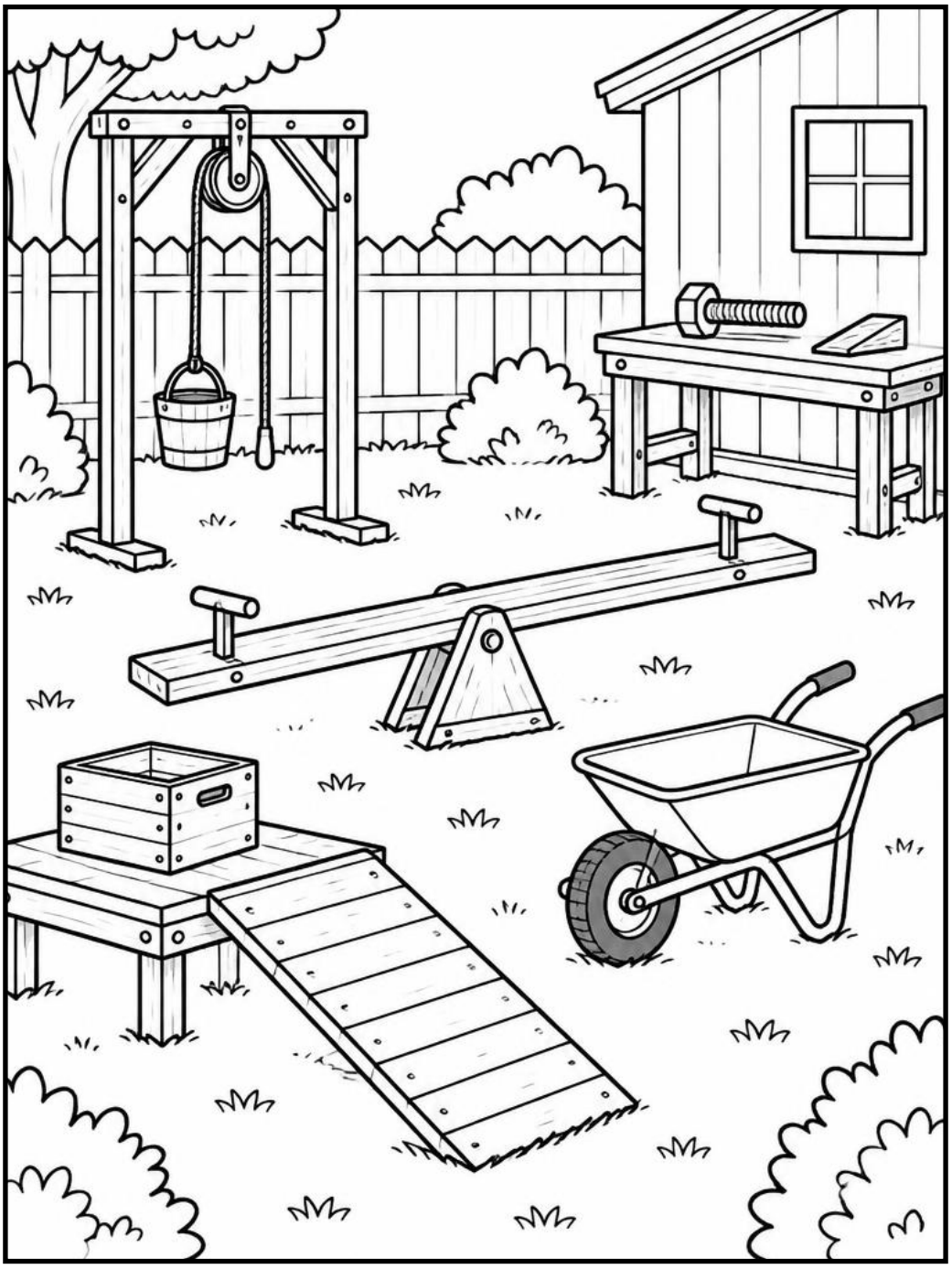
Simple Machines & Engineering

Learning Pack · Color It. Learn It. Explore It.

Ages 6–10 · Grades 1–4 (approximate) · Physical Science / Engineering · 30–75 minutes

Name: _____



Inside: facts · vocabulary · six machines · everyday machines · ramp challenge · quiz · answer key · notes

What you will learn

Learning objectives

- ☐ Name the six classical simple machines.
- ☐ Explain how simple machines help people do work.
- ☐ Find simple machines in everyday objects.
- ☐ Understand that machines can change the size or direction of a force.
- ☐ Use engineering thinking to test a solution to a problem.

Five engineering facts

Fact 1: What is a simple machine?

A simple machine is a basic device that can change the size or the direction of a force. It can make a job easier, often by letting you push or pull with less force over a longer distance. Machines do not create energy.

Fact 2: Lever

A lever is a stiff bar that turns around a pivot point called a fulcrum. A seesaw is a lever. Moving the fulcrum changes how much force you need and how far you have to push.

Fact 3: Wheel and axle

A wheel and axle are joined and turn together. Turning the big wheel a long way turns the small axle a short way with more force, which is how a doorknob works.

Fact 4: Inclined plane, wedge and screw

An inclined plane is a ramp that connects a low place to a high place. A wedge has sloping sides that push materials apart, like an axe or a doorstop. A screw has a spiral thread, like an inclined plane wrapped around a cylinder.

Fact 5: Pulleys and engineering

A pulley is a grooved wheel with a rope. One fixed pulley changes the direction of a pull, so you pull down to lift up. Several pulleys together can reduce the force needed. Engineers combine simple machines to solve problems.

Sources (checked October 2026)

Facts 1–5: TeachEngineering (University of Colorado Boulder), teachengineering.org/lessons/view/cub_simple_lesson01
Fact 4 (wedge): TeachEngineering, teachengineering.org/lessons/view/cub_simple_lesson02

Engineering words

Simple machine	A basic device that changes the size or direction of a force.
Force	A push or a pull.
Work	In science, work is done when a force moves something in the direction of the force. Pushing a wall that does not move is not work.
Lever	A stiff bar that turns around a fixed point.
Fulcrum	The point a lever turns on, like the middle of a seesaw.
Pulley	A grooved wheel with a rope that can change the direction of a pull.
Wheel and axle	A wheel joined to a rod (the axle) so they turn together.
Inclined plane	A flat sloping surface, like a ramp, that joins a low place and a high place.
Mechanical advantage	How much a machine changes the force you need. Less force usually means moving a longer distance — the machine does not make extra energy.

Your turn: write a sentence using two new vocabulary words.

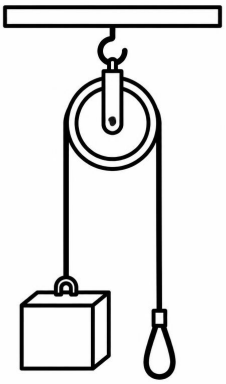
Identify the six simple machines

Name: _____ Date: _____

Write the name of the simple machine under each picture. Use each word once.

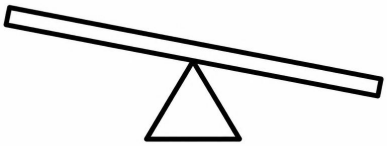
Lever · Wheel and axle · Pulley · Inclined plane · Wedge · Screw

1



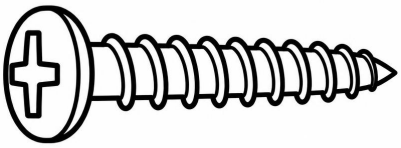
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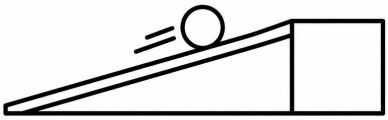
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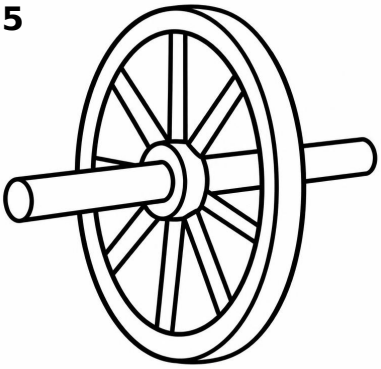
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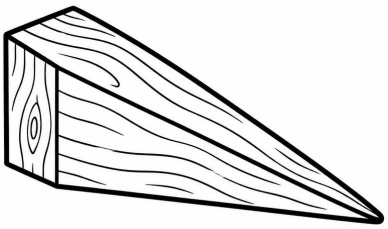
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6



_____

Machines all around us

Name: _____ Date: _____

Activity A: Everyday machines

Some objects combine simple machines. Choose the simple machine that best matches each example. Use each machine once.

1. Wheelchair ramp: _____
2. Bottle opener: _____
3. Jar lid: _____
4. Doorknob: _____
5. Doorstop: _____
6. Flagpole rope: _____

Activity B: Ramp engineering challenge

Question: does a longer, gentler ramp need less pulling force? With an adult, build a short, steep ramp and a long, gentle ramp that reach the SAME height. Use the same car and rubber band. Pull slowly and steadily, along the ramp, and watch how far the band stretches. Band stretch is a rough way to compare force, not an exact measurement.

Ramp	Band stretch: a lot or a little?	Distance: short or long?
Short, steep ramp		
Long, gentle ramp		

Which ramp needed less force? What did you trade for it?

_____

_____

Draw your best ramp design here

Simple machines quiz

Name: _____ Date: _____

Fill in the circle next to the best answer.

1. What can a simple machine do?

- ◯ a) Make energy out of nothing
- ◯ b) Change the size or direction of a force
- ◯ c) Work without anyone pushing or pulling

2. What is the pivot point of a lever called?

- ◯ a) The fulcrum
- ◯ b) The axle
- ◯ c) The thread

3. A screw is like which simple machine wrapped around a cylinder?

- ◯ a) A pulley
- ◯ b) A lever
- ◯ c) An inclined plane

4. What can a single fixed pulley do?

- ◯ a) Change the direction of a pulling force
- ◯ b) Make a load disappear
- ◯ c) Turn a rope into a wheel

5. Why can a long, gentle ramp make lifting a box easier?

- ◯ a) The box gets lighter
- ◯ b) You push with less force, but over a longer distance
- ◯ c) Ramps create extra energy

Bonus: A wheelbarrow uses two simple machines. Can you name them?

_____

_____

_____

Answer key

Identify the six simple machines

1. Pulley 2. Lever 3. Screw 4. Inclined plane 5. Wheel and axle 6. Wedge

Activity A: Everyday machines

1. Wheelchair ramp – Inclined plane 2. Bottle opener – Lever 3. Jar lid – Screw 4. Doorknob – Wheel and axle 5. Doorstop – Wedge 6. Flagpole rope – Pulley

Activity B: Ramp challenge

Results can vary. With the same car, the same height and similar friction, the long, gentle ramp usually stretches the band less (less force), but the car travels a longer distance. The steep ramp usually needs more force over a shorter distance.

Quiz

1. b) Change the size or direction of a force
2. a) The fulcrum
3. c) An inclined plane
4. a) Change the direction of a pulling force
5. b) You push with less force, but over a longer distance

Bonus: a wheel and axle and a lever. The wheel and axle acts as the lever's fulcrum, the load sits between the wheel and the handles, and the person lifts at the handles.

Teacher and parent notes

Who it is for

Ages 6–10 (about grades 1–4). Younger children can do the coloring, vocabulary and identify pages with help reading.

Time

30–75 minutes, depending on the activities selected.

Suggested order

1) Read the facts. 2) Vocabulary. 3) Identify the six machines. 4) Everyday machines. 5) Ramp challenge. 6) Quiz. 7) Color a sheet from the free Construction Workers & Tools collection.

Ramp challenge set-up

You need a toy car, a rubber band, two or three books and a board or stiff cardboard (one short piece, one long). Tie or tape the band to the car. Both ramps must reach the same height; use the same car. Pull slowly and steadily along the ramp. Band stretch is only an approximate force indicator.

Safety

An adult should supervise. Keep ramps low, stable and on the floor, and keep cars away from table edges. Do not launch cars toward other children or stretch rubber bands toward faces. No real tools, saws or sharp wedges are needed.

Discussion questions

Where did you see a lever today? Why do delivery trucks use ramps? Can you find a screw in your classroom? Why don't machines make energy?

A note on the science

Machines trade force for distance: less force usually means a longer push. Friction means real machines always need a little more effort than the ideal. Many tools, like scissors and wheelbarrows, combine more than one simple machine.