Learning Resources®

LER 2824

grades K+ | ages años • ans • jahre 5+

Simple Machines STEM Activity Set

Set de actividades STEM Máquinas Sencillas
Kit d'activités STEM Simples Machines
MINT-Aktionsset „Einfache Maschinen"

Activity Guide

Guía de actividades • Guide d'activités • Spielanleitung

⚠ WARNING:
CHOKING HAZARD - Small parts.
Not for children under 3 years.

Includes:

- Pulley with rope and hook
- Wedge
- Lever board (combines with wedge to make an **inclined plane**)
- Archimedes screw
- 4 Wheels on 2 axles (threaded **screw** on one end)
- Cart
- 4 Barrels (of two different weights)
- 10 Activity Cards
- Support materials (reproducible)
  - o Prediction Sheet
  - o Observation Sheet
  - o Data Sheet
  - o Simple Machines Sorting Cards
  - o *Draw Simple Machines* Sheet

Welcome to the wonderful world of simple machines!

This activity set includes real science concepts and support materials for you, paired with interesting pieces (including a cranking, twisting Archimedes screw, weighted barrels, pulley with rope and hook, and more) and activities to spark children's imaginations and stimulate their curiosity. Each activity has been teacher-tested and child-approved to ensure broad appeal and ease of use. Aspects of the scientific method are included for your early learner "scientists." Incorporate the activities as an introduction to STEM or as a follow up, to support and reinforce learning. Extended connection ideas further challenge children, encouraging them to become logical thinkers and fostering self-reliance. Let's get started!

STEM and STEAM

Simply defined, STEM is the acronym for **S**cience, **T**echnology, **E**ngineering, and **M**athematics. But STEM is much more than an acronym. It is an approach to learning that asks children to solve real-world problems through inquiry-based problem-solving, hands-on experimentation, trial and error, and self-discovery. The three disciplines of science, engineering, and mathematics are clearly defined and understood. But what about technology? In STEM, technology is broadly defined to mean practical innovation—that is, designing and using materials and tools to help solve a specific problem. Today, of course, technology is commonly understood in terms of computers and the internet, which also solve specific problems occurring in everyday life.

Another acronym associated with STEM is STEAM, which adds the component of art and design to the mix. Art can be incorporated through traditional means of drawings or paintings (e.g., drawing your prediction prior to an experiment), or through real, 3-D construction (e.g., designing your own inclined plane). By incorporating art into scientific exploration and discovery, you tap into the right (creative) side of the brain to help develop creative problem solving skills and flexible thinking.

Simple Machines

Simple machines are all around you: on the playground when go down a slide (inclined plane), or when a flag is raised or lowered on a pole (pulley). All simple machines have one common purpose: to make work easier. The six simple machines include: **Wheel and Axle, Lever, Inclined Plane, Pulley, Screw,** and **Wedge**. Units focusing on simple machines are commonly taught in early school years as a way for children to explore simple machines and their functions. With this STEM set, children will discover several related concepts through fun, hands-on experiments, such as lifting objects with levers, and even moving items with an Archimedes screw!

Activity Cards

Children will love performing the activities found on the 10 double-sided cards. Each card, based on the scientific method, follows the same format: it begins with a real-world problem to solve, followed by a prediction (or hypothesis), hands-on experimentation, and data collection, and ends with children drawing a conclusion about their findings. Each activity includes different components of STEM/STEAM, while the end of each activity offers yet another opportunity to incorporate science, technology, engineering, math, or art. Please note that because children at this age are emergent readers, the cards are intended to be read by an adult to direct, guide, and prompt the child along the way. Of course, this won't stop them from lifting a weight with a pulley or placing different objects in the Archimedes screw during experimentation!

Support Materials

Use the reproducible sheets found in this guide in conjunction with the activity cards. Using these open-ended templates, children can record predictions or observations while conducting experiments. These support materials are intentionally light on text to allow plenty of space for children to write or draw, or for customization according to the child's learning needs. Use the included sorting cards to help support and extend simple machines concepts, as an independent activity for sorting or classifying simple machines, or as a way to assess understanding. After performing all the activities on the cards, use the *Draw Simple Machines* sheet as a final summary activity for young learners to draw each simple machine, and to think about where they have seen these simple machines in the real world.

Glossary

The words below are key concepts taught throughout the activities. On the activity cards, these words are **bolded** the first time they appear in an activity. Children can better understand these vocabulary-building words when they are used within the context of real, hands-on experiments.

- **effort** force applied to a lever in order to move a load
- **force** any push or pull
- **fulcrum** support on which a lever rests while moving or lifting an object
- **inclined plane** surface that is angled or sloped, which connects a lower level to an upper level; used to help move an object
- **lever** board or pole that rests on a fulcrum; used to move or lift an object or a load
- **pulley** a wheel that a rope, cord, or belt moves around; used to raise or lower a load or object
- **screw** an inclined plane wrapped or twisted around a cylinder
- **simple machine** a tool with few moving parts that makes work easier
- **wedge** two inclined planes, back-to-back, used to separate, lift, or tighten an object or load
- **wheel and axle** an axle is a rod that goes in or through the wheel to move it, and keeps the wheel in place as it turns

Prediction Sheet

Write or draw your prediction.

I think... (If ... then...)

After my experiment I learned...

My prediction was...

T M

Observation Sheet

First I saw (noticed or observed)...

Then I saw (noticed or observed)

Data Sheet

Name _____

Measure the distance for each experiment. Write the distance below in each box.

Experiment 1

distance _____

Experiment 2

distance _____

In which experiment did the object go a longer distance? Circle that experiment above.

Extended activity ideas:

- *Make a chart or graph to show the distances each object went.*
- *Figure out the difference between the two distances in your experiment.*

Name _____

Measure the distance for each experiment. Write the distance below in each box.

Experiment 1

distance _____

Experiment 2

distance _____

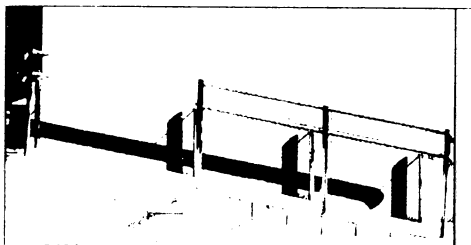
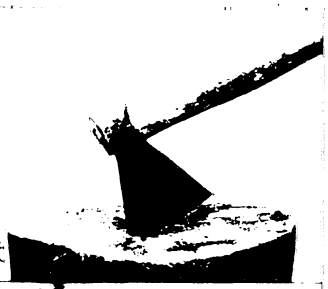
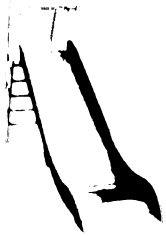
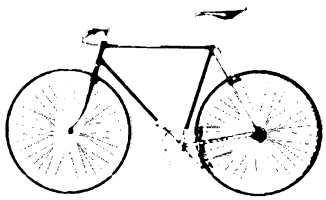
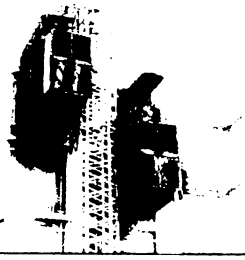
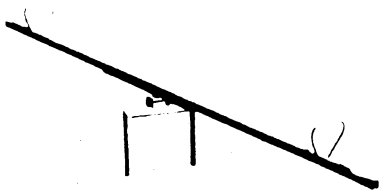
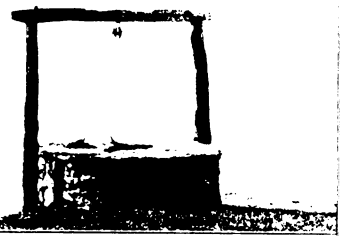
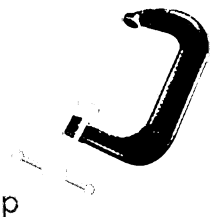
In which experiment did the object go a longer distance? Circle that experiment above.

Extended activity ideas:

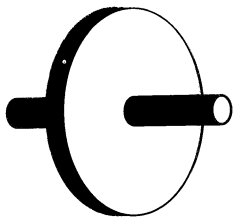
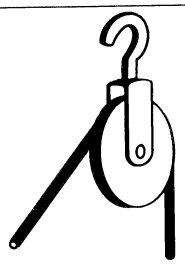
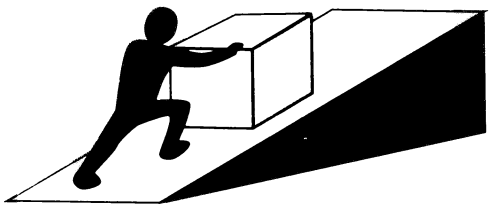
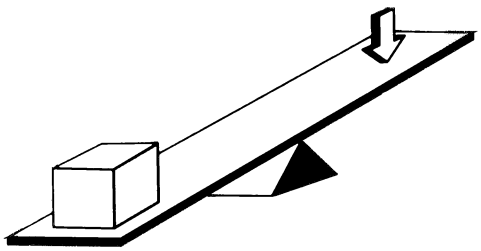
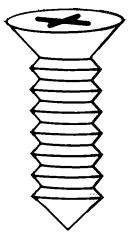
- *Make a chart or graph to show the distances each object went.*
- *Figure out the difference between the two distances in your experiment.*

Simple Machines Sorting Cards

Sort these cards into 6 categories of simple machines: screw, inclined plane,wedge, lever, wheel and axle, and pulley.

ramp 	roller blades 	hatchet 
slide, 	car 	knife 
ladder 	bike 	doorstop 
jar 	wheelbarrow 	elevator 
lightbulb 	see saw 	well 
G-clamp 	hammer 	flagpole 

Name each simple machine below. Then, draw your own example of each.

Simple Machine:		My example:
	wheel and axle	
	pulley	
	inclined plane	
	lever	
	wedge	
	screw	