CHILDREN'S MUSEUM OF VIRGINIA PORTSMOUTH

Pre and Post-Visit Activities

Catch The Current

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Important Information for Teachers

Thank you for choosing *Catch The Current* for your students! This program will cover the following aspects of your SOL's:

4.3 The student will investigate and understand the characteristics of electricity. Key concepts include:
a) conductors and insulators;
b) basic circuits;
c) static electricity; and
d) the ability of electrical energy to be transformed into light and motion, and to produce heat.

Museum Manners

Please review with students and chaperones prior to your visit to the museum.

1. Please plan to arrive 15 minutes before your scheduled time to allow final counts and payment prior to your visit.
2. Remember to use walking feet.
3. Remember to use inside voices.
4. Teachers and chaperones must stay and explore with their students at all times throughout the museum.
5. Remember to share the exhibits and place items back where you found them.
6. Food and drink are not permitted in the museum.

Vocabulary

Atom: Units that make up all matter and include protons (positively charged) and neutrons (neutrally charged) within the nucleus and electrons (negatively charged), which circle around the nucleus.

Circuit- A conducting pathway, that when closed the circuit is completed and current flows, and when open the current is stopped.

Conductor: A substance through which current can flow.

Current: The forced flow of electric charges.

Electricity: The effect caused by the presence or movement of charged particles.

Energy: A power source used to move current.

Insulator: A substance through which current cannot flow.

Parallel Circuit: A type of circuit which has more than one pathway for the current.

Series Circuit: a type of circuit in which the current passes through components one after the other in a singular fashion.

Static Electricity: An electrical charge held by a material.

Pre-visit Activity:
Try this activity before your visit to the Children's Museum.

Circuit Connections I

Objective**:** Students will understand that current electricity must run through a complete circuit and must have some form of energy to get the electrons moving. Unlike static electricity, electrons on the move through a circuit create current electricity. The electrons will only move if there is a source of energy. Meets SOLs 4.3a, b, d

Current electricity is the type of electricity we use in everyday life. Current electricity is the forced movement of electrons along a circuit. Current electricity uses some form of energy to excite the electrons to create electrical movement.

Materials**:** Light switch , Light bulb, 2 pieces of 4-6" copper wiring, 6 "zinc and copper rods, Batteries, Vinegar, Salt, Water

Investigation**:**
How do we turn on lights in our house?
Hold a light bulb in one hand and a switch in the other. Flip the switch to show that a connection must be made for the light to work.
What turns on a light? How can we connect the switch to the light bulb?
(Your goal is to have the students use prior knowledge of what they have seen with wires and electricity around their household to answer this question.)

Attach the wires in a circuit from the light bulb to the switch and from the switch to the light bulb. Have them predict if the light bulb is going to turn on. If everyone says yes then flip the switch and show the group that it doesn't turn on. If there is a mixed response or a resounding NO it won't turn on, ask them, "why not?"

The light will not turn on because it must have some form of energy to get the electrons moving.

Batteries are examples of an energy source that force electrons to move. The ones bought at the store (AAA, AA, C, D) are dry cell and the ones in our cars are wet batteries. Wet batteries use stronger liquids to create charges, but vinegar is a household liquid that can also create a charge.

Place the copper and zinc rods into a jar of vinegar and wrap wire around the end sticking out of the jar. Connect the other ends of the wires to the base of the light bulb. The bulb should light up because of the charges from ions in the vinegar. This experiment can then also be done using water supersaturated with salt instead of vinegar.

Post-Visit Activities:

Try these activities after your visit to the museum.

Circuit Connections II

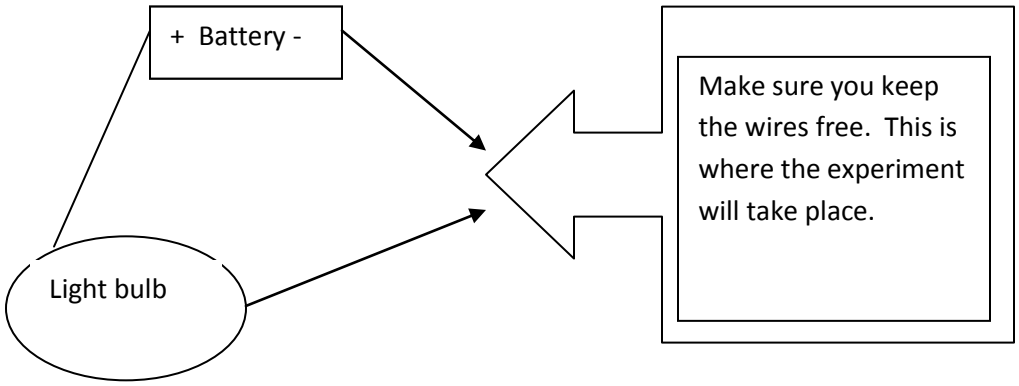
Objective*:* Students will demonstrate and understand characteristics and key concepts of electricity. Meets SOLs 4.3a, b, d

Electric current, or the movement of electrons between atoms creating an electric charge, creates current electricity. The current can flow through conductors like copper and aluminum and can't through insulators such as plastic.

Materials**:** Circuit boards, Batteries and battery holders, Copper wire, Small light bulbs, Alligator clips or paper clips, various materials (some conductors and some insulators), White board, Dry erase markers

Investigation**:**
Students should work in groups.
Each group sets up a circuit board with a battery in a battery holder, a wire connected to the light bulb and the battery, and a wire off of the other side of both the battery and light bulb creating two ends of wire but they are not connected. Have available the various conducting and insulating materials to complete the circuit.

Example picture of circuit board set up:



Have the students hypothesize as to which materials, when connected to the circuit, will make the bulb light up and which will not, and why. Gather their predictions and have them vote on which they will think will work. Create a bar graph on the white board to show their predictions.

Have the students experiment with each material, starting with the item that they think is least likely to work until they get to the one that is most likely to work. Once they have gone through each material and talked about what did and did not work, discuss the results as a class, based on what they discovered versus their original hypothesis. Were they correct? Has their reasoning behind what circulates electricity changed or stayed the same? What do the items that work have in common? What do the items that don't work have in common?

Review Vocabulary

Objective: Students will be able to review and understand the key terms used in the program and by the Virginia Standards of Learning.

Materials: Word Search on following page and pencils.

Investigation/Practice: Students will review the terms in the puzzle and write the definitions of the terms as they find them.

CHILDREN'S MUSEUM OF VIRGINIA PORTSMOUTH

CATCH THE CURRENT

Name: _____

Date: _____

O K W Z V K G E K J L D L X Z A D C Y N
C D L E I F C I T E N G A M W J Z N D T
L Y B X L Z R M F M W R L R I C Q A E E
O E S K C C M A U Y Y I E Q U I O H Y N
S K Y A B O Q R O I N S U L A T O R G G
E B V W R N E R H K N I M E Z A S N R A
D I G Q O D N O D Y N X E J M T F E E M
X V I J X U W K Y A P N A L J S O P N O
F C W K Z C Y T I C I R T C E L E O E R
Z S I E C T C H I B F Q O C A S I E E T
D S L L U O O N W O W T Q Q I R Z Q Y C
G E E T W R D Q P P A X E C I K X S G E
M R L B P C T J K H J L Z P F E N R K L
G I L S C X F R G C C K C I R C U I T E
Z E A W P H Z I C X M F Q I S L J Z U S
Z S R T Q T Z C J N Z R W T N E R R U C
E G A Z G T E N G A M T N E N A M R E P
U J P E E C P R V U L R Y U F F F W T X
P K S F Y W Y N K R S J C A Z F I Z M U
Y F B F Y I B O Z O F P H A E O J Z V M

CIRCUIT
CLOSED
CONDUCTOR
CURRENT
ELECTRICITY
ELECTROMAGNET
ENERGY
INSULATOR
MAGNET
MAGNETIC FIELD
OPEN
PARALLEL
PERMANENT
SERIES
STATIC