

Knowledge box 1



Geography Plus: Little Blue Planet

These knowledge boxes provide background information for teachers to help develop knowledge for teaching about *Little Blue Planet*. For lots more useful sources of information, along with recommended storybooks for pupils' reading, have a look at the **Useful information: weblinks, storybooks and references** sheet. Make sure you have a look at the 'Notes' on the PowerPoints as well; they offer useful snippets of information and questions for your pupils.

Lesson 1: Earth view

The digital image shown on slides 2 and 3 of **PowerPoint 1** is a spectacular picture of the western hemisphere. It was generated by researchers at NASA's Goddard Space Flight Centre using data from three different Earth-observing satellites. Their goal was to assemble an image that recreates the impact of viewing Earth from space with human eyes.

It shows one of the strongest hurricanes ever observed in the Eastern Pacific – Hurricane Linda. Other obvious features include the shallow waters of the Caribbean and sediments around the mouth of the Amazon River.

The underlying image of the full disk of Earth and its clouds was taken on 9 September 1997 by a Geostationary Operational Environmental Satellite. The ocean data was collected in late September and early October 1997 and the land colour is portrayed by a vegetation index calculated using data collected 9–19 September 1997 by instruments carried aboard a Polar Orbiting Environmental Satellite.

(NASA, 2006. For more information see http://visibleearth.nasa.gov/view_rec.php?id=174)



Photo: NASA image created by Reto Stockli with the help of Alan Nelson, under the leadership of Fritz Hasler – see http://visibleearth.nasa.gov/view_rec.php?id=174

Knowledge box 2



Geography Plus: Little Blue Planet

These knowledge boxes provide background information for teachers to help develop knowledge for teaching about *Little Blue Planet*. For lots more useful sources of information, along with recommended storybooks for pupils' reading, have a look at the **Useful information: weblinks, storybooks and references** sheet. Make sure you have a look at the 'Notes' on the PowerPoints as well; they offer useful snippets of information and questions for your pupils.

Lesson 3: Why do stars only come out at night?

Your pupils can visualise how planet Earth rotates by holding out their right fist in a 'thumbs up'. Tell them to imagine that their thumb points north and their fingers are curling in the direction of the Earth's rotation. Because of this, we say that Earth rotates in a right-handed manner.

(Iowa State University, 2010. For more information see www.polaris.iastate.edu/NorthStar/Unit3/unit3_sub1.htm)

Earth rotates about an imaginary line that passes through the North and South Poles, called the axis of rotation. One rotation of Earth takes a few minutes less than a full day – 23 hours, 56 minutes 04.09053 seconds to be exact. This is called the sidereal period, which means the period relative to stars. The sidereal period is not exactly equal to a day because by the time the Earth has rotated once, it has also moved a little in its orbit around the sun, so it has to keep rotating for about another four minutes before the sun seems to be back in the same place in the sky that it was in exactly a day before.

(Butterworth and Palmer, 1997. For more information see http://imagine.gsfc.nasa.gov/docs/ask_astro/answers/970401c.html)



For convenience, we measure a day as 24 hours and then regain the 'lost day' every four years as part of our leap year.

The moon has no light of its own but reflects light from the sun. As the moon travels around the Earth on its 29½ day journey, different parts of it are lit up by the sun. We call these different views the 'phases' of the moon.

We see the most stars in the sky from the darkest places on the Earth, where there is the least light pollution. The thousands of stars once visible to the naked eye are now obscured by the glare of industrial light and the haze of pollution. This is particularly true in the USA and Europe, where light researchers estimate that a child born today in either region has only a one in ten chance of witnessing a truly dark sky.

(Ruiz, 2008. For more information see www.forbes.com/2008/06/17/stars-travel-galaxy-forbeslife-cx_rr_0617travel.html)

Knowledge box 3



Geography Plus: Little Blue Planet

These knowledge boxes provide background information for teachers to help develop knowledge for teaching about *Little Blue Planet*. For lots more useful sources of information, along with recommended storybooks for pupils' reading, have a look at the **Useful information: weblinks, storybooks and references** sheet. Make sure you have a look at the 'Notes' on the PowerPoints as well; they offer useful snippets of information and questions for your pupils.

Lesson 4: Thank you ocean

Visit www.safeshare.tv/v/hwVUo-2Qnso or www.youtube.com/watch?v=hwVUo-2Qnso

This short video explains how oceans began millions of years ago. Although some of the commentary uses challenging vocabulary, you may want to show it to your pupils as the images are stunning and convey a story very well.

Phytoplankton

Fish, whales, dolphins, crabs, seabirds and just about everything else living in or off the oceans owe their existence to phytoplankton, one-celled plants that live at the ocean surface. Phytoplankton not only provide a food source for herbivorous marine creatures (which are in turn eaten by carnivorous creatures), they also produce oxygen through the process of photosynthesis. In fact, half the world's oxygen is produced by phytoplankton photosynthesis with the other half produced on land by trees and other plants. (Roach, 2004. For more information see http://news.nationalgeographic.com/news/2004/06/0607_040607_phytoplankton.html)

Whales

Whales can be divided into two categories: toothed whales and baleen whales. Toothed whales include killer whales, sperm whales and beluga whales. Some of the larger, toothed whales can feed on large prey such as seals, although they mainly eat fish, squid and shellfish from the ocean floor. There are 11 species of baleen whales in total, including the humpback whale, blue whale and finback whale. Rather than teeth, baleen whales have hard, bone-like plates (known as baleen) in their mouths. These feed on plankton and krill through filter-feeding: they swim with their mouths open and then filter the water back into the ocean through their baleen, keeping the food inside.



Humpback whale. Photo: Morguefile/matthew_hull.

(Whale Facts, 2009. For more information see www.whale-facts.net/types_of_whales/types_of_whales.html)

Geography Plus: Little Blue Planet

These knowledge boxes provide background information for teachers to help develop knowledge for teaching about *Little Blue Planet*. For lots more useful sources of information, along with recommended storybooks for pupils' reading, have a look at the **Useful information: weblinks, storybooks and references** sheet. Make sure you have a look at the 'Notes' on the PowerPoints as well; they offer useful snippets of information and questions for your pupils.

Lesson 6: Green Earth

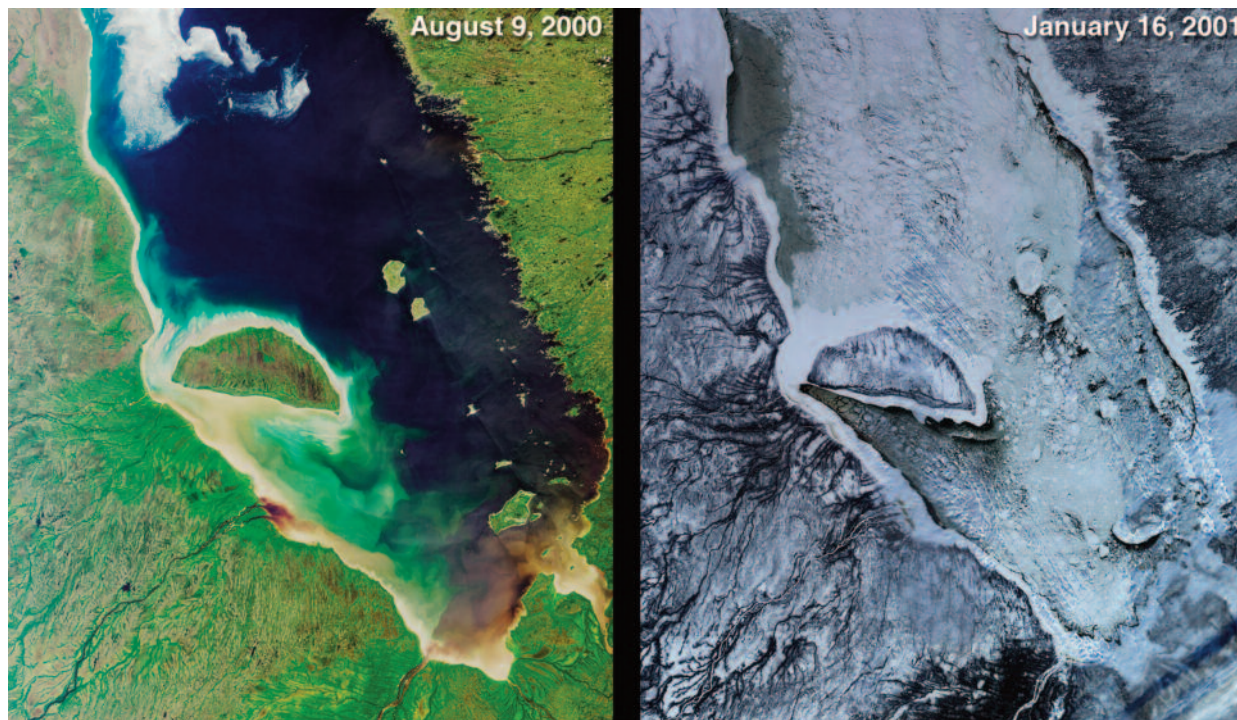


Photo: NASA/GSFC/JPL – see http://visibleearth.nasa.gov/view_rec.php?id=1617#

Slide 5 of **PowerPoint 6** shows two images of James Bay taken at different times of the year. James Bay, which lies at the southern end of Hudson Bay in northeastern Canada, is named after the English explorer Thomas James who first visited the area in 1631 while searching for the North-west Passage. Many of the rivers which flow into the bay are visible in these images; starting at the southern tip and moving clockwise on the western side are the Harricana, Moose, Albany and Attawapiskat. The latter enters the bay just to the west of the large, crescent-shaped Akimiski Island.

The two images show stark contrasts between summer and winter in the area. Pupils will not need to know all this information about James Bay but they need to recognise that the changes in colour in the images are because of seasonal change. Pupils should be able to relate these changes in landscape to their knowledge of their own locality and differences between summer and winter. The green swirls, which show green plant boom in the bay, could also be discussed.

(NASA, 2006. For more information see http://visibleearth.nasa.gov/view_rec.php?id=1617#)

Knowledge box 5



Geography Plus: Little Blue Planet

These knowledge boxes provide background information for teachers to help develop knowledge for teaching about *Little Blue Planet*. For lots more useful sources of information, along with recommended storybooks for pupils' reading, have a look at the **Useful information: weblinks, storybooks and references** sheet. Make sure you have a look at the 'Notes' on the PowerPoints as well; they offer useful snippets of information and questions for your pupils.

Lesson 8: Our Earth

Slide 3 of **PowerPoint 8** shows the famous 'Earthrise' image. It was taken in December 1968 as the Apollo 8 crew flew from Earth to the moon and back. Three astronauts, Frank Norman, James Lovell and William Anders, were launched on a Saturn V rocket on 21 December, circled the moon ten times and then returned to Earth six days later. The Apollo 8 mission includes an impressive list of firsts including:

- the first humans to journey to Earth's moon
- the first manned flight using Saturn V
- the first photograph of Earth from deep space.

This stunning photograph was taken as the spacecraft rounded the farside of the moon, allowing the astronauts to look towards the lunar horizon and see the Earth appear to rise, due to their orbital motion. The resulting photograph, taken 240,000 miles away, was the first time that people could see what planet Earth looks like from space. This image of Earth, rising in the vastness of space over a sunlit lunar landscape, became a reminder of our planet's isolation and fragility. Although many photographs have since been taken by satellites with remote control cameras, only 24 people have seen the whole of Earth from space.

(Nemiroff and Bonnell, 2005. For more information see <http://antwarp.gsfc.nasa.gov/apod/apo51224.html>. Connor, 2009. For more information see www.independent.co.uk/news/science/forty-years-since-the-first-picture-of-earth-from-space-1297569.html).



Photo: NASA – see www.nasa.gov/multimedia/imagegallery/image_feature_102.html