

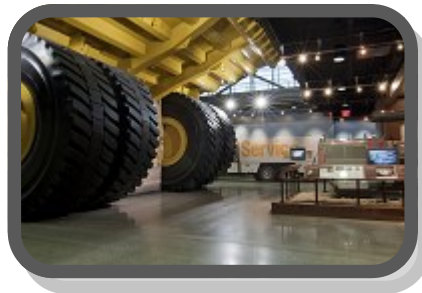
# Simple Machines Scavenger Hunt

## Caterpillar Visitors Center

### LEARNING OBJECTIVES



### LEARNING STANDARDS



### VOCABULARY ACTIVITY



### LEARNING OBJECTIVES

Identify simple machines in a variety of settings

Define a simple design problem and how it was or could be solved

Understand how simple machines and science affect our day to day lives

Discuss and understand how engineers improve existing technologies or develop new ones

Read with accuracy and understanding at grade level

### LEARNING STANDARDS

#### Engineering Design

*3-5-ETS1* Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time or cost.

#### Influence of Science, Engineering and Technology on Society and the Natural World

*4-PS3-4* Engineers improve existing technologies or develop new ones.  
Science affects everyday life

#### English and Language Arts

*CC.3-5.R.1.1* Key Ideas and Details: Refer to detail and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

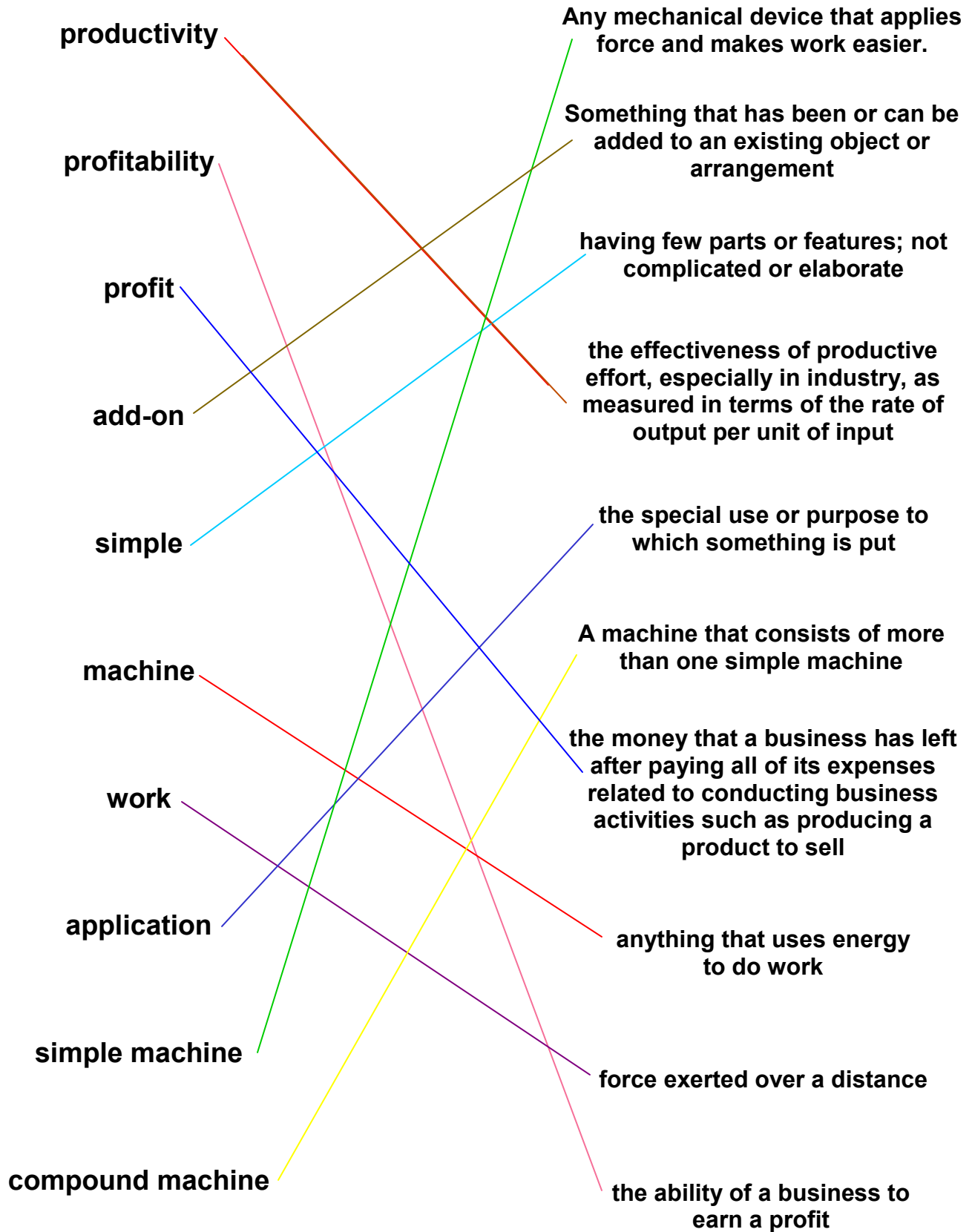
*CC3-5.R.1.10* Range of Reading and Level of Text Complexity: Read and comprehend information texts including history/social studies, science and technical texts.

*CC.3-5.RF.4.4* Fluency: Read with sufficient accuracy and fluency to support comprehension.

*CC.3-5.RF.4.4a* Fluency: Read on level with purpose and understanding.

# VOCABULARY ACTIVITY

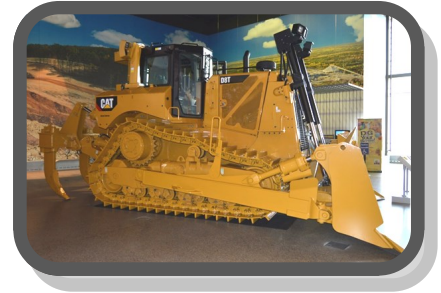
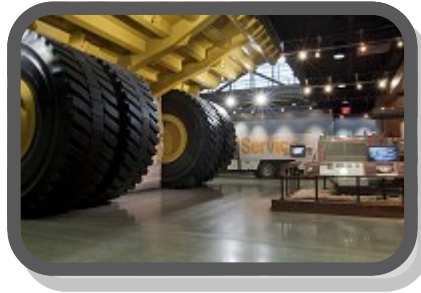
Instructions: Draw a line from the vocabulary word to the correct definition.



# Simple Machines Scavenger Hunt

## Caterpillar Visitors Center

**Instructions:** Work as a team, explore the galleries and record the simple machines you discover.



**What does simple mean?** Having few parts or features; not complicated or elaborate.

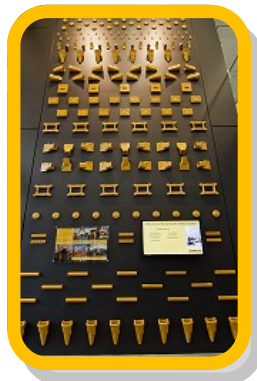
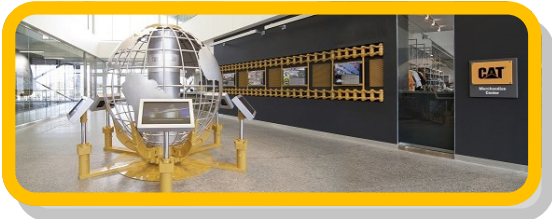
**What is a machine?** A machine is anything that uses energy to do work.

**What is work?** Science defines work as a force exerted over a distance.

**What is a simple machine?** A simple machine is any mechanical device that applies force and makes work easier.

**What is a compound machine?** A compound machine is a machine that consists of more than one simple machine.

### BEGIN IN THE LOBBY



Look for the Ground Engaging Tool (GET) Wall. Discuss how and why these tools are used. Do they solve a problem? If so, what problem?

Can you find two simple machines in the lobby?  
How about on one of the walls? Name them.

Track on wall - wheel & axle  
Ground Engaging Tool (GET) Wall - wedges  
Bucket under ticket desk - bucket is a wedge  
tips (GET) are wedges

Ground engaging tools are heavy duty add-ons that customers put on their machines to increase productivity, profitability and to reduce wear. The tools protect the wear edge of buckets, blades rippers among other products. Choosing the right tool for each application helps the customer be more efficient. This saves the customer time and money.

**MOVE TO THE 797F MINING TRUCK**

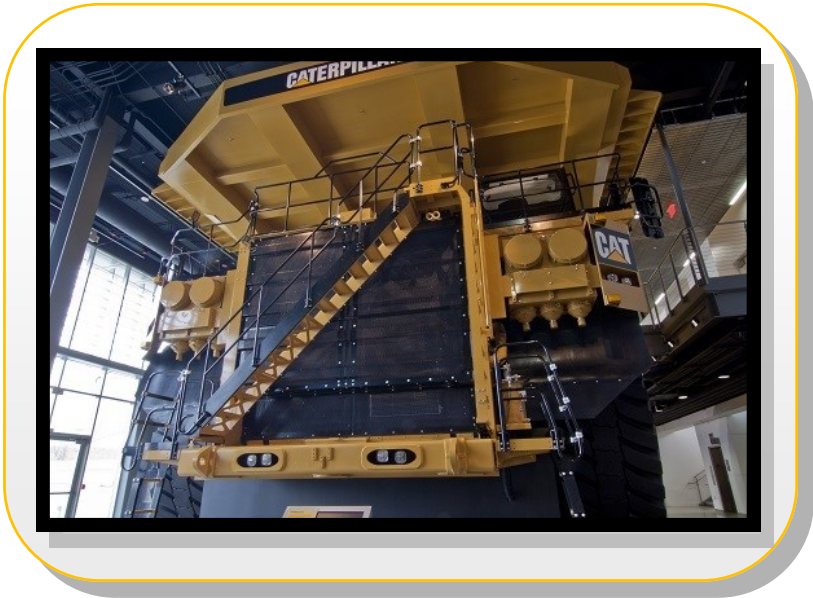
Which part of the Cat® 797F Mining Truck is a very large inclined plane?  
Hint: What lifts up to dump?

The bed of the truck

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When you return to your classroom, draw a picture of the 797F Mining Truck in dump position.

**MOVE TO THE HERITAGE GALLERY**



Find the Model Twenty Tractor. Name a simple machine found on the front of the tractor.

The crank - wheel & axle

Find the D8 Simulator in the Heritage Gallery. Name a simple machine found on the D8?

Hand controls - levers  
Foot pedals - levers  
Pivot joints - wheel & axle

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**MOVE TO THE PRODUCT DEVELOPMENT GALLERY**



Compare the joysticks to the levers on the D8 Simulator you saw in the Heritage Gallery. Name two differences. Name two similarities.

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Find the joysticks in the Ergonomics area. Discuss whether a joystick is a simple machine or a compound machine made up of two or more simple machines. What did your group decide?

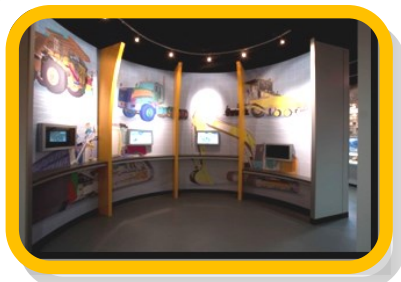
Take into consideration the pivot point and the buttons and switches.

D8 levers are heavy, stiff and hard to push and pull.

The joysticks are light weight, much smaller and easy to push and pull.

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**MOVE TO DESIGN YOUR OWN MACHINE**



Name the simple machines you find as you're designing a machine.

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Which machine did you choose to design? Why?

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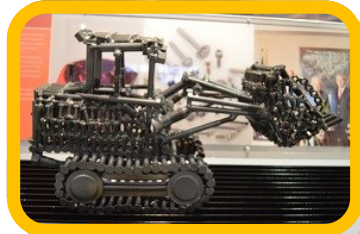
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MOVE TO THE  
SUPPLIER GALLERY



Look for the track loader made of nuts and bolts. Are nuts and bolts simple machines? If so, name them.

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Nuts & bolts - wheel & axle

What other simple machines can you find on the nut and bolt tractor? Hint: Consider the bucket or the tracks.

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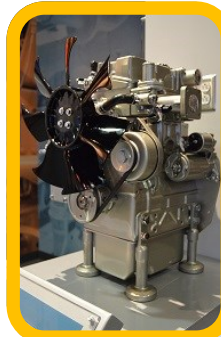
Bucket - wedge  
Tracks - wedge  
Track drive - wheel & axle

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MOVE TO THE POWER  
SYSTEMS GALLERY



Find the engine wall mural. Have each team member point out a simple machine. Record the simple machine each team member finds.

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Pistons - wheel & axle  
Pulleys, levers, gears

Find the Perkins® engine. Can your team find two simple machines and name them?

Fan - wheel & axle  
Fan is turned with a pulley

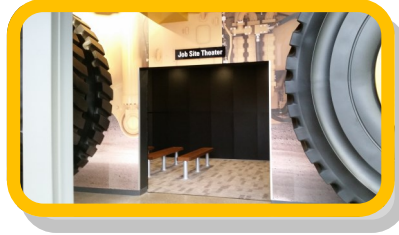
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**MOVE TO THE  
JOBSITE THEATER**



**BONUS QUESTIONS**

What types of jobs did you see  
Cat equipment doing in the  
movie? Which job would you  
like to do when you grow up?

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Watch Cat Construction Rocks (video #2).  
As a team, identify a lever, pulley, screw,  
inclined plane, wheel & axle and wedge.

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**MOVE TO THE  
PRODUCT FLOOR**



**BONUS QUESTIONS**

What is the largest and smallest  
compound machine you can find on the  
product floor? Which is your favorite?

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What is the largest and smallest simple  
machine you can find on the product  
floor? Name them.

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