



**Regina
Catholic Schools**

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CARBON CAPTURE

GRADE 3



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Grade 3 Author

Elizabeth Stephenson

St. Mary School

Project Team

Heather Haynes

Miller Comprehensive High School

Leah Maier

Archbishop M.C. O'Neill High School

Paul Owens

St. Jerome School

Christine Treptau

St. Gabriel School

Mark Wernikowski

Archbishop M.C. O'Neill High School

Project Consultant

Donna Ell

Regina Catholic School Division

These materials have been externally peer reviewed by

Kirsty Anderson

Global Carbon Capture and Storage Institute

Grade 3

Outcomes

PL3.2 Analyze the interdependence among plants, individuals, society, and the environment.

Indicators

- i. Defend a position related to plant use (e.g., picking plants, harvesting crops, fertilizing, and planting invasive species) and protection (e.g., establishing conservation areas, planting native species, and developing alternatives to plant-based products).
- j. Imagine a world without plants and describe the impact on animals, people, and the environment.

Lesson intro (background for teachers)

This is a basic introduction to the Carbon Capture concept. One thing that is important for the students to understand is that the fossil fuels (coal, oil and gas) that we burn for electricity comes from plants that died millions of years ago. In a way, we depend on plants that lived long ago to provide us with electricity.

In these lessons, the students will investigate how burning those plants affects our environment, and how Carbon Capture and Storage technology can help deal with some of these effects on the environment. We will also investigate how plants clean our air naturally, but that when trees are cut down, it decreases our air quality.

Activities

1. Read the worksheet with the students, and complete the questions.
2. Show the powerpoint and complete last 8 questions.
3. Do Mimio interactive activity with the students.

Answer key

Diagrams



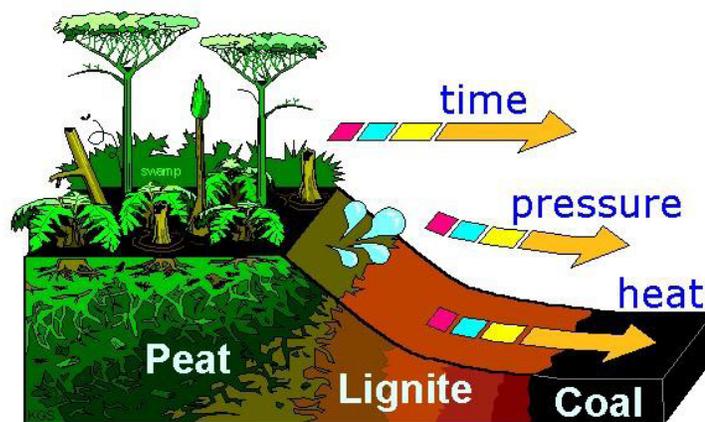
Answers to powerpoint questions

1. Atmosphere
2. Carbon dioxide
3. Fossil fuels, trees, metals
4. Hot
5. Extreme weather, spread of disease, smog, droughts (choose one)
6. Turning on lights, using computers, driving cars, etc.
7. Deep underground
8. Pollution

How do plants help clean the air when we burn fossil fuels?

What are fossil fuels?

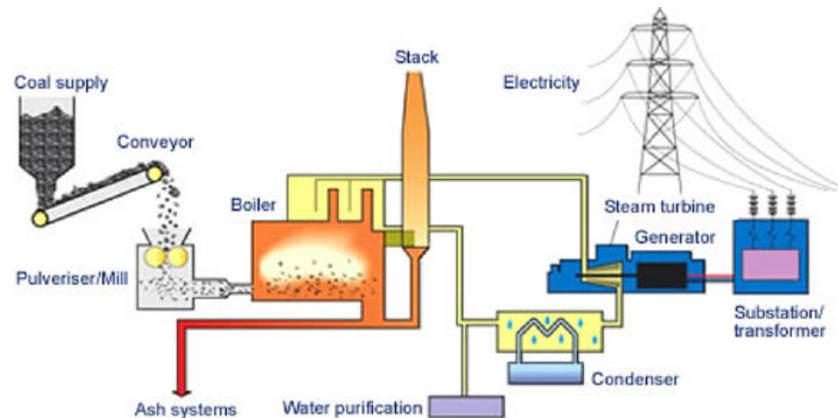
Fossil fuel is the name given to coal, oil and gas. These are sources of energy found under the Earth's surface, that were formed over millions of years when dead plants and (for oil and gas) tiny bugs and insects sunk into the Earth and over time layers of rock and earth built up on top of them. After years trapped inside the rocks under pressure, the dead plants and insects turned into different types of fossil fuels. Coal is a rock made up of old decayed plants, oil and natural gas are a liquid and a gas made up of old decayed plants and tiny insects that got trapped inside tiny holes in the rocks underground. Fossil fuels are combustible, which means that can burn. When we burn fossil fuels it gives us lots of energy.



<http://www.ildceo.net/NR/rdonlyres/7835F94C-D524-4919-B4F3-385F4C5B9391/0/PlantstoCoallessonwithactivities.pdf>

Why do we burn coal?

We burn coal and other fossil fuels because they are full of energy. When we burn them we release that energy as heat, and we can use that heat to do things like heat up water and make a turbine and a generator spin, which turns the heat and movement energy into electricity. Look at the diagram below to see how coal can be used to make electricity.



<http://www.worldcoal.org/coal/uses-of-coal/coal-electricity/>

In Saskatchewan, 65% of our electricity comes from coal. That's a lot of electricity fueled by old plants! Just think, in a few million years, the plants that we see today may become fuel for future generations.

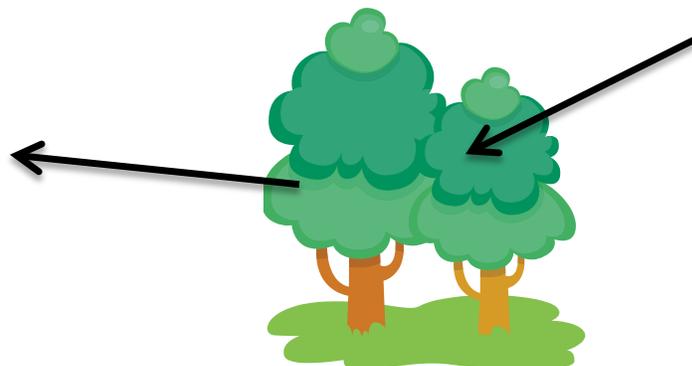
We use fossil fuels like coal quite a bit because they are easy to find, and inexpensive to mine and use. Unfortunately, when you burn fossil fuels you also make a gas called carbon dioxide.

Carbon dioxide is an important gas in our atmosphere that helps trap in some of the heat energy from the sun to keep the earth nice and warm. But if there is too much carbon dioxide in the atmosphere, it captures too much heat and causes changes in our climate.

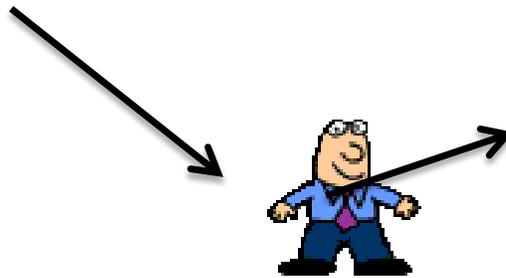
How can plants help?

Plants are very helpful to our environment. They breathe in carbon dioxide, and they breathe out oxygen. They are our perfect partner, because we breathe in (inhale) oxygen, and breathe out (exhale) CO_2 . Plants use the carbon from the carbon dioxide they breathe in to grow! They use up the carbon for us, and make sure that we have lots of oxygen to breathe.

Place the oxygen (O_2) and carbon dioxide (CO_2) in the right place to show which the plants inhale, and which the plants exhale.



Place the oxygen (O_2) and carbon dioxide (CO_2) in the right place to show which the person inhales, and which the person exhales.



This balance worked really well for thousands of years until humans started mining and burning fossil fuels like coal. Fossil fuels are mostly made out of old decayed (fossilized) plants that have been stored underground for millions of years. Over time all the carbon that the old plants had used to grow, turns into carbon-rich fossil fuels. When we burn fossil fuels we get lots of energy, but it also releases all that stored up carbon into our atmosphere. When carbon is in our atmosphere it joins up with oxygen to make carbon dioxide or CO_2 !

The new plants can't keep up with the heavy workload. Also, people have been cutting down forests, and this means there are fewer plants to absorb the CO_2 from our atmosphere.

Draw a picture of what our Earth would look like if we had no plants.

With your partner, discuss what we can do about people cutting down forests for mining, lumber, and land. Write 3 ideas you discussed.

- 1-
- 2-
- 3-

How can we help the plants?

One way that people can help the plants keep the air clean is by using Carbon Capture and Storage technology. This is a process that captures the CO₂ that is made when we burn fossil fuels like coal. It catches the CO₂ before it goes out into our atmosphere, then pipes it deep underground into special types of rock that can trap the CO₂ (just like it trapped the coal oil and gas for millions of years) so that it doesn't reach our atmosphere.

We can also help the plants by using less energy in the first place by turning off lights and appliances that we're not using. When lights are on, there is usually fossil fuels being burnt somewhere, sending more CO₂ into our air. So we should always turn things off when we're not using them to save electricity and help reduce the amount of CO₂ we put into the atmosphere.

Watch the slide show, and complete the sentences below.

1. The Earth is surrounded by an _____ that keeps us warm.
2. One gas found in the atmosphere is CO₂, or _____.
3. When people burn _____, cut down _____, or mine for _____, it adds too much CO₂ into the atmosphere.
4. If we keep polluting our Earth, it is going to get too _____.
5. If our world heats up, there will be _____.
6. One thing we use fossil fuels for is _____.
7. Carbon Capture and Storage technology takes the CO₂, and puts it _____.
8. CCS helps because there is less _____ in the air.