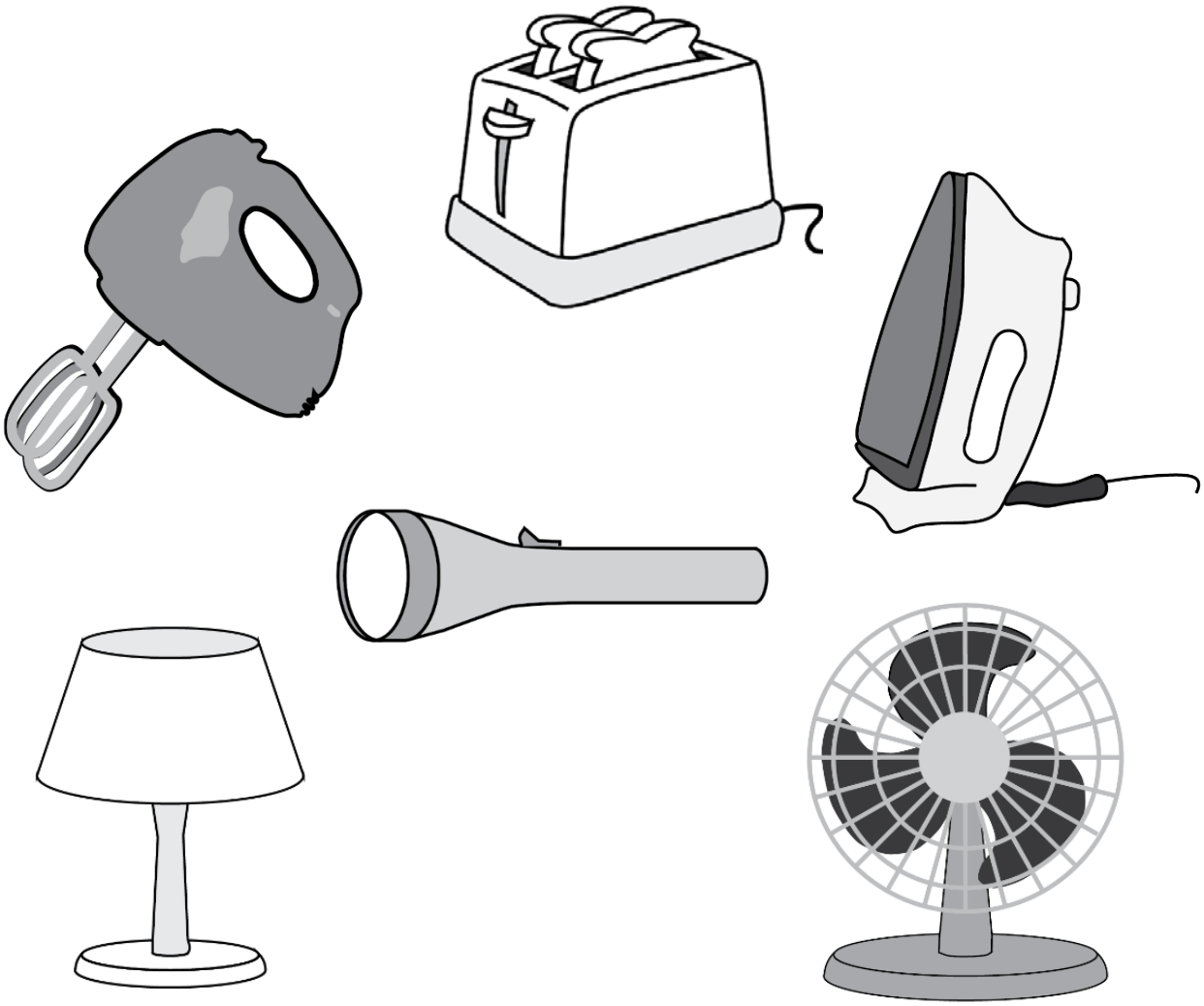
4. Have you ever played with a small battery? We use batteries to run many toys and small tools. The small power supply in a battery can move small toys or brighten small lights. The electricity in most batteries is too weak to hurt us, so it is safe to touch batteries. But think about the power in a wall outlet. This electricity is strong enough to vacuum a floor or chop up a smoothie. It creates enough heat to microwave food and burn toast. The power in a wall outlet is useful, but it is strong enough to hurt us. We should never touch the metal on a wall socket. We should also be careful not to touch broken power cords. It is never safe to play with electricity from the walls in our houses and schools. If you do, the electricity will change to heat and burn you!

5. Remember, electricity is a wonderful tool! Just be careful when you use it. Look out for all the amazing ways electricity changes into heat, light, and motion around you. Fill in the diagram with facts about batteries and outlets, and cool uses for each.



Identifying Energy Transformations

Directions: Cut out the energy transformation labels at the bottom of the page. Glue each label to a picture which represents it.



Electric → Heat	Electric → Light	Electric → Motion
Electric → Heat	Electric → Light	Electric → Motion

How to Read an Appliance Label

1. Every electric appliance needs a specific amount of electricity in order to work. Wall outlets carry enough electricity to run most of the things we use. But for some jobs, we need stronger or weaker power. Three key terms that help us measure electricity are “volt,” “amp,” and “watt.”

2. The power of electricity is measured in *volts.* The symbol for a volt is V~. The power that something needs is called *voltage.*

3. The speed of electricity is measured in amperes, or “amps.” The electric speed that we need is called amperage. The symbol for an amp is A.

4. The amount of electricity is measured in *watts*. The symbol for a watt is W. The amount of electricity we need is called *wattage.*

5. Most wall outlets carry 120 volts of electricity. 120 volts is strong enough to power things like fans, TVs, lamps, and clocks.

6. Bigger things like ovens and dish washers need 240 volts of electricity. These products need special wall outlets that carry 240 volts of electricity.

7. Most of the things we use come with labels that say how many volts of electricity they must have. The label might look like this.

8. This label says that we need 120 volts of electricity.

9. The label has another important number. It says that this product uses 900 watts of electricity per hour. This number is important because we can use it to add up how much electricity we use every day.

10. Every electric appliance calls for a specific amount of power. The three terms “volt,” “amp,” and “watt” help us measure how much electricity we need. If you look through your classroom, you will see many electrical appliances. Check the labels to see how many watts of electricity each one uses!

How to Read an Appliance Label

1. Circle the main idea in this passage.

   a. Electrical energy is a powerful but dangerous tool.
   b. Every electrical device needs a certain amount of power, which we measure using volts, amps, and watts.
   c. Electrical appliances do not work well if we take off the electric usage label.

2. Based on the information in paragraphs 5 and 6, do you think your classroom has 120 or 240 volt wall outlets? _____

3. Look at the appliance label below. If you buy a new fridge, which number will tell you what type of outlet to plug it into?

   240V 50Hz 572 6K89

4. Which number would tell you how much electricity the fridge uses?

   572 240V 1800W E109890

How Batteries Work

Directions: Fill in the blanks and circle the appropriate answers.

1. Give example of devices that use batteries. Calculators, TV remotes, cell phones

2. What are the two types of cells? Dry cells and wet cells

3. Why are dry cells more common than wet cells? They are safer and easier to use.

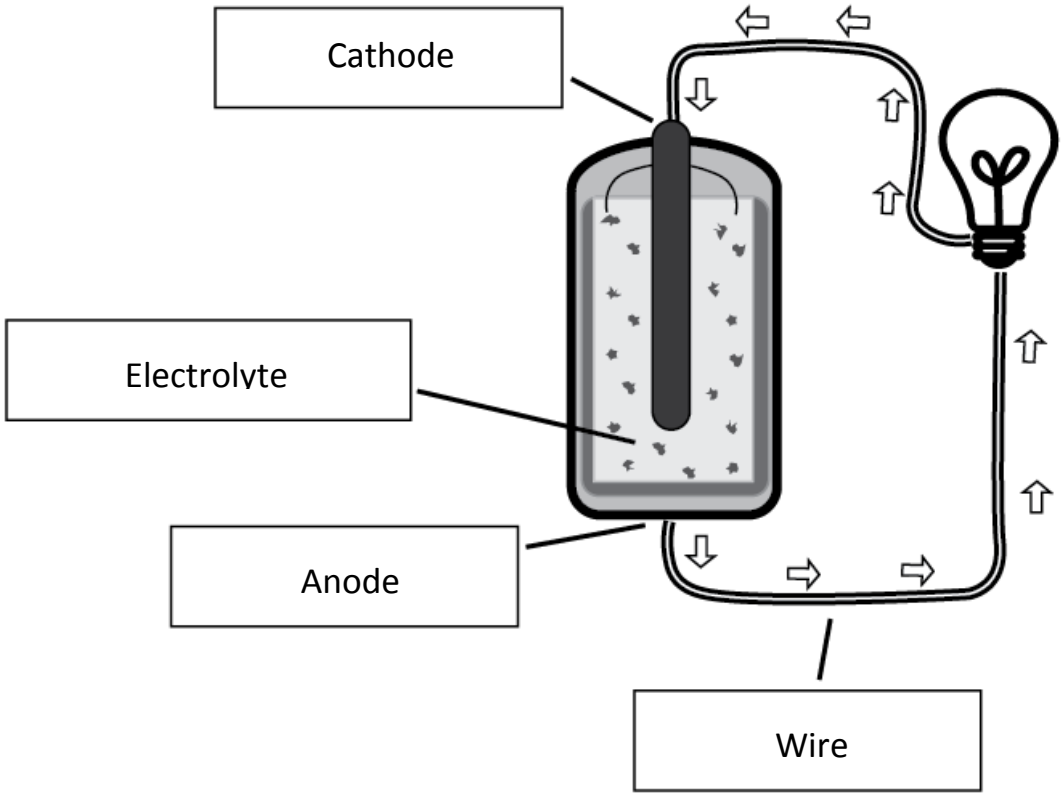
4. Put the correct sign next to the parts of a battery: cathode + anode –

   What is the third part of a battery? The electrolyte

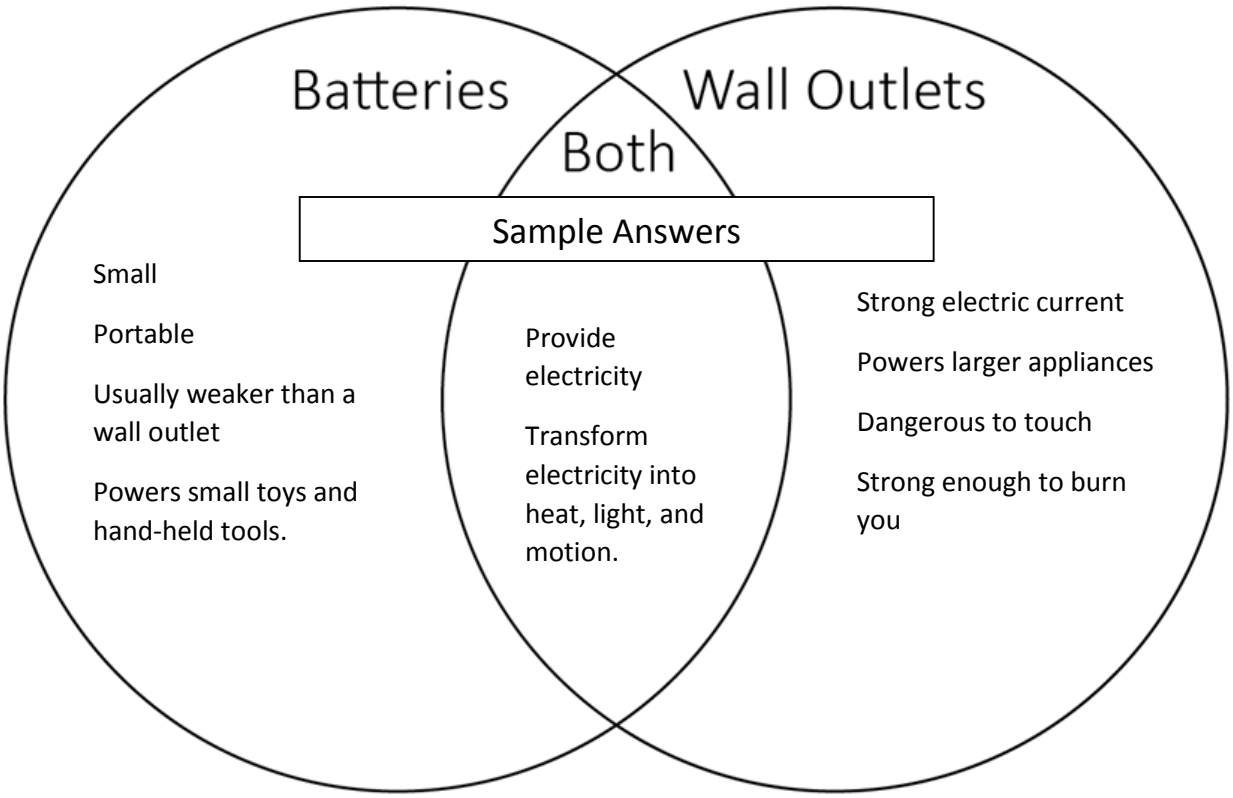
5. The electrolyte moves Electrons from the *positive (+)* / *negative (-)* side of the battery to the *positive (+)* / *negative (-)* side. The electrons light up the bulb as they pass through the wire.

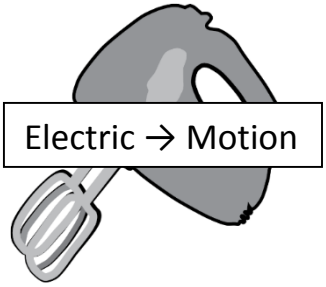
6. Batteries are either disposable or rechargeable.

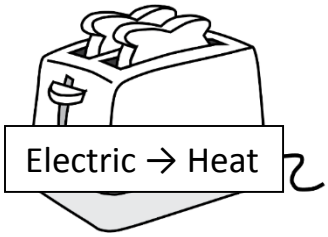
7. Throw away dead disposable batteries. Charge rechargeable batteries.

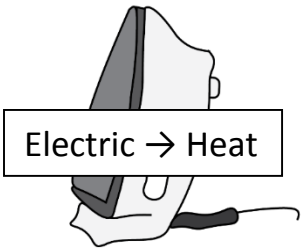


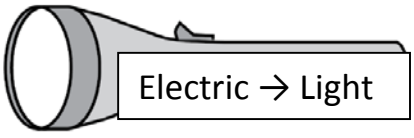
Energy Transformation

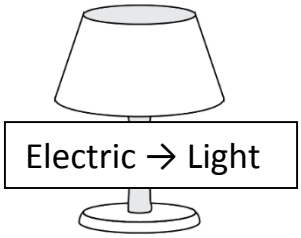


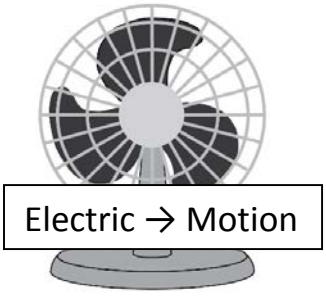












How to Read an Appliance Label

5. Circle the main idea in this passage.

   d. Electrical energy is a powerful but dangerous tool.
   e. Every electrical device needs a certain amount of power, which we measure using volts, amps, and watts.
   f. Electrical appliances do not work well if we take off the electric usage label.

6. Based on the information in paragraphs 5 and 6, do you think your classroom has 120 or 240 volt wall outlets? 120 volt

7. Look at the appliance label below. If you buy a new fridge, which number will tell you what type of outlet to plug it into?

   240V 50Hz 572 6K89

8. Which number would tell you how much electricity the fridge uses?

   572 240V 1800W E109890