



Lesson Plan: Force, Motion, and Energy

Grade Level: 4

Subject: Physical Science

Duration: 45–60 min

NGSS 4-PS3-1: Use evidence to construct an explanation relating the speed of an object to the energy of that object.

Learning Objectives

By the end of this lesson, students will be able to:

- **Define** force, motion, and energy and describe their relationships.
- **Identify** different types of energy (kinetic and potential) and simple machines that make work easier.



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Materials Needed: (all links are included in this PDF)

- Study Guide (<https://newpathworksheets.com/api/guide/study-guide-science-grade-4-force-motion-and-energy.pdf>)
- Activity Lesson (<https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-4-force-motion-and-energy-force-motion-energy-4.pdf>)
- Worksheet 0 - Quiz (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-4-force-motion-and-energy-0.pdf>)
- Worksheet 1 - Practice (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-4-force-motion-and-energy-1.pdf>)



- Vocabulary Worksheet 1 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-4-force-motion-and-energy-1.pdf>)

Lesson Procedure

Step 1: Introduction (5 minutes)

- Ask students: 'What makes a car move faster or slow down? What force keeps us on the ground?'
- Introduce the concepts of Force, Motion, and Energy using the visuals in the Study Guide. (<https://newpathworksheets.com/api/guide/study-guide-science-grade-4-force-motion-and-energy.pdf>)

Step 2: Direct Instruction (15 minutes)

- Use the Study Guide to define Speed, Acceleration, and types of Forces (Gravity, Friction)



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Step 5: Assessment (10 minutes)

- Administer the multiple-choice quiz in Worksheet 0 to evaluate student understanding of speed, force, and inertia. (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-4-force-motion-and-energy-0.pdf>)

Differentiation Strategies



For advanced learners:

- Challenge students to design a compound machine using two or more simple machines to solve a problem.

For learners needing support:

- Provide physical examples of simple machines (e.g., scissors as a lever/wedge) for students to manipulate.

Extension Activities

- Investigate the effects of different surfaces on friction by rolling a toy car over carpet, tile, and sandpaper.
- Create a poster illustrating the transformation of potential energy to kinetic energy in a playground setting (e.g., a slide or swing).



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- Worksheet 3 (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-4-force-motion-and-energy-forces-motion-end-energy-3.pdf>)
- Vocabulary Worksheet 1 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-4-force-motion-and-energy-1.pdf>)
- Vocabulary Worksheet 2 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-4-force-motion-and-energy-2.pdf>)
- Vocabulary Worksheet 3 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-4-force-motion-and-energy-3.pdf>)

FORCE, MOTION, AND ENERGY

MOTION...

Motion is the process of an object changing place or position.

Speed refers to the rate an object changes position. When you are in motion you might speed up, go the same speed, or slow down.

To **accelerate** means to go faster; **decelerate** means to slow down.

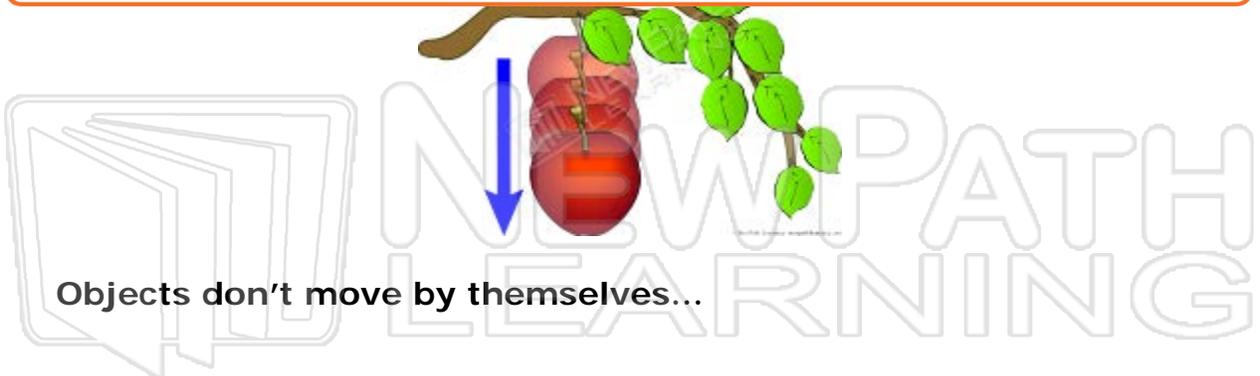


FORCE



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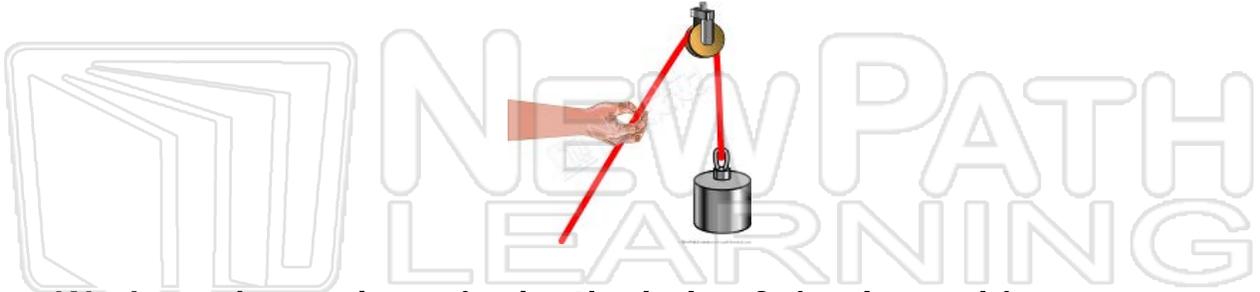
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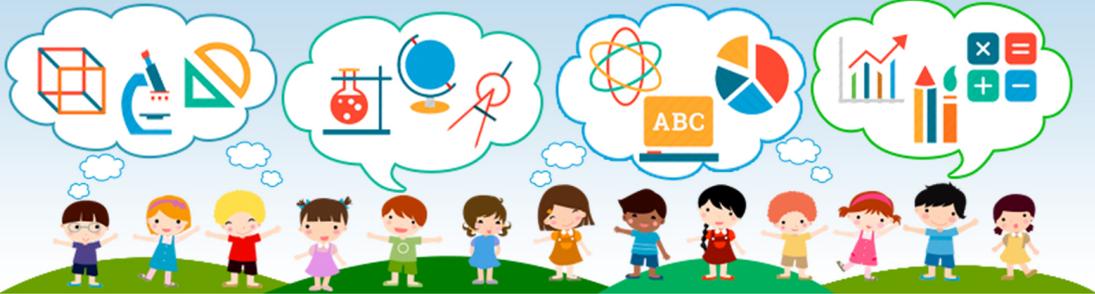
Objects don't move by themselves...

Inertia is a property of matter referring to the way an object remains at rest and doesn't move unless someone or something forces it to move.

Work is the ability to move an object. An object **MUST** move in order for work to have been done.



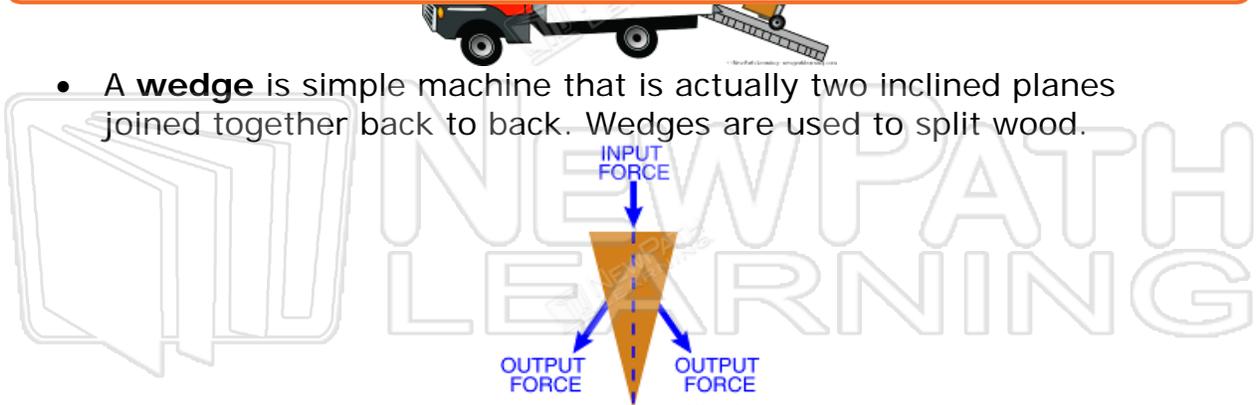
Work can be made easier by the help of simple machines....
Simple machines can make work easier, but do not make less work.
There are several types of simple machines.



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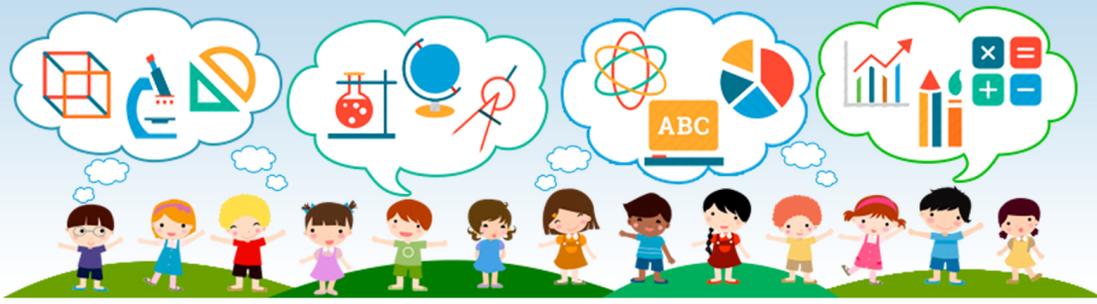
- A **wedge** is simple machine that is actually two inclined planes joined together back to back. Wedges are used to split wood.



- A **gear** is made of two wheels that have notches that fit together either directly or by a chain or belt which allows one wheel to turn the other wheel. Gears help clocks and bicycles move.



Lesson Checkpoint:
**Give one example of a simple machine
you see around you.**

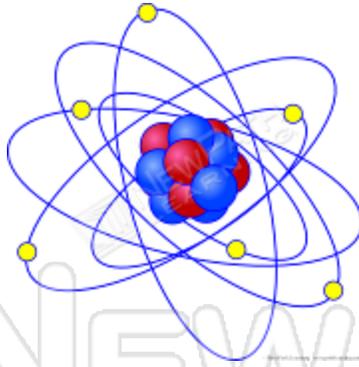


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- **Nuclear energy** is energy stored in the nucleus of an atom; it is the energy that holds the nucleus together.





- **Radiation** is energy that is given off in the form of particles or rays. This form of energy can be used for research and for medical reasons as well. Radiation can be used to fight against certain cancers in humans.

Conduction is the transfer of heat energy from one object to another.



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Force, Motion & Energy

Sci
D

Name _____ Class _____ Date _____

Motion is the process of an object changing place or position. **Speed** refers to the **rate** an object changes position.

Force is a **push or pull** upon an object. Forces can **change** the position and motion of an object.

Gravity is an **attractive force** that tries to pull objects together. **Gravity** depends on the **mass** of the objects and the **distance** between them.



Gravity keeps the Moon in orbit around Earth.



Energy is the ability to do **work** and comes in many different forms.

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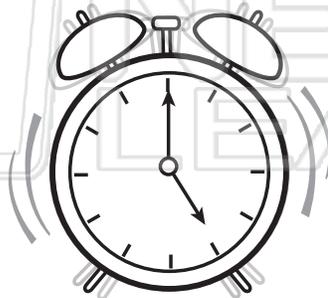
Elect

electrical charges. Electrical charges moving through wires is called **electricity**.

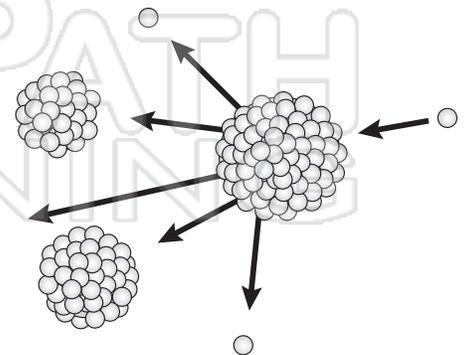
Conduction is the **transfer** of heat energy between objects.



Light and **sound** energy are forms of energy that travel in waves.



Nuclear energy is energy stored in the **nucleus** of an atom and that holds the nucleus together.





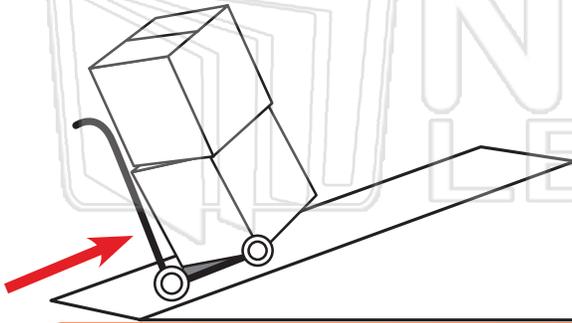
Force, Motion & Energy

Sci
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Name _____ Class _____ Date _____

Work is the ability to **move an object**. An object must move in order for work to have been done. **Simple machines** make doing work **easier** but they never decrease the amount of work that needs to be done. There are many different kinds of simple machines.

Inclined Plane

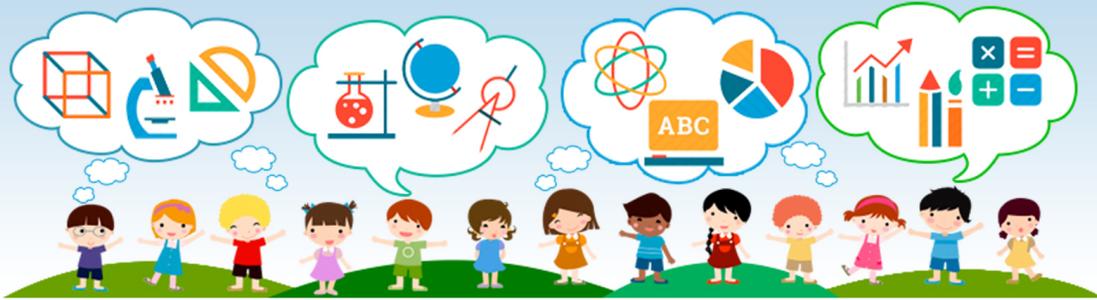


Wheel & Axle



A plan
objec

or



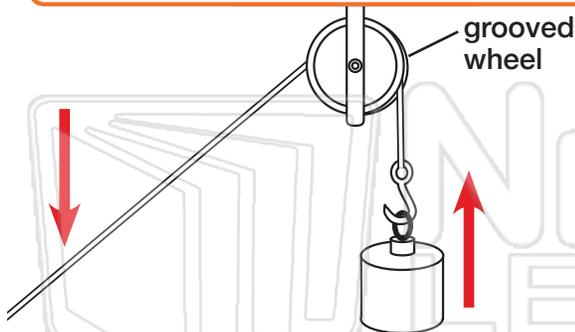
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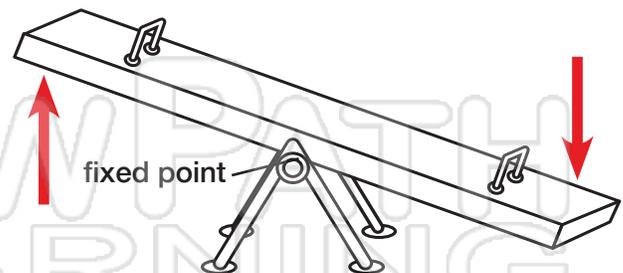
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Made up of a wheel with a grooved rim in which a rope can move around in order to help lift a load.



A bar which rests and moves on a fixed point, used to raise an object on the other side.

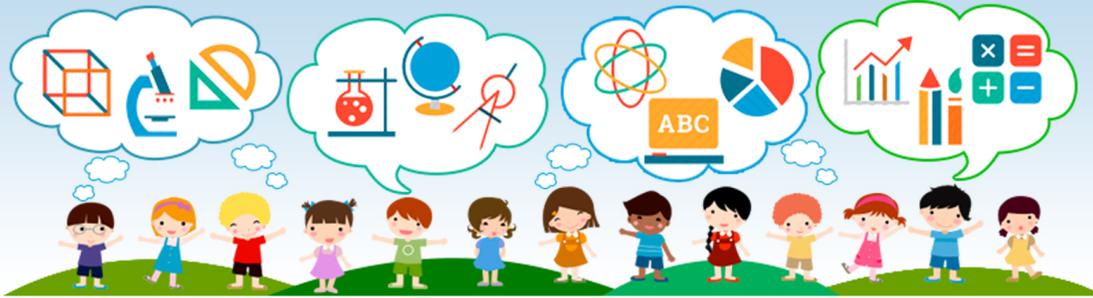
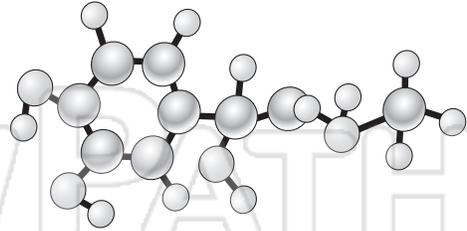
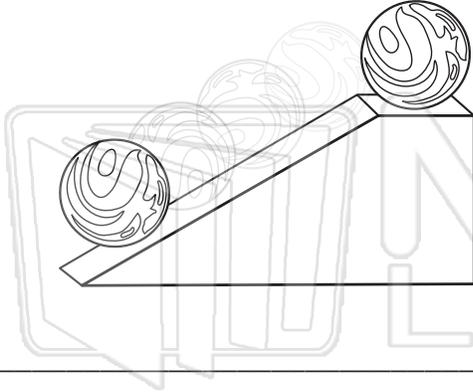


Force, Motion & Energy

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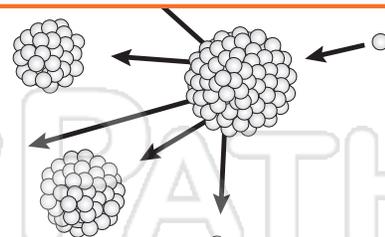
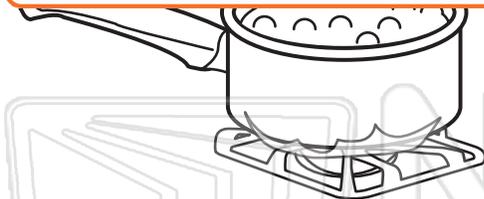
Name _____ Class _____ Date _____

Energy is the ability to do **work** and comes in many different forms. Identify and describe each type of energy shown below.



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Force, Motion & Energy

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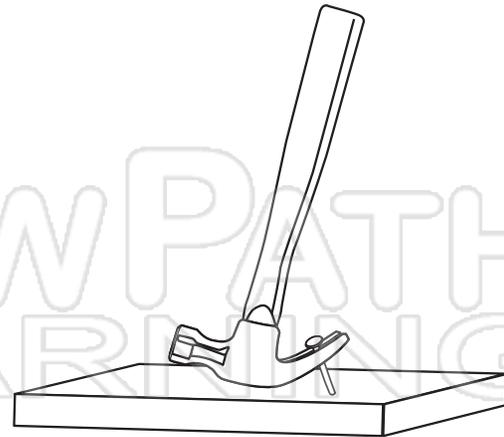
Name _____ Class _____ Date _____

Circle the name of the **simple machine** being used.



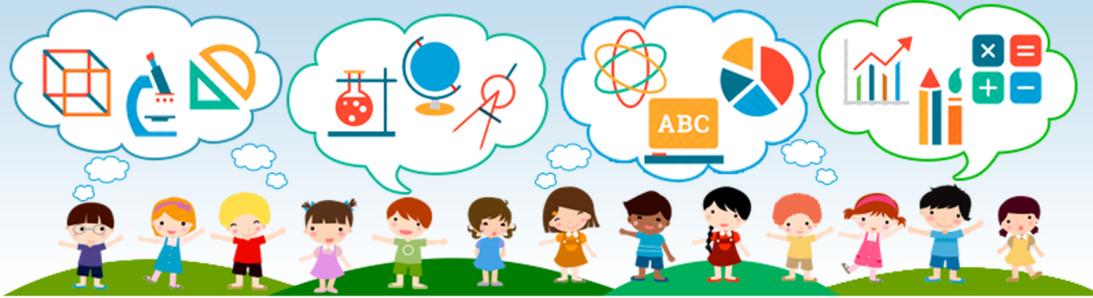
pulley

wheel & axle



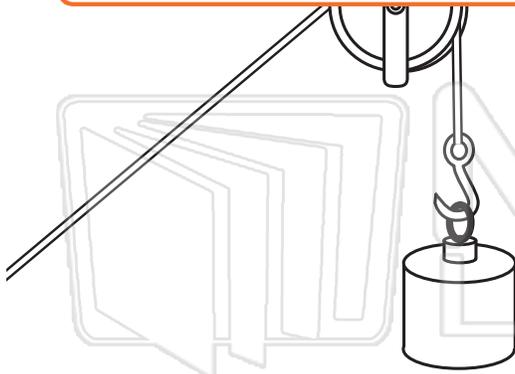
wheel & axle

lever



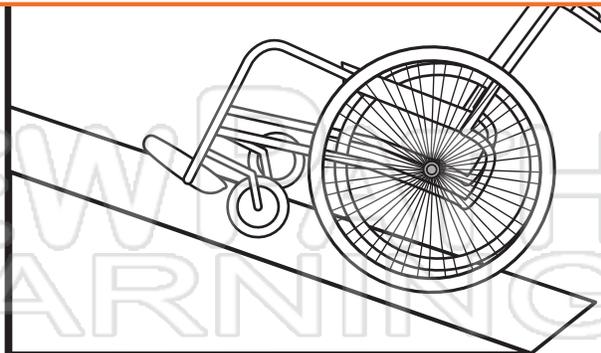
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lever

pulley



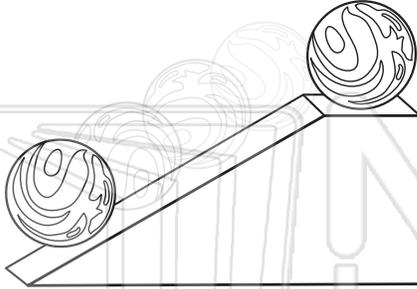
lever

inclined plane



Answer Key

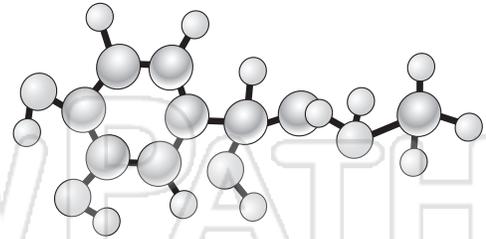
Energy is the ability to do **work** and comes in many different forms. Identify and describe each type of energy shown below.



Potential energy is stored energy.

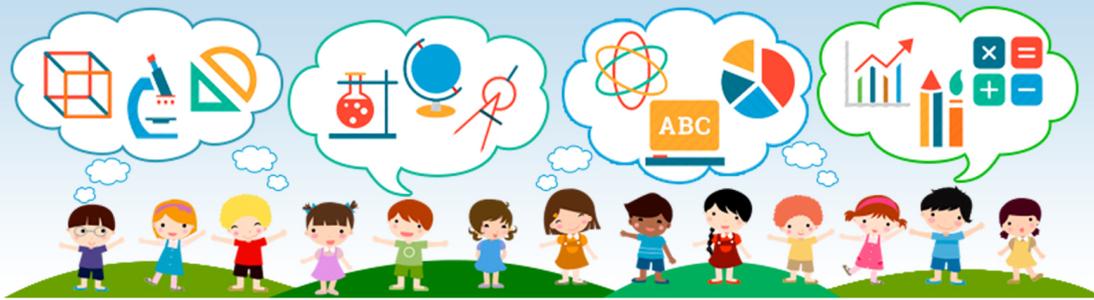
Kinetic energy is the energy

of m



Chemical energy is energy that certain

matter has because of the way its



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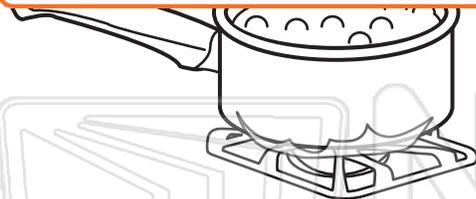
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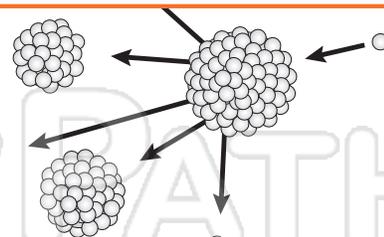
elect

char

of



Thermal energy is created by movement of particles in matter. Conduction is the transfer of heat energy.



Nuclear energy is energy stored in the nucleus of an atom and that holds the nucleus together.



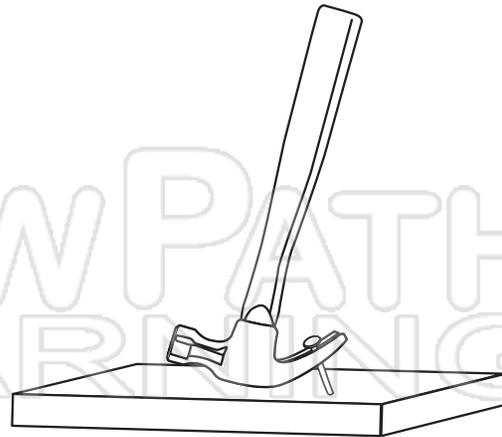
Answer Key

Circle the name of the **simple machine** being used.



pulley

wheel & axle



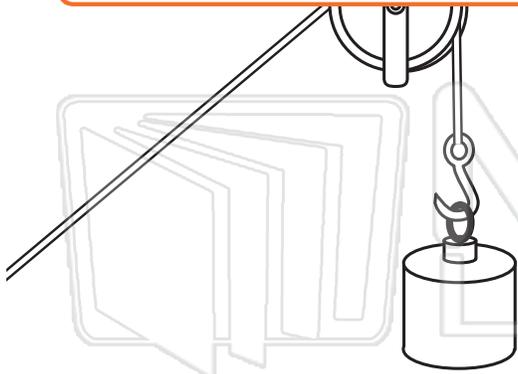
wheel & axle

lever



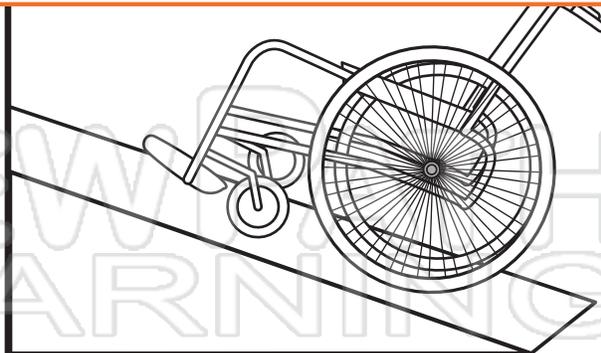
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lever

pulley



lever

inclined plane



Name _____ Class _____ Date _____

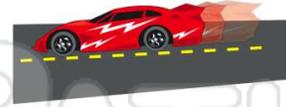
1 _____ is the process in which an **object changes place or position**.

- A Speed
- B Friction
- C Work
- D Motion



2 _____ is the **rate** at which an object **changes its position**.

- A work
- B motion
- C speed
- D inertia



3 If **accelerate** means to go faster, than **decelerate** means to _____

- A slow down
- B go even faster
- C immediately stop



4 A **push or pull** upon an object is _____

- A inertia
- B friction
- C a force



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D gravity

- C work
- D push



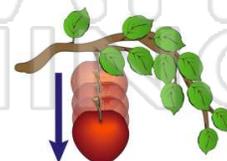
9 _____ is a property of matter referring to the way an object **remains at rest and does not move** unless someone or something forces it to move.

- A Speed
- B Gravity
- C Work
- D Inertia



10 What **force** is causing the apple to **fall to the ground** in this picture?

- A gravity
- B inertia
- C magnetism
- D a push





Name _____ Class _____ Date _____

1 _____ is the process in which an **object changes place or position**.

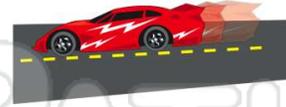
- A Speed
- B Friction
- C Work
- D Motion



(D)

2 _____ is the **rate** at which an object **changes its position**.

- A work
- B motion
- C speed
- D inertia



(C)

3 If **accelerate** means to go faster, than **decelerate** means to _____

- A slow down
- B go even faster
- C immediately stop



(A)

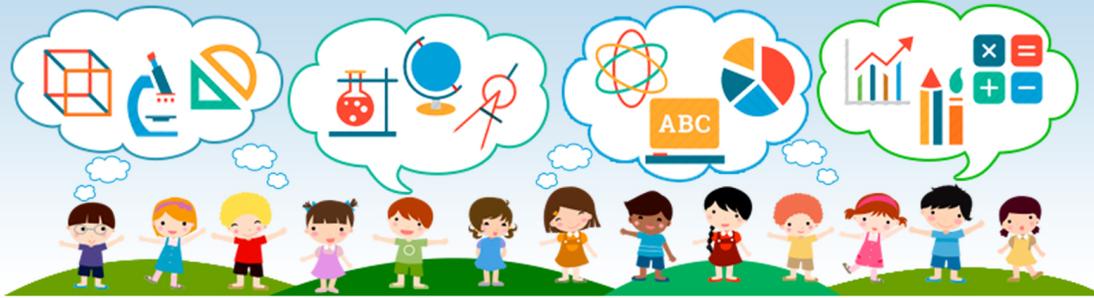
4 A **push or pull** upon an object is _____

- A inertia
- B friction
- C a force



(C)

5



(B)

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(A)

9

_____ is a property of matter referring to the way an object **remains at rest and does not move** unless someone or something forces it to move.

- A Speed
- B Gravity
- C Work
- D Inertia

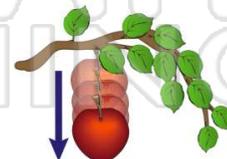


(D)

10

What **force** is causing the apple to **fall to the ground** in this picture?

- A gravity
- B inertia
- C magnetism
- D a push



(A)



Name _____ Class _____ Date _____

1 What are two things that affect the **force of gravity**? 

- A size and what objects are made out of
- B size and color of objects
- C mass of objects and distance between them
- D location and texture of objects

2 Mark tried to push a large rock for 30 minutes but could not make it move even a centimeter. After trying for several more minutes, he finally gave up. He realized he **could not move the rock**. **Did Mark do work?**

- A no; because he did not move the rock at all
- B yes; because Mark tried
- C yes; because the rock was heavy
- D yes; because he was pushing on the rock

3 Which is **true** of **simple machines**? 

- A They make work harder.
- B They are all large and heavy.
- C They make work easier.

4 Which **simple machine** is being used to raise this flag? 

- A pulley
- B lever
- C wedge



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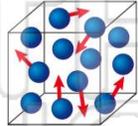
C pulley
D wedge 

B bicycle
C flag up a flagpole
D rocking chair 

9 Scientifically, **work** occurs when an object is **moved**. _____ is the **ability to do work**.

- A Energy
- B Force
- C Gravity
- D Inertia



10 **Kinetic energy** is the energy of **motion**. Which is true of kinetic energy? 

- A All matter has kinetic energy.
- B Anything moving has kinetic energy.
- C Anything not moving has kinetic energy.
- D Anything about to move has kinetic energy.



Name _____ Class _____ Date _____

1 What are two things that affect the **force of gravity**?



A size and what objects are made out of
B size and color of objects
C mass of objects and distance between them
D location and texture of objects

(C)

2 Mark tried to push a large rock for 30 minutes but could not make it move even a centimeter. After trying for several more minutes, he finally gave up. He realized he **could not move the rock**. Did Mark do **work**?

A no; because he did not move the rock at all
B yes; because Mark tried
C yes; because the rock was heavy
D yes; because he was pushing on the rock

(A)

3 Which is **true** of **simple machines**?

A They make work harder.
B They are all large and heavy.
C They make work easier.



(C)

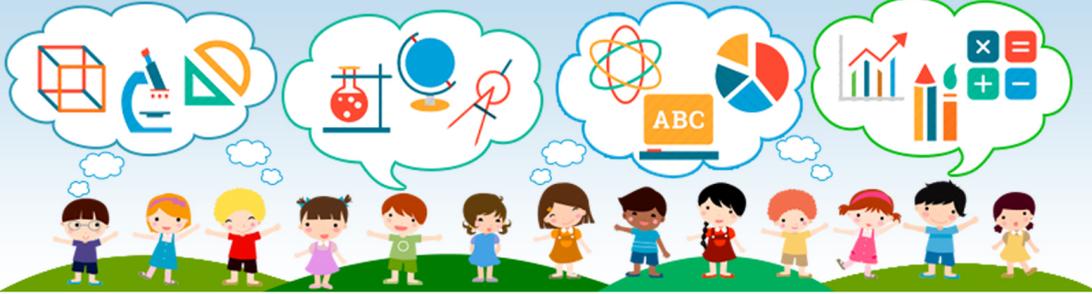
4 Which **simple machine** is being used to raise this flag?



A pulley
B lever
C wedge

(A)

5



(C)

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(B)

- C** pulley
D wedge



- B** bicycle
C flag up a flagpole
D rocking chair



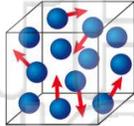
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A Energy
B Force
C Gravity
D Inertia



(A)

10 **Kinetic energy** is the energy of **motion**. Which is true of kinetic energy?



A All matter has kinetic energy.
B Anything moving has kinetic energy.
C Anything not moving has kinetic energy.
D Anything about to move has kinetic energy.

(B)



Name _____ Class _____ Date _____

Match each of the following terms to its definition:

Energy

Conduction

Force

Simple machine

Wedge

Lever

Wheel and axle

Speed

1. _____ - the ability to do work; what animals need to grow and move



2. _____ - the transfer of heat energy from the contact of one object to another



3. _____ speed



4. _____ in a cell

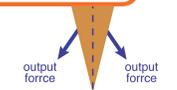
5. _____ not de

6. _____ pointed things apart

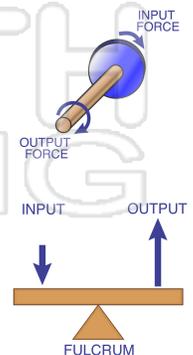
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7. _____ - a simple machine consisting of a bar that a wheel revolves around, on or along with it



8. _____ - a simple machine that can be pushed down on one side to raise an object on the other side





Name _____ Class _____ Date _____

Match each of the following terms to its definition:

Energy

Conduction

Force

Simple machine

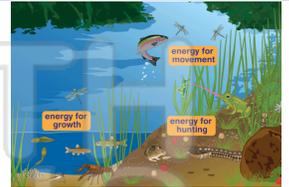
Wedge

Lever

Wheel and axle

Speed

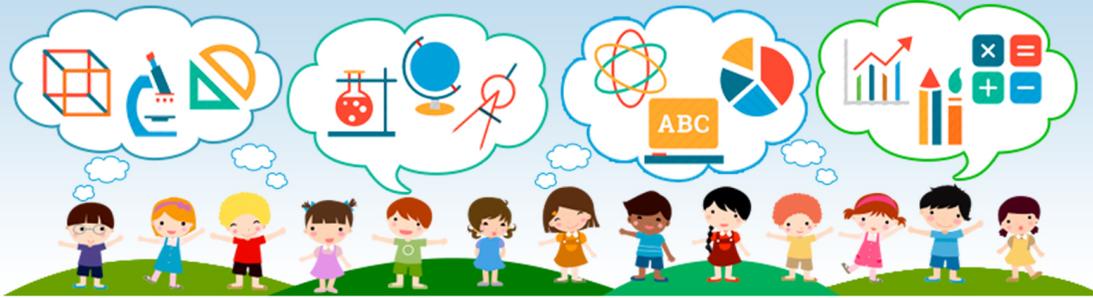
1. **energy** - the ability to do work; what animals need to grow and move



2. **conduction** - the transfer of heat energy from the contact of one object to another



3. **force**
direct



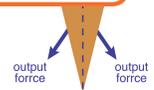
4. **speed**
period

5. **simple machine**
decrea

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6. **wedge**
and tw



7. **wheel and axle** - a simple machine consisting of a bar that a wheel revolves around, on or along with it



8. **lever** - a simple machine that can be pushed down on one side to raise an object on the other side

