

Wild Dog Books

Teachers’ Notes

Carbon CloseUp

Synopsis

Carbon is one of the most important elements. It comes in a number of different forms and it is the basis of life. Carbon combines easily with other elements to make many different compounds. Carbon is in the atmosphere as carbon dioxide and plants use the carbon in carbon dioxide to make carbohydrates, which are used to build stems, trunks and roots and to store energy. We eat plants to obtain carbohydrates to get energy. The energy can also be release when stems, trunks are used as fuel and are burnt. Coal and oil are fossil fuels made from fossilized plants and organisms. We use fossil fuels to power engines, and carbon dioxide is then released back into the atmosphere. This carbon dioxide acts like a blanket and warms the Earth.

From the author

Andrew Kelly is an author, editor and publisher. He is passionate about putting the right words with the right pictures to convey complex ideas simply. He has always been fascinated by science, especially chemistry, but was never very good at adding up so he follow a word path rather than a number path, though he does have a degree in geography and a qualification in carbon accounting. He has closely followed the carbon debate over the last few years and came to the conclusion that children needed a simple introduction to carbon and the important role it plays in their lives and that this would help demystify some of the debate that was swirling around them.

Main ideas

By the end of reading this book, students should understand:

• Carbon is an element that can make many compounds.  
• It is the basis of life.  
• Plants store energy as carbohydrates.  
• We eat plants to obtain carbohydrates for energy.  
• Fossil fuels are fossilized plants and animals.  
• When carbohydrates release energy, carbon dioxide is released back into the atmosphere.  
• Carbon dioxide in the atmosphere acts like a blanket.   
• The more carbon dioxide in the atmosphere the warmer the world becomes.

Writing style

The *Close Up* series has been designed with the needs of very early readers and reluctant readers in mind. Text is succinct and simple, with no more than a few sentences on a page. The large format images relate directly to the text, so young readers have multiple entry points to engaging with the information. The series takes complex ideas and presents them simply and clearly. There is a brief glossary in the back of the book, which will aid young readers in developing the tools of research and analysis.

Photographic style

The *CloseUp* series uses photographs that bring the viewer close to the subject that is being discussed. These photographs also have the advantage that the image is static, giving the reader the opportunity to explore the image and look at the subject matter and its features in detail. The photographs are also strongly composed and clearly printed with bright strong colours to increase the appeal to visual readers. Readers can explore how photographs are used to convey messages.

Focus Questions

* What is carbon?
* What is an element?
* What is a compound?
* Why is carbon important?
* What is carbon dioxide?
* What is the atmosphere?
* What are fossil fuels?
* Where do we find fossil fuels?
* How do we use fossil fuels?
* How does this contribute to global warming

Study notes

Themes:

* •Sustainability
* Materials
* Atmosphere
* Words – descriptive, alliterative and rhyming
* Elements and compounds
* Gases and liquids and solids
* Earth’s resources are used in a number of ways.

Curriculum link: English/Creative Arts

Before reading *Carbon CloseUp*:

* Brainstorm what students know about carbon
* What is their first response when they look at the front and the back cover of the book? Are they surprised that coal and diamond are made of the same material?
* Ask the students if any one has ever used something made of carbon.
* Ask the students to look around the classroom and name items that contain carbon. [Then repeat this exercise after the students have read the book.]

Adjectives are descriptive words. What word can the students brainstorm to describe carbon? Ask the students to identify five descriptive words in the text.

Explain to the students that when you use several words in a row that begin with the same sound (cars cart carbon), you call this alliteration. How many words can they come up with that begin with an ‘k’ sound and describe carbon (cold, complex, cool, cute)? Ask them to arrange the words into phrases that relate to carbon (carpenters cut carbon, cars carry carbon).

The opposite of alliteration is rhyming. What words can they find that rhyme with carbon (ribbon, gibbon, bon-bon, con, abandon)?

Link your investigations to the National Curriculum:  
<http://www.australiancurriculum.edu.au/English/Curriculum/F-10>

Curriculum link: Science and technology:

Before reading *Carbon CloseUp*, brainstorm some of the following:

* Where might carbon be found?
* What are other names for carbon?
* What colour is carbon?

After reading *Carbon CloseUp*, ask the students to list all the things they have learnt about carbon from this book.

Ask the students to research how coal and oil are mined and transported. Coal is a solid and oil is fluid and natural gas is a gas. Ask the students to draw up a table comparing how these different states are mined and transported.

Ask the students to choose type of fossil fuel using *Carbon CloseUp* to help them. Ask them to research their chosen fuel and list four facts that they can find out.

* Where is it found?
* How do we mine it?
* How do we transport it to where we use it (train, trucks, tankers, pipelines)?
* How do we use it?
* What alternative fuels can be used instead? (This will require additional research outside the book.)

What is a fossil? Ask students to write a definition of a fossil, and then to find images of fossils on the internet. Explore the Museum of Victoria Exhibition: 600 Million Years Victoria evolving

<http://museumvictoria.com.au/melbournemuseum/discoverycentre/600-million-years/>

Examine how the element carbon mixes with other elements to make a large variety of compounds. Ask the students to find compounds that include carbon - carbohydrates are one example, and hydrocarbons are another.

Link your investigations to the National Curriculum:  
http://www.australiancurriculum.edu.au/Science/Curriculum/F-10

Curriculum link: Sustainability

Why is carbon important to life? Why does carbon have an impact on the environment? Ask the students to brainstorm/research reasons where carbon can be found in the world around them? What examples of fossil fuel can they think of? Ask them to think of what they have done today which would have used fossil fuels (say, been driven in a car, had food heated on a gas stove, turned on a light? Get them to think about why fossil fuel is a part of our lives and what the world might be like without it? Ask them to think about how we can use less fossil fuel? Did people use as much fossil fuel in the past? Ask students to create a poster outlining their findings.

Ask them to research alternatives to the fossil fuel they chose for the first poster and then to make a poster outlining these further findings.

Ask the students to consider how carbon is linked in a cycle (from atmosphere to plant to animal to fossil fuel and then back into the atmosphere). Ask them to draw a diagram of the carbon cycle. [References can be found on the internet and here is one link - <http://en.wikipedia.org/wiki/File:Carbon_cycle-cute_diagram.svg>]

Ask the students to collect newspaper articles for one week that talk about carbon.

Link your investigations to the National Curriculum:

<http://www.australiancurriculum.edu.au/CrossCurriculumPriorities/Sustainability>

Marketing and promotion

*Carbon CloseUp* is part of the *CloseUp* series, which includes *Snakes CloseUp, Mini-Beasts CloseUp, Crocs CloseUp, Spiders CloseUp, Wolves CloseUp, Human Body CloseUp, Elephants CloseUp* and *Sharks CloseUp*. The most recent additions to the series are *Rhinos CloseUp* and *Polar Bears CloseUp* Future titles in the series are planned.