Name _____ Date_____

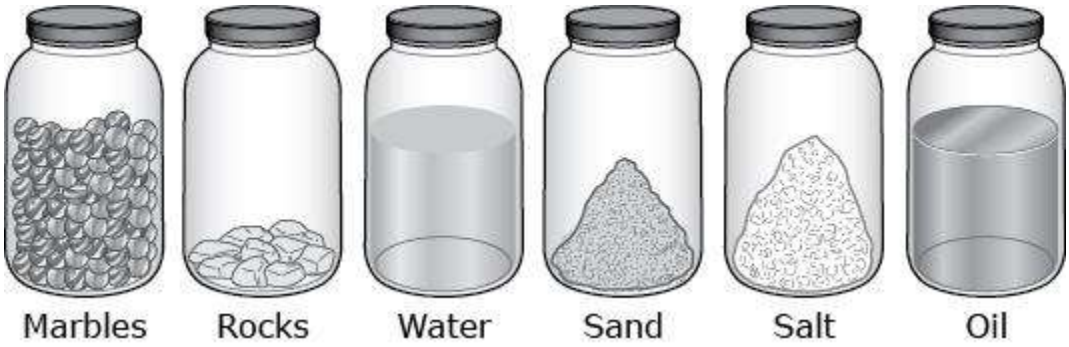
Science Benchmark 2 Study Guide 2017

Physical and Chemical Changes: ANSWER KEY

Define:

- Mixture: *two or more substances combine and DO NOT make a new substance*
- Physical Change: *two or more substances combine and DO NOT make a new substance*
- Chemical Change: *two or more substances react to create a new substance*
- States of Matter (water):*Solid, liquid, gas → changes occur with adding/taking heat*

1. Students were given marbles, rocks, water, sand, salt, and oil. They were asked to form two different mixtures by combining three of the substances shown for each mixture.



a. Name three substances shown that would form a mixture that could be separated without using any tools other than your hands. One of the three substances **must be a liquid**. Explain your answer.

Marbles, rocks, water
Sand, marbles, oil
Marbles salt, oil

b. Name three substances shown that would form a mixture that would require a tool to separate them into the original substances. One of the three substances must be a liquid. Explain your answer. *sand, salt, water → filter and Bunsen burner*

c. Explain how you could use at least two different tools to separate the substances in your mixture from Part B. *filter for the sand and Bunsen burner to separate salt and water*

d. Describe a mixture that could be formed by two of the substances shown that would be best separated using evaporation. Explain your answer. *sand, salt, water → need evaporation to separate salt and water because salt is soluble in water*

2. Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt. Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

ACTION	**PHYSICAL/CHEMICAL**	**EXPLANATION**
Combining Baking Soda and Vinegar	*Chemical*	*It begins to bubble*
Ice Cube Melting	*Physical*	*It still is made up of water molecules*

Finally, Mr. Alves took a potato out of a bag.

a. Name a physical change that can happen to the potato. Explain how you know that it is a physical change. *Cutting, peeling, mashing → it is only changing the physical properties →still made up of the same molecules*

b. Name a chemical change that can happen to the potato. Explain how you know that it is a chemical change. *Rotting → it is molding and turning into a new substance due to a reaction*

Electricity

Define:

- Static electricity: *build-up of electrical charges in one place*
- Current electricity: *energy created by moving charged particles through conductors*
- Conductor: *material through which heat and electricity and flow easily*
- Insulator: *a material that slows the flow of heat and electricity*
- Series circuit: *an electric circuit with only one path that current can follow*
- Parallel circuit: *an electric circuit with two or more paths for current*
- Resistance:

_____

- Open Circuit: *a circuit that does not allow energy to flow → turned off*
- Closed Circuit: *a circuit that allows energy to flow →turned on*

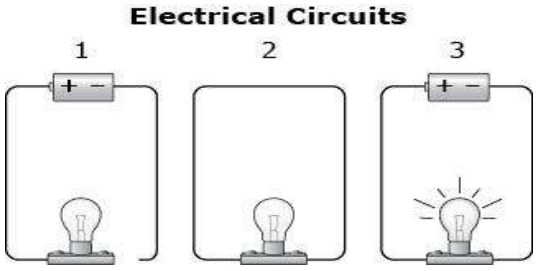
1. William is sliding down a plastic slide on a playground. After he slides down the ground, he feels a small electric shock when he touches a piece of metal. What has been built up on his body that causes the shock? *Charges are being built up →static electricity*

2. When the switch in a series circuit is opened, what happens to the light bulb that the electricity is flowing to? *The light bulb will turn off*

3. Matt was trying to make a circuit for the technology festival. If he was trying to make the electricity go all the way around the circuit, what type of circuit does he want? *Closed circuit*

4. If one burnt out light bulb causes all the lights in that circuit to fail, what might you conclude? *It is a series circuit*

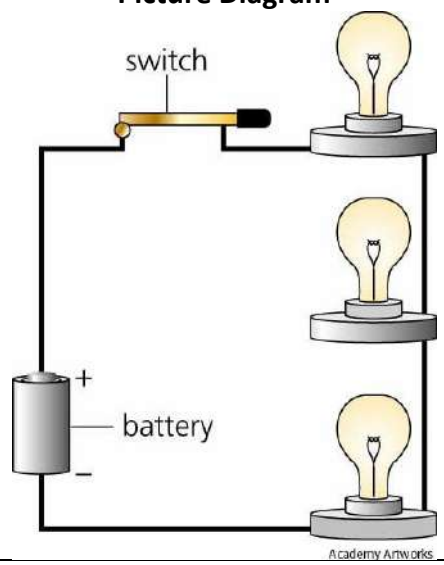
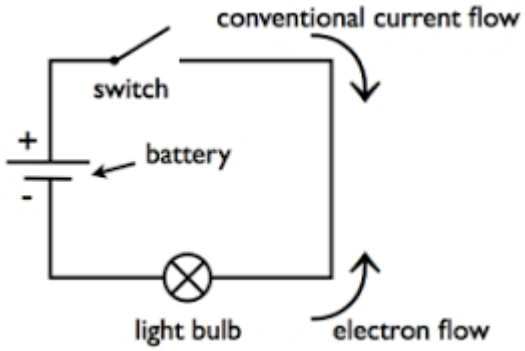
5. 2. Some students are given three electrical circuits to analyze. The diagrams of the electrical circuits are shown below.



   a. Explain the parts of an electrical circuit that are needed to make a complete circuit. *Power source (battery), conductor(wires), light*

   b. Identify each of the three circuits in the diagram as complete or incomplete. Explain your answers. *1-incomplete →wire is not connected by bulb ; 2-incomplete →no power source/battery ; 3-complete →all parts are connected and bulb is on*

6. Draw and label the two different types of circuit diagrams.

Picture Diagram	Schematic Diagram
	*don't forget the zig zag for resistor* 

Magnetism and Electromagnets

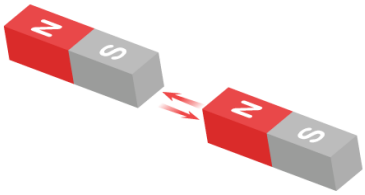
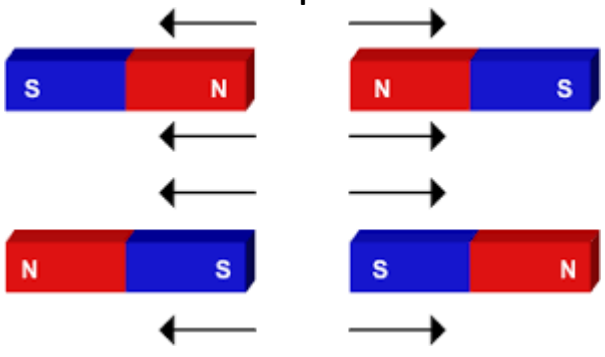
Define:

- Magnet: *iron that can attract or repel certain metal objects*

- Attract: *opposite charges pull towards each other (N/S)*
- Repel: *like charges push away (N/N or S/S)*

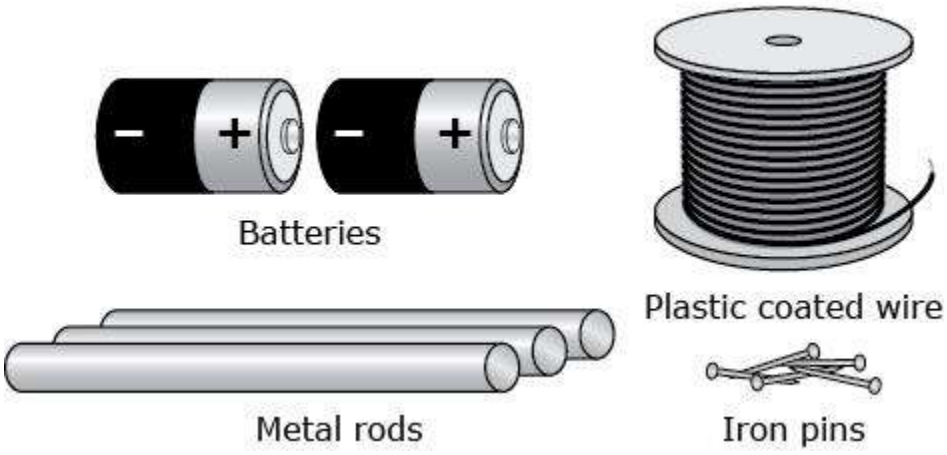
- Electromagnet: *wires or iron core that turns into a magnet when electricity runs through it*

1. Draw diagrams showing magnets attracting and repelling.

Attract	Repel
	

2. Laura and Kelly are asked to build and test an electromagnet. The students are given the materials shown below.

Materials to Build and Test an Electromagnet



a. List the steps the students should take to build the electromagnet. Provide specific details for each step. *take plastic off wire and wrap around metal rod, attach the ends of the wires to the batteries.*

b. Describe how to test the electromagnet to be sure it is functioning. *See how many iron pins it can attract*

c. Explain how you can increase the magnetic strength of an electromagnet. *Wrap more wire around rod or add more batteries*

d. A heavy bar magnet was made available. What test can be performed to compare the difference in the strength of the bar magnet and the electromagnet? *How many metal objects each can pick up or the distance they can be away from the object → use materials to block the field to see what happens also.*