Monday 19th July

CGPS Writing Competition 2021

For the first time Courtenay Gardens will be holding a writing competition. We would like for you to use your home learning time to start, continue with or finish your competition entry.

The judges are looking for writing that:

- Shows creativity of writing.
- Shows originality of writing style and content.
- Demonstrates author's voice • Creates an impact on the reader.

Your entry can be typed or handwritten and there is no word count limit. Please write a narrative piece and return what you have written when school resumes.

Identifying the number pattern and rule

Work out what the number pattern rule is for each of these patterns. The pattern might be increasing (addition +) or decreasing (subtraction -).

Use the rule to help you complete the number patterns.

14, 18, 22,_____,_____,_____ Rule: _____

28, 26, 24,_____,_____,_____ Rule: _____

65,_____, 75, 80,_____,_____ Rule: _____

150, 145,_____, 135,_____,_____Rule: _____

36, 30, 24,_____,_____,_____ Rule: _____

90,_____, 96, 99,_____,_____ Rule: _____

201, 211, 221,_____,_____,_____Rule: _____

77, 66, 55,_____,_____,_____ Rule: _____

Can you create your own tricky addition and subtraction number patterns? Show me!

Don't forget to write down the rule!

My **ADDITION** number pattern rule: _____

My number pattern is:_____,_____,_____,_____,_____, _____

My **subtrACtion** number pattern rule: _____

My number pattern is:_____,_____,_____,_____

Work out what the number pattern rule is for each of these patterns. The pattern might be increasing (addition +) or decreasing (subtraction -).

Use the rule to help you complete the number patterns.

9,_____, 19, 24,_____,_____ Rule: _____
48, 44,_____,_____, 32,_____ Rule: _____
99, 90,_____, 72,_____,_____ Rule: _____

110, 130,_____, 170,_____,_____Rule: _____
107, 97,_____,_____, 67,_____ Rule: _____
36, 42,_____, 54,_____,_____ Rule: _____

24, 36, 48,_____,_____,_____ Rule: _____
235, 233,_____, 229,_____,_____Rule:_____

Can you create your own tricky addition and subtraction number patterns? Show me! Don't forget to write down the rule!

My **ADDITION** number pattern rule: _____

My number pattern is:_____,_____,_____,_____,_____, _____

My **subtrACtion** number pattern rule: _____

My number pattern is:_____,_____,_____,_____,_____, _____

Work out what the number pattern rule is for each of these patterns. The pattern might be increasing (addition +) or decreasing (subtraction -).

Use the rule to help you complete the number patterns.

30,_____, 60, 75,_____,_____ Rule: _____

66, 63,_____,_____,_____, 51 Rule: _____

249, 244,_____,_____, 229, _____ Rule: _____

21, 28,_____,_____, 49, _____ Rule: _____

72, 60, 48,_____,_____, _____ Rule: _____

8, 16, 24,_____,_____,_____ Rule: _____

132,_____, 140,_____, 148,_____ Rule: _____

109, 100,_____,_____, 73,_____ Rule: _____

Can you create your own tricky addition and subtraction number patterns? Show me! Don't forget to write down the rule!

My **ADDITION** number pattern rule: _____

My number pattern is:_____,_____,_____,_____,_____, _____

My **subtrACtion** number pattern rule: _____

My number pattern is:_____,_____,_____,_____,_____,

Alliteration is the occurrence of the same letter or sound at the beginning of adjacent or closely connected words.

Adventures With Alliteration!

Verbs

EXAMPLE: Robert - ran

PART 1

Write a verb for each name that makes an alliterative phrase.

1) Anna -

2) Bill -

3) Carrie -

4) Devon -

5) Edward -

6) Glenda -

7) Harry -

8) Joy -

9) Kevin -

10) Lulu -

PART 2

Fill in the blank with a verb that makes an alliteration with the word in blue.

1) Simon_____a pot on the stove.

2) Molly_____her mother's book.

3) Wendy_____on top of the wide table.

4) Paul_____potatoes in the garden.

5) Tilly_____about her troubles.

Commas (Part 1)

Lists

Commas are used to separate three or more items in a list. When listing, do not use a comma before and.

Dylan needs to finish his Maths, Science, Art and English work before break.

1) Write a sentence using these items. Add commas in the correct place.

a) football, basketball, tennis racquet, cricket bat, baseball bat _____

b) strawberries, watermelon, bananas, apples _____

c) giraffe, monkey, lion, elephant, panda, meerkat _____

d) shirt, scarf, gloves, boots _____

Beginning Phrases and Clauses

Commas are also used to separate a beginning phrase or clause.

After sleeping in, I was running late.

2) Re-write the following sentences adding commas to separate the beginning phrases or clauses.

a) After cricket the team will go out for ice-cream.

_____

b) Over the holidays I read five books.

_____

c) By lunchtime you should have finished all of your work.

_____

d) After a hard fought contest the home team won in extra time.

_____

e) Early one morning I got up and cooked everyone breakfast.

_____

Compound Sentences

In compound sentences, commas are joined by 'and', 'but', 'or', 'so', 'as', 'because' or 'yet'.

You can read a book, or play a game.

3) Add commas to these compound sentences.

a) I don't like eating steak but I love sausages.

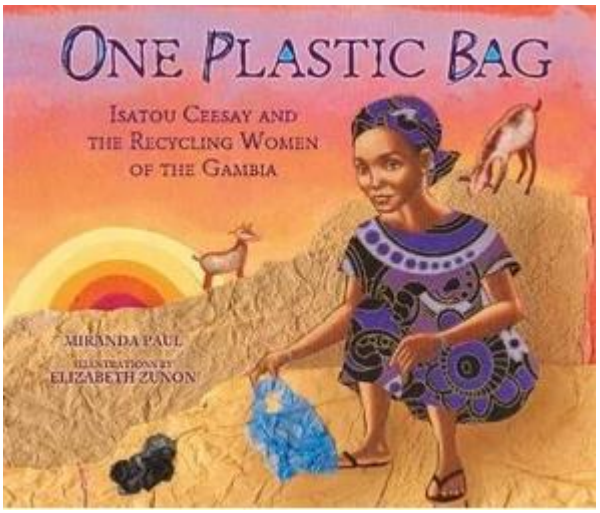
b) Kathryn is kind because she helped me when I skinned my knee.

c) The kids were working hard at school yet they couldn't seem to get all of their work finished.

d) I want to stay in bed as it is cold and raining.

e) I went home early so I could play with my toys.

f) James is good at backstroke but still needs to work on his freestyle.



Watch the read aloud of 'One Plastic Bag'

Isatou Ceesay found a way to recycle the bags in her village and transform her community.

What could you make using a plastic bag?

Type your answers into the text boxes.

List all the ways you could reuse a plastic bag.

Pick one of your ideas that will be the most useful. What will it be used for? How many bags will it take?

Your design. Sketch your design on a piece of paper. Make sure you clearly label all the parts. Then take a photo and insert it into this text box to share your design.

After watching the read aloud of the book type in the boxes to complete the sentence starter.
https://www.youtube.com/watch?v=gNv_Oy0rQ4M

Nerdy Birdy

making text to text connections

The text says:

This reminds me of the book/movie:

Prime Number

A natural number greater than 1 with no divisors other than 1 and itself.

REMEMBER these facts about Prime Numbers.

There are no even numbers except 2.
There are no prime numbers ending in 5 except 5.
The digits can't add up to 3 except 3 (digital root).

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

PRIME NUMBERS

1) Finish the definitions.

A prime number _____
A composite number _____

2) Sort the numbers correctly to show whether they are prime or composite numbers.

3, 6, 7, 9, 13, 15, 18, 27, 33, 41, 61, 81

Prime numbers	Composite numbers

3) Find all the prime numbers between 70 and 100. List them below.

---

4)
Michael says….

"All prime numbers are odd"

Do you agree or disagree? Explain your reasons.

---

5)
What number am I?
Use the clues to find all the possible answers. You might want to use the 100 square to help you.

I am a prime number less than 100.
I am 1 more than a multiple of 10.

_____

6)
What number am I?

I am a prime number less than 100.
I am 2 less than a multiple of 5.

_____

7) Amira sets a challenge for her friend Marc.

"I am thinking of a number. It is higher than 20. It is less than 60. It is a prime number. The sum of its digits is an odd Number."
Can you find all the possible numbers she could be thinking of?

Marc says…"There are three possibilities."

Is he right? Explain your reasoning.

---

8)
Can you arrange the in the square so that each adjoining pair adds to make a prime number?

2, 3, 4, 6, 7, 8, 10, 11, 12, 14, 15, 16

Top tip; *think about where the odd numbers will need to be placed.*

		27		
1				**9**
		5		

Prime Crime

I can identify prime numbers up to 100 and recall prime numbers up to 19.

1. The prime numbers to 20 have gone missing!
Can you write them in the boxes below?

2. The only clue we have about the identity of the thief is that they live in a house with a prime number. Tick the houses below where the thief might live.

Prime Detectives

I can identify prime numbers.

Sing-Song Aloud is a very popular competition for singing. Every year, thousands of people enter the competition in search of fame.

This year is no different… but there has been a crime committed! Somebody has sabotaged the equipment and they have broken the microphones, with only pig-like sounds being emitted! The police have been investigating exactly what happened.

As the Detective Chief Inspector, it is your job to work out who the saboteur is. Your officers have taken down names and descriptions of the people on the set that day. Your task is to solve the clues and work out who has sabotaged the equipment!

Name	Gender	Height	Left handed or Right handed
Amelia Killen-Browne	Female	Tall	Left
Barry Shaw	Male	Short	Right
Fenella Bentley	Female	Tall	Left
Gurdeep Mehmi	Male	Short	Left
Janice Twist	Female	Short	Right
Ken Corder	Male	Tall	Right
Ling Chang	Male	Tall	Left
Mei Chang	Female	Short	Left
Nancy Greene	Female	Tall	Right
Ramesh Iqbal	Male	Tall	Right

Clue One

Circle all of the prime numbers. If the amount of prime numbers is odd, then the saboteur is female. If the amount of prime numbers is even, then the saboteur is male.

2 52 9 111 19 83 85 31 59 89

133 21 22 88 15 90 17 57 131 72

The saboteur is_____.

Clue Two

Count in prime numbers from the first number in the row, and then take the last number you reach and find the corresponding word in the table below. Rearrange the words to form a sentence and solve the first clue.

2	?	?	?	?
13				
47				
83				

the 11	microphone 9	ran 2	stole 71
short 101	broken 27	saboteur 29	of 15
was 67	a 69	singer 16	tall 103

Clue Three

Look at the numbers in the middle squares. Write the nearest prime number lower than the number in the left-hand (yellow) boxes and the nearest prime number higher in the right-hand (green) boxes. Then add each column of boxes up. If either column adds to exactly 183, the saboteur is left handed.

	←	**45**	→	
	←	**15**	→	
	←	**9**	→	
	←	**68**	→	
	←	**34**	→	

The saboteur is _____handed.

The saboteur is _____.

Tuesday 20th July

Alliteration

Animalia by Graeme Base

After watching the read aloud of the book complete the close activity. Remove the dots before typing.

https://www.youtube.com/watch?v=ZEhVfEgmlNM

An armoured armadillo avoiding an ……. alligator	Beautiful ……. …….basking by a babbling brook	Crafty crimson cats carefully catching crusty ……	…….. dragons delicately devouring ……. delicacies	Eight enormous …….. expertly eating easter eggs
Five fat frogs fishing for frightened …….	Great ……. gorillas growing grapes in a …….. glass greenhouse	Horrible hairy hogs h……. homeward on heavily harnessed …….	Ingenious …… improvising an intricate impromptu on ……. impractical instruments	Jovial jackals juggling …… of …….. in the jungle
Kid …….. and Kelly Kangaroo …….. Kitty Koala	Lazy lions lounging in the local ……	Meticulous mice monitoring mysterious …….. messages	……. nautical newts navigating near ……	One outrageous …… ostrich ordering an …… omelette
Proud peacocks preening perfect plumage	Quivering quails queuing quietly for quills	Richly robed rhinoceroses riding in rickety red rickshaws	Six slithering snakes sliding silently southward	Two tigers taking the 10:20 train to Timbuktu
Unruly …….. upending urns of ultramarine ……..	Victor V. ……. the Vaudeville Ventriloquist versatile virtuoso of vociferous verbosity vexatiously vocalizing at the Valhalla Variety Venue	Wicked warrior wasps wildly ……. ……. weapons	Rex Fox fixing ……. saxophones	Youthful ……. yodelling in ……. yachts
Zany zebras ……. in zinc zeppelins				

Commas (Part 2)

Complex Sentences

Commas are used in complex sentences. They begin with words like 'when', 'as', 'since', 'if', 'although', 'so', 'because', 'until' and 'for'.

When I speak to your Mother, I will let her know.

4) Add commas to these sentences.

a) As he was ambitious and keen to learn he became the manager in no time.

b) When I was younger I believed in monsters.

c) Although I was invited by my friend I chose not to go to the party.

d) Until the drought breaks it will continue to be dry and dusty.

e) Although the movie was long it was still very enjoyable.

f) Since I have moved back home I have managed to save lots of money.

Embedded Clauses

Commas separate an embedded clause in a sentence. The comma is used to separate the extra information from the main idea.

My dad, his eyes twinkling, stole a chip from my plate.

5) Rewrite the sentences and add in one extra piece of information from the box. Remember to punctuate your sentence correctly.

after lunch	which was very crowded
also known as the city that never sleeps	who gets excited very easily
which is an acronym for laugh out loud	

a) LOL originated as internet slang but it is now widely used in everyday communication.

b) My puppy is a constant source of entertainment for us.

c) The plane was running behind schedule.

d) New York is an exciting hub of activity.

e) Tomorrow we are going to the markets.

Quotes

Commas separate spoken and unspoken words.

"My dog is my best friend," declared Trevor.

6) Re-write a conversation that you had with a friend or family member recently. Remember to use the correct punctuation throughout your conversation.

Text to text connections

Nerdy Birdy

Complete each box after watching the read aloud of the book Nerdy Birdy.

The first row is an example of how to complete the table.

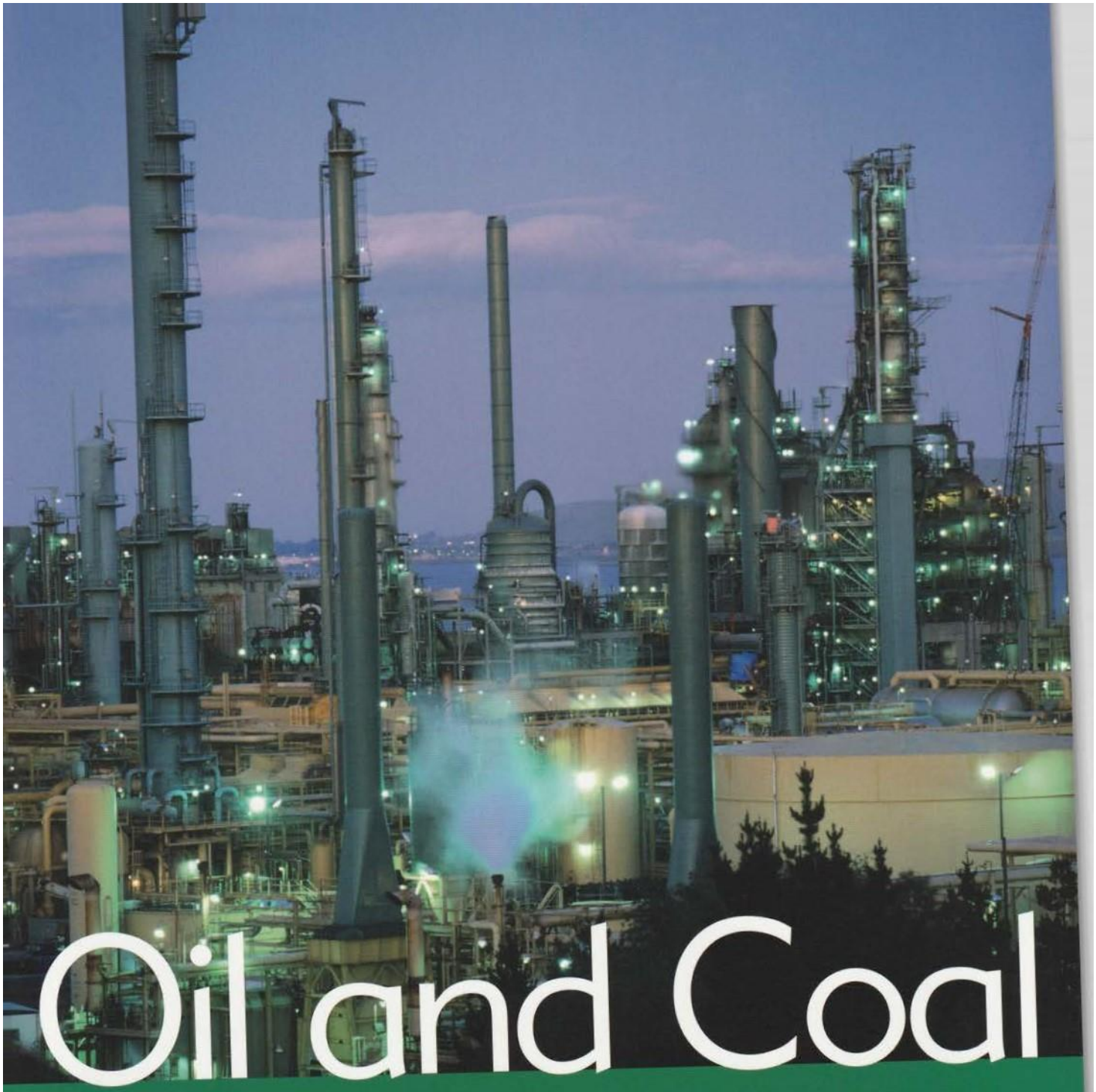
https://www.youtube.com/watch?v=gNv_Oy0rQ4M

What I read	What book/movie it reminds me of	Why?
Nerdy Birdy felt alone and different.	Pixar short movie – For the Birds	There were little blue birds who looked the same and then a giant different bird sat with them and they were mean to him.

CAUSE AND EFFECT

Read *Oil and Coal*, then complete the table below with the positive and negative effects for each section.

Cause: Burning coal as a fuel	
Positive effect	Negative effect
Cause: Exploring land and sea for oil	
Positive effect	Negative effect
Cause: Transporting crude oil	
Positive effect	Negative effect



Oil and Coal

GO FACTS

GO FACTS **NATURAL RESOURCES**

Oil and Coal

Nicolas Brasch

Blake EDUCATION
Better ways to learn

Oil and Coal

Oil and coal are found deep underneath the surface of the Earth. People mainly use oil and coal to produce energy, such as electricity.

Oil formation

1 Remains of animal and plant life are buried under sand and dirt.

2 Over time, layers of sand and dirt cover the remains. The layers bury and compress the animal and plant remains.

3 Pressure and heat from inside the Earth changes the animal and plant remains into a liquid, known as oil. Natural gas forms where temperatures are very high.

DID you KNOW? Over 67% of oil and 66% of natural gas reserves are in the Middle East and Russia.

Coal formation

1 Most coal began to form about 300 million years ago. When plants die, some of them fall into swamps and start to decay.

2 As the plants decay, other dead plants make layers on top. Over thousands of years, the layers of plant matter change into peat.

3 Over millions of years, layers of earth bury and compress the peat. The peat tums into coal.

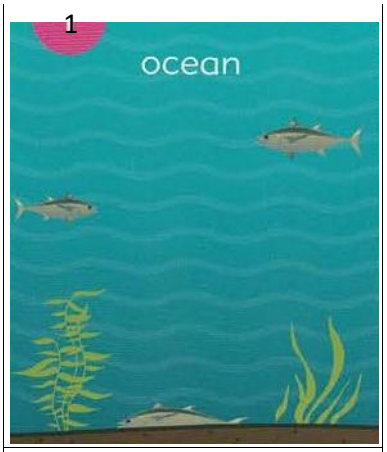
eo FACT!

The future

Oil and coal are non-renewable resources. This means that there is a limited supply of

oil and coal. Some people predict the world's oil will run out in the second half of this century.

How Oil Forms



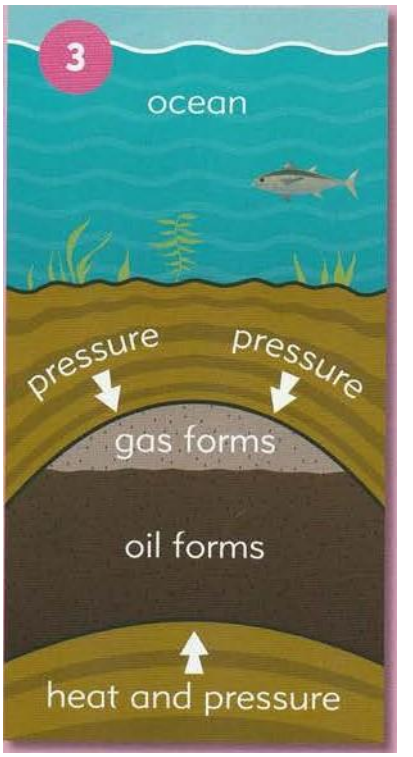
plant and
Ghimal remaihS

old ocean bed

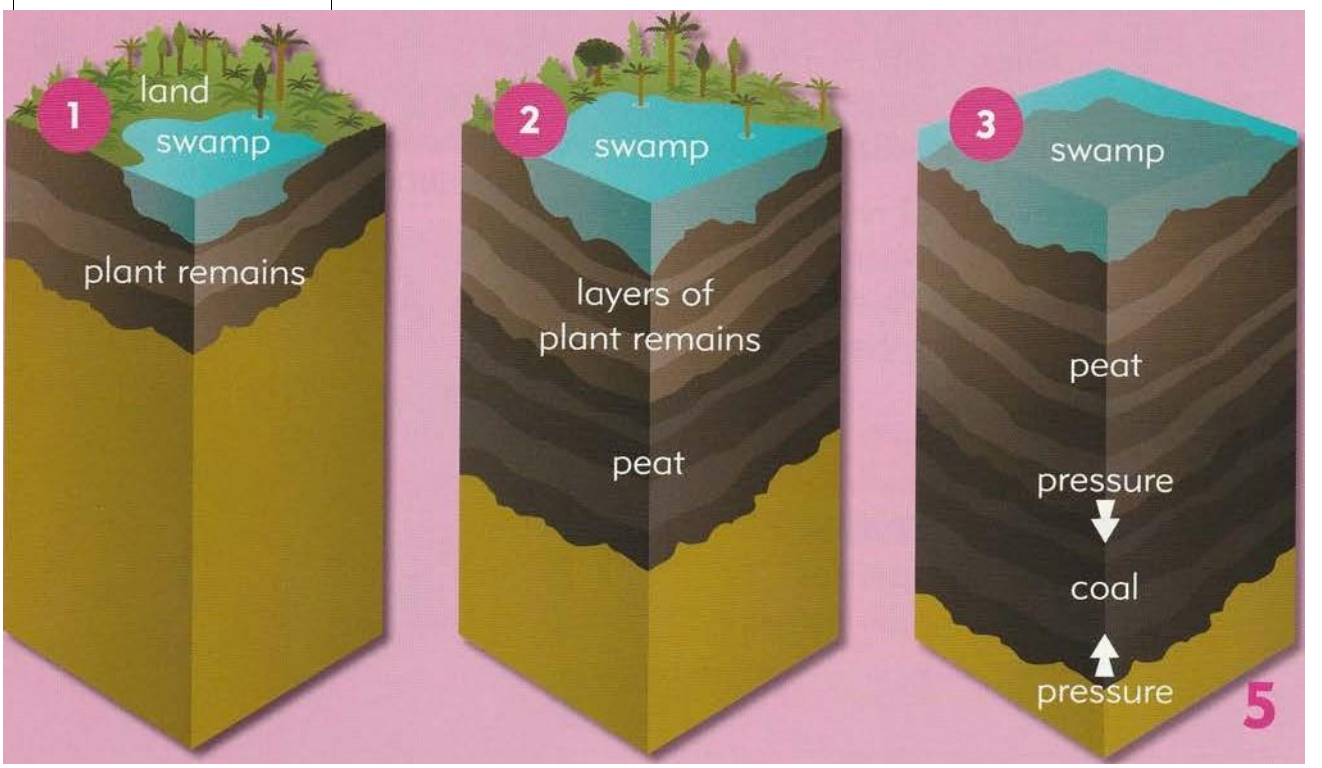
layers of sand and mud

plant and
animal remains

old ocean bed



How Coal Forms



OIL Oil Reserves

Oil reserves are deposits of oil that have been found but have not been extracted yet.

Types of reserves There are three types of oil reserves: proven reserves, probable reserves and possible reserves.

- Proven oil reserves are deposits where there is more than a 90% likelihood of extracting oil using modern equipment and technology.
- Probable oil reserves are deposits where there is a 50—90% likelihood of extracting the oil.
- Possible oil reserves are deposits where there is less than a 50% likelihood of extracting the oil.

estimate that Saudi Arabia has proven oil reserves equivalent to more than 16 million Olympic size swimming pools, or more than 82 Sydney Harbours.

Australia has I .5 billion barrels of proven oil reserves, mainly in the Carnarvon Basin and the Gippsland Basin.

marvon Basin

eo FACT!

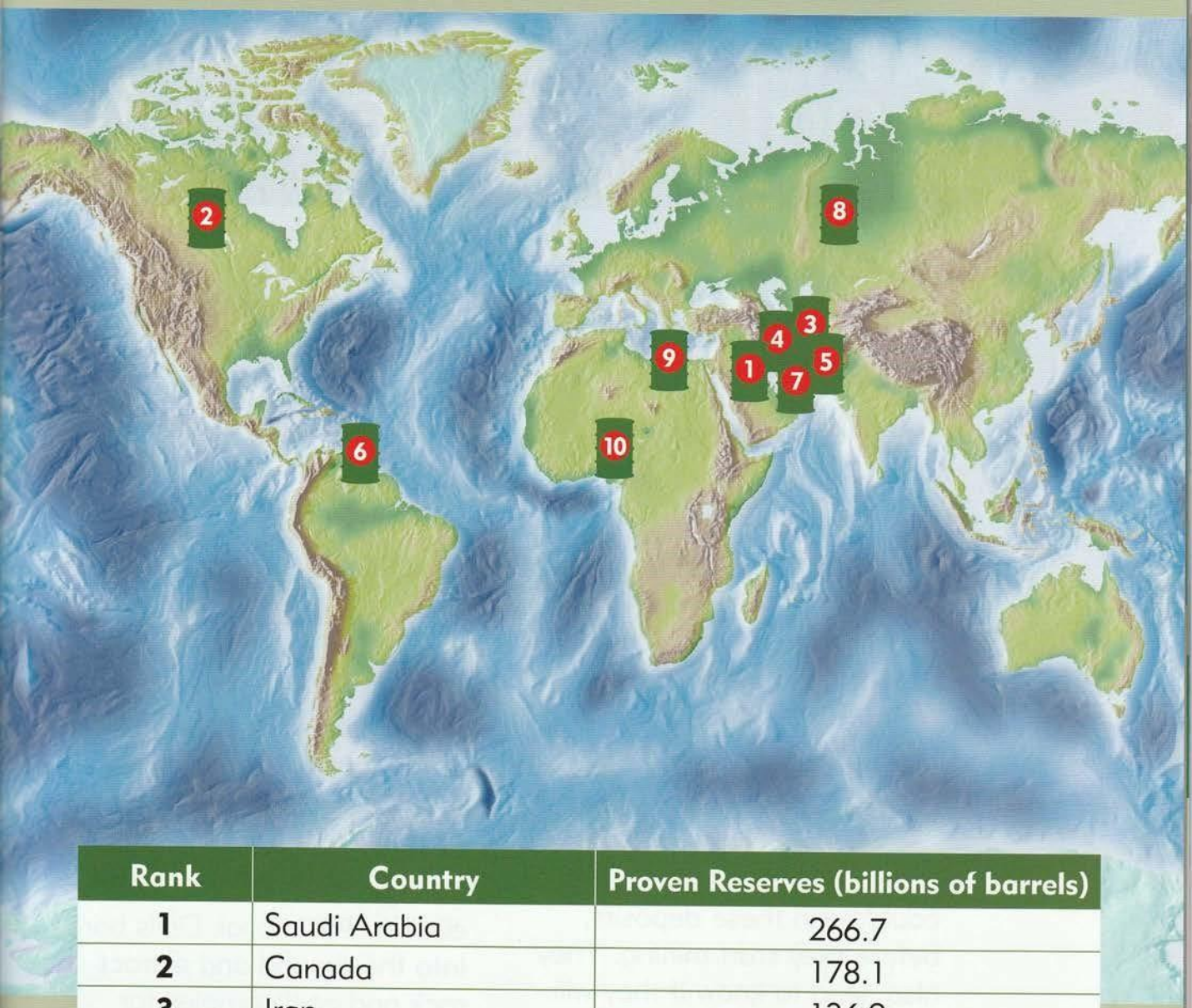
DID VOU KNOW?

Saudi Arabia produces about eight million barrels of oil every day.

Where the reserves are The volume of oil is measured in barrels. One barrel is equal to 159 litres. The country with the largest oil reserves in the world is Saudi Arabia. People

Gippsland Basi

The Top 10 Oil Reserves in the World



Rank	Country	Proven Reserves (billions of barrels)
1	Saudi Arabia	266.7
2	Canada	178.1
3	Iran	136.2
4	Iraq	115.0
5	Kuwait	104.0
6	Venezuela	99.4
7	United Arab Emirates	97.8
8	Russia	60.0
9	Libya	43.7
10	Nigeria	36.2

Coal Reserves

Coal reserves are deposits of coal that have been found underground, but have not yet been extracted.

Recoverable reserves

There are two types of coal reserves: proven reserves and probable reserves.

Proven coal reserves are deposits where coal can be extracted using modern equipment and technology.

Probable coal reserves are deposits which may contain coal. Mining companies need to test how much coal there could be in these deposits, before they start mining. They also need to know if they will be able to easily extract the coal using modern technology.

Where the reserves are

More than one trillion tonnes of coal have been found under the surface of the Earth — about 90% of it is recoverable. Australia accounts for around 6% of world black coal production, almost all of it from New South Wales and Queensland. Brown coal from Victoria and South Australia is used to make electricity.

How geologists find coal Geologists study land formations and aerial and satellite photographs.

2 Companies conduct test borings if they believe land could contain coal. Drills bore into the ground and extract rock and coal samples for geologists to examine.

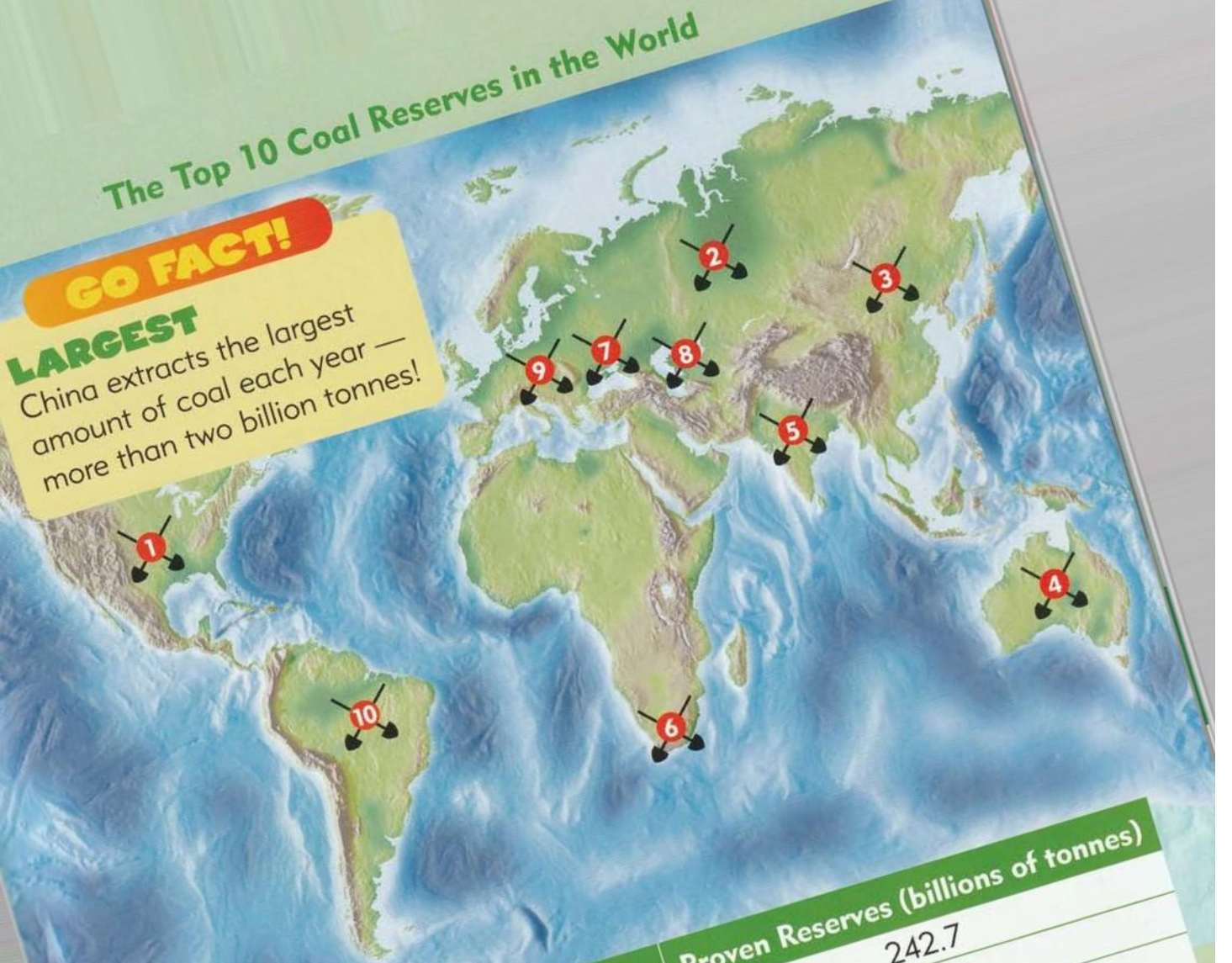
3 After examining the rocks, geologists can estimate the amount of coal that exists in an area.

The Top 10 Coal Reserves in the World

GO FACT!

LARGEST

China extracts the largest amount of coal each year — more than two billion tonnes!



Rank	Country	Proven Reserves (billions of tonnes)
1	United States	242.7
2	Russia	157.0
3	China	114.5
4	Australia	76.6
5	India	56.5
6	South Africa	48.0
7	Ukraine	33.9
8	Kazakhstan	31.5
9	Poland	7.5
10	Brazil	7.1

Coal Mines in the Pas

Digging coal from a mine in the 19th century was dangerous. Explosions, floods, mine collapses and disease were a daily risk of going to work.

Digging by hand

Before coal-cutting machines were invented in the 1880s, miners used picks and shovels to dig. They placed the coal in carts. Pit ponies pulled the carts along tracks to the surface. Women and children, some as young as seven years old, also worked in the mines.

eo FACT!

DID you KNOW?

Getting light into a mine was difficult. Candles were dangerous because of explosive gases. Safety lamps, which were safe even if gases were present, were invented in the early 1800s.

The dangers

Coal mining can release explosive and poisonous gases. To detect gases, miners took caged canaries down the mine. Canaries are very sensitive to poisonous gases — if the birds died, the miners knew the area wasn't safe. In 1866 an underground explosion at the Oaks Colliery in England killed 360 men and boys.

Another danger was fast-flowing underground water. When a mine floods, miners drown if they can't escape. On 4 July 1 838, at Husker Pit in England, 26 children drowned in a coal mine — I l girls aged 8—16 years and 15 boys aged 9— 12 years. By the mid 1 800s, steam engines pumped water away from where miners worked.

miners with pit ponies in 191

Here are the young men and boys of the Pennsylvania Coal mine in 191 1. Many of the boys were no more than ten years old.

Coal Mines Today

Coal is mined in more than 50 countries. The two modern types of coal mining are surface mining and underground mining.

Strip and blast

Surface mining is also called open-cut mining or strip mining. About 80% of coal production in Australia is surface mining. Surface mining removes coal when a seam (layer) is less than 60 metres underground. Bucketwheel excavators, stripping shovels and earthmovers remove soil and rocks from the Earth's surface. Miners often use explosives to loosen rocks above the coal.

a bucket-whee
excavator

Deep underground

Underground mining removes coal that is deeper than 60 metres below the surface. About 60% of the world's coal is dug from underground mines. Miners ride elevators down mine shafts to reach the coal seam. One method of removing the coal is to cut 'rooms' into the coal seam and leave behind pillars of coal to support the roof of the mine.

Processed and sold

Once the coal is extracted, it is loaded onto conveyor belts. It is sent to a preparation plant for processing (eg crushing, washing, sorting). It is then transported to industries, to coal power stations, and to ports for export.

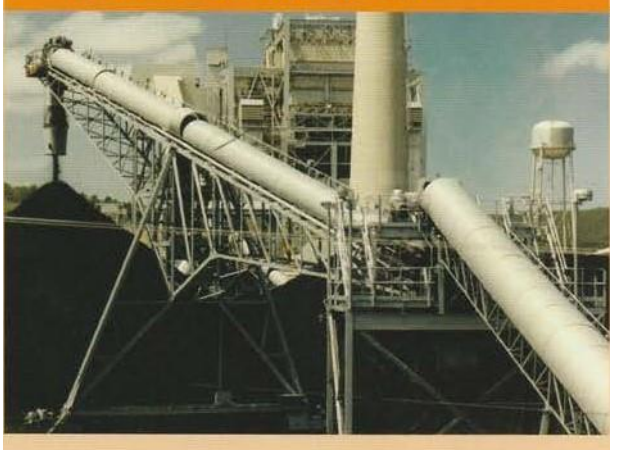
How Surface Mining Operates

1 Explosives blast apart the coal.

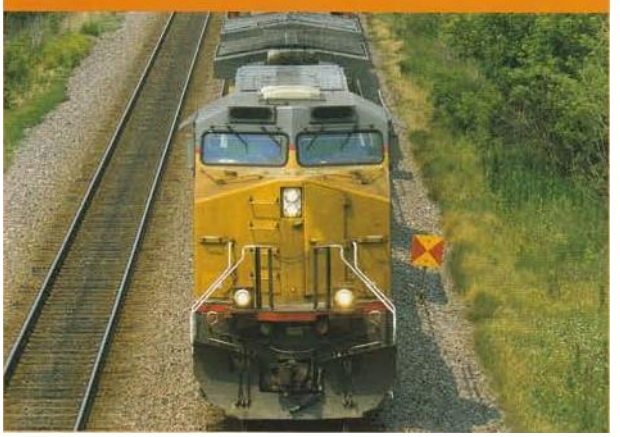
2 Earthmovers pick up the coal and dump it onto trucks.

3 Trucks transport the coal to the treatment plant.

4 Coal is cleaned and processed at the treatment plant.



5 Processed coal is transported to consumers.



GO FACT!

GO FACT!

DID you KNOW?

About 70 countries around the world have recoverable coal reserves. At the current rate of production, proven coal reserves will last for about 133 years.

Offshore Oil Rigs

Offshore oil rigs locate and extract oil from under the seabed. They are huge structures that support the machinery and people needed to bring oil through kilometres of pipes to the ocean's surface.

Types of rigs

There are several types of oil rigs.

Platform rigs are the largest type.

Their bases rest on the seabed. Oil companies build platform rigs when they plan to produce oil from a specific area for many years.

Semi-submersible rigs have legs filled with water. The weight of the water keeps the rig upright and stable. They can be towed from site to site.

Jack-up rigs operate in shallow water. They have legs that lower onto the sea bed.

Life at sea

Offshore rigs usually operate 24 hours a day, with crews working in shifts. Teams might work 12 hour shifts every day for 14 days straight and then have 14 days off.

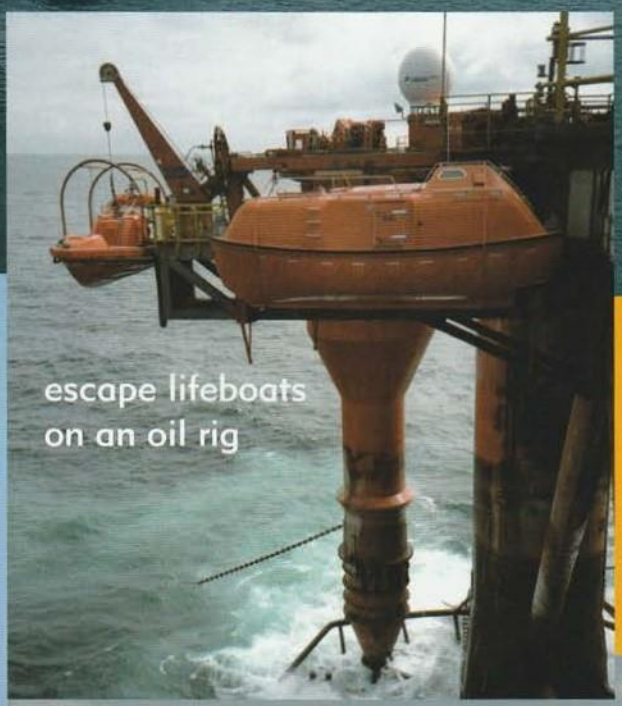
Many different workers are needed on an offshore oil rig. A supervisor oversees all work. Operators control the oil flow to the surface. Maintenance workers look after equipment. Other workers do the drilling, diving, painting and catering.

GO FACT!

you

The Petronius Platform in the Gulf of Mexico is one of the worlds tallest structures. It stands only 75 metres above water, but 535 metres of it is below the surface.

Tugboats tow this oil rig platform to its destination in the Pacific Ocean.



escape lifeboats on an oil rig

helipad

Helicopters transport workers and equipment between the rigs and the land.

A drill ship can drill in deeper water than an oil rig.

Uses in the Past

People have used oil and coal for thousands of years, mainly as a fuel.

Oil in the past

Throughout history, people have used oil and coal, mainly for fuel. More than 5 000 years ago, the Mesopotamians used oil to waterproof their boats and houses. The Ancient Egyptians used oil to soak cloths which they wrapped around their dead.

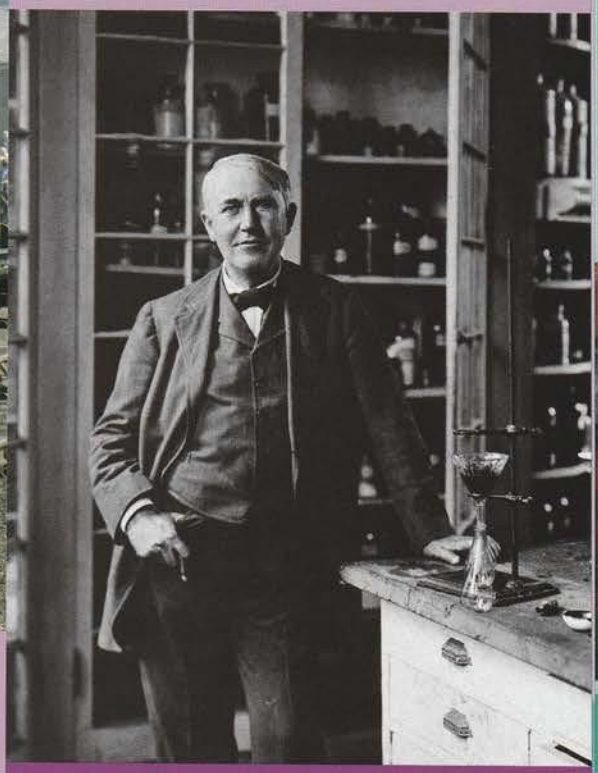
In 4 000 BC, the Chinese carved ornaments from pieces of coal, and began to burn coal as fuel around 200 BC. The Ancient Romans and Greeks knew of coal but had little use for it because of the abundance of trees for fuel.

Before the electric light, most cities had gas lights. In Britain this gas was made from coal until the 1950s.

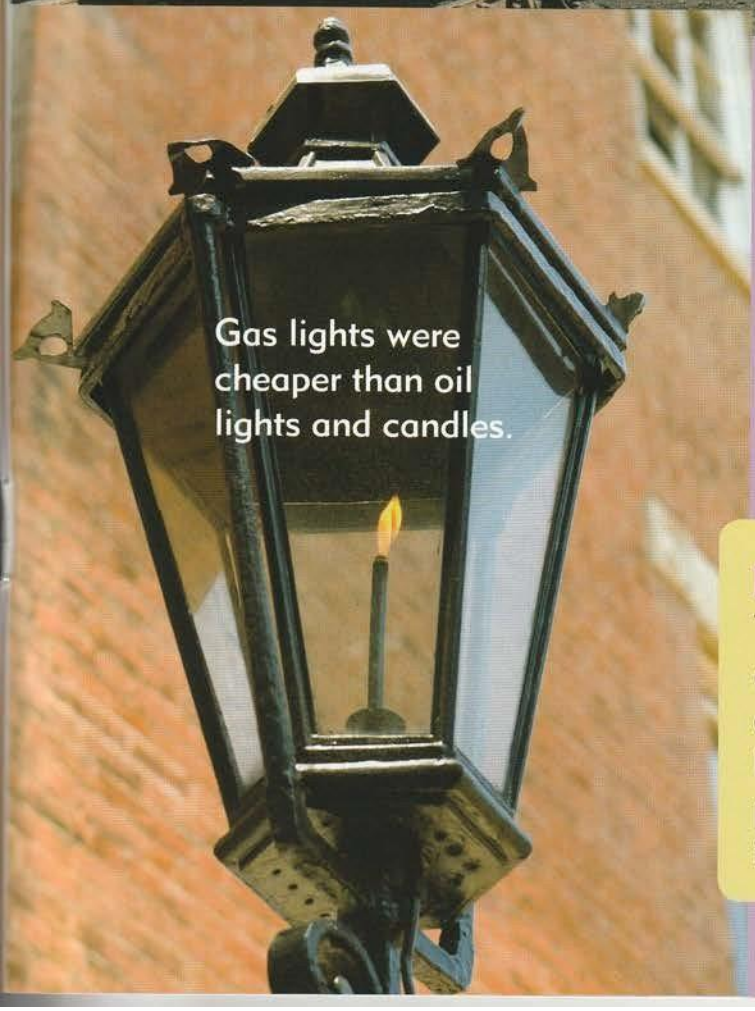
The Industrial Revolution led to the large-scale use of coal. The steam engine, powered by burning coal, took over from the water wheel. By the end of the 19th century, people used coal to power steam trains and steam ships. It became the main fuel for melting iron ore for the steel industry.

WKFJyptiG@Tupttpy

Coal was used to power steam engines during the **Industrial Revolution**.



The inventor, Thomas Edison, designed the first practical coal-powered station to generate electricity. It was built in New York City, in 1882.



Gas lights were cheaper than oil lights and candles.

GO FACT!

DID YOU KNOW?

The Chinese drilled for oil about 2 000 years ago. They attached devices called drill bits to the end of bamboo poles and forced the poles into the earth.

Uses of Coal Today

Coal-fired power stations produce 41 % of the world's electricity. Coal is also used by the construction, aluminium, paper and chemical industries.

How coal-fired power stations generate electricity 1 Coal is crushed into powder.

2 Coal powder is burnt in a boiler at about 400^0C. This produces heat which converts the water in the boiler into steam.

3 The steam powers a turbine and a generator.

4 The generator produces electricity.

5 The electricity travels along power lines from the power station to homes, offices and factories.

Other uses of coal

Coal powder is burnt to produce energy to make cement. Large amounts of energy are required to produce cement — about 450 grams of coal is burnt to make 900 grams of cement.

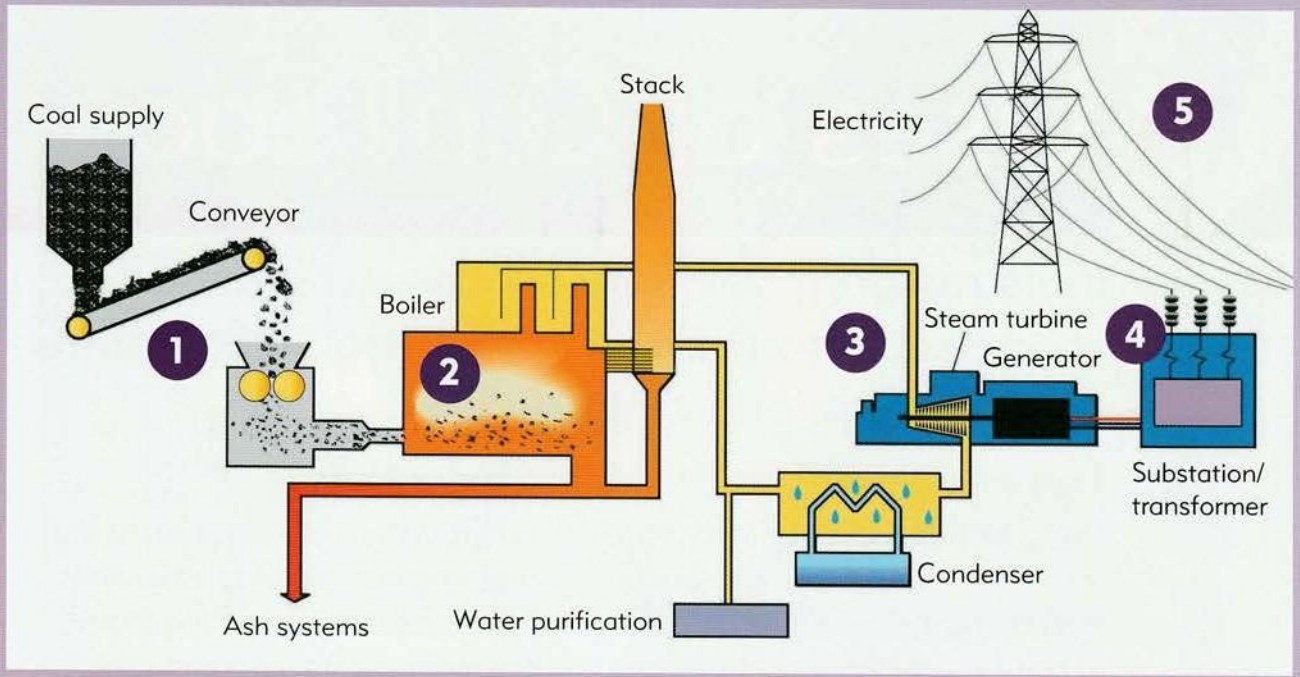
Several chemical products are made from the by-products of coal. Coal tar is used to make creosote oil (used to protect wood) and naphthalene (formerly used in mothballs). Coal or coal by-products are found in soap, dyes, plastics and fibres such as nylon.

Coal is also an ingredient in the production of carbon fibre, an extremely strong but lightweight material.

Uses

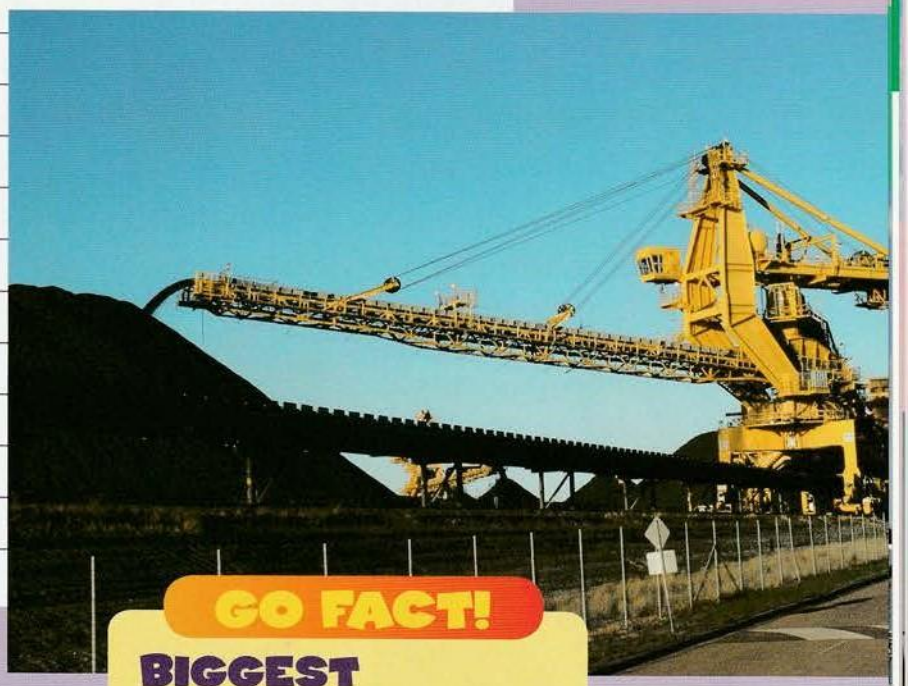
One-quarter of this F-22 Raptor
by weight is made of carbon fibre.

How Coal-fired Power Stations Generate Electricity



Who Uses Coal-fired Power Stations?

Country	Amount of Electricity Produced by Coal
Poland	93%
South Africa	93%
Australia	80%
China	78%
Israel	71%
Kazakhstan	70%
India	69%
Morocco	69%
Czech Rep	59%
Greece	58%
USA	50%
Germany	47%



GO FACT!

BIGGEST

Coal is Australia's largest single export.

Uses of Oil Today

In its raw form, oil has few uses. It must be processed into products like petrol, lubricating oils, bitumen and chemicals.

Fuel and power

Oil is distilled at a refinery to make different products. The main products are fuels — petrol and diesel for cars and trucks, for aircraft. A Boeing 747 uses more than 2 000 litres of jet fuel just to take off.

Liquefied petroleum gas (LPG) is used for heating, cooking and as a vehicle fuel. It is stored in metal containers under pressure as a liquid. When heated, it can be burnt in power stations to generate electricity and in boilers as a waterproofing material, especially on flat roofs. It can also be used to build canals and dams, and make inks and paper. Another by-product of distilling oil is wax. It is used to make candles and the waterproof coverings for food and drink cartons.

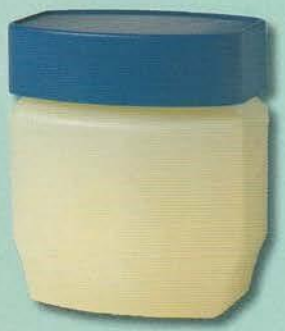
Slippery oils

Lubricating oils keep machines and engines running smoothly. This includes everything from passenger cars, motorcycles, and marine engines and lawnmowers, to trucks, mining equipment and other industrial applications.

Oil for roads as a vehicle fuel. Bitumen is left after everything else has been removed from oil. When heated, it can be used to make roads. It is used to drive ships. especially on flat roofs. It can also be used to build canals and dams, and make inks and paper. Another by-product of distilling oil is wax. It is used to make candles and the waterproof coverings for food and drink cartons.

Plasticine is made -from petroleum.

Propane is a gas that is made from petroleum. It is used to lift hot-air balloons.



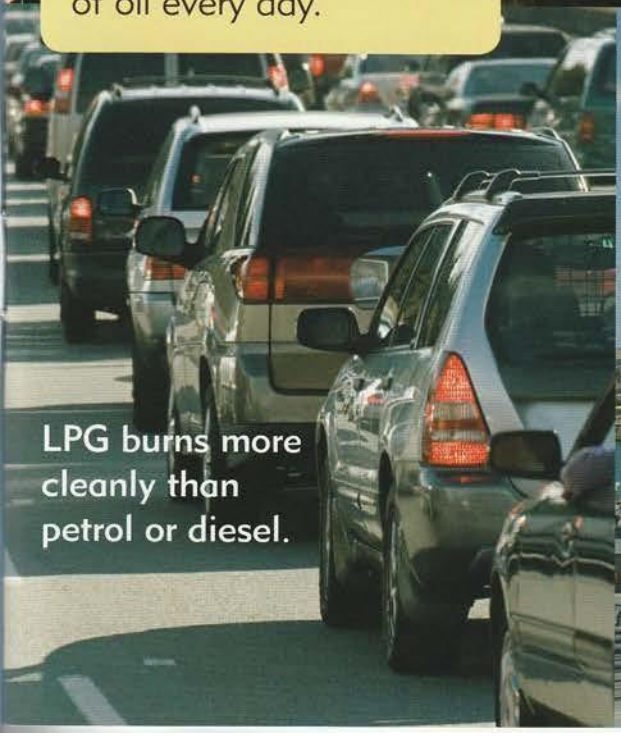
Vaseline is a type of petroleum jelly. People use it on their skin to protect cuts and scrapes.

One barrel of oil produces about 86 litres of petrol for cars and other machines.

GO FACT!

DID YOU KNOW?

The world consumes about 85 million barrels of oil every day.



LPG burns more cleanly than petrol or diesel.

Australia has seven major oil refineries — two in Queensland, two in New South Wales, two in Victoria and one in Western Australia.

Petrochemicals

Petrochemicals are chemicals made from petroleum. Petrochemicals are made into products we use everyday.

In 1 872, carbon black was the first chemical to be made from petroleum. Carbon black is used to make certain types of rubber.

Making petrochemicals Petrochemicals are made at oil refineries. Some are made by heating and then rapidly cooling oil. Others are created by mixing certain gases with steam.

Basic petrochemicals are then converted into more complicated petrochemicals. One of the most important processes is polymerisation, which makes chains of petrochemicals. It is used to make plastics, fibres and synthetic rubber.

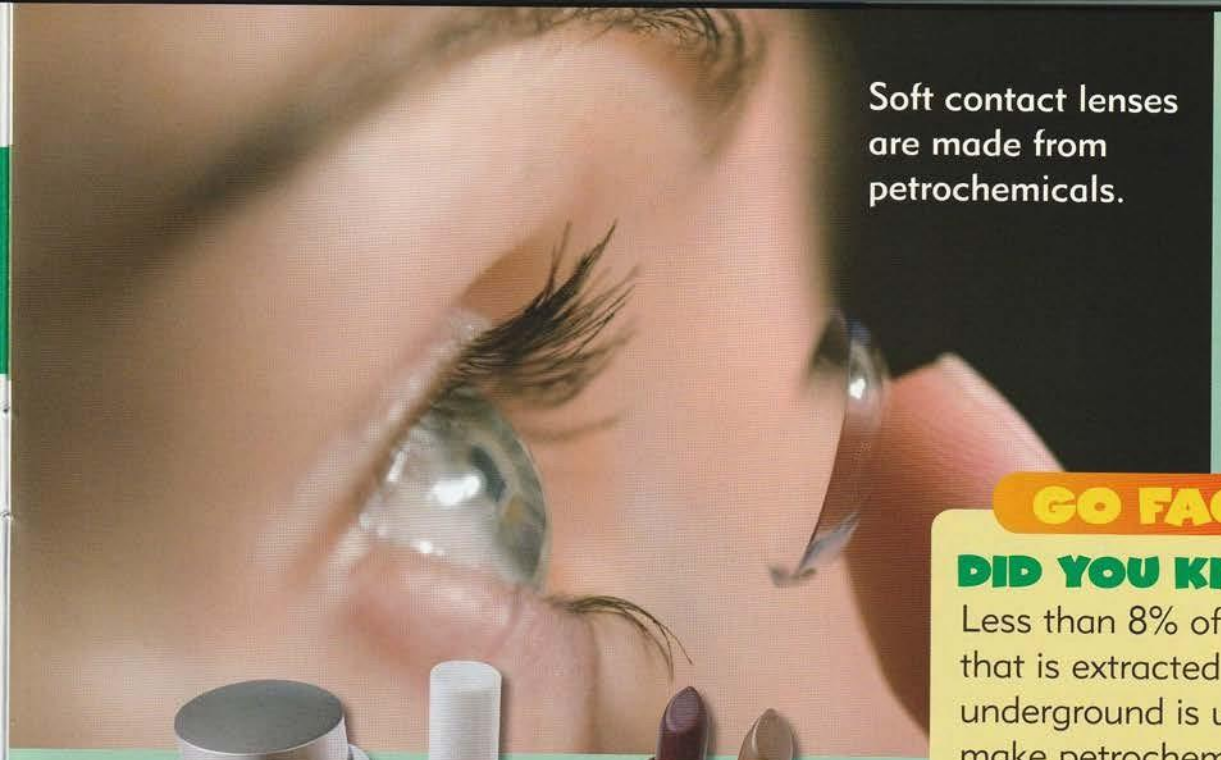
Some petrochemicals and their end products are:

- vinyl acetate, for paint, paper and fabrics

  vinyl chloride, for plastic pipes, electric wires, street signs and fabric resin, for plastics ethylene glycol, for polyester fabric and engine coolants styrene, for rubber and plastic manufacturing.

Other common products made from petrochemicals include paint, detergent, cosmetics, fertilisers, insect repellents, sewing threads, umbrellas and car seats.

Petrochemicals are used to make bubble gum.



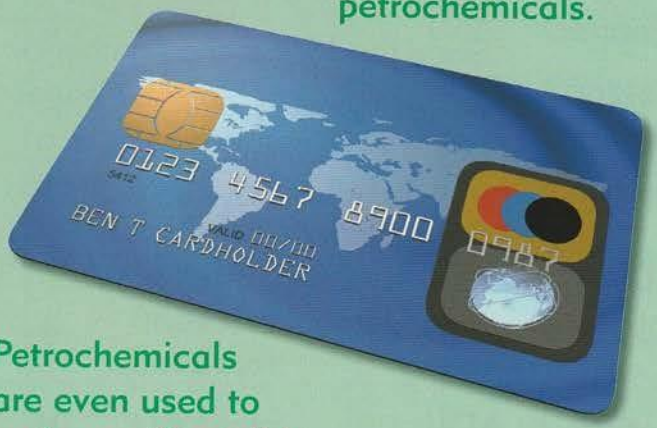
Soft contact lenses are made from petrochemicals.

GO FACT!

DID YOU KNOW?

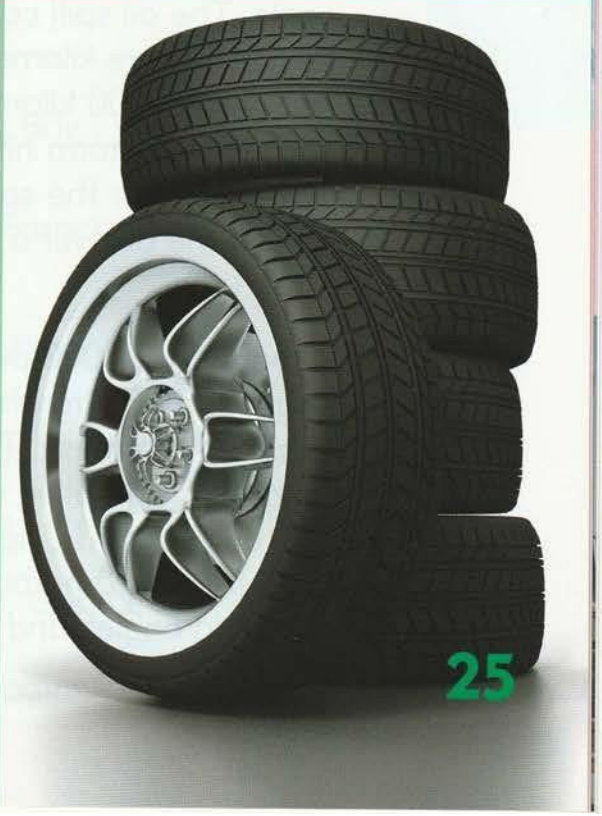
Less than 8% of the oil that is extracted from underground is used to make petrochemicals. The rest is used to make petrol and other types of fuel.

Some cosmetics contain petrochemicals.



Petrochemicals are even used to make credit cards!

About 70% of all carbon black produced is used in tyres and ink **pigment**.



Oil Spills

Oil spills are when oil tankers or oil rigs leak oil into the sea or onto land. The spill from the oil tanker Exxon Valdez in 1989 was one of the most damaging to the environment.

Leaving Alaska

At 12:04 am on 24 March 1 989, the Exxon Valdez ran aground on Bligh Reef in Prince William Sound, Alaska. The crash damaged the side of the ship, leaking over 35 600 tonnes of oil into the water. That is the same as 125 Olympic-sized swimming pools. The oil spill covered about 28 000 square kilometres of sea and 15 000 kilometres of coastline. A storm hit the area two days after the spill. This spread the oil over a wider area. Cleaning up Ultimately, 1 1 000 people, 1 400 boats and 85 aircraft helped to clean up the mess. The Exxon Valdez oil spill killed about 250 000 seabirds, nearly 3 000 sea otters, 300 harbour seals, 250 bald eagles and up to 22 killer whales.

The spill also damaged the fishing and tourism industry in Alaska. After the spill, polluted areas were closed to herring, salmon, shrimp and crab fishing. The year of the oil spill, commercial fishermen in Alaska lost over $130 million.

More than 20 years after the accident, there is still oil on the coast of Prince William Sound.

eo FACT!

DID you KNOW?

Since the 1990s, the number of oil spills has decreased. New oil tankers are required to have a double-hull lining. This protects the bottom of the ship and reduces the chances of oil leaking into the ocean.

2	Atlantic Empress	1979	Off Tobago, West Indies	287 000
	ABT Summer	1991	Off Angola	260 000
	Castillo de Bellver	1983	Off Saldanha Bay, South Africa	252 000
4	Amoco Cadiz	1978	Off Brittany, France	223 000
5	Haven	1991	Genoa, Italy	144 000
6	Odyssey	1988	Off Nova Scotia, Canada	132 000
7	Torrey Canyon	1967	Scilly Isles, UK	1 19 000
	Sea Star	1972	Gulf of Oman	15 000
	Irenes	1980		100 000

	Serenade		Navarino Bay, Greece	
10	Uriquiola	1976	La Coruna, Spain	100 000

Some of the Worst Oil Spills since 1967

Rank	Ship name	Year	Location	Size of Spill (tonnes)
1	Atlantic Empress	1979	Off Tobago, West Indies	287 000
2	ABT Summer	1991	Off Angola	260 000
3	Castillo de Bellver	1983	Off Saldanha Bay, South Africa	252 000
4	Amoco Cadiz	1978	Off Brittany, France	223 000
5	Haven	1991	Genoa, Italy	144 000
6	Odyssey	1988	Off Nova Scotia, Canada	132 000
7	Torrey Canyon	1967	Scilly Isles, UK	119 000
8	Sea Star	1972	Gulf of Oman	115 000
9	Irenes Serenade	1980	Navarino Bay, Greece	100 000
10	Uriquiola	1976	La Coruna, Spain	100 000

Clean Coal Technology

Coal-fired power stations produce greenhouse gases, which contribute to global warming. New clean coal technologies (CCT) reduce the amount of greenhouse gases released so that burning coal is less damaging to the environment.

Clean coal technologies Clean coal technologies capture and store greenhouse gases before they enter the atmosphere. They collect the gases, concentrate them, and pump them deep underground for permanent storage. Also, when coal is burnt it releases a harmful gas called sulphur dioxide. To reduce the amount of sulphur dioxide emissions, power stations can wash and scrub coal before it is burnt.

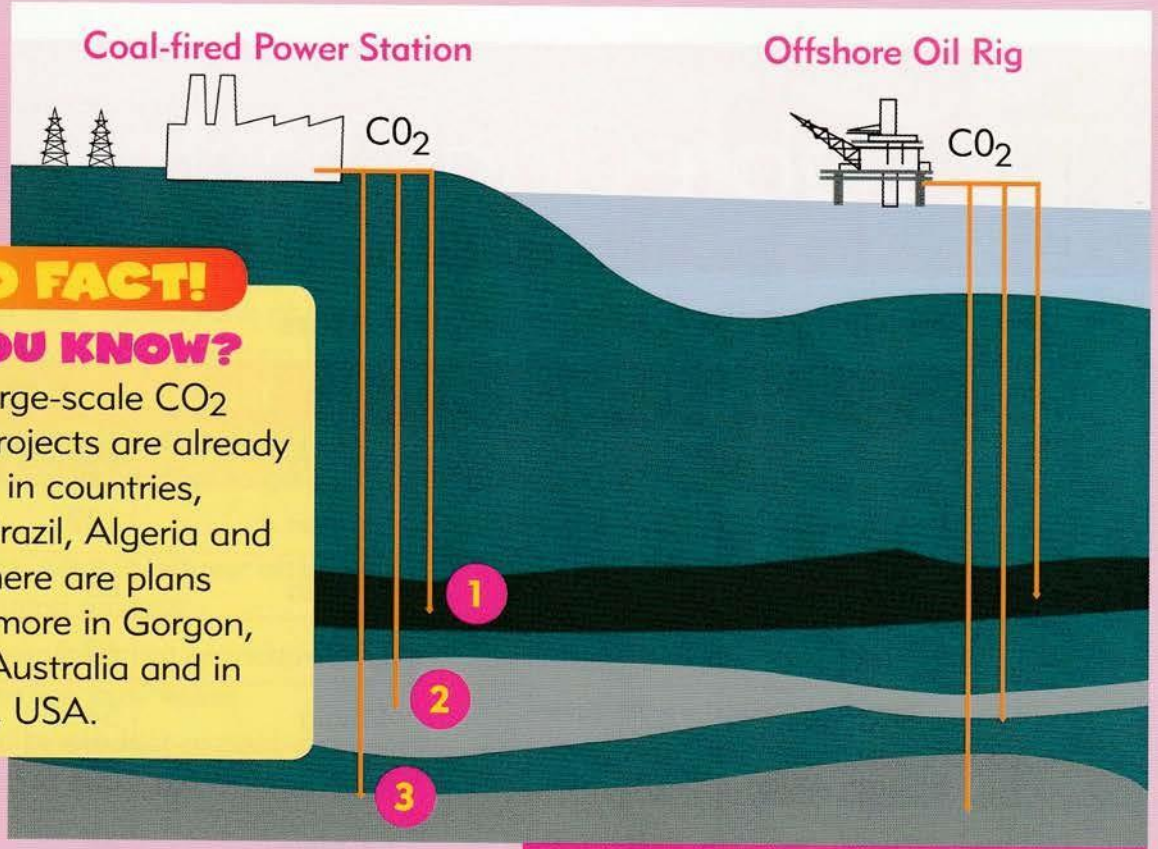
It's the best way

People who support CCT say that the technologies work and have been used in projects in Norway, Canada, Germany and Algeria. They believe that the coal and power industries are so large and important to the world's production of electricity that there is no other way to realistically reduce the production of greenhouse gases.

There are better ways

People against CCT argue that it does not capture and store all the harmful gases. Some poisonous gases still enter the atmosphere. They point out that CCT is very expensive and has still not been used at a large coal-fired power station, so it is unproven and may not work. Coal is also a non-renewable resource — it will run out. People argue that society should develop new, clean ways of making electricity, eg by using wind and solar energy.

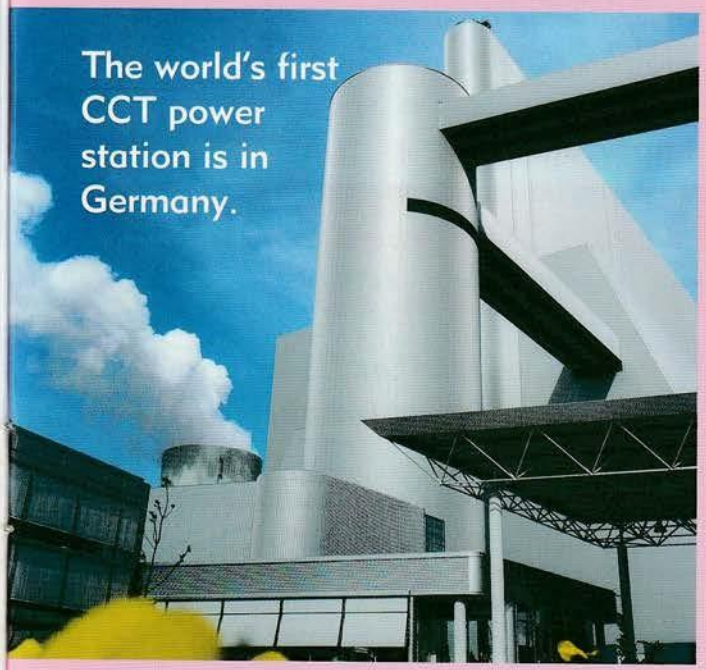
How Carbon Dioxide (CO_2) Could Be Stored



GO FACT!

DID YOU KNOW?

Several large-scale CO_2 storage projects are already operating in countries, such as Brazil, Algeria and Japan. There are plans to install more in Gorgon, Western Australia and in Wyoming, USA.



The world's first CCT power station is in Germany.

1. Carbon dioxide is pumped into unused coal deposits.
2. Carbon dioxide is pumped into oil reserves. This also makes it easier to extract the oil.
3. Carbon dioxide is stored safely in rock and water reservoirs that are deep underground.

Coal-fired power stations release about nine billion tonnes of carbon dioxide every year.

Table

Top World Coal Exporters and Importers

Top Coal Exporters		Top Coal Importers	
Country	Millions of Tonnes	Country	Millions of Tonnes
1 Australia	244	1 Japan	182
2 Indonesia	202	2 Korea	88
3 Russia	100	3 Taiwan	69
4 Colombia	67	4 India	54
5 South Africa	67	5 UK	50
6 China	54	6 China	48
7 USA	53	7 Germany	46

Top World Oil Exporters and Importers

Top Oil Exporters		Top Oil Importers	
Country	Millions of Barrels	Country	Millions of Barrels
1 Saudi Arabia	8.65	1 USA	12.22
2 Russia	6.57	2 Japan	5.10
3 Norway	2.54	3 China	3.44
4 Iran	2.52	4 Germany	2.48
5 United Arab Emirates	2.52	5 South Korea	2.15
6 Venezuela	2.20	6 France	1.89
7 Kuwait	2.15	7 India	1.69

Glossary

black coal the highest rank of coal; hard, glossy, mainly used for heating homes and other buildings brown coal the lowest rank of coal; used almost exclusively as fuel to generate electricity by-product what is leftover after the manufacturing process catering services that provide food and drink, often for businesses coal tar a by-product of coal; a thick black liquid, used to make dyes, medicine and soap compress to press or squash together coolant a substance, usually a liquid, used to prevent an engine, or other machinery, from overheating decay when something breaks down into many parts deposits where natural materials have collected

distilled when a liquid has been purified emissions something that is produced or given out energy the power that drives machinery extracted pulled out generator a machine that turns mechanical energy into electrical energy geologist a scientist who studies the Earth global warming an increase in the world's temperatures, believed to be caused in part by the greenhouse effect
greenhouse gases gases that increase the temperature of the Earth's atmosphere Industrial Revolution a period of time during the late 18th to early 19th Century, when machines were used more in factories iron ore a natural material that contains the metal iron likelihood a probable event; something that is likely to happen liquefied to become a liquid lubricating oil a substance that helps moving parts to move smoothly and easily Mesopotamians peoples who lived in southwest Asia, about 5 000 years ago Middle East the region from Egypt to Iran mummy the body of a person or animal that has been preserved and wrapped in cloth, a custom in ancient Egypt peat deposit of compressed, decaying organic debris petroleum a thick, dark oil found under the Earth or under the seabed pigment a substance that adds colour to something, such as paint or ink seismic survey a test that involves studying vibrations within the earth surveyor a person who measures the details of areas of land trillion a million times a million turbine a machine with blades that are turned by water, steam or gas

Index