



CHILDREN'S
MUSEUM
— OF VIRGINIA —
PORTSMOUTH

Pre and Post-Visit Activities

Energy and Forces

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Important Information for Teachers

Thank you for choosing *Energy and Forces* for your students! This program will cover the following aspects of your SOL's:

- 4.2 The student will investigate and understand characteristics and interactions of moving objects. Key concepts include
- b) changes in motion are related to force and mass;
 - c) friction is a force that opposes motion; and
 - d) moving objects have kinetic energy.

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

Please review these terms prior to your visit:

DIRECTION- the course along which something moves.

ENERGY- the capacity to do work.

FORCE- any push or pull that causes objects to move, stop, or change direction or speed.

FRICTION - the resistance to motion created by two objects moving against each other.

KINETIC- the energy an object has when it is in motion.

MASS- a measure of the amount of matter.

MOTION- the action of changing place or position.

POTENTIAL- stored energy caused by its position.

PULL- applying force to move something toward or with you.

PUSH- the act of applying force in order to move something away.

RESISTANCE- any mechanical force that tends to retard or oppose motion.

REST- stay the same; not moving.

SPEED- how fast an object is moving.

Pre-Visit Activities

Try these activities prior to your visit to the museum.

What a Stretch!

Objectives: Students will be able to identify potential and kinetic energy and understand that an increase in potential energy results in greater kinetic energy.

Materials: Rubber bands, ruler, masking tape, and yardstick.

Investigation: Discuss potential and kinetic energy with students. Have them identify examples of both types of energy. Place a strip of masking tape on the floor as a starting line. Stretch a rubber band around one end of a ruler to the 5" mark. Stand behind the starting line, release the rubber band, and measure the distance it traveled. Have students indicate the energies of this experiment. How does the amount of stretch in the rubber band affect the amount of potential and kinetic energy?

Energy Possibilities

Objective: Students will be able to understand that moving objects have kinetic energy.

Materials: Hammer, Nail, Wood, Paper clip, 5 Washers, Pencil, Tape, Table

Investigation: Discuss with students potential and kinetic energy. Have them think of examples of both energies. Demonstrate potential and kinetic energy by using the hammer to put the nail into the wood. The higher the hammer, the greater the potential energy. The moving hammer transfers kinetic energy to the nail, which moves into the wood.

Have pairs of students make pendulums using the remaining materials. Ask where the potential energy is stored. When did the potential energy change to kinetic? What happened as you added more washers? (The number of swings basically stays the same no matter the number of washers.)

Post Visit Activity

Try these activities after your visit to the museum.

Frictional Forces

Objective: Students will be able to understand that friction is a force that opposes motion.

Materials: 4 blocks of wood, rubber bands, felt pads, thumbtacks, a piece of cardboard, wax paper, foil, plastic wrap, and newspaper.

Investigation: Leave block #1 unchanged. Put rubber bands around block #2, felt pads on block #3, and thumbtacks in block #4. Push each block back and forth on the cardboard. Which has more resistance? Why? Try rubbing the blocks on the other surfaces. Think about how friction can be helpful and harmful. Consider ways to increase or decrease friction.

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.





ENERGY AND FORCES

Name: _____

Date: _____

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

KINETIC

MASS

MOTION

POTENTIAL

PULL

DIRECTION

ENERGY

FORCE

FRICTION

RESISTANCE

REST

PUSH

SPEED