Critical Thinking Skills

Simple Machines

Skills For Critical Thinking		Reading Comprehension								Hands-on Activities
		Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	
LEVEL 1 Knowledge	• List Details/Facts	✓	✓	✓	✓		✓	✓	✓	✓
	• Recall Information	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Match Vocab. to Definitions	✓	✓	✓		✓				
	• Define Vocabulary		✓			✓	✓	✓		
	• Label Diagrams			✓			✓	✓		✓
	• Recognize Validity (T/F)	✓	✓	✓	✓	✓	✓	✓	✓	
LEVEL 2 Comprehension	• Demonstrate Understanding	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Explain Scientific Causation	✓	✓	✓	✓	✓		✓	✓	✓
	• Rephrasing Vocab. Meaning	✓		✓	✓	✓		✓		✓
	• Describe		✓		✓	✓		✓		✓
	• Classify into Scientific Groups	✓	✓	✓	✓	✓	✓	✓	✓	✓
LEVEL 3 Application	• Application to Own Life	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Model Scientific Process	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Organize & Classify Facts	✓		✓	✓	✓	✓	✓	✓	✓
	• Use Alternative Research Tools									✓
LEVEL 4 Analysis	• Distinguish Roles/Meanings									✓
	• Make Inferences	✓		✓	✓	✓	✓	✓	✓	✓
	• Draw Conclusions Based on Facts Provided	✓		✓	✓	✓	✓	✓		✓
	• Classify Based on Facts Researched									✓
LEVEL 5 Synthesis	• Compile Research Information									✓
	• Design & Application				✓					✓
	• Create & Construct				✓	✓				✓
	• Imagine self in Scientific Role				✓					✓
LEVEL 6 Evaluation	• Defend an Opinion					✓				✓

Based on Bloom's Taxonomy

Before You Read

NAME: _____

What Are Simple Machines?

1. Circle the word True if the statement is true. Circle the word False if it is false.

a) Simple machines have no moving parts.

True **False**

b) When we use a simple machine we do less work.

True **False**

c) A motor scooter is a simple machine.

True **False**

d) A screwdriver is a simple machine.

True **False**

e) A screw is a simple machine.

True **False**

2. Put a check mark (✓) next to the answer that is most correct.

a) All of these are simple machines, *except* _____.

- ○ **A** an axe
- ○ **B** a toaster
- ○ **C** a bottle opener
- ○ **D** a wheelchair ramp

b) What does force times distance equal?

- ○ **A** power
- ○ **B** speed
- ○ **C** work
- ○ **D** weight

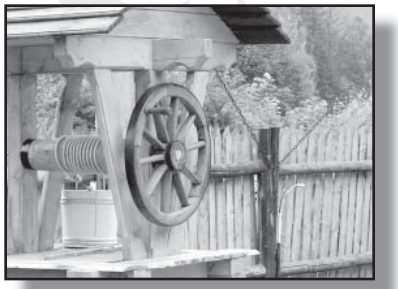
c) Which action is work?

- ○ **A** lifting a pencil
- ○ **B** reading a school book
- ○ **C** pushing a wheelbarrow
- ○ **D** carrying an armload of firewood

NAME: _____

What Are Simple Machines?

A **machine** is something that makes work easier by changing the force you apply to do work. A machine can change the amount of force you apply, and it can also change the direction of the force. A **simple machine** is a machine with only one kind of movement.



Wheel and Axle

There are six kinds of simple machines: **lever, wheel and axle, pulley, inclined plane, wedge,** and **screw.** Look at the pictures of the six simple machines. It's easy to see how most of these work and how they change the force. We will look at each of these machines later in this book.

Inclined Place

Pulley

It is important to understand that simple machines make work easier, but they don't change the *amount* of work you have to do. (That's the bad news.) What machines change is the **effort** you have to put out. (That's the good news.)

For example, you can use a kind of lever to pull a nail out of a board. You could never pull a nail out with your fingers. You might have to push the lever down ten inches to pull the nail up one inch. The nail comes right out because the pull on the nail is ten times the force of your push on the lever.

Wedge

Screw

Lever

How does a bottle opener change the force you apply to the handle of the opener?

_____

_____

Later, we will learn more about what you lose and what you gain when you use a simple machine.

NAME: _____

What Are Simple Machines?

1. Circle the word True if the statement is true. Circle the word False if it is false.

a) A wheel and axle is a simple machine.

True **False**

b) A simple machine has only one kind of motion.

True **False**

c) We use simple machines so we don't have to do as much work.

True **False**

d) A simple machine can change the direction of force.

True **False**

e) A simple machine can change the amount of force.

True **False**

2. Put a check mark (✓) next to the answer that is most correct.

a) Which of these is a simple machine?

- ○ **A** bicycle
- ○ **B** clock
- ○ **C** pulley
- ○ **D** toaster

b) Which of these is *not* a simple machine?

- ○ **A** lamp
- ○ **B** lever
- ○ **C** screw
- ○ **D** wedge

c) A simple machine can do all of these things, *except* _____.

- ○ **A** change the amount of work
- ○ **B** change the amount of force
- ○ **C** change the amount of effort
- ○ **D** change the direction of force