SIMPLE MACHINES AND FORCES

Activity Pack -- FREE Resource

Ages 7-10 | No Prior Reading Required
Classroom, Library and Home Use

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The Six Simple Machines

Every simple machine does one job: it changes how hard, or which way, you push or pull. There are six. Everything from a bicycle to a jet engine is these six ideas working together.

Activity 1: Name the Machine

Word bank: lever wheel and axle pulley ramp wedge screw

Everyday Thing	Which Simple Machine?
A door handle	
A tap	
A rope over a wheel on a flagpole	
Stairs or a sloping path	
A zip	
A hook that twists into wood	

Activity 2: Machine Hunt

Find four simple machines at home or school. Write what you found and which type it is.

What I Found	Type of Machine

Think About It

* Which simple machine do you think you use the most each day?

* A bicycle uses more than one simple machine. Which ones can you spot?

Pulley Maths

In a pulley, every rope holding up the load shares the work. Two ropes means half the effort. Four ropes means a quarter. But machines don't give free force: you pull the rope further. That's the deal every machine makes.

Activity 1: Share the Load

A 20 kg bag is lifted 1 metre. Fill in the table.

Ropes Holding the Load	Effort Needed	Rope You Pull
1	20 kg	1 metre
2	_____ kg	2 metres
4	_____ kg	_____ metres

Activity 2: Halve It

1. A 16 kg box with 2 ropes feels like _____ kg.
2. A 16 kg box with 4 ropes feels like _____ kg.
3. A 12 kg bag with 2 ropes feels like _____ kg.
4. With 4 ropes, how much rope do you pull to lift something 2 metres? _____ metres

Think About It

* What does a pulley give you -- and what does it ask for in return?

* Why might someone choose a pulley with more ropes?

Lever Lab and Machine Designer

A flat plank over a brick makes a lever. The brick is the pivot. When the pivot is close to a heavy load, you can lift it by pressing the far end of the plank with very little effort.

Activity 1: Easy or Hard?

Tick whether each lever set-up would make lifting easy or hard.

Lever Set-Up	Easy	Hard
Pivot close to the heavy bag	[ ]	[ ]
Pivot far from the heavy bag	[ ]	[ ]
Pushing down on the far end of the plank	[ ]	[ ]
Pushing down right next to the pivot	[ ]	[ ]

Activity 2: Design a Machine

Problem: a heavy box of books needs to get up onto the school stage.
DRAW A MACHINE THAT USES TWO SIMPLE MACHINES. LABEL EACH ONE:

The two simple machines I used: _____ and _____

Think About It

* Why does moving the pivot change how hard it is to lift?

* What everyday problem would you solve with a simple machine?

Work Nobody Notices

Note to students:
This worksheet explores personal feelings. There are no right or wrong answers -- your thoughts are your own. Sharing is always optional. If any question brings up big feelings, please talk with a trusted adult.

Lots of important work goes unnoticed. Many of the tools we use every day were invented by people whose names were never written down. Skills are often passed from grandparent to parent to child.

Activity 1: Feeling Check-In

Circle the words that show how you feel.

When I work hard and nobody notices, I feel:
Sad Okay Frustrated Invisible Other: _____

When someone thanks me for my work, I feel:
Proud Happy Shy Warm Other: _____

When an older person teaches me a skill, I feel:
Curious Lucky Proud Happy Other: _____

Activity 2: Someone Who Taught Me

DRAW SOMEONE WHO TAUGHT YOU HOW TO DO SOMETHING:

They taught me how to: _____

Think About It

* Why might someone feel proud even if their name isn't remembered?

* Who in your life does important work that nobody notices?

Original Inventor: Unknown

People have used ramps for at least 10,000 years, and the oldest wheel ever found is about 5,000 years old -- but nobody knows who invented them. We can still say thank you.

Activity 1: My Chain of Knowledge

Skills are passed from person to person. Trace a chain for three things you know how to do.

Something I Can Do	Who Taught Me?	Who Taught Them?

Activity 2: A Thank-You Label

Choose something you use every day. Write a label for its unknown inventor.

Thing: _____ Original inventor: unknown.

Thank you for: _____

Without it, my day would be: _____

Think About It

* Why don't we know who invented the wheel -- and does that matter?

* Why is it worth thanking people even when we don't know their names?

My Machine and Thank-You Goals

Here is a challenge: spot simple machines everywhere -- and thank someone whose work usually goes unnoticed.

Activity 1: My Goals

Write or draw one goal for each time.

Goal Tier	My Goal	How I Will Do It	When I Will Start
THIS WEEK			
THIS TERM			
THIS YEAR			

Activity 2: Challenge Tracker

Colour a star each day you do it.

I did it!	Mon	Tue	Wed	Thu	Fri
I spotted a simple machine	*	*	*	*	*
I thanked someone for work nobody notices	*	*	*	*	*
I asked an older person how they learned a skill	*	*	*	*	*
I taught someone something I know	*	*	*	*	*
I built or tested a machine	*	*	*	*	*

Think About It

* Think of something you use every day that was invented by someone whose name you'll never know.

* What skill would you like to pass on to someone else one day?

Teacher's Companion

No Prior Reading Required
This pack is fully standalone. No book or characters are referenced. Any student can complete these worksheets without prior reading. Suitable for classroom, library, and home learning programmes. This pack is an excerpt of a full book-specific learning pack available with purchase at **learningsmart.au**

Australian Curriculum Alignment

Learning Area	Strand	Year Level	Content Description (summary)
Science	Physical Sciences	Yr 2-4	Pushes and pulls; how simple machines change the size or direction of a force (WS1, WS3)
Science	Science as a Human Endeavour	Yr 2-4	People have used science and technology for thousands of years (WS5)
Mathematics	Number	Yr 2-4	Halve and quarter quantities; use multiplication facts (WS2)
Design and Technologies	Design Processes	Yr 2-4	Design a solution combining simple machines (WS3)
HASS	History	Yr 2-4	How knowledge and skills are passed on through families and communities (WS5)
Gen. Capabilities	Personal and Social Capability	Yr 2-4	Recognise and appreciate others' contributions (WS4, WS5)
Gen. Capabilities	Critical and Creative Thinking	Yr 2-4	Classify machines and generate design ideas (WS1, WS3)

16 Key Simple Machines and Forces Lessons

#	Lesson
1	A simple machine changes how hard, or which way, you push or pull.
2	There are six simple machines: lever, wheel and axle, pulley, ramp, wedge and screw.
3	Scientists call a ramp an inclined plane.
4	A lever turns on a pivot.
5	Moving the pivot closer to the load makes lifting easier.
6	In a pulley, every rope holding the load shares the work.
7	More ropes means less effort -- but more rope to pull.
8	Machines don't make free force: you trade effort for distance.
9	Every complex machine is simple machines working together.
10	Simple machines are all around us: handles, taps, stairs and zips.
11	People have used ramps for at least 10,000 years.
12	The oldest wheel ever found is about 5,000 years old.
13	Archimedes explained levers more than 2,000 years ago.
14	Many inventors' names were never written down.
15	Skills are passed from person to person, through families and communities.
16	Big question: Whose names are missing -- and how can we say thank you anyway?

Answer Keys and Discussion Guidance

WS1 -- Name the Machine (Answers)
Door handle = lever; tap = wheel and axle; flagpole rope = pulley; stairs or sloping path = ramp; zip = wedge; hook that twists into wood = screw. Machine hunt: accept any correctly classified example.

WS2 -- Pulley Maths (Answers)
Table: 2 ropes = 10 kg; 4 ropes = 5 kg and 4 metres. Halve It: 1. 8 kg; 2. 4 kg; 3. 6 kg; 4. 8 metres.

WS3 -- Easy or Hard? (Answers)
Easy: pivot close to the heavy bag; pushing on the far end. Hard: pivot far from the bag; pushing next to the pivot. Designs: accept any reasonable mix, e.g. a ramp plus wheels, or a pulley plus a lever.

WS4 -- Sensitivity Note for Educators
Some students may not have older family members nearby, or may find family topics difficult. Any person who taught them counts, including teachers, friends or coaches. Do NOT require sharing. If a student discloses a concern, follow your school's wellbeing and child safety protocol.

WS5 -- Chain of Knowledge (Guidance)
No right answers. Encourage students to notice how far back a skill can be traced, and that the chain usually ends with someone whose name we don't know.

WS6 -- Challenge Tracker
There are no correct scores. Celebrate every attempt; any day left blank is a chance for a gentle reminder, not correction.

Upsell Note for Educators
This generic pack is based on the Learning Smart book series. The full book-specific learning pack -- which references the characters, story moments, and adventure narrative -- is available with book purchase or subscription at **learningsmart.au**. Book-specific packs significantly increase student engagement and reading motivation.

Differentiation Strategies

Level	Strategy	Example Application
Below Level (support)	Reduce written output; use sentence starters; allow verbal responses; pair with peer.	WS2: use counters to share 20 into 2 or 4 groups. WS4: use feeling faces instead of writing.
On Level (standard)	Complete all activities as written. Use discussion partner for Think About It sections.	Standard completion with class debrief of Think About It questions.
Extension (enrichment)	Build a broomstick pulley with rope and a bag of books; measure the rope pulled for single and double pulleys.	WS1: take apart an old toy or tool (safely) and list every simple machine inside it.

7 Discussion Questions

1. What does a pulley trade to make lifting easier?
2. Find three simple machines in the room you're in right now. What type is each one?
3. Why don't we know who invented the wheel -- and does that matter?
4. Why might someone put 'Original inventor: unknown' on a label?
5. Think of something you use every day that was invented by someone whose name you'll never know.
6. Why might some people's work not be written down?
7. Who in your life does important work that nobody notices?

Classroom Display Ideas

Six Machines Wall: A labelled display of the six simple machines with everyday examples.

Machine Hunt Map: Students mark simple machines they find around the school.

Pulley Station: A working broomstick pulley with a chart of ropes versus effort.

Inventor Unknown Labels: Students' WS5 thank-you labels displayed beside everyday objects.

Chains of Knowledge: Paper chains showing how skills passed from person to person.

Machine Designers: Display the WS3 designs for getting a heavy box onto the stage.

Want the Full Adventure?

This free activity pack is inspired by the **Learning Smart book series** -- everyday adventures about character, confidence and growing into a kind, capable leader.

The Full Book-Specific Learning Pack Includes:

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