

Lesson of the Week!



LET'S MAKE THINGS GO!

ALL ABOUT ENGINES
for Young Scientists

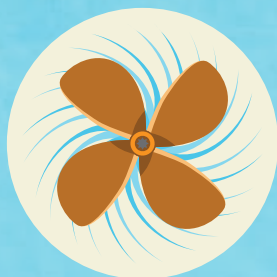
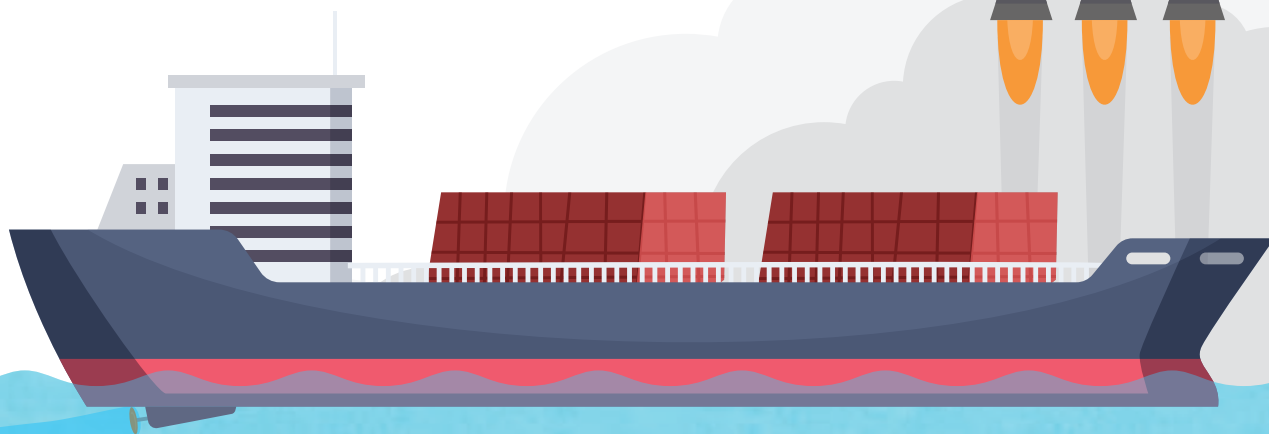
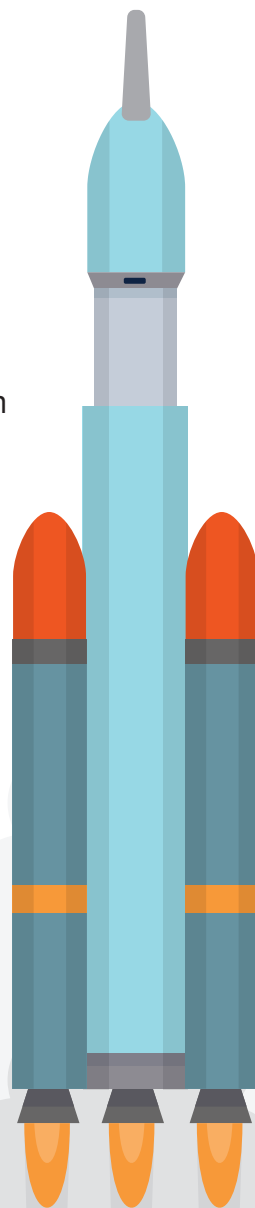
10 CHAPTER ENGINES

All machines make work easier, but some machines do more than that. An **engine** is a special kind of machine that uses energy to make things go.

Car engines, for example, use energy to turn wheels. The tires push against the road and the car moves forward.



Rockets have engines that shoot them into outer space.



Boats have engines that turn propellers that move them through water.

All engines use energy to make things move! But where do they get it?

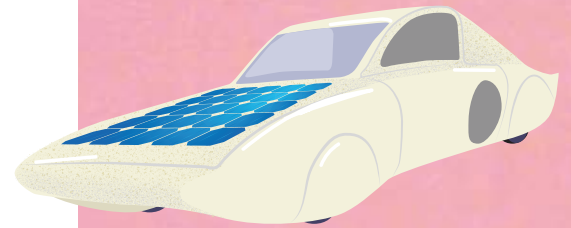


Most engines, like those in cars, motorcycles, lawnmowers and boats, get their energy from fuel like gasoline.

Some engines run on electricity. Battery-powered garden tools like leaf blowers and trimmers are examples.



For years people have even been working on making cars with engines that run on solar power—light from the sun.

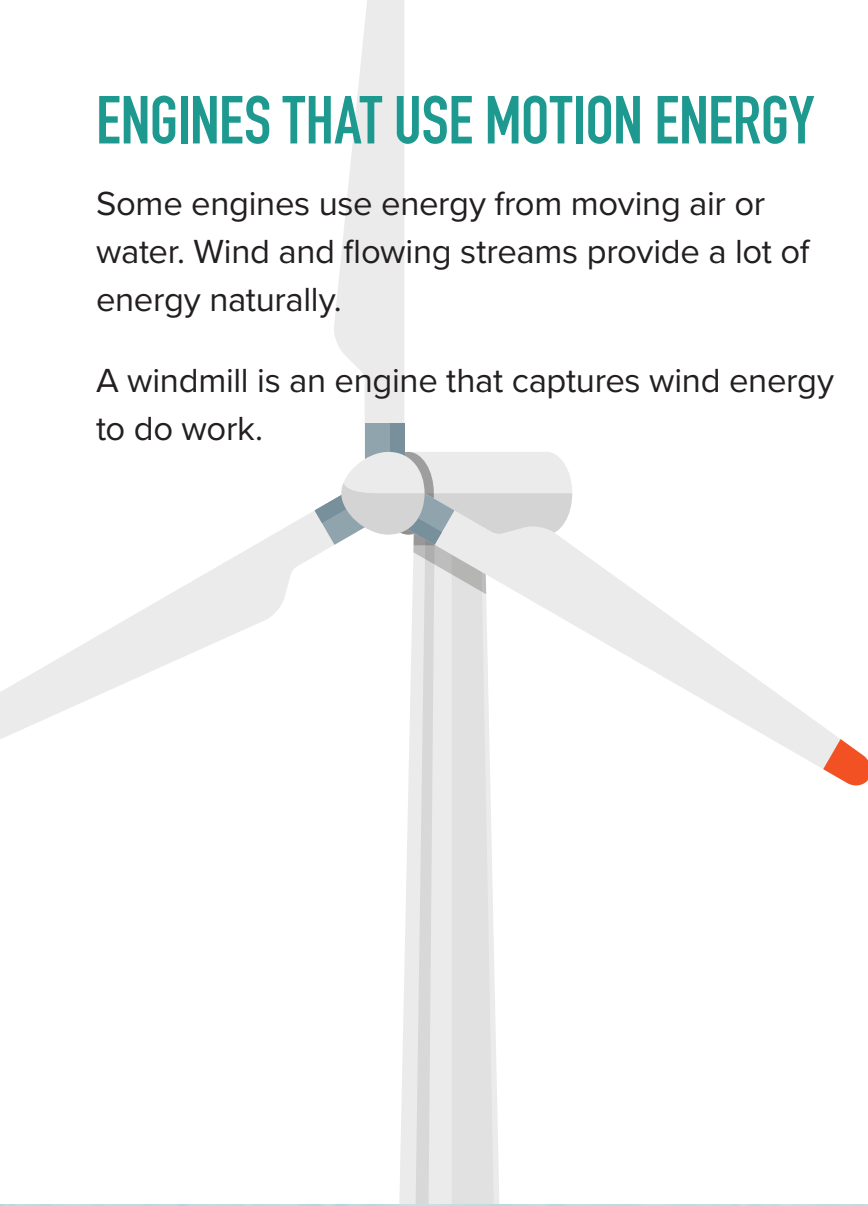


Someday you may drive a car that doesn't use gasoline or electricity as its main source of energy, but uses energy directly from sunlight!

ENGINES THAT USE MOTION ENERGY

Some engines use energy from moving air or water. Wind and flowing streams provide a lot of energy naturally.

A windmill is an engine that captures wind energy to do work.



For more than a thousand years, people used windmills to grind grain into flour.

Grain was put between two large, flat, round stones called millstones. Power from the windmill turned one of them.

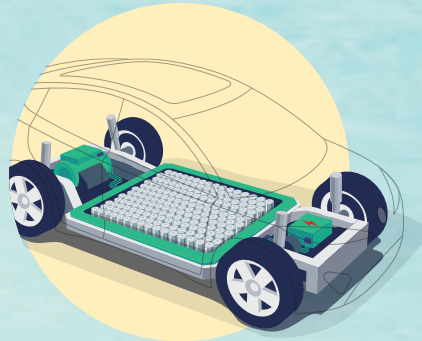
This crushed the grain between the two stones and turned it into flour.

ENGINES THAT USE STORED ENERGY

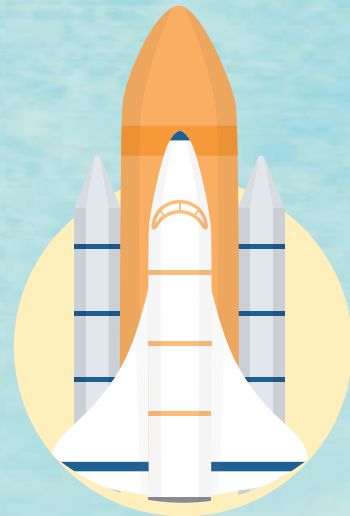
Most engines use some kind of stored energy.



A lot of cars use energy stored in gasoline.



Some use electric energy stored in batteries.



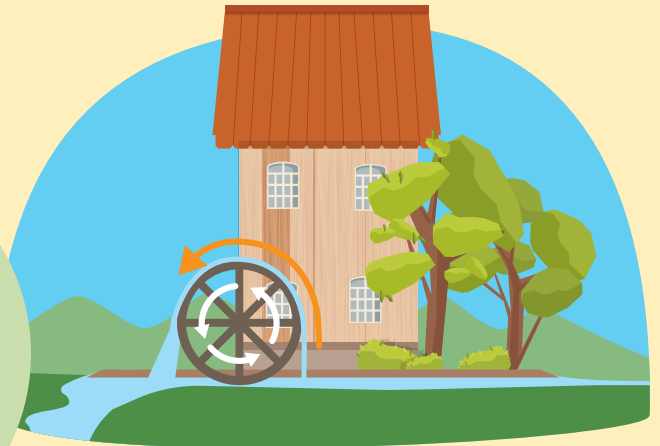
Rockets use energy stored in rocket fuel.



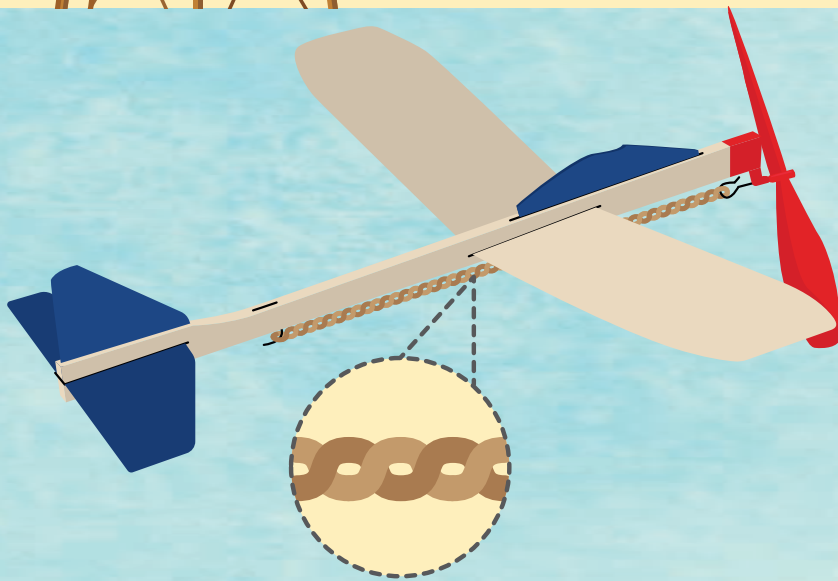
Wind energy has often been used to pump water out of the ground. Many pioneer farms had windmills to provide water for animals and people.

Just like windmills, water wheels were often used to grind grain. They were also used in sawmills to cut huge logs into lumber.

Another engine that has been used for thousands of years is a water wheel. This is a large wheel with paddles or blades. Running water, such as a stream or waterfall, pushed on the paddles and this turned the wheel.



Through a lot of human history, windmills and water wheels have been important engines that run on motion energy found in nature.



You can make or buy a simple toy airplane with an engine that runs on stored energy from a rubber band.

The rubber band is hooked to a propeller. You wind the propeller up by turning it with your finger. As you do this, the rubber band twists and stores up energy from the movement of your hand.

When you let go of the propeller, the rubber band quickly unwinds. This makes

the propeller spin and it pulls the plane through the air. The rubber band is the airplane's engine.

You can make your own rubber band engine for a toy helicopter. To find out how, just turn the page!



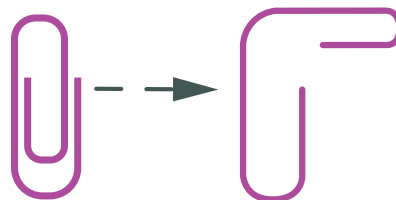
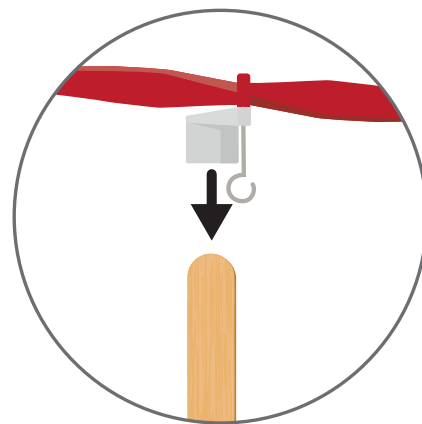
RUBBER BAND HELICOPTER

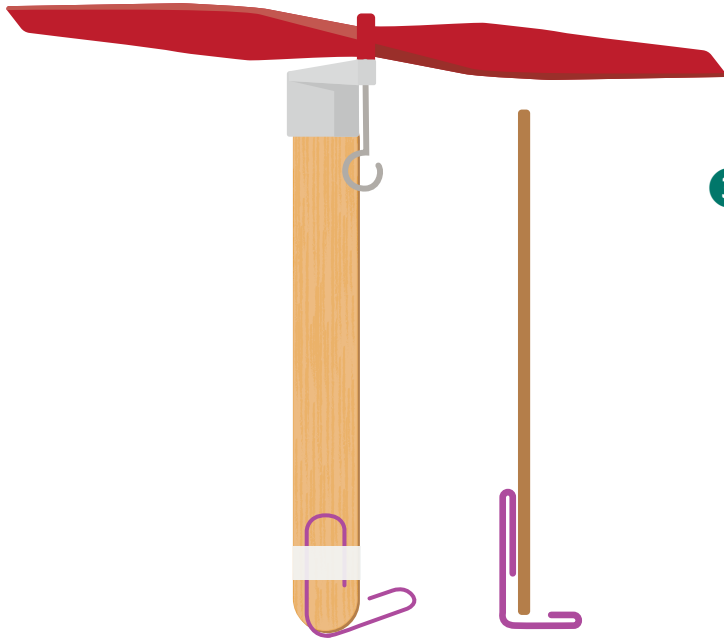
For this activity you will need

- 1 rubber band helicopter kit
or
1 rubber band helicopter propeller
- 2 rubber bands – 3 ½ x ⅛ inch (size #33)
- 1 popsicle/craft stick
- 1 regular size plastic wrapped paper clip
- file folder or similar stiff paper
- plain white paper
- tape

Steps

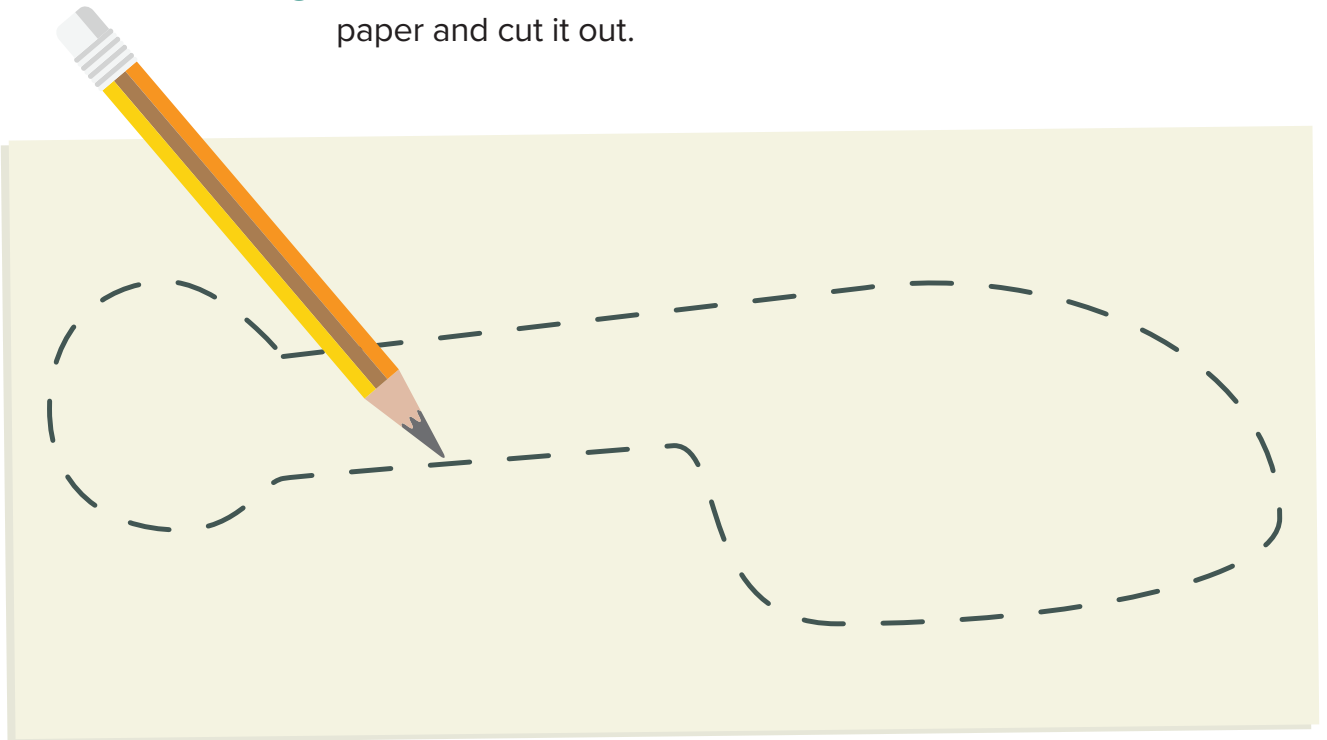
- 1 Fit the propeller onto one end of the craft stick.
- 2 Unfold the paper clip until it looks like this





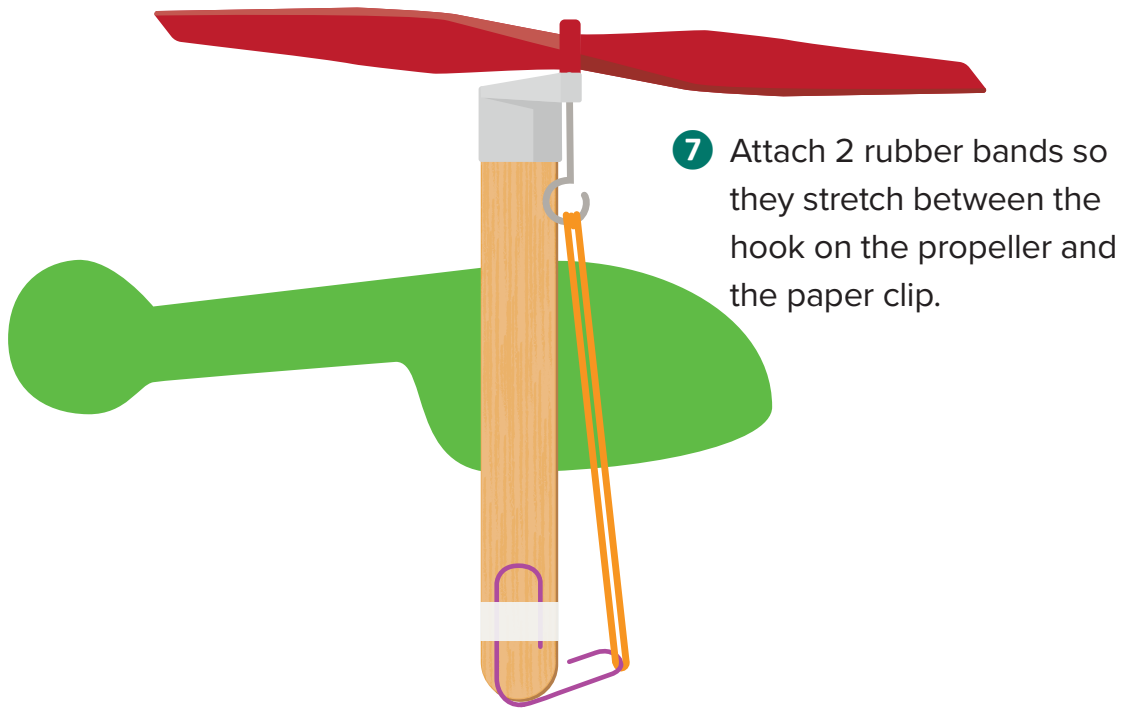
- 3 Attach the larger half of the paper clip to the other end of the craft stick with tape. Make sure it is securely attached. The smaller end of the paper clip should stick out and make a hook.

- 4 Trace the helicopter body onto plain white paper and cut it out.



- 5 Use your cut-out shape to trace the helicopter body onto a file folder or piece of stiff paper, then cut it out.

- 6 Tape the helicopter body to the craft stick near the propeller end. Make sure the helicopter body and the paper clip hook are on opposite sides of the craft stick.



- 8 Hold the paper clip and wind the propeller in a clockwise direction. Keep winding until the rubber band starts to coil tightly on itself.
- 9 Hold the top of the propeller in one hand and the bottom of the craft stick in the other.

- 10 Let go of the propeller first and then the craft stick. You can say “top, bottom” as you let go to help you remember.
- 11 Did it fly? How high?
- 12 (Optional) Experiment with different shapes or material for your helicopter to see if you can improve how high it goes or how well it flies.
- 13 Tell (or write up for) another person what makes your helicopter an engine, and explain what energy changes you observed in this activity and what happened.