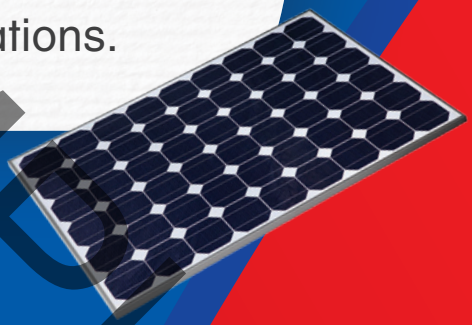
Powered by the Sun

The sun is a ball of energy. All life gets its energy from the sun. But we also use the sun to create and power awesome innovations.



The Natural World

Smithsonian

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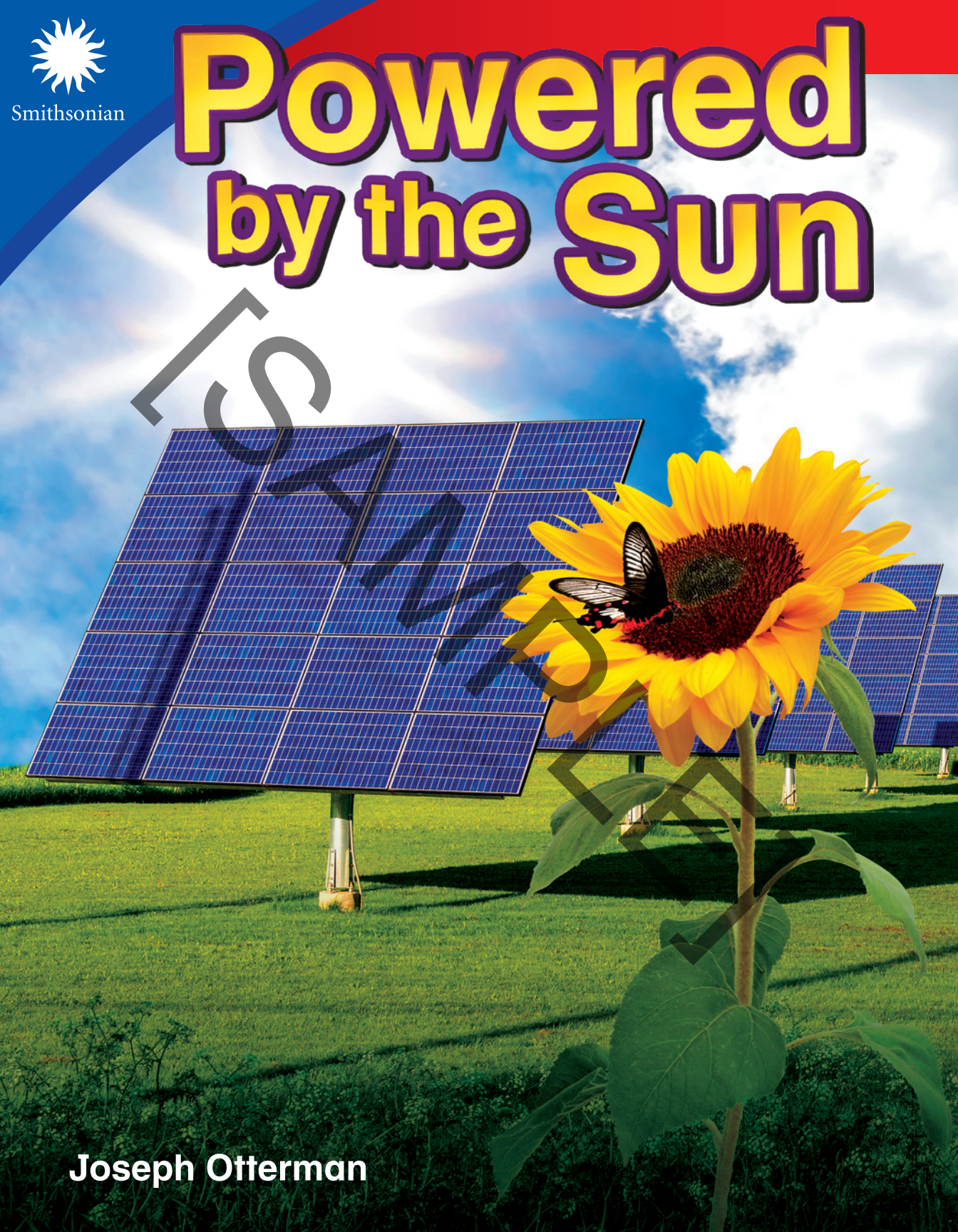
Smithsonian
Powered by the Sun
Joseph Otterman
SAMPLE

Think and Do

1. Why is the sun important?

2. What might happen if we did not have the sun?

Powered by the Sun

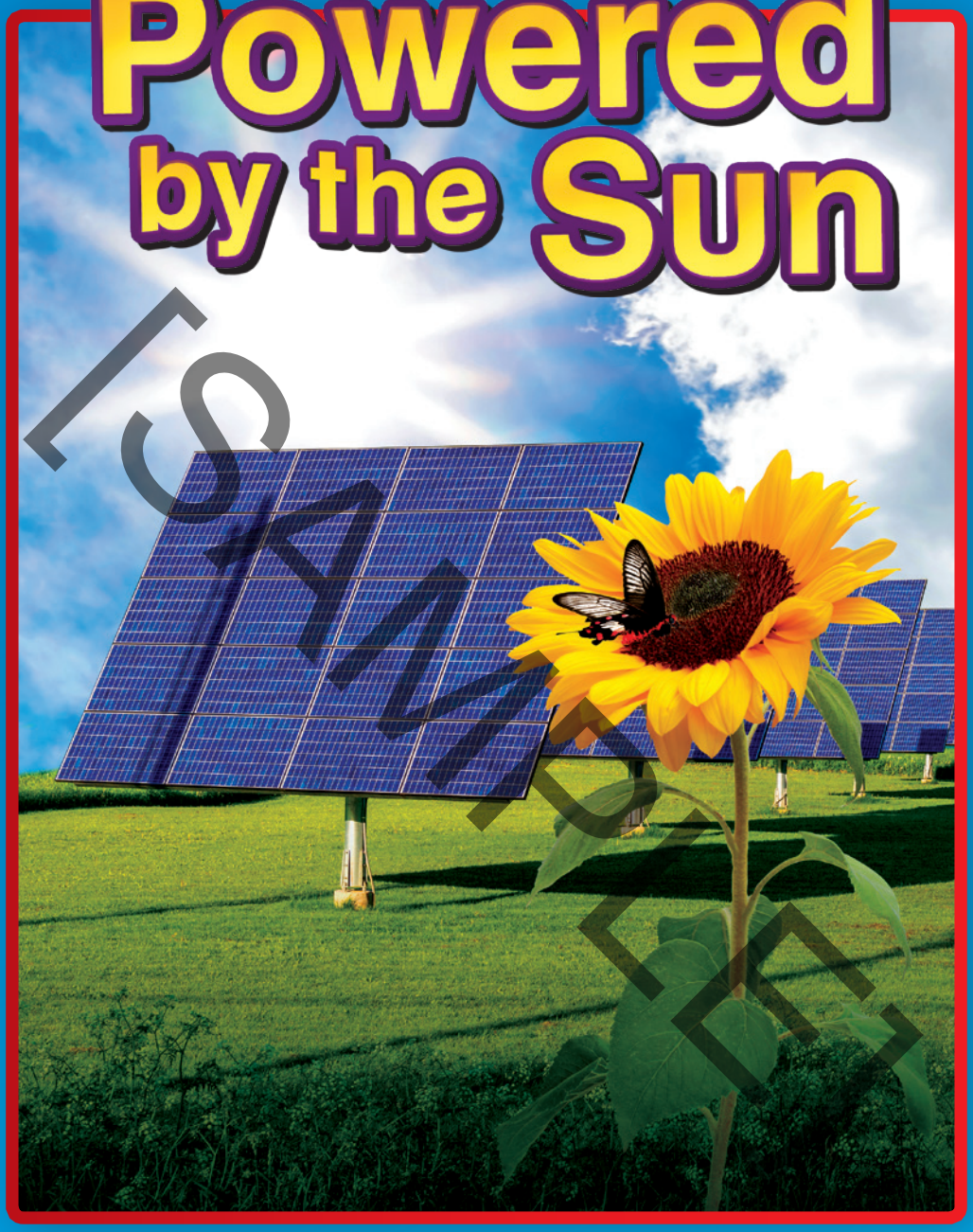

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Table of Contents

Let the Sun Shine In

Life on Earth exists because of the sun. Living things get energy from it. We get heat and light. We cannot live without the sun.

This drawing shows the sun, Earth, and Earth's moon.

The sun also helps people form their best ideas. People study the sun. They test its energy. They watch how living things act in sunlight. Then, they use what they learn to create new things.

The Solar Wall shows how the sun's surface looks.

This scientist checks that these plants get enough sunlight.

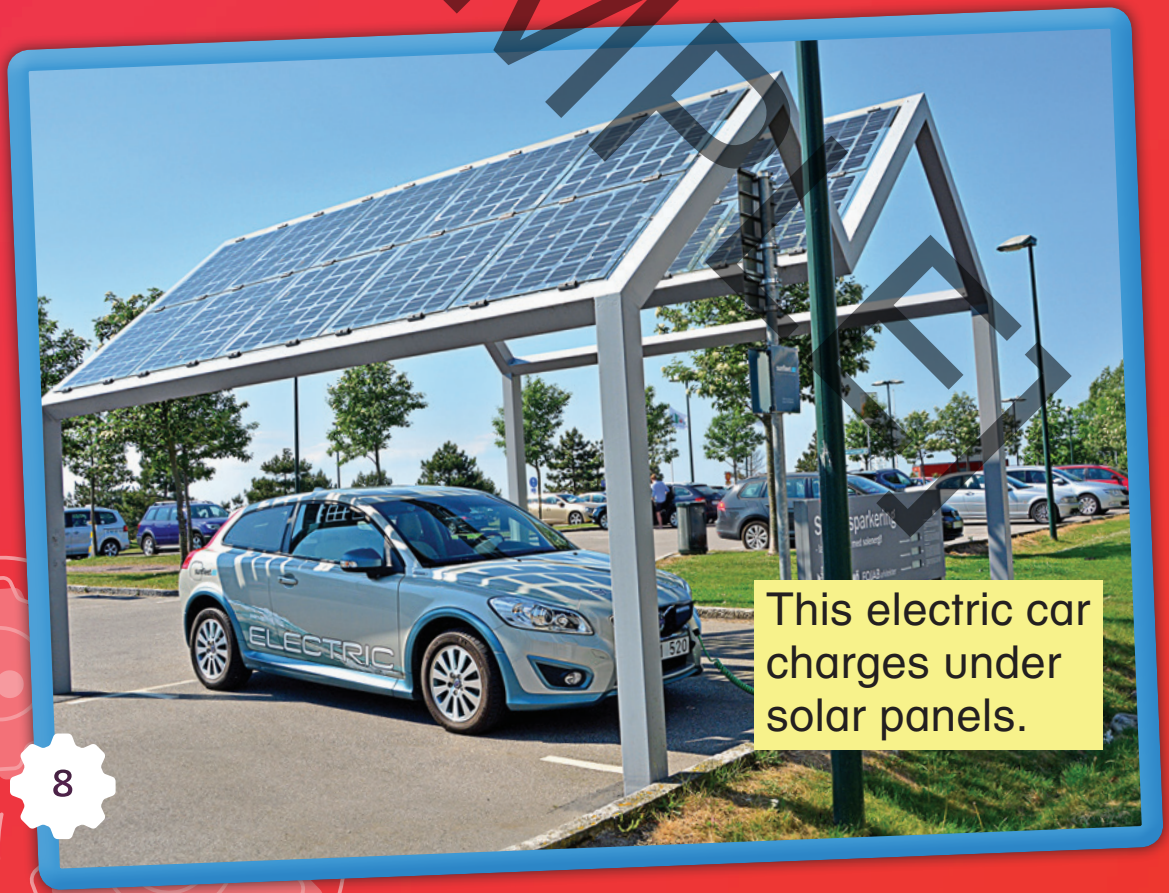
Engineering & Arts

In the Bag

This backpack looks like a normal bag. But it has a **solar panel** in it. The panel gets power from the sun. The power can be used to charge a phone.

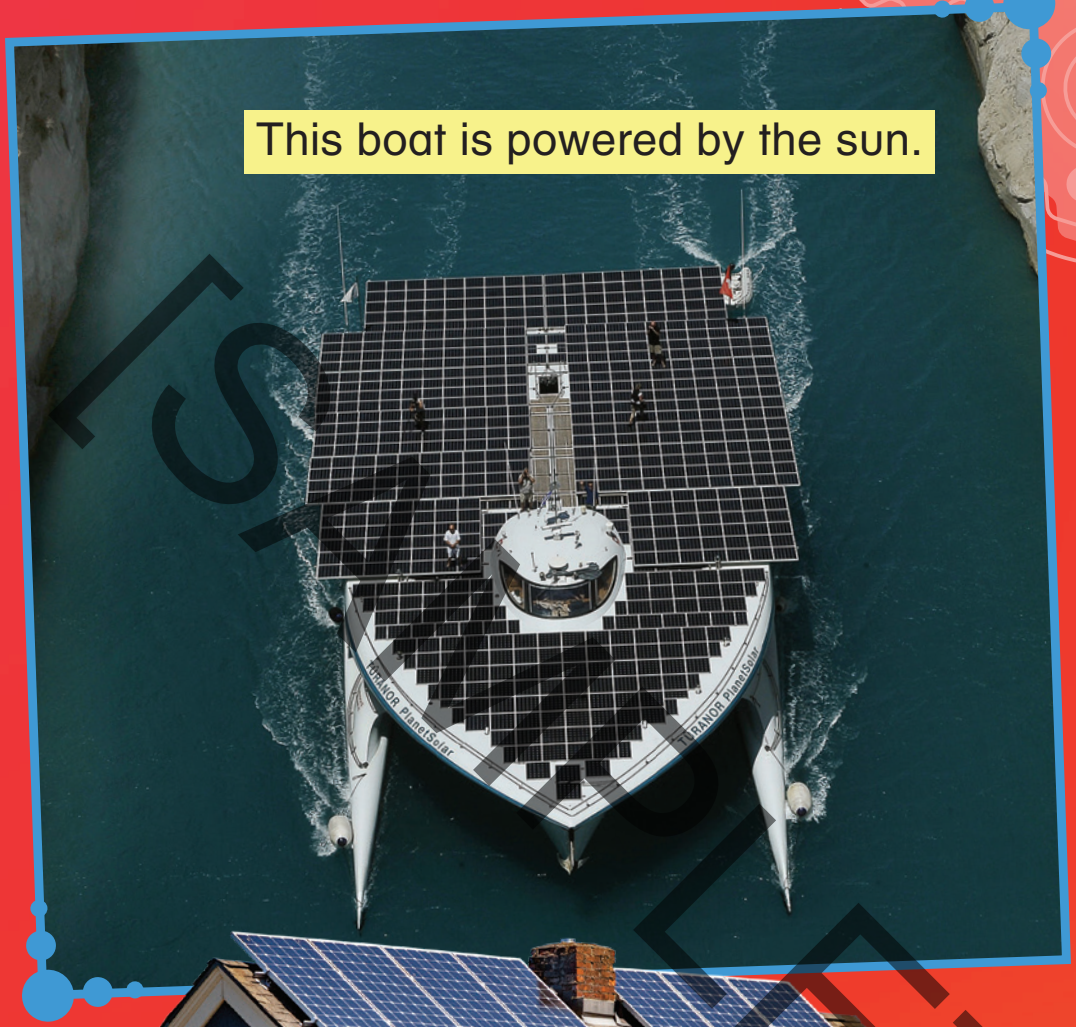
Innovations

Many things have come from studying the sun. People call these things *innovations*. They are new ways of doing things. They make life easier.



This electric car charges under solar panels.

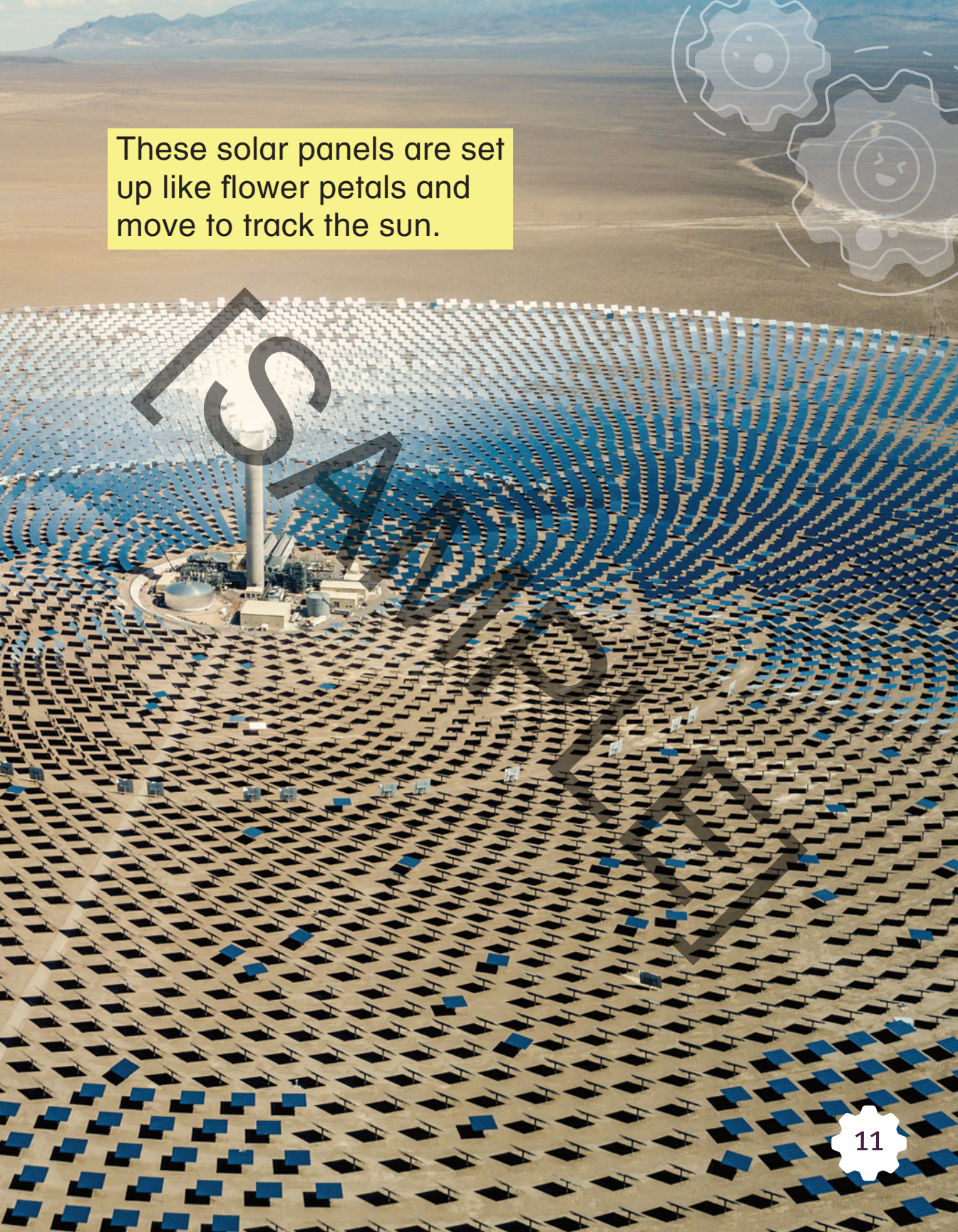
This boat is powered by the sun.



Sunflowers

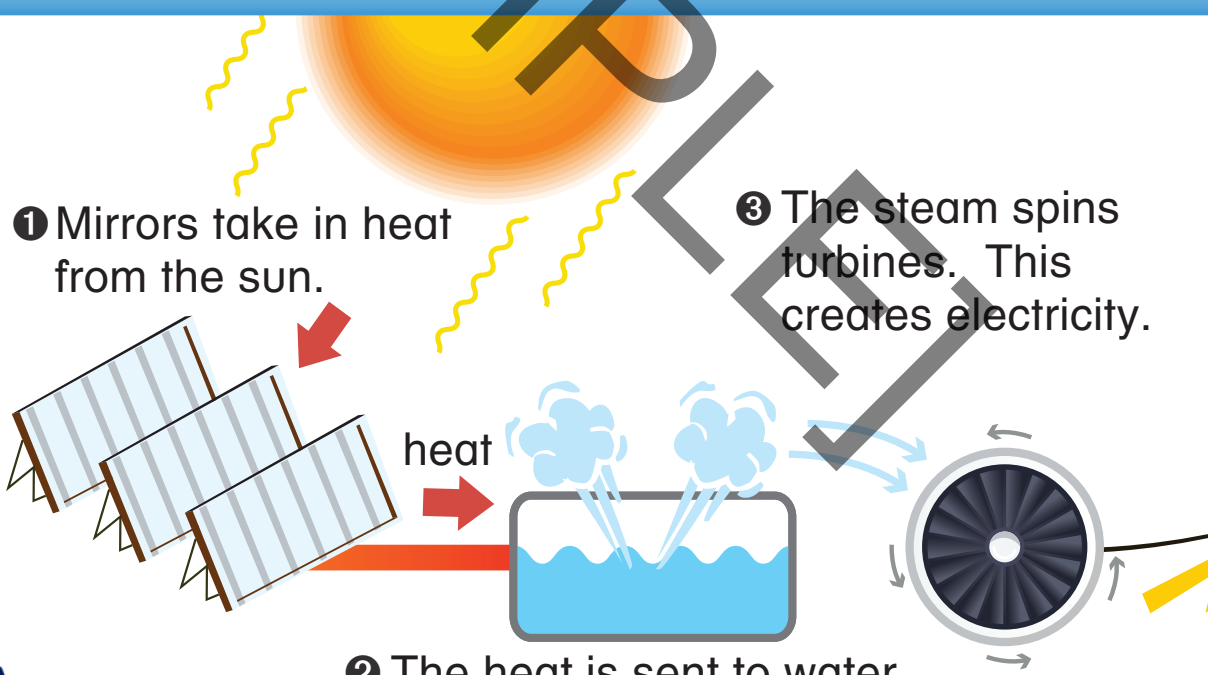
Sunflowers face the sun as they grow. They get more energy that way.

People have set up mirrors like sunflower petals. The mirrors take in solar power. They also move to track the sun.

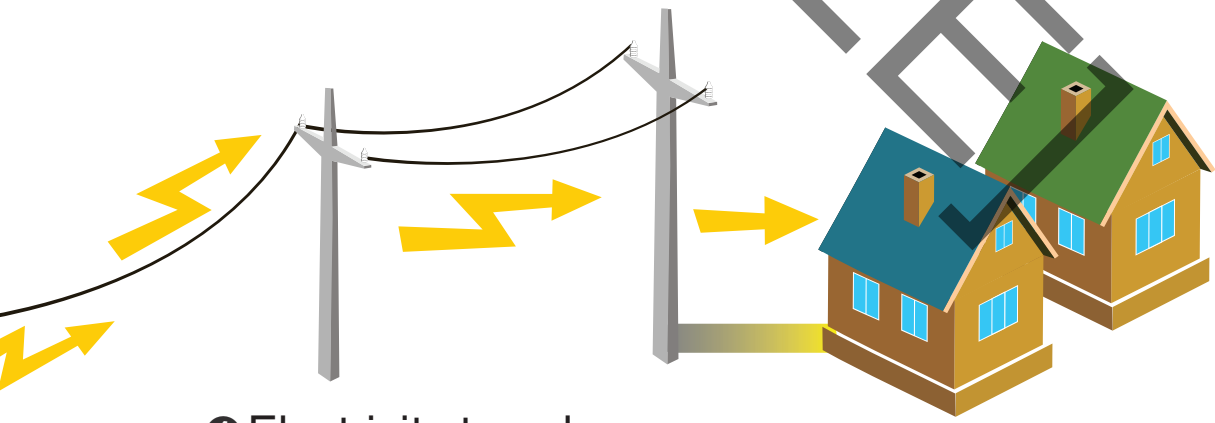

These solar panels are set up like flower petals and move to track the sun.

Electricity

We have learned to gather energy from the sun. We can use it to make steam. The steam spins **turbines**. Their motion makes **electricity**. It all starts with the sun!



❺ Homes receive electricity.



❹ Electricity travels on power lines.

Solar Oven

The sun gives off a lot of heat. People have learned to cook with it. They just need a solar oven. People can buy or make a solar oven easily. It does not cook quickly, but it does cook well!

This solar oven cooks a pot of rice.

This solar oven is heating water to make coffee.

Technology

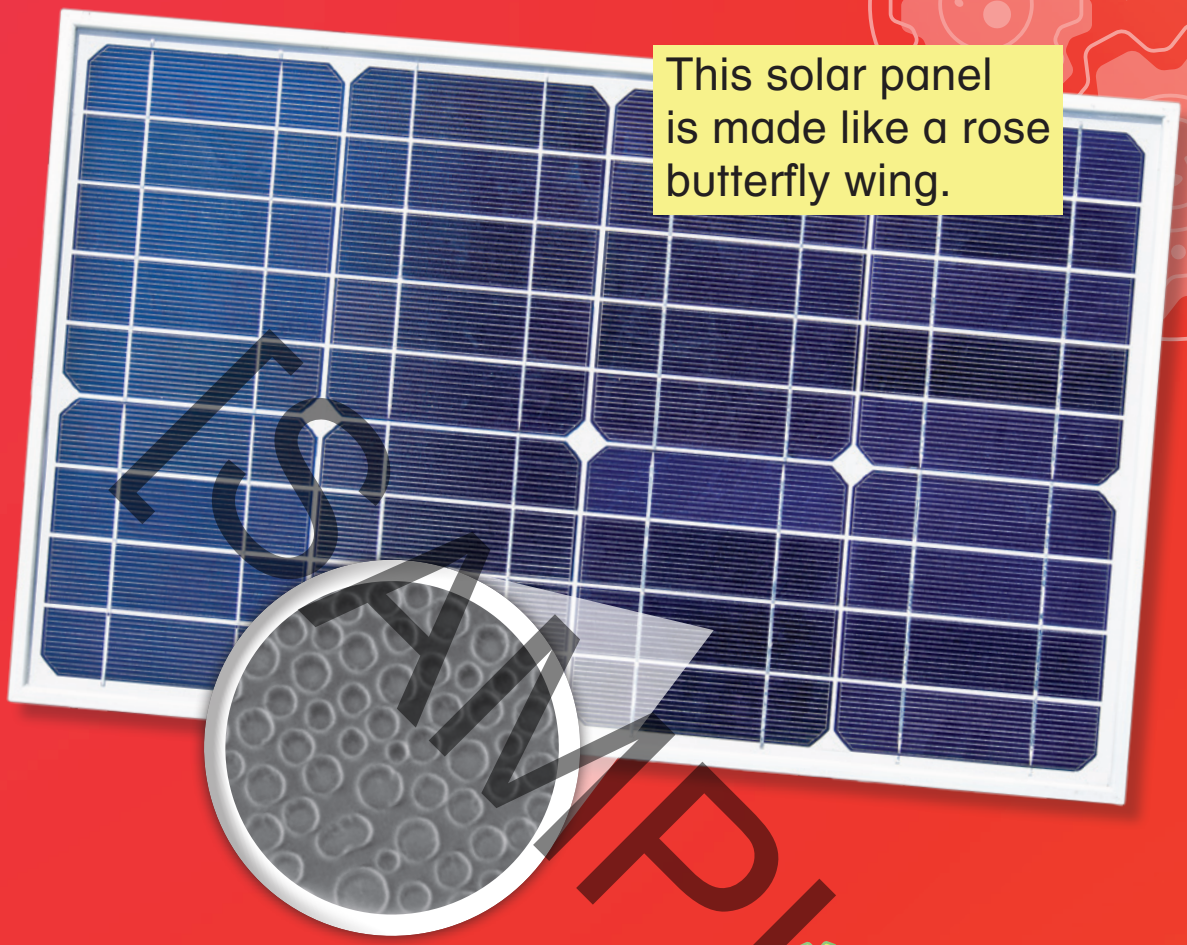
Solar Tea

Iced tea drinkers do not need a stove to brew tea. The sun's heat can be used. It works through a closed glass container. Just add tea bags, and the sun brews the tea!

Butterfly Wings

The rose butterfly is black. Its thin wings grab energy from the sun. Some solar panels are made like the wings. They are thin but mighty. They take in energy with ease.

rose butterfly



This solar panel is made like a rose butterfly wing.

Science & Mathematics

The Eyes Have It

Some insects have eyes with many **lenses**. There are solar panels made like this. The shapes of the panels let people pack them together. Solar panels like this are strong.

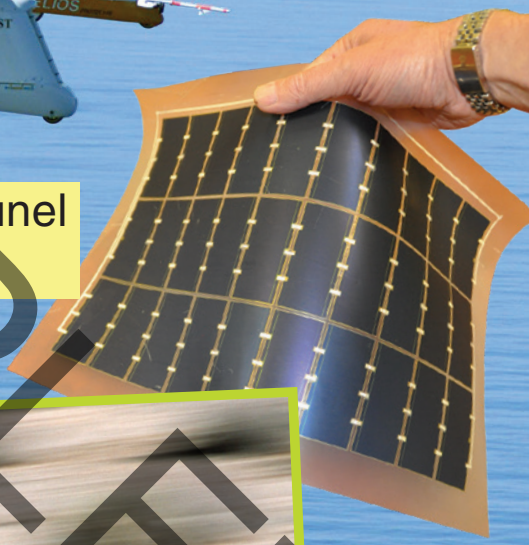
Under the Sun

People can do many things with energy from the sun. Who knows what great things each new day will bring? Shine on, sun!

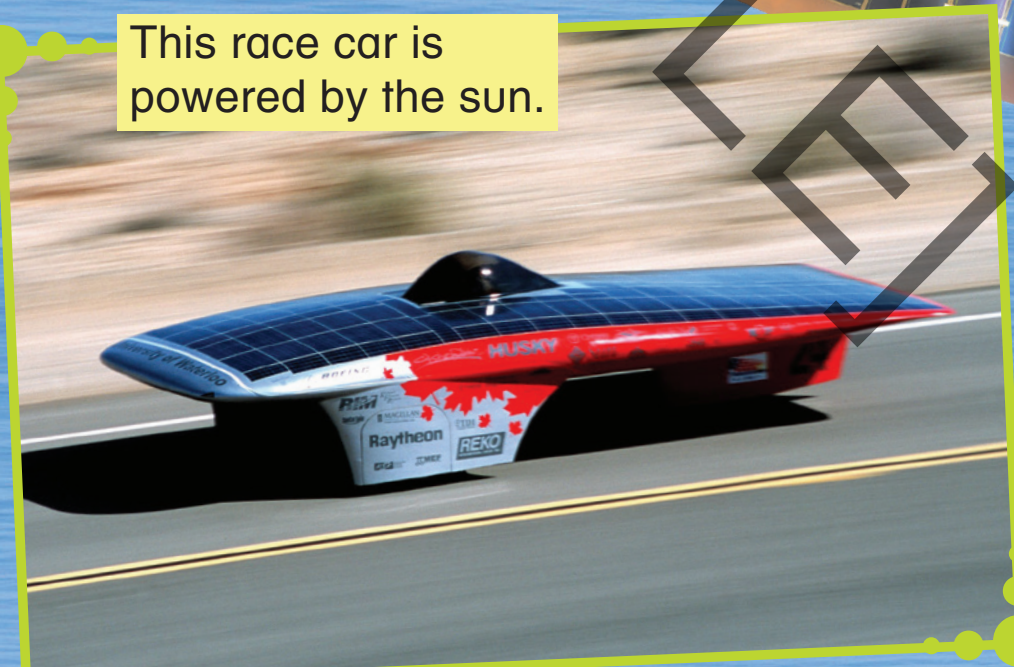
This woman checks food she has grown with energy from the sun.

This aircraft is powered by the sun.

This solar panel can bend.



This race car is powered by the sun.



STEAM CHALLENGE

The Problem

Your art class is stuck with broken crayon pieces. Your job is to make new crayons by melting and mixing the old bits. You must use the sun to make it happen. What will you do?

The Goals

- Create a device that will use the sun to melt crayons together.
- Create an area in your device that can hold the crayons.
- Create your device with any supplies. A box, aluminum foil, and plastic wrap might be helpful.

Research and Brainstorm

What is the best way to melt crayons in the sun? How long does it take for crayons to melt?

Design and Build

Draw your plan. How will it work? What materials will you use? Build your device. Be careful not to burn yourself!

Test and Improve

Remove the paper from the crayons. Place the crayons in your device. Place your device outside. Do the crayons melt and blend? Can you make it better? Try again.

Reflect and Share

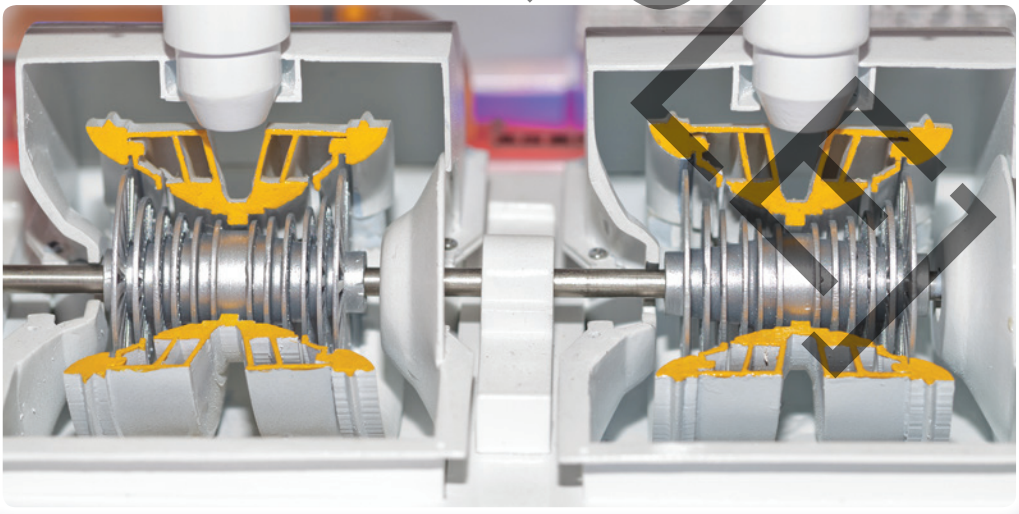
How many pieces melted? Do some colors melt faster than other colors? Do the new crayon blends work well?

Glossary

electricity

lenses

solar panel



turbines

Career Advice
from Smithsonian

Do you want to use the sun to power innovations? Here are some tips to get you started.

"Think of new ideas that could help people. Then, start trying to build them. If you fail, try again!" ***—Susan Tolbert, Curator***

"Creativity and problem solving are important parts of STEAM! If you want to design and power innovations, you must never give up!" ***—Mike Hulslander, How Things Fly Gallery Manager***