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Build a renewable energy device

Glossary:

Conservation: prevent the wasteful use of a resource

Fossil Fuels: formed from ancient plant and animal remains buried deep inside Earth millions of years ago

Matter: everything around you. Matter can be a solid like people or rocks. It can be a liquid like water or juice or it can be a gas like air

Mining: removing materials such as oil, coal, gas, minerals, stone and metals from the Earth

Non-renewable energy: fossil fuels like coal, oil, and natural gas

Renewable energy: energy sources that are not used up. Examples include solar power from the sun, wind, and water

THE ADVENTURES OF Spriggy & Twiggy

Spriggy and Twiggy are Sprowteez. They live with their Sprowtee friends on Sprowt Island. They are clever, funny and kind little scientists and always very curious...

As Spriggy chopped wood for the new tree house they were building, Twiggy nailed the pieces together.



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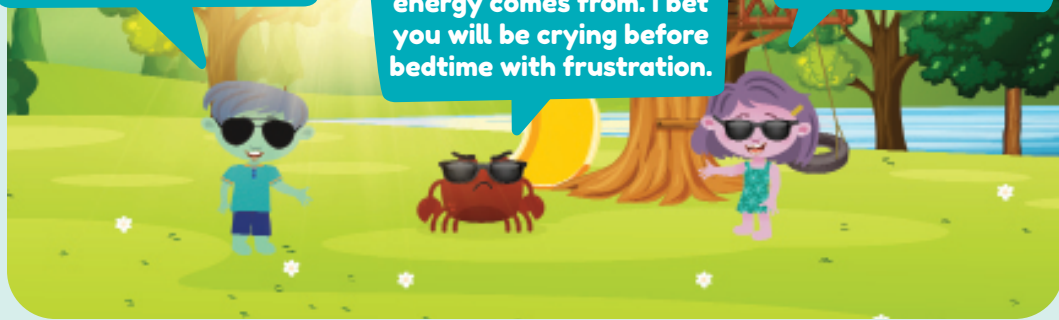
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Awesome idea Crabby! I want to understand where energy comes from. It must come from our Earth – or maybe even the sun – in some way.

As if! You scientist Sprowteez think you are so smart. I dare you to try and discover where energy comes from. I bet you will be crying before bedtime with frustration.

All right Crabby. We accept your challenge. We like things that get us thinking and learning in new ways. It's fun!



Fun??!! How can you possibly think science, technology and engineering are fun? I'm outta here. You Sprowteez are boring. I'm going to go do something that actually is fun – like taking a long nap on my rock.



All this talk got Spriggy thinking. As he looked around him, he realized that all living things need water, air and resources from the land. Sprowteez need soil and water to grow food, wood from trees to build houses, and energy to warm their homes, turn on lights, and cook.

I just realized that when we cut down the tree to build our tree house, the birds and squirrels that lived here lost their home. I wonder if, when we use energy, it affects our planet and life on Earth too?

Golly – you're right Spriggy. I didn't think about that. All living things need water, air and resources from the land or ocean.



Why don't we explore together? We can try and figure out where energy comes from and what happens when we use it.

Super awesome idea Twiggy! Let's do it!



Woo – hoo! Spriggy and Twiggy want to uncover the mystery of energy with you! Join Spriggy and Twiggy as they discover where energy comes from and how it affects life on Earth.



THE SPROWTEEZ ASK: WHAT IS Energy?

Energy is the ability to do work. Energy makes things move and living things grow.

People and other animals get energy from food. If you're like Spriggy and Twiggy, you've probably heard people say, "you've got a lot of energy!"



PREDICT IT

Think of a plant at night and during the day. Would day or night provide the plant with the most energy? Why?



WATCH IT! Discover how plants turn sunlight into food.

<http://tiny.cc/iSprowt-plant-eat>



BUT HOW DO NON-LIVING THINGS GET ENERGY? HAVE YOU EVER WONDERED:

- What makes our stove heat up?
- What makes our car drive?
- What makes our lights turn on?
- What makes our computer turn on?



SPRIGGY DISCOVERS 2 CATEGORIES OF ENERGY

There are 2 types of energy: renewable and non-renewable.

RENEWABLE ENERGY ENERGY THAT CANNOT BE USED UP. IT CAN BE USED OVER AND OVER AGAIN. THERE ARE MANY TYPES OF RENEWABLE ENERGY, BUT THE THREE MOST COMMON ARE:

- Sun (called solar energy)
- Wind
- Water



DRAW OR WRITE

Can you find examples of renewable energy in your community? What are they?

NON-RENEWABLE ENERGY ENERGY THAT IS IN LIMITED SUPPLY AND COMES FROM DEEP INSIDE THE EARTH. EXAMPLES OF NON-RENEWABLE ENERGY ARE:

- Oil
- Coal
- Natural gas



DRAW OR WRITE

Can you think of a way we use non-renewable energy?

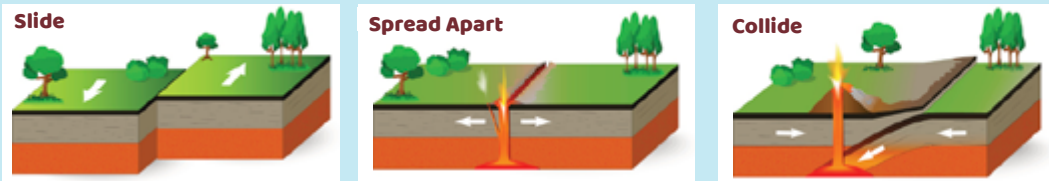
Non-Renewable energy comes from fossil fuels. Once they are used up, they can not be used again.

DID YOU SAY FOSSIL?

Yep – fossils! Fossil fuels were formed from plants and animals that died 15 – 600 million years ago – before the age of dinosaurs and when land was surrounded by ocean. During this time, our continents were in different places, land was covered with swamps, and very simple living things lived in the water and on land.

Our Continents Are On the Move!

Earth's crust is made up of giant puzzle pieces called Plates. Plates slide apart, spread apart, and collide. When plates collide into each other, they get pushed up and become tall mountains and volcanoes.



HOW OIL AND NATURAL GAS FORMED

As our earth's plates move, they change the shape of our oceans and continents. Plates move about as fast as your fingernails grow. This movement creates a tremendous amount of heat and pressure.

Check out how much our continents have moved over the last 225 million years!

EARTH'S PUZZLE PIECES HAVE LOOKED LIKE THIS



225 million years ago



150 million years ago



100 million years ago



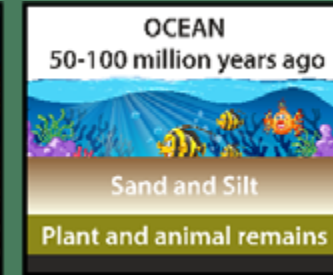
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HOW FOSSIL FUELS WERE FORMED

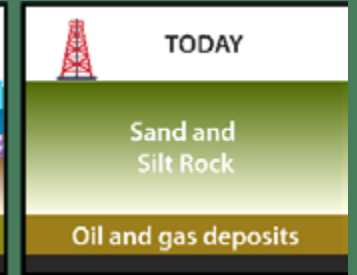
HOW OIL AND NATURAL GAS FORMED



Sea plants and animals died and were buried in the ocean floor. Over time they were covered by layers of silt and sand.



These remains were buried deeper and deeper over millions of years. Tremendous heat and pressure turned them into oil and gas.



To reach the oil and gas deposits, engineers drill down through layers of sand, silt and rock.

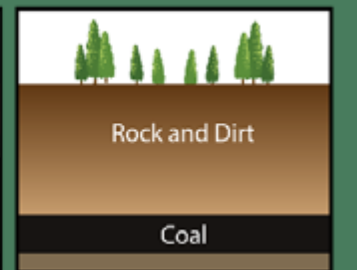
HOW COAL FORMED



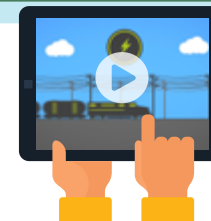
Before the age of dinosaurs, giant plants lived and died in swamps.



These plants were buried under water and dirt for millions of years. Heat and pressure turned the dead plants into coal.



To reach the coal, engineers mine the coal which is sometimes found near the surface of the Earth and sometimes deep underground.



WATCH IT! How Fossil Fuels were formed:

<http://tiny.cc/iSprowt-Fossil-Fuels>



Experiment: Twiggy's Toilet Bomb Fizzy

Toilet Time Fun! Simply plop a Toilet Bomb Fizzy into your toilet and watch it bubble and clean.

GET READY
✓

WHAT YOU NEED:

- ✦ Butterfly and bear molds
- ✦ Blue sodium bicarbonate
- ✦ White citric acid
- ✦ Lemon essential oil and soap
- ✦ Bowl and plate



 15 MINUTES

LET'S DO IT

1. Mix blue sodium bicarbonate and white citric acid in bowl.
2. Add in lemon essential oil.
3. Mix together using your hands or spoon. Your mixture should feel like damp sand.
4. Fill your molds over a disposable plate for easy clean up.
5. Press the mixture firmly into mold, just like you are building a sand castle.
6. Wipe away any extra mixture.
7. Tip: If you use too much liquid dish soap, your Toilet Fizzy will expand. That is okay. Just let it expand for a few moments, then wipe away any extra with your finger.
8. Let dry for at least 24 hours.
9. Once completely dry, gently and carefully remove the fizzy from your mold and store in an airtight container.
10. To use: Simply plop a toilet fizzy into your toilet bowl. Watch it slowly fizz and clean.
11. Observe immediately and 5 minutes later.



How are Toilet Bomb Fizzies Similar to Non-Renewable Energy?

Oil, natural gas, and coal come from fossils. The fossils are like the chemicals used to make your Toilet Bomb Fizzy. There is only a limited amount. This is like when we use oil or natural gas. Once we put these in our cars or use them for energy, we do not get to reuse them.



However, you can reuse your molds to make lots of different things, it doesn't get "used up." Being able to reuse is similar to energy being renewable, neither one gets "used up."



What's the Difference Between Reuse & Renewable?

Reuse and renewable are similar but different. Reuse means you can use the same thing over again. Your molds are re-usable. Renewable energy does not get reused - but it also doesn't get used up. It sounds like a brain twister, doesn't it? But let's think of rays of sunshine as an example. We cannot reuse a sun's rays, but they continue to be available whenever the sun shines. Sun rays are _____.



If you said, renewable - you were right! Great job!

BRAIN BREAK!

