6th Grade Worksheets

Follow along with your VSVS team using these sheets and info!

Potato Power Observation sheet

Name____

Circle the correct answers:

1. What color are the copper electrodes orange silver
2. What color are the zinc electrodes orange silver
3. What kind of energy was the chemical energy in the clock converted to?
   electrical mechanical light

4. Add 2 scoops of sodium bisulfate to each compartment and stir with a coffee stirrer. Measure and record the voltage from 4 compartments, then 1, 2, and 3.

Voltage Measurements:

Voltage measurement from 4 compartments using distilled water	**Voltage measurement from 4 compartments after sodium bisulfate added.**	**Voltage measurement from 1 compartment**	**Voltage measurement from 2 compartments**	**Voltage measurement from 3 compartments**

5. What arrangement gave the highest voltage? _________________

6. How many compartments does it take to light up the LED? _________________

7. How many compartments does it take to make the clock work? ______________

Potato Power Observation Sheet - Answers

Circle the correct answers:

1. What color are the copper electrodes *orange*
2. What color are the zinc electrodes *silver*
3. What kind of energy was the chemical energy in the clock converted to? *electrical*
4. Add 2 scoops of sodium bisulfate to each compartment and stir with a coffee stirrer. Measure and record the voltage from 4 compartments, then 1, 2, and 3.

Voltage Measurements:

Voltage measurement from 4 compartments using distilled water	**Voltage measurement from 4 compartments after sodium bisulfate added.**	**Voltage measurement from 1 compartment**	**Voltage measurement from 2 compartments**	**Voltage measurement from 3 compartments**
0 or very small	*About 3V*	*0.75V*	*1.5V*	*2.3V*

5. What arrangement gave the highest voltage? *4 compartments*

6. How many compartments does it take to light up the LED? *At least 2*

7. How many compartments does it take to make the clock work? *At least 2*

Conduction, Convection and Radiation Observation Sheet

Name____

2. **Introducing Liquid Crystal Temperature Sensors**

   Record what happens when you put your finger on the liquid crystal sensor. Note the pattern of colors produced.

   ____

   Circle the color indicating the coolest temperature

   Black Red Orange Yellow Green Blue Purple

   Circle the color indicating the warmest temperature

   Black Red Orange Yellow Green Blue Purple

3. How is Energy Transferred?

A. Radiation

What color does the sensor change to when the lamp is shone on to it? _______________

What does this show?____

B. Convection

What color does the sensor change to when it is held above the heat pack? ____________

What does this show?____

C. Conduction

1. **Using the Thermal Conductivity boards**

   Circle the material that had the fastest changing temperature sensor. Copper iron wood

   Circle the material had the slowest changing temperature sensor. Copper iron wood

   Circle the material that is the best conductor of heat. Copper iron wood

1. **Ice melting on the 2 black squares.**
   What do you observe? ____

2. **Ice melting on 3 different materials**
   Which block feels the coldest? ____
   Which block feels the warmest?____

   What are the temperatures of the 3 blocks?______________________________

   Which block melts ice the fastest? _____________________________________
   What do you think the black squares (in #2 above) are made of?

   ____

Conduction, Convection and Radiation Answer Sheet

2. Introducing Liquid Crystal Temperature Sensors

Record what happens when you put your fingers on the liquid crystal sensor. Note the pattern of colors produced.

color changes spread out from the center of the finger (blue/green) and changes color as it spreads

What color indicates the coolest temperature*? Black*

What color indicates the warmest temperature*? Blue*

3. How is Energy Transferred?

A. Radiation

What color does the sensor change to when the lamp is shone on to it? *From black to yellow/red/green/blue*

What does this show? *Heat is being transferred from the lamp to the sensor via electromagnetic radiation*

B. Convection

What color does the sensor change to when it is held above the heat pack? *From black to yellow/red/green/blue*

What does this show? *Thermal energy is being transferred from the heat pack to the sensor by convection currents.*

C. Conduction

1. Using the Thermal Conductivity boards

Which material had the fastest changing temperature sensor? *Copper (orange metal)*

Which material had the slowest changing temperature sensor? *Wood*

Which material is the best conductor of heat? *Copper*

1. Ice melting on the 2 black squares.

What do you observe? *Ice melts very fast on one of the blocks, and does not melt on the other. Both blocks look the same. One is heavier to hold.*

2. Ice melting on 3 different materials

Which block feels the coldest? *Aluminum (silver colored)*

What are the temperatures of the 3 blocks? *The temperatures of the 3 blocks are nearly the same within each group. The thermometers are not accurate and can differ from one group to another.*
Which block melts ice the fastest? *The aluminum metal.*

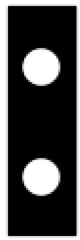
What do you think the black squares (in C2 above) are made of? *One is aluminum and the other is a material similar to Styrofoam.*

Deep Ocean Currents Observation Sheet

Name ______________________________________

1. **Draw arrows on the diagram below showing the movement of the blue salt water and the clear fresh water.**

Salt Water (Blue)
Fresh Water (Clear)

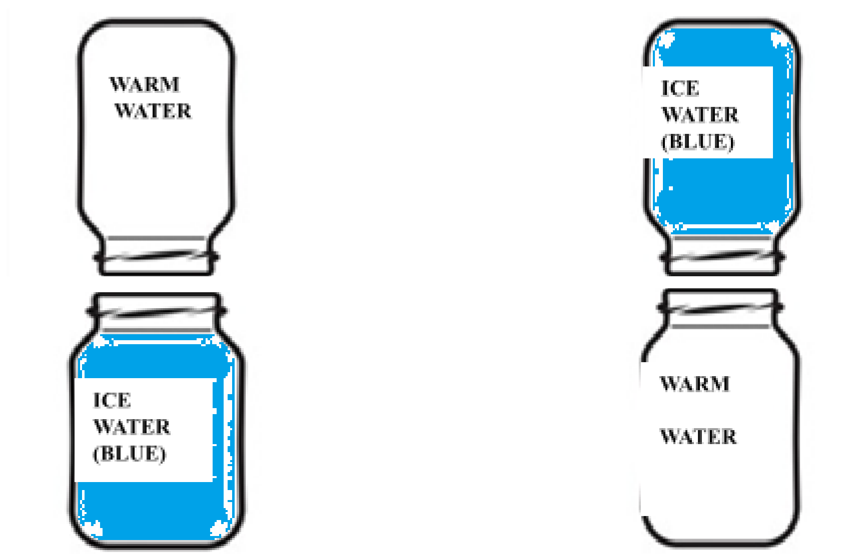


What happens to the salt water? ____

What happens to the fresh water? ____

What happens to the pepper? ____

2. **Draw arrows on the diagram to show the movement of blue cold water and the clear room temperature water.**



3. **Look at the map of ocean currents to answer the following questions.**

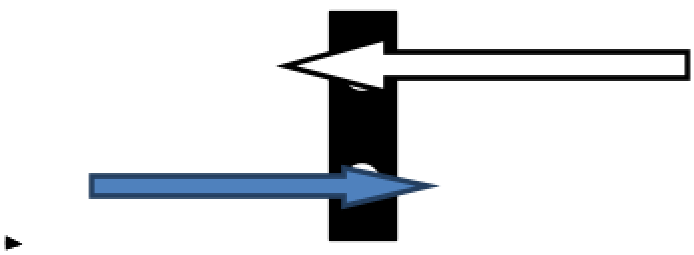
In what parts of the Earth does deep water formation occur? _______________________

Why does deep water formation occur in these regions? ___________________________

Deep Ocean Currents Answer Sheet

1. **Draw arrows on the diagram below showing the movement of the blue salt water and the clear fresh water.**

Salt Water (Blue)
Fresh Water (Clear)

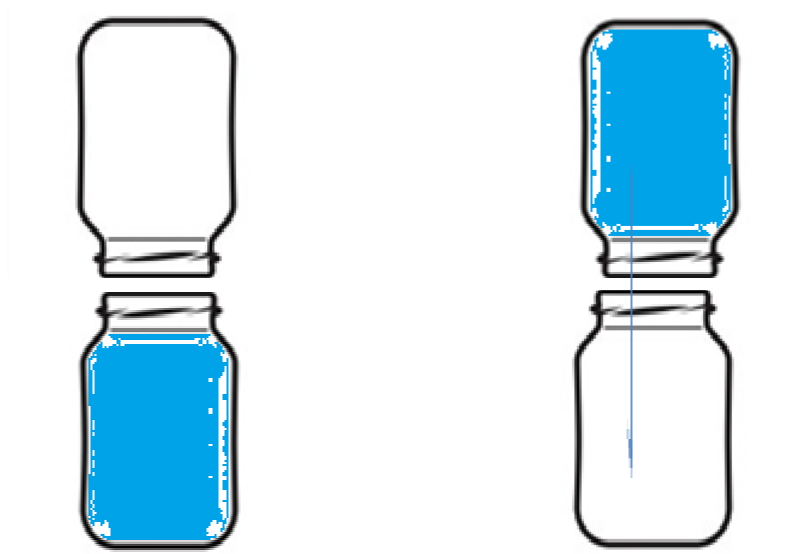


What happens to the salt water? *Moves through the bottom hole and stays below the fresh water*

What happens to the fresh water? *Moves through the top hole and stays above the salt water*

What happens to the pepper? *The pepper/water on the right (originally just clear water) does not move much, but the pepper/water on the left side (originally blue salt water) moves away from the hole and is circling around on that side.*

2. **Draw arrows on the diagram to show the movement of blue cold water and the clear room temperature water.**



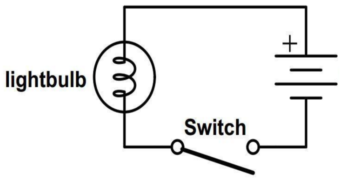
3. **Look at the map of ocean currents to answer the following questions.**

In what parts of the Earth does deep water formation occur? *3 areas in the Arctic & Antarctic*

Why does deep water formation occur in these regions? *Cold temperatures and salty water.*

Electric Circuits Observation Sheet

Name ____



2 1.5V batteries

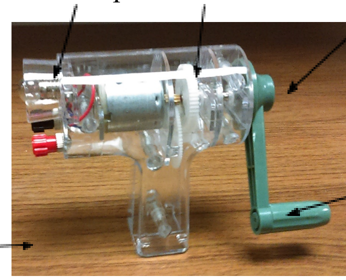
Wire --------

Introduction – Hand Generator

Circle the energy conversions that occur when the hand generator is activated.

chemical to electrical
mechanical to nuclear
mechanical to sound
mechanical to electrical to light
mechanical to electrical

Lamp DC Motor Gears



Crank Handle

Holding Handle

Energy Stick Circle the energy conversions when the stick is activated.

chemical to electrical
chemical to nuclear
electrical to sound
electrical to light
electrical to mechanical

A. Current Measurements

Current in the Simple Circuit with regular light bulb ____________

Current in the Simple Circuit with LED ____________

Which light bulb is warmer – regular or LED? ____________

Which light bulb saves electrical energy? How do you know? _________________________

Which light bulb would be more useful for keeping cooler temperatures in the house? _________

Current in the Series Circuit with regular light bulbs ____________

Current in the Parallel Circuit with regular light bulbs ____________

B Series and Parallel Circuits – Circle your answer.

1. The light bulbs in the series circuit were (brighter, dimmer, the same brightness) as those in the parallel circuit.
2. When one light bulb was unscrewed, the other light went out in the (series, parallel) circuit.
3. When one light bulb was unscrewed, the other light remained on in the (series, parallel) circuit.
4. The light bulb in the simple circuit was (brighter, dimmer, the same brightness) as the light bulb in the parallel circuit.

Observation Sheet – Answers
Electric Circuits

Introduction – Hand Generator

Circle the energy conversions that occur when the hand generator is activated.

~~chemical to electrical~~
~~mechanical to nuclear~~
mechanical to sound
mechanical to electrical to light
mechanical to electrical

Energy Stick

Circle the energy conversions when the stick is activated.

chemical to electrical
~~chemical to nuclear~~
electrical to sound
electrical to light
~~electrical to mechanical~~

B. Current Measurements

Current in the Simple Circuit with regular light bulb **~1.2 A**
Current in the Simple Circuit with LED **~.5 A**

Which light bulb is warmer – regular or LED? Regular

Which light bulb saves electrical energy? How do you know? LED

Which light bulb would be more useful for keeping cooler temperatures in the house? LED

Current in the Series Circuit with 2 regular light bulbs **~1 A**

Current in the Parallel Circuit with 2 regular light bulbs **~2.5 A**

A. Series and Parallel Circuits – Circle your answer.

1. The light bulbs in the series circuit were (brighter, **dimmer**, the same brightness) as those in the parallel circuit.
2. When one light bulb was unscrewed, the other light went out in the (**series**, parallel) circuit.
3. When one light bulb was unscrewed, the other light remained on in the (series, **parallel**) circuit.
4. The light bulb in the simple circuit was (brighter, dimmer, **the same brightness**) as the light in the parallel circuit.