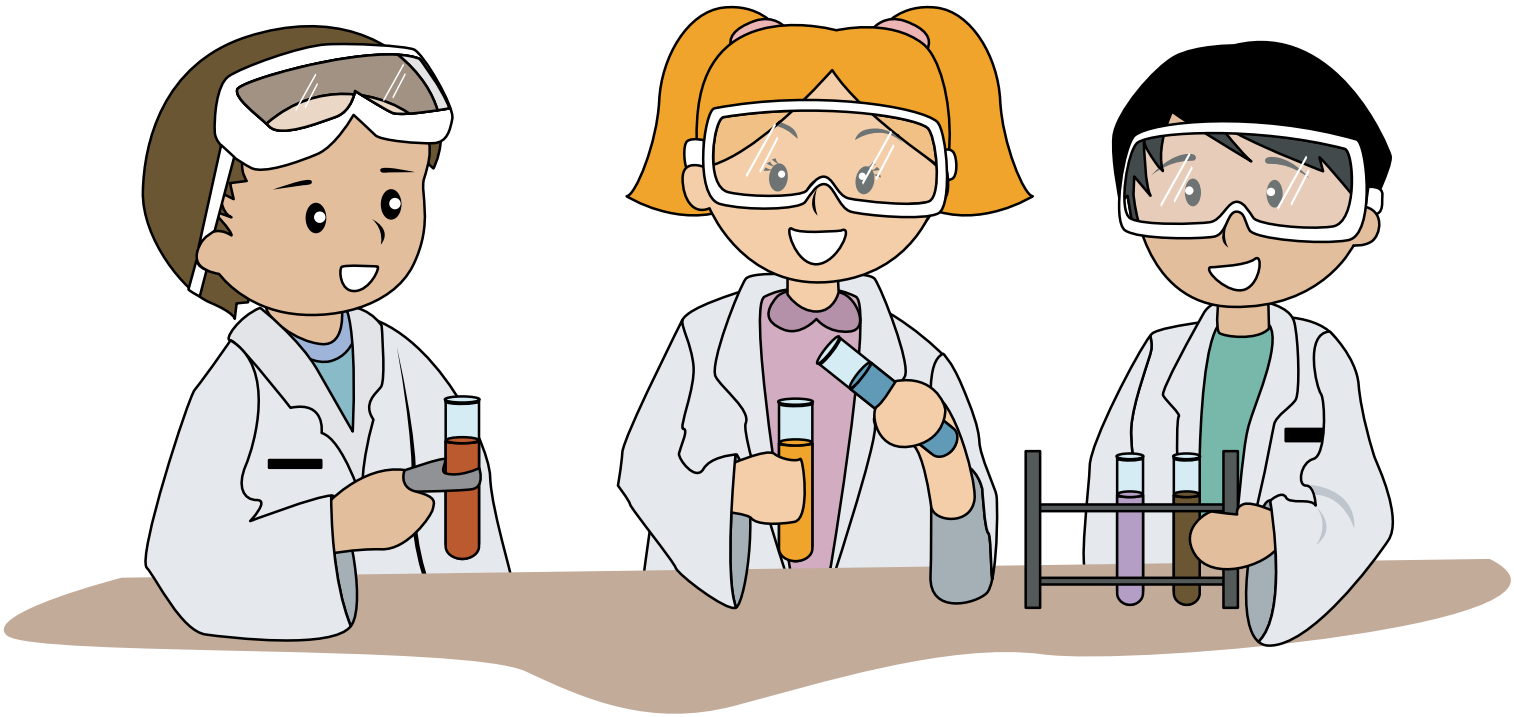
SCIENCE TODAY



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Education Editor

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Courier Mail Bulletin Bulletin Cairns Post
Inspire
Igniting minds.
nie The Advertiser
nie Newspapers in Education
The Daily Telegraph

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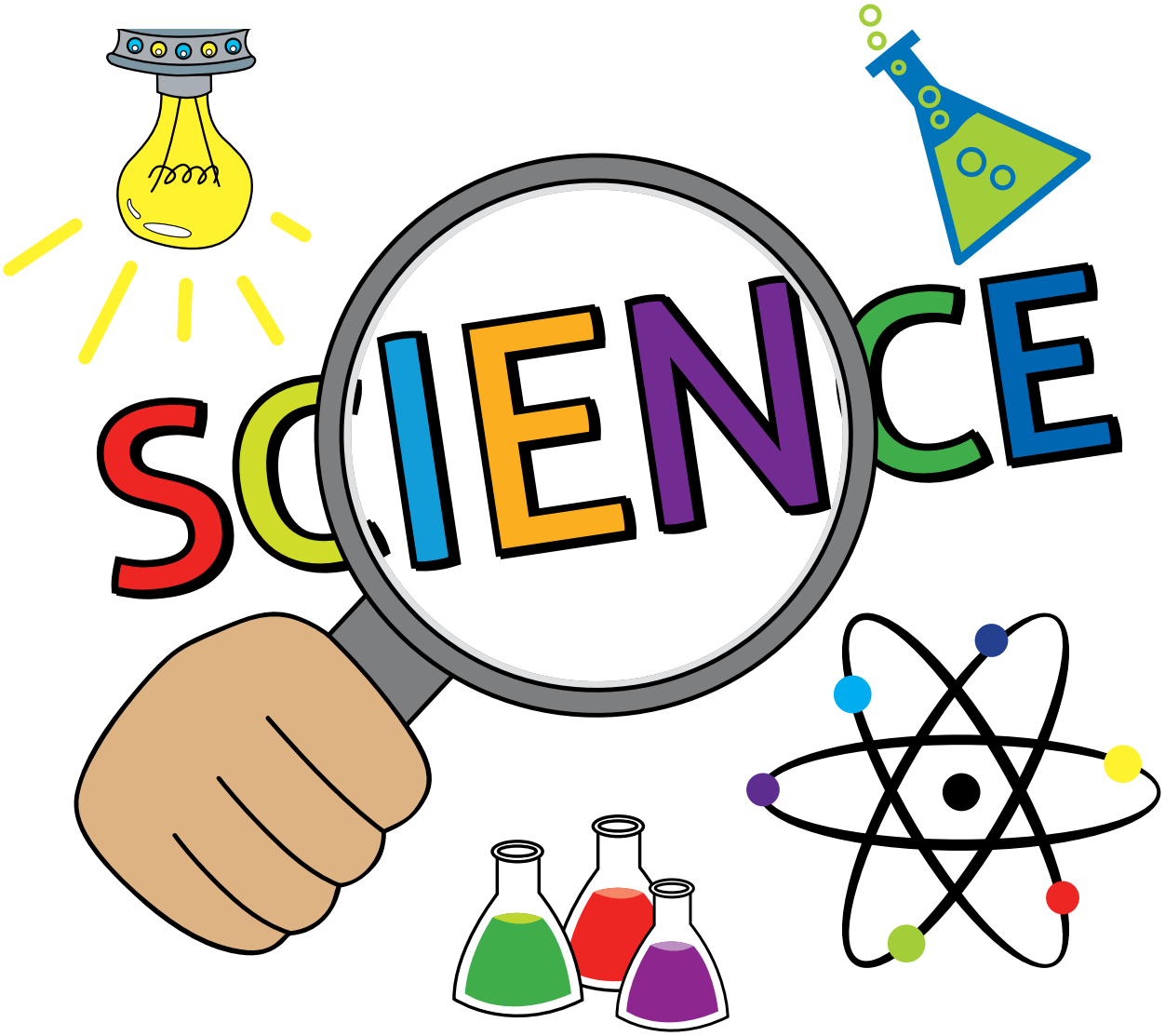
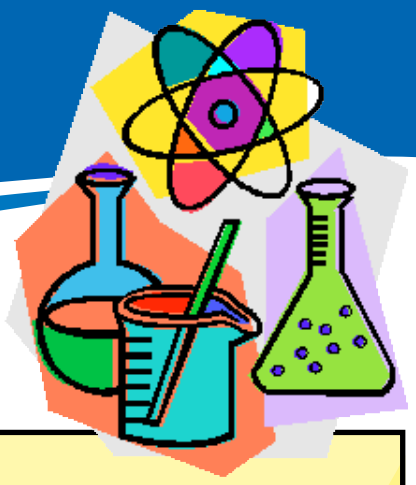
SCIENCE TODAY



Science today

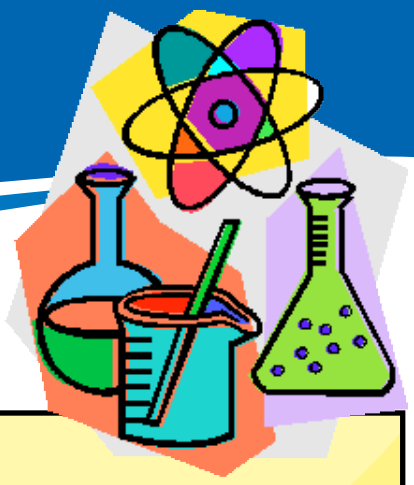


Write short paragraph responses to the following questions.

Why is science important in our lives?

Why are scientists so important?

Science today



Write short paragraph responses to the following questions.

Why is it important to be scientifically literate?

Why is it important to do scientific research and development?

How does a poor government commitment and investment impact on science?

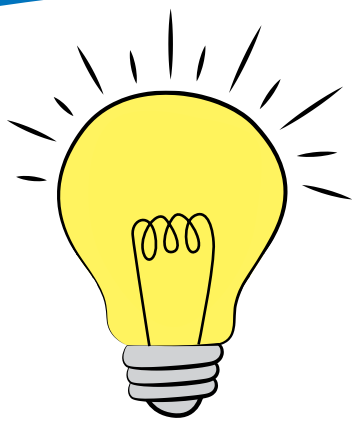
Branches of science

Can you match each of the following sciences with its correct definition?

BACTERIOLOGY	Study of skin
AGRONOMICS	Study of climate
ACOUSTICS	Study of the distribution, occurrence, properties, chemistry and circulation of water on the earth
EPIDEMIOLOGY	Study of productivity of land
BACTERIOLOGY	Study of evolution, structure, classification and pathogenesis of viruses
HYDROLOGY	Study that deals with the composition, properties, reactions, and the structure of matter.
GEOLOGY	Study of function and pathology of endocrine glands
GENETICS	Study of the chemistry, crystal structure, and physical (including optical) properties of minerals
CLIMATOLOGY	Study of heredity and variation of organisms as well as the patterns of inheritance of specific traits
DERMATOLOGY	Study of bacteria
VIROLOGY	Study of diseases; epidemics
CHEMISTRY	The study of bacteria in relation to disease
MINERALOGY	Study of origin, history, evolution and structure of the earth's crust. It also involves the examination of soil and rocks.
ENDOCRINOLOGY	Science of sound

Check answers:
https://www.factmonster.com/science/general-science/branches-science
https://en.wikipedia.org/wiki/Branches_of_science

Science Legacy



Science has invaded every branch of modern life from the food we eat to the clothes we wear. Science makes everyday life easier than it ever has been. One of the most powerful examples was the harnessing of electricity. This changed people's lives forever.

Research to learn how each of the following contributed to our knowledge and understanding of electricity.

Benjamin Franklin (1706 – 1790)

James Watt (1736-1819)

Science Legacy

Research to learn how each of the following contributed to our understanding of electricity.

Alessandro Volta (1745-1827)

André-Marie Ampère (1775-1836)

Georg Ohm (1787-1854)

Science Legacy

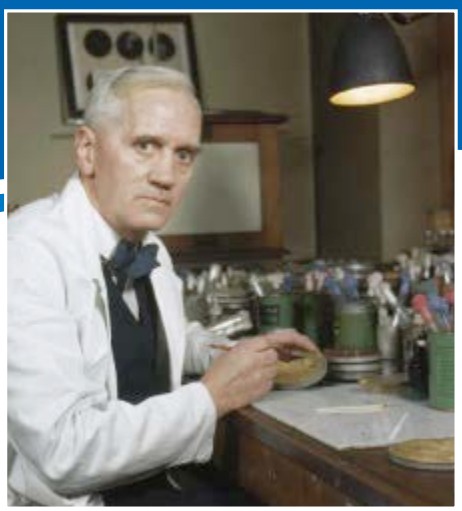
Research to learn how each of the following contributed to our understanding of electricity.

Michael Faraday (1791-1867)

Thomas Edison (1847-1931)

Nikola Tesla (1856-1943)

Science Legacy



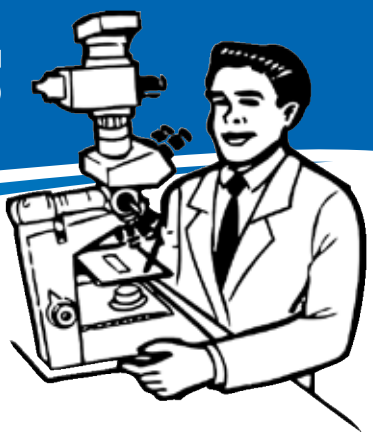
Professor Alexander Fleming revolutionised medicine with his discovery of penicillin. Photo: wikipedia.org

The development of antibiotics has made a huge impact on the lives of billions of people.

Write a short essay on the importance of another scientific discovery that has made a major impact.

Detail its discovery or invention.

World of discoveries



List and describe six of the major scientific achievements or discoveries of the 20th century?

1.

2.

3.

4.

5.

6.

Latest scientific discoveries

List and describe a top scientific discovery that has been made so far this century.

E.G. 2012 - Higgs boson, new sub-atomic particle, was discovered at CERN. The particle was named for Peter Higgs, one of the physicists who proposed its existence. It later became popularly known as the "God particle."

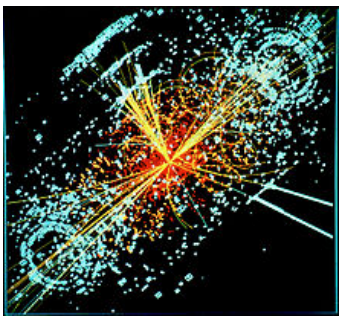
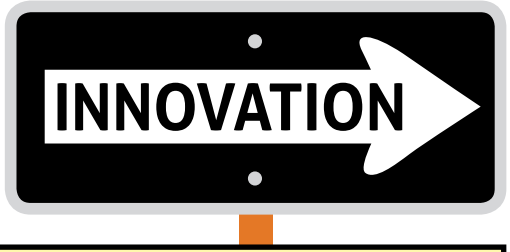


Image: Wikipedia.org

21st century innovations

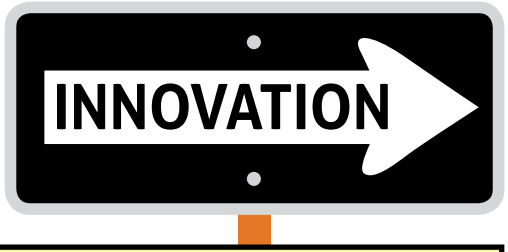


Describe how each of the following are changing the way we live in the modern world?

Augmented reality:

Self-driving cars:

21st century innovations

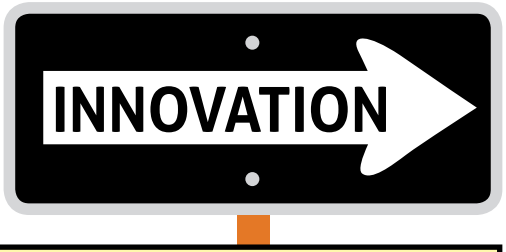


Describe how each of the following are changing the way we live in the modern world?

Robotics:

Nanotechnology:

21st century innovations



Describe how each of the following are changing the way we live in the modern world?

Genetic engineering:

Artificial intelligence:

3D printing

Image: www.allthat3d.com

The invention of 3D printing has ushered in a new era of manufacturing.

Explain how 3D printing is bringing significant and rapid changes to manufacturing.

Superstars of science today

Explain how Professor Brian Greene, Professor Brian Cox, Professor Michio Kaku and Neil DeGrasse Tyson have helped to popularise science?

What are the essential skills of good science communicators?

SPACE SCIENCE

Image: https://commons.wikimedia.org/wiki/File:Milky_Way_infrared.jpg

THE MILKY WAY

There are over 100 billion stars in the Milky Way galaxy.
If you tried to count them one by one, it would take you over 3000 years!

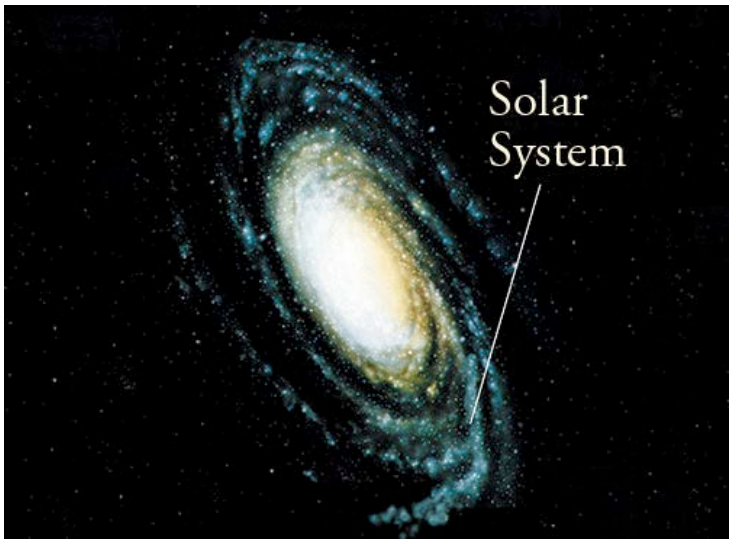


Image: http://pics-about-space.com/our-solar-system-in-the-milky-way?p=3

Planet Earth

PHOTO: NASA/Apollo 17 crew.

"The Blue Marble" is a famous photograph of the Earth taken on December 7, 1972, by the crew of the Apollo 17 spacecraft en route to the Moon at a distance of about 29,000 kilometres.

Write a short descriptive paragraph as a response to this photo.

Our cosmic backyard – Solar System

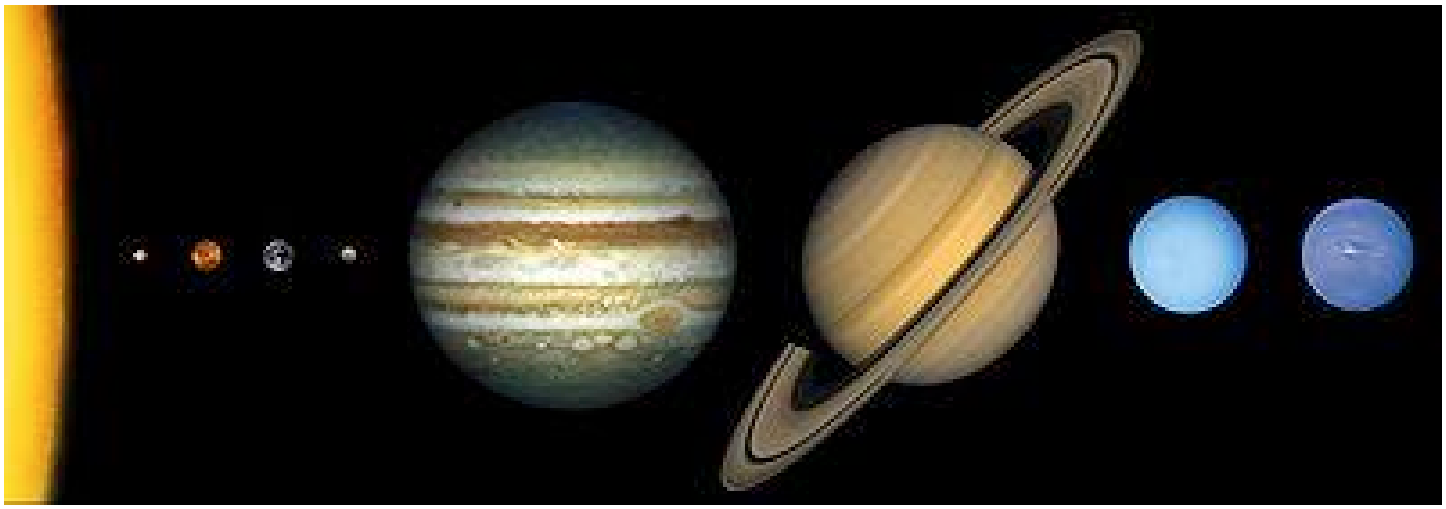


Image: nasa.gov

This includes the Sun, Earth and the Moon, the major planets including Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune, their satellites, as well as smaller bodies including comets, asteroids, and dust.

Write a fact file on the Sun.

First explorations of the Solar System

The first real explorations of the Solar System were conducted by telescope.

Research to learn how each of the following contributed to our knowledge of our Solar System.

Image: Wikipedia.org

Galileo Galilei

Image: Wikipedia.org

Eratosthenes

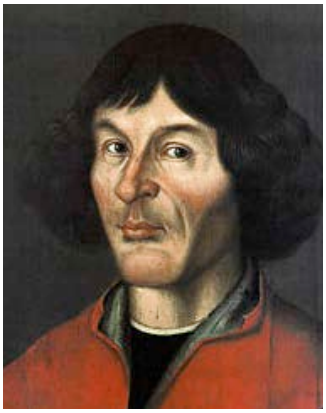


Image: Wikipedia.org

Nicolaus Copernicus

First explorations of the Solar System

The first real explorations of the Solar System were conducted by telescope.

Research to learn how each of the following contributed to our knowledge of our Solar System.

Image: Wikipedia.org

Tycho Brahe

Image: Wikipedia.org

Johannes Kepler

Image: Wikipedia.org

Edwin Hubble

Modern day planet hunters

Why have each of the following been named in TIME's 2017 Top 100 most influential people?

Write a paragraph on the nature of their work and their achievements.

Research link:
http://time.com/collection/2017-time-100/

Image: Wikipedia.org

Natalie Batalha from NASA's Ames Research Centre in California's Silicon Valley.

Photo: nasa.gov

Michael Gillon from the University of Liège in Belgium.

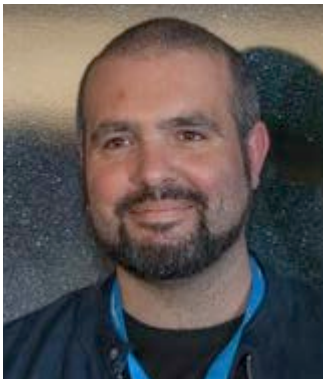


Photo: nasa.gov

Guillem Anglada-Escudé from the Queen Mary University in London.

Orbiting the Sun

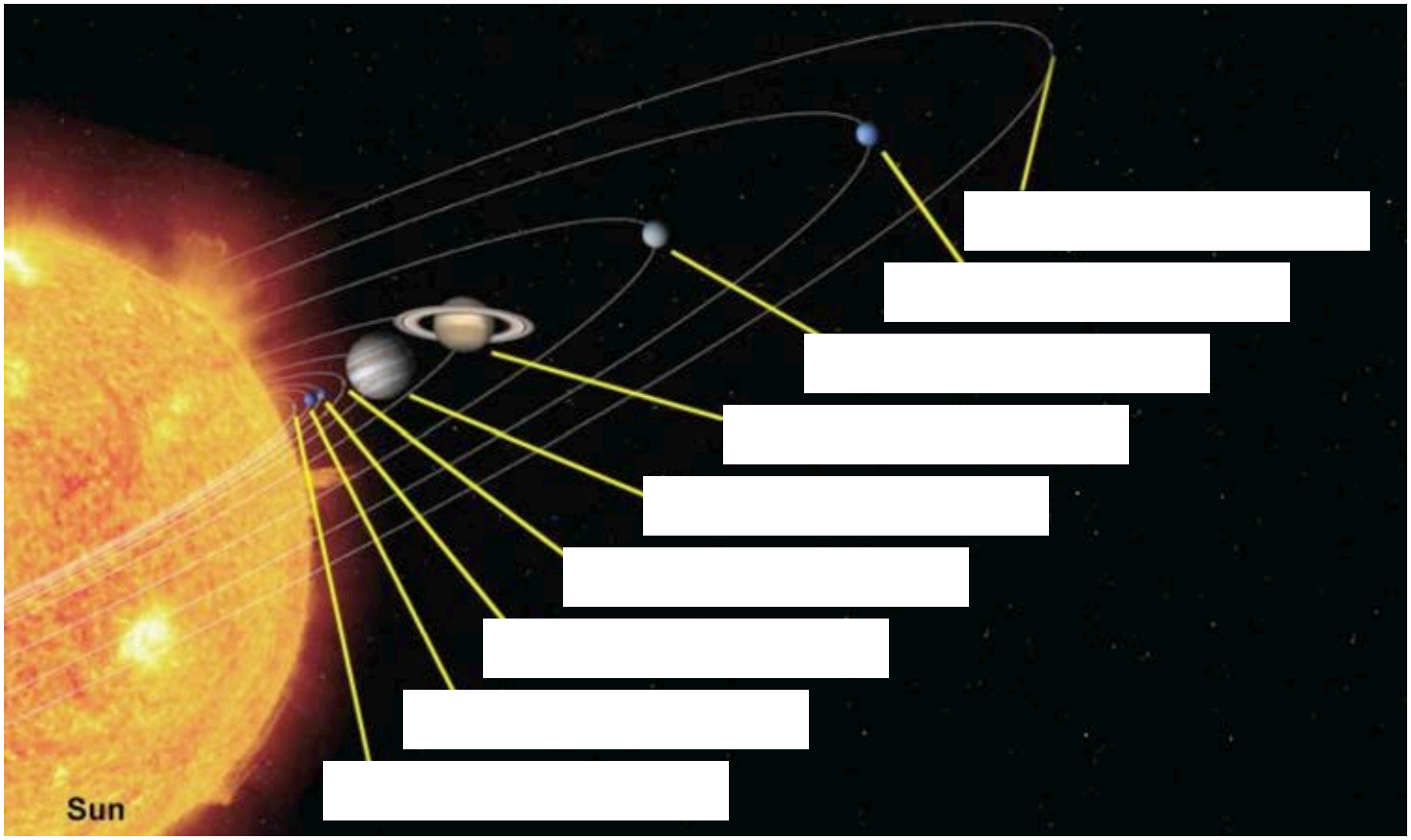
Image: nssdc.gsfc.nasa.gov

Complete the following table about the ORBITS of the planets of the SOLAR SYSTEM.

Planet	Distance from the Sun (millions of km)	Time for one orbit of the Sun
Earth	150 million km	365 days
Mercury		
Venus		
Mars		
Jupiter		
Saturn		
Uranus		
Neptune		
Pluto		

Explain why the planets have elliptical orbits?

The Solar System



Name each of the planets indicated above.

Explain why the planets go around the Sun?

_____

_____

_____

_____

_____

What is the third planet from the Sun?

_____

Name the 'inner' planets.

_____

_____

_____

_____

_____

Name the planet that is closest to the sun.

_____

The Solar System

Answer the following questions:

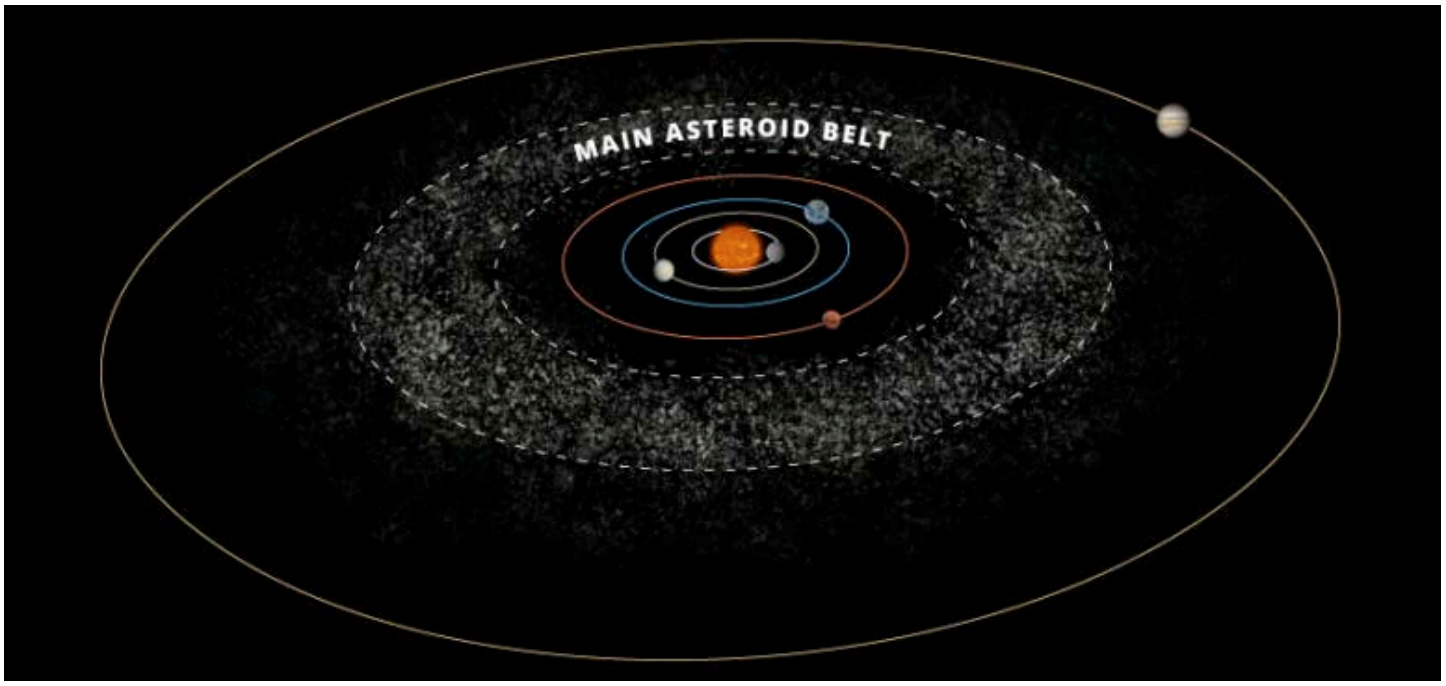


Image: http://space-facts.com/asteroid-belt/

What is the asteroid belt? Where is it located?

Name the 'outer' planets.

What is the Kuiper Belt and where is it located?

The Solar System

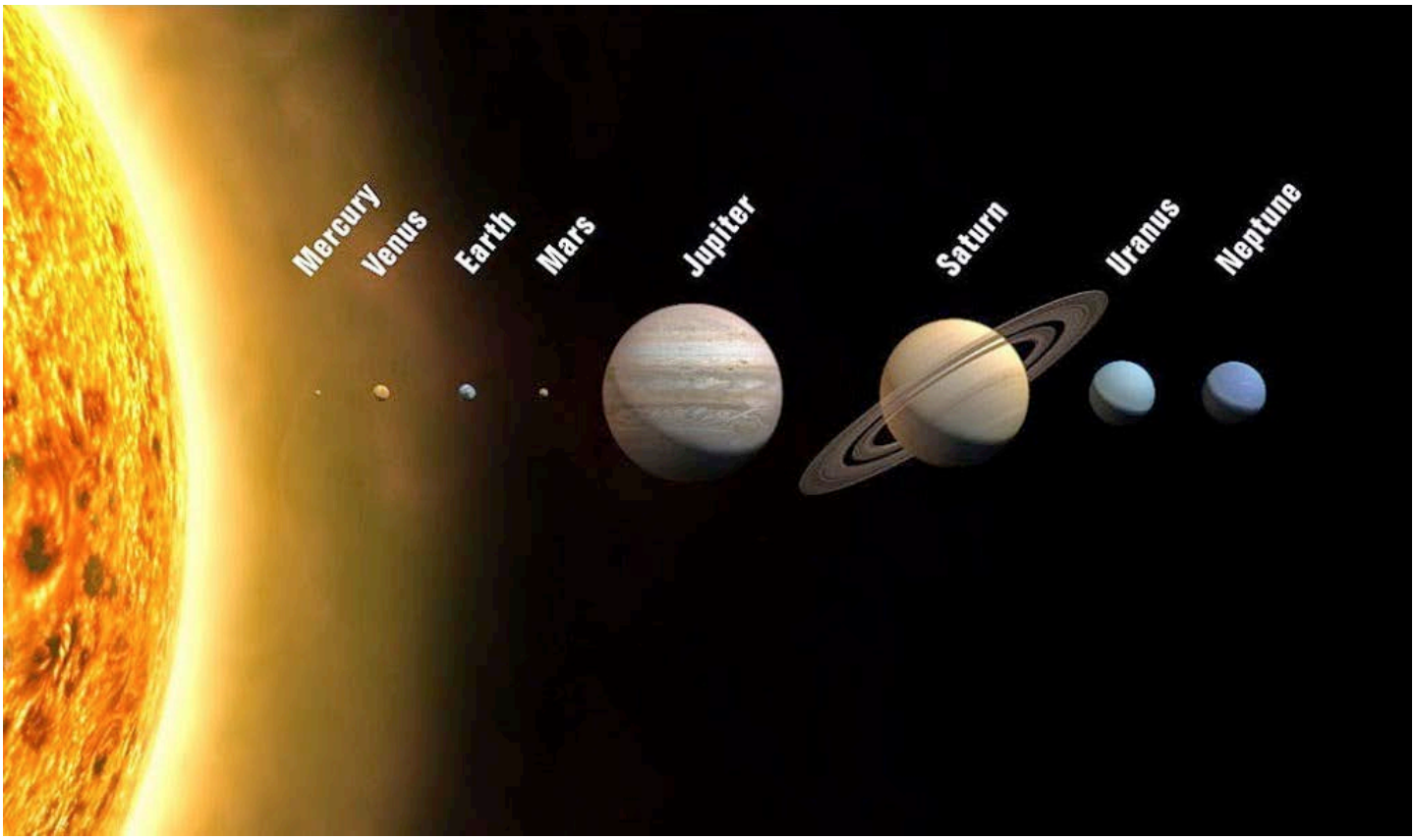


Image: nasa.gov

Compare and contrast an inner planet with an outer planet.

Inner planet: _____	**Outer planet:** _____

The Sun

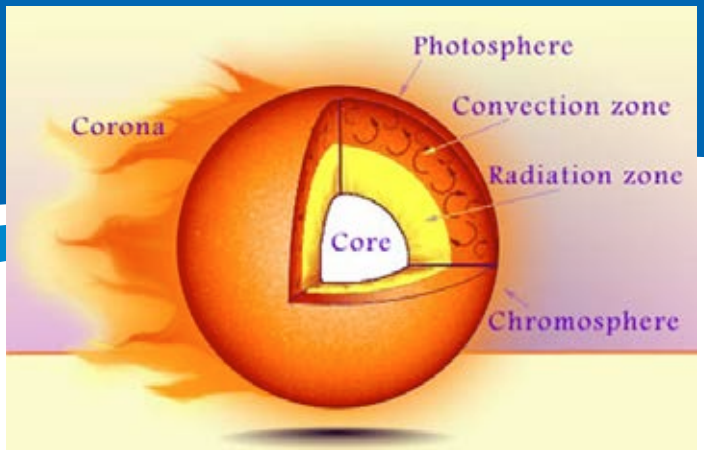


Image: http://slideplayer.com/slide/4074025/

Reference links:
https://www.nasa.gov/sun
http://nineplanets.org/sol.html
http://space-facts.com/the-sun/

Use the reference links quoted above to answer the following questions:

Write down some basic facts about the Sun.

1.

2.

3.

4.

5.

6.

Describe each of the layers of the Sun.

CORE:
RADIATION ZONE:
CONVECTION ZONE:
PHOTOSPHERE:
CHROMOSPHERE:

The Sun

Reference links:
https://www.nasa.gov/sun
http://nineplanets.org/sol.html
http://space-facts.com/the-sun/

Use the reference links quoted above to answer the following questions:

What are solar flares?

_____

_____

_____

What is a solar prominence?

_____

_____

_____

What is the solar cycle?

_____

_____

_____

What are solar spots?

_____

_____

_____

Solar Eclipses

Image: http://space-facts.com

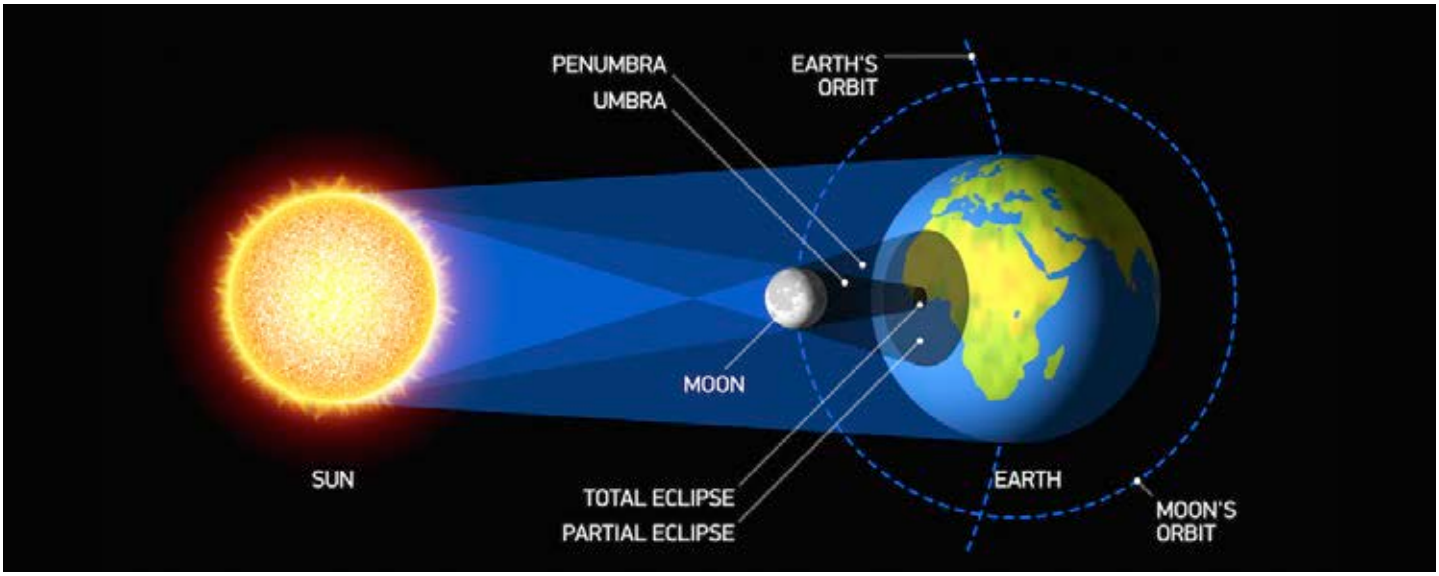


Image: http://space-facts.com

Use the above illustrations to explain how a solar eclipse occurs.

Solar Eclipses

Answer the following questions.

What is a partial solar eclipse?

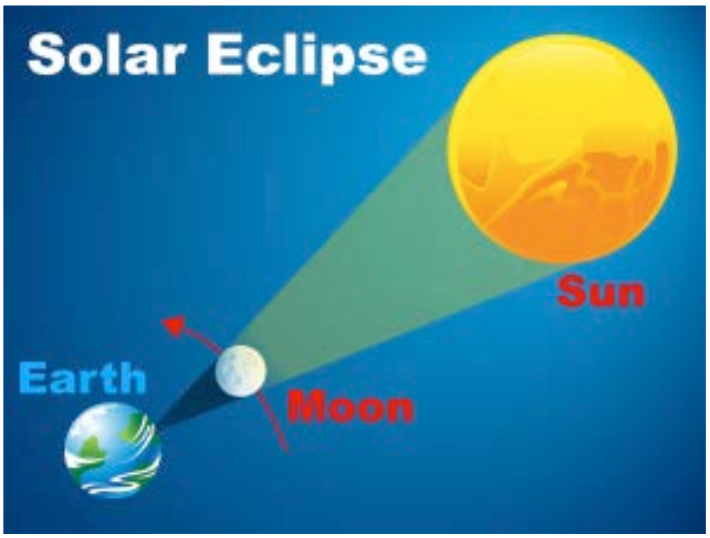


Image: nasa.gov

What is an annular solar eclipse?

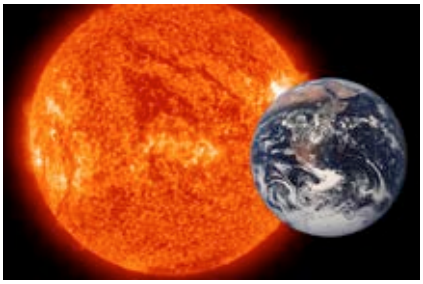
When are the next few total solar eclipses?

How can one safely watch an eclipse?

The SUN and the EARTH

Answer the following questions.

Nothing is more important to us on Earth than the Sun. WHY?



Explain photosynthesis and its importance.

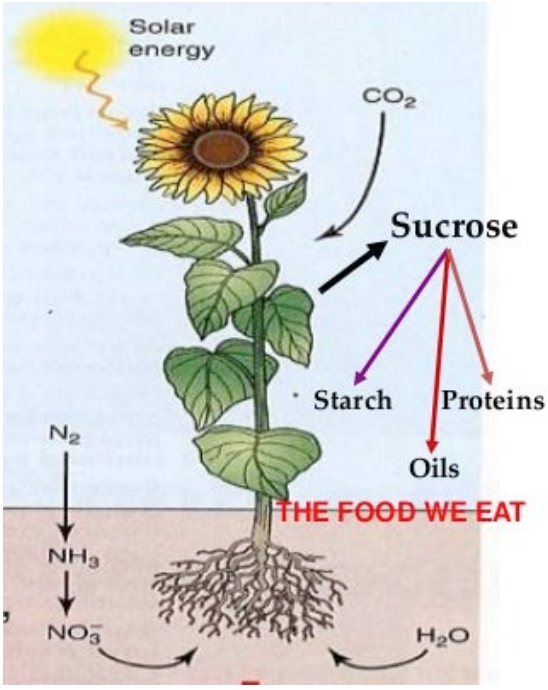
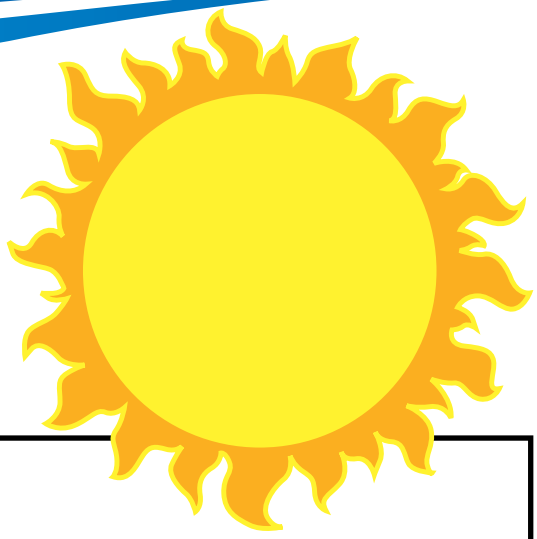


Image:Wikipedia.org

The SUN and the EARTH



The Sun's energy and the water cycle play important roles in the weather patterns seen on Earth.

Explain the role that the sun's energy plays in the Earth's water cycle.

Use an illustration to enhance your explanation.

Glossary

Match each of the following with its correct definition.

asteroid	A cluster of stars, dust, and gas held together by gravity.
corona	A specific path followed by a planet, satellite, etc.
elliptical	The process by which plants use carbon dioxide, nutrients, and sunlight to produce food.
meteor	A shadow which falls on an area of Earth when the Moon moves between the Sun and Earth.
orbit	The Sun and all of the planets, comets, etc. which revolve around it.
solar eclipse	Gases trapped at the edge of the Sun which appear to shoot outward from the Sun's surface.
universe	The very hot outermost layer of a star's atmosphere. Our Sun's corona can only be seen during a total solar eclipse.
solar wind	Shaped like an elongated closed curve.
solar prominences	Meteoroids which burn up in the atmosphere of a space body, such as the Earth, prior to impacting on the surface.
galaxy	The vast expanse of space which contains all of the matter and energy in existence.
photosynthesis	A continuous stream of charged particles which are released from the Sun and hurled outward into space at speeds up to 800 km per second. Solar winds are very prominent after solar flare activity.
solar system	A magnetic storm on the Sun's surface which shows up as a sudden increase in brightness.
solar flare	A rocky space object which can be from a few hundred feet to several hundred km wide. Most asteroids in our solar system orbit the Sun in a belt between Mars and Jupiter.

CHECK YOUR ANSWERS: http://starchild.gsfc.nasa.gov/docs/StarChild/glossary_level2/glossary_text.html

ExoPlanets

Artist's impression of the 10 hot Jupiter exoplanets studied using the Hubble and Spitzer space telescopes. Image credit: NASA/ESA.

Research links :
https://exoplanets.nasa.gov/
http://space-facts.com/exoplanets/
http://www.solarsystemquick.com/universe/exoplanets.htm

Use the links above to learn more about exoplanets.

Write a short response to each of the following questions.

What are exoplanets?
How many exoplanets have been discovered to date ?
What is the closest exoplanet to Earth?
How do we find exoplanets?
What is the habitable zone or "Goldilocks zone"?
What are exoplanets made of?
Are there any exoplanets like Earth?
How do exoplanets get their names?

Proxima Centauri b

Nearest" Earth-like"planet

Research links :
https://www.nasa.gov/feature/jpl/eso-discovers-earth-size-planet-in-habitable-zone-of-nearest-star
http://www.space.com/34510-proxima-b-habitable-ocean-planet.html
http://now.space/posts/proxima-centauri-b/
http://www.australasianscience.com.au/article/science-and-technology/say-hello-earths-nearest-exoplanet-neighbour-proxima-centauri-b.html

The discovery of an Earth-size planet around Proxima Centauri, the nearest star to Earth, has generated a lot of excitement.

Use the above links to learn more.

Write a short response to each of the following questions.

Artist's conception of Proxima Centauri b, with Proxima Centauri and the Alpha Centauri binary system in the background. The actual appearance of the planet is unknown. Source:Wikipedia.org

What are Alpha Centauri, Proxima Centauri and Proxima b?

_____

_____

_____

_____

What do we know about the star Proxima Centauri?

_____

_____

_____

_____

Could Proxima b be another Earth?

_____

_____

_____

_____

Is Proxima Centauri b habitable? What does the latest research reveal?

_____

_____

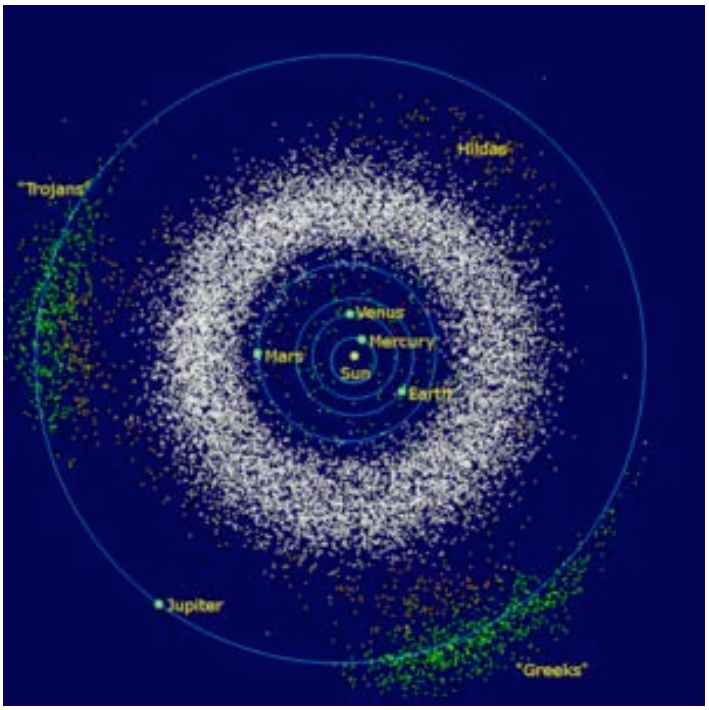
_____

Near-Earth objects

Research links :
https://www.psi.edu/epo/faq/meteor.html
http://nineplanets.org/meteorites.html
http://nineplanets.org/asteroids.html
http://nineplanets.org/comets.html
https://spaceflightnow.com/2017/01/11/two-asteroid-missions-get-nod-from-nasa
https://discovery.nasa.gov/stardust.cfml
http://stardust.jpl.nasa.gov/home/index.html

Use the above links to answer the following questions.

What are Near-Earth Objects (NEOs)?



The asteroids of the inner Solar System and Jupiter: The donut-shaped asteroid belt is located between the orbits of Jupiter and Mars.
Source: https://en.wikipedia.org/wiki/Asteroid_beltMeteors, meteorites, asteroids and comets

What are asteroids and comets? How are they formed ?

Near-Earth objects

What is the Oort Cloud or Kuiper Belt?

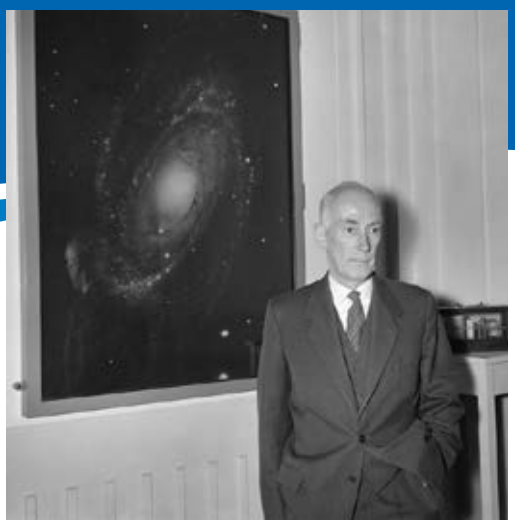
List some facts that scientists have discovered about the Oort Cloud or Kuiper Belt.

Astronomer Gerard Kuiper, after whom the Kuiper belt is named. Photo: wikipedia.org.

What are the differences between an asteroid, comet, meteoroid, meteor and meteorite?

Name some famous comets and asteroids.

Jan Hendrik Oort
(1900 - 1992)



Dutch astronomer Jan Oort, Leiden University, 1961.
Photo: wikipedia.org

The European Space Agency website describes him as, "one of the greatest astronomers of the 20th century," and states that he "revolutionised astronomy through his ground-breaking discoveries."

Write a short biography on this esteemed astronomer. Include a list of his achievements.

International space station

The ISS is the size of a football field. Graphic: nasa.gov

Research links :
https://www.nasa.gov/mission_pages/station/main/index.html
http://www.esa.int/Our_Activities/Human_Spaceflight/International_Space_Station/Highlights/International_Space_Station_panoramic_tour
http://www.esa.int/Our_Activities/Human_Spaceflight/International_Space_Station_Benefits_for_Humanity

Use the above links to research the answers for the following questions:

Name some countries that have participated in the building of the International Space Station.

_____

_____

_____

_____

List the names of some of the previous space stations.

_____

_____

_____

_____

International space station

Answer the following questions:

What is the purpose of the International Space Station?

Image: nasa.gov

What are some of the challenges astronauts face living in a microgravity environment?

List examples of experiments that have been conducted on the ISS?
How do scientists conduct controlled experiments in space?

The cost of completing the ISS will exceed $60 billion.
Do you think that the benefits of this project justify this astronomical cost?

EXTENDED ACTIVITY:
Build your own ISS. https://www.nasa.gov/pdf/616947main_Build_Station_Simulation.pdf

Space spinoffs

Space research and development has led to the creation of numerous products and services that are now widely used around the world.

Image: nasa.gov

"Technology transfer is the agency's oldest continuously operated mission, but our work is ongoing and of continuing significance."

"You can find NASA technology in virtually every facet of modern life."

"Today there are many new technologies being developed at NASA, and we are hard at work accelerating the rate at which they end up in the hands of companies and organisations that can put them to use in spinoff applications."

NASA Chief Technologist David Miller, 2016.

Research link :
https://spinoff.nasa.gov/

Use this research link to learn more about space spinoffs.

Identify and list some of the many of the spin-offs that have impacted on the following areas:

Information technology:

_____

_____

_____

_____

Consumer goods:

_____

_____

_____

_____

Space spinoffs

Image: nasa.gov

Identify and list some of the many of the spin-offs that have impacted on the following areas:

Energy and environment:

Health and medicine:

Transportation:

EARTHQUAKES

Aerial photo of the San Andreas Fault. Photo: wikipedia.org

Structure of the Earth

The Earth consists of four layers: inner core, outer core, mantle and crust.
Research to learn about each of the different parts of the Earth.
Complete the following:

Layer	Composition	Temperature	Thickness
inner core			
outer core			
mantle			
crust			

What is the difference between the continental and the ocean crust?

Tectonic Plates

What are tectonic plates?

Image: wikipedia.org

List five of the largest tectonic plates:

Explain the theory of plate tectonics.

Explain how tectonic plates cause earthquakes?

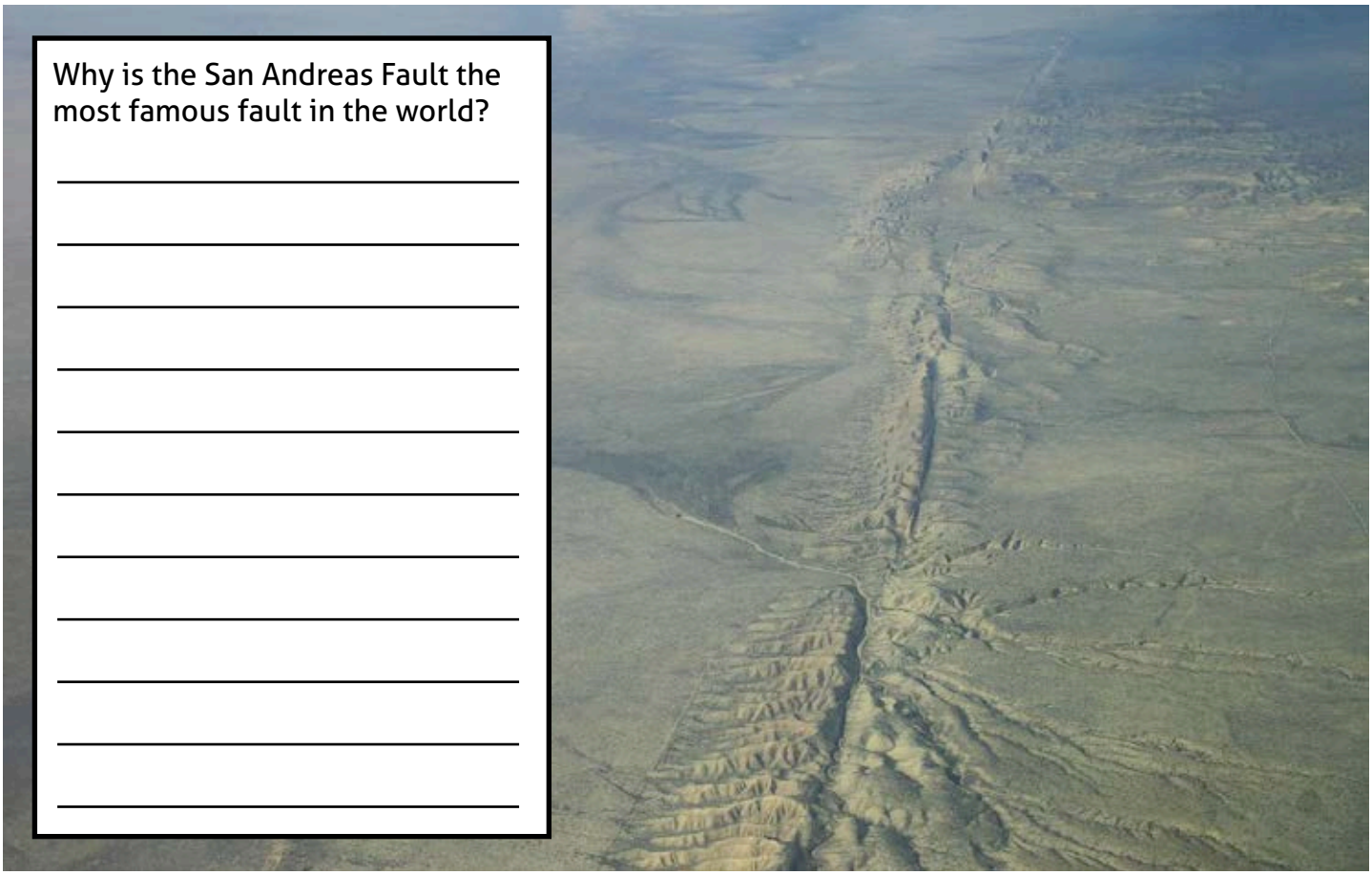
Earthquake Faults

A fault is an area of stress in the Earth where broken rocks slide past each other, causing a crack in the Earth's surface.

Illustrate and explain each of the following type of earthquake faults:

Normal fault:	**Reverse fault:**
Oblique fault:	**Strike-slip fault:**

Famous Faults Line



Why is the San Andreas Fault the most famous fault in the world?

Image: wikipedia.org

Describe the size and location of the San Andreas Fault.

How many earthquakes have there been in this area in the past 120 years?
List dates and location of major earthquakes:

Valdivia Earthquake, 1960

The largest seismic event ever recorded, occurred off the south central coast of Chile and caused a devastating tsunami in the Pacific.

Learn more about the most powerful earhquake ever recorded on Earth and summarise your findings

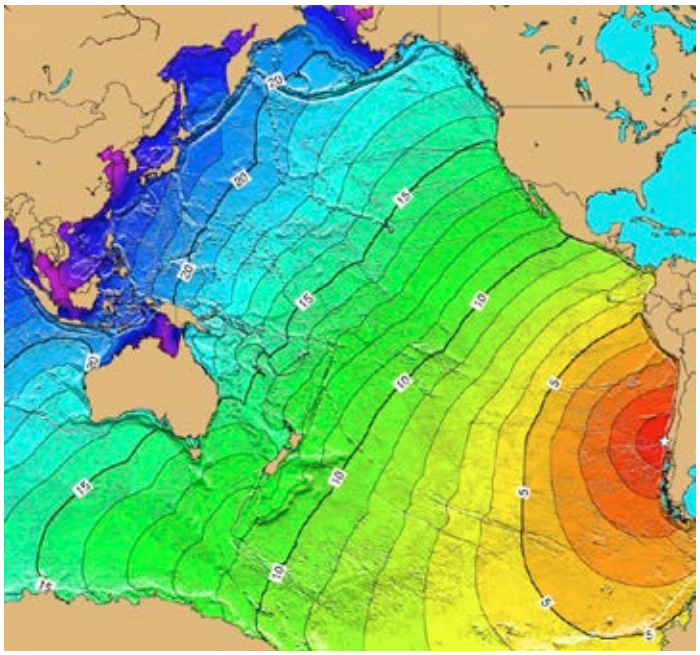


Image: wikipedia.org

Magnitude: _____

Depth: _____

Epicentre: _____

Casualities: _____

Response and emergency management:

_____

_____

_____

Damage:

_____

_____

_____

_____

_____

Aftershocks:

_____

_____

_____

_____

_____

Impact:

_____

_____

_____

_____

_____

Recovery:

_____

_____

_____

_____

_____

Haiti Earthquake, 2010

On January 12, 2010 Haiti was hit by the most powerful earthquake to strike the country in 200 years.

Learn more about this powerful natural disaster and summarise your findings

Image: wikipedia.org

Magnitude: _____

Depth: _____

Epicentre: _____

Casualities: _____

Response and emergency management:

_____

_____

_____

Damage:

_____

_____

_____

_____

_____

Aftershocks:

_____

_____

_____

_____

_____

Impact:

_____

_____

_____

_____

_____

Recovery:

_____

_____

_____

_____

_____

Christchurch Earthquake, 2011

A powerful earthquake severely damaged New Zealand's second-largest city, Christchurch, on February 22, 2011.

Learn more about this powerful natural disaster and summarise your findings

Image: wikipedia.org

Magnitude: _____

Depth: _____

Epicentre: _____

Casualities: _____

Response and emergency management:

_____

_____

_____

Damage:

_____

_____

_____

_____

_____

Aftershocks:

_____

_____

_____

_____

_____

Impact:

_____

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_____

_____

Recovery:

_____

_____

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_____

Sendai Earthquake, 2011

Japan is one of the most active seismic areas in the world. The Sendai earthquake created a massive tsunami that devastated the northeast coast of Japan.

Learn more about this powerful natural disaster and summarise your findings

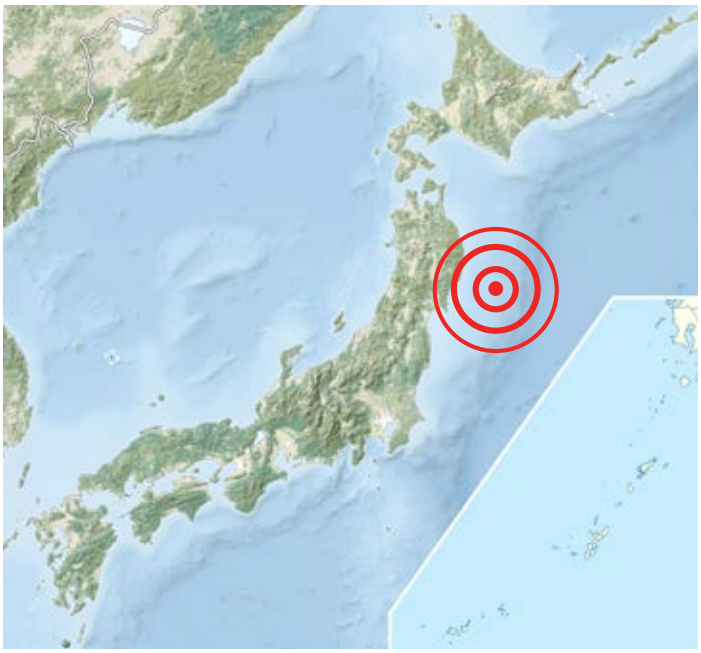


Image: wikipedia.org

Magnitude: _____

Depth: _____

Epicentre: _____

Casualities: _____

Response and emergency management:

_____

_____

_____

Damage:	Aftershocks:
Impact:	Recovery:

Deadly Earthquakes

Research links :
http://www.pbs.org/wgbh/nova/earth/deadliest-earthquakes.html
http://www.time.com/time/specials/packages/completelist/0,29569,1953425,00.html

Location	Date	Magnitude	Casualties
Valdivia, Chile			
Shaanxi, China			
Prince William Sound, Alaska			
Sumatra, Indonesia			
Haiyuan, China			
Sendai, Japan			
Kamachatka, Russia			
Bio-bio, Chile			
Assam, Tibet			
Tangshan, China			
Kanto, Japan			
Sichuan, China			
Haiti			

Earthquakes

Write short paragraph answers for each of the following:

1) What is an earthquake?	5) What do seismographs measure?
2) Where do most earthquakes occur?	6) Explain how seismologists determine the distance to the epicentre of an earthquake?
3) What is the epicentre of an earthquake?	7) Where does most of the damage from an earthquake occur?
4) What is a seismic wave?	8) Why are some locations more prone to earthquake activity?

Energy Explosion

Seismic waves are waves of energy that travel through the earth as a result of an explosion or earthquake.

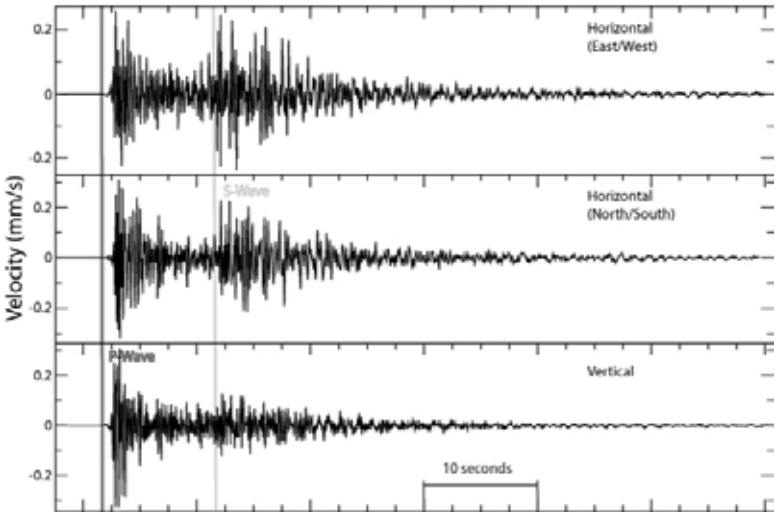


Image: wikipedia.org

Explain each of the following seismic waves:

Body waves:	**Secondary waves:**
Primary waves:	**Surface waves:**

What type of seismic waves cause the most damage?

Monitoring Earthquakes

Each year there are several thousand earthquakes throughout the world.

Which instrument is used to detect and record earthquakes?

What is the name of the recording that this instrument makes?

List major factors that affect the intensity of an earthquake.

What does the Mercalli Scale measure?

Modified Mercalli Scale

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII

The strength of an earthquake is usually measured on one of two scales, the Modified Mercalli Scale and the Richter Scale.

The Mercalli Scale is a rather arbitrary set of definitions based upon what people in the area feel, and their observations of damage to buildings around them.

Complete the following table:

Intensity	Observed effects	Richter Magnitude Scale
I		
II		
III		
IV		
V		
VI		
VII		
VIII		
IX		
X		
XI		
XII		

Examine several photographs online and try to calculate the Mercalli Scale for each photo.

Earthquake Glossary

Words to know

Use a dictionary or online earthquake glossary to learn the meaning of the following words:

mainshock:	
aftershock:	
foreshock:	
epicentre:	
fault:	
magma:	
lava:	
tiltmeter:	
P-waves:	
seismograph:	
magnitude:	
tremor:	
tsunami:	
seismologist:	
tectonic:	

Earthquake Impact

List some of the effects of earthquakes:

E.g. Liquefaction
The shock waves cause groundwater to rise to the surface, turning soft ground to mud.

Image: wikipedia.org

1. _____

2. _____

3. _____

We can't prevent earthquakes from happening. What protective measures can be taken in earthquake-prone areas?

_____

_____

_____

_____

_____

How can cities and town vulnerable to earthquake activity create better infrastructure to cope with unpredictable earthquakes?

_____

_____

_____

_____

_____

Ring of Fire

The **Pacific Ring of Fire** is an area where a large number of earthquakes and volcanic eruptions occur in the Pacific Ocean. Shade in areas that are part of the **RING of FIRE**.

Famous Earthquakes

Name of earthquake:	Date of occurrence plus interesting facts about this earthquake:
Location:	
Latitude:	
Longitude:	
Magnitude:	
Epicentre:	

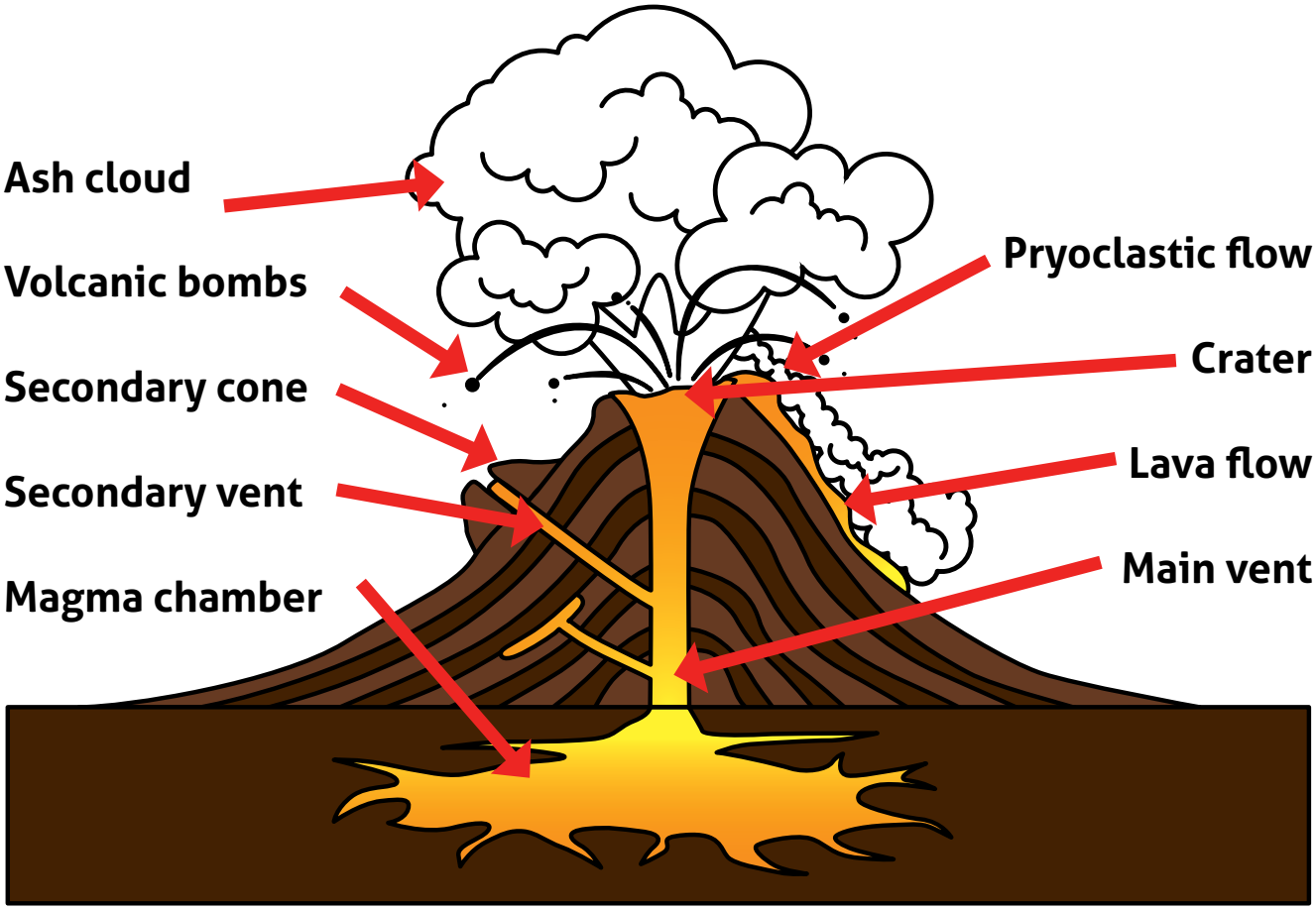
Name of earthquake:	Date of occurrence plus interesting facts about this earthquake:
Location:	
Latitude:	
Longitude:	
Magnitude:	
Epicentre:	

Famous Earthquakes

Name of earthquake:	Date of occurrence plus interesting facts about this earthquake:
Location:	
Latitude:	
Longitude:	
Magnitude:	
Epicentre:	

Name of earthquake:	Date of occurrence plus interesting facts about this earthquake:
Location:	
Latitude:	
Longitude:	
Magnitude:	
Epicentre:	

VOLCANOES



Magma - Molten rock beneath Earth's surface.
Parasitic Cone - A small cone-shaped volcano formed by an accumulation of volcanic debris.
Sill - A flat piece of rock formed when magma hardens in a crack in a volcano.
Vent - An opening in Earth's surface through which volcanic materials escape.
Flank - The side of a volcano.
Lava - Molten rock that erupts from a volcano that solidifies as it cools.
Crater - Mouth of a volcano - surrounds a volcanic vent.
Conduit – An underground passage magma travels through.
Summit - Highest point; apex
Throat - Entrance of a volcano. The part of the conduit that ejects lava and volcanic ash.
Ash - Fragments of lava or rock smaller than 2 mm in size that are blasted into the air by volcanic explosions.
Ash Cloud - A cloud of ash formed by volcanic explosions.

Volcanoes

The Stromboli stratovolcano off the coast of Sicily. Image: wikipedia.org

1) What is a volcano?

2) Why does magma in the mantle rise through the crust above it?

3) Explain each of the following:

active volcano:

dormant volcano:

extinct volcano:

4) What is the Ring of Fire?

Volcanoes

5) Why do so many of Earth's volcanoes occur along plate boundaries?

6) What are the different stages of volcanic activity?

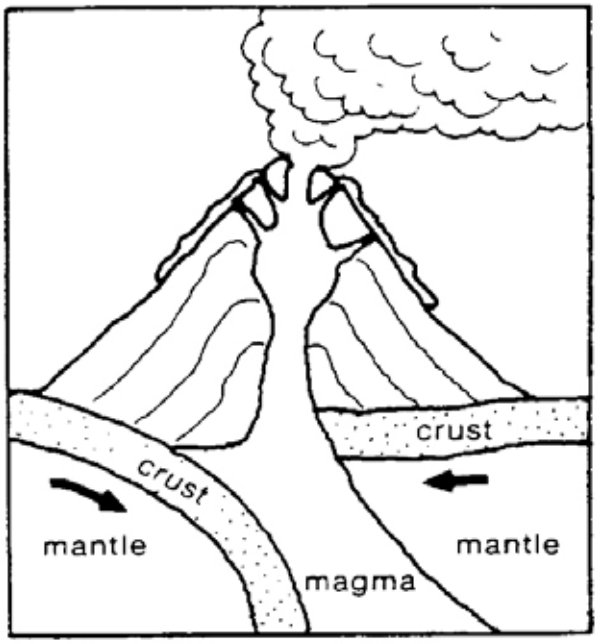
7) What are **hotspots**?

8) Name the location where you would find the best known example of hotspot volcanism.

Types of Volcanoes

The five major types of volcanoes:

1. **Caldera** – a large depression in the Earth that is created when a volcano collapses.
2. **Cinder Cone** – a volcano that is built from blobs of lava that are ejected from a single vent.
3. **Shield Volcano** – volcano that builds up from countless outflows of fluid lava.
4. **Stratovolcano** – volcanoes that are made up of layers of ash, lava and volcanic debris.
5. **Lava Dome** – large mounds that form from lava that piles up around a vent.



FAMOUS VOLCANOES:

- Kilauea (Hawaii, USA)
- Krakatoa (Rakata, Indonesia)
- Mauna Loa (Hawaii, USA)
- Mauna Kea (Hawaii, USA)
- Mount Baker (Washington, USA)
- Mount Etna (Sicily, Italy)
- Mount Erebus (Ross Island, Antarctica)
- Mount Hood (Oregon, USA)
- Mount Fuji (Honshu, Japan)
- Mount Rainier (Washington, USA)
- Mount Ruapehu (Nth Island, New Zealand)
- Mount Shasta (California, USA)
- Mount St. Helens (Washington DC, USA)
- Novarupta (Alaska, USA)
- Popocatépetil (Mexico)
- Surtsey (Surtsey island, Iceland)
- Santorini (Santorini island, Greece)
- Tambora (Sumbawa, Indonesia)
- Teide (Tenerife, Canary Islands, Spain)
- Vesuvius (Bay of Naples, Italy)
- Yellowstone (Wyoming, USA)

Types of Eruptions

Volcanoes are frequently classified by their size and shape but they can also be classified by their eruptive habits.

THERE ARE MANY TYPES OF ERUPTIONS:

1. Icelandic
2. Hawaiian
3. Strombolian
4. Vulcanian
5. Pelean
6. Plinian

Research links :
http://science.howstuffworks.com/nature/natural-disasters/volcano.htm
http://www.livescience.com/56-volcanoes-work.html

Illustrate and describe each of the following types of volcanic eruptions:

1. Icelandic	**2. Hawaiian**	**3. Strombolian**
4. Vulcanian	**5. Pelean**	**6. Plinian**

Volcanic Eruptions

Volcanoes have caused major disruption and destruction throughout human history. Investigate the history of some of the world's most famous volcanoes.

Your list of discoveries should include Mt. Pinatubo, Mount Saint Helens, Mauna Loa, Mt. Fuji and Mt Etna.

Choose two volcanoes to complete the following summaries:

Name of volcano:	Sketch of volcano:
Location:	
Type of volcano:	
History:	

Name of volcano:	Sketch of volcano:
Location:	
Type of volcano:	
History:	

Volcanoes in Australia

Image: wikipedia.org

Australia is the only continent on earth without active volcanoes. Our past was completely different.

Investigate the volcanic history of the following locations:

Location:	History:
Glasshouse Mountains, Qld	
The Warrumbungles, NSW	
Mt Gambier, SA	
Mt Warning, NSW	
Canobolas, NSW	
Undara Lava Tubes, Qld	
Bunya Mountains, Qld	
Mt Napier, Vic	

Australia's most active volcanoes are on Heard and McDonald Islands.
Find out how active these locations have been in recent years.

The Plus Side of Volcanoes

Lava flow during a rift eruption at Krafla, Iceland in 1984.
Photo: wikpiedia.org

One of the most destructive natural forces on Earth also produces positive benefits.

Brainstorm with a class mate.

What benefits do volcanoes bring?

Summarise your discussion:

E.G.
Volcanic rocks eventually breakdown to form fertile, mineral rich soils.
Geothermal areas around volcanoes can be used as alternative energy sources.

Tsunamis


JAPAN TSUNAMI SPECIAL EDITION

JAPAN TSUNAMI SPECIAL EDITION

the Sunday Mail

HELL ON EARTH

THOUSANDS DEAD & INJURED
CITIES WIPED OUT
NUCLEAR MELTDOWN FEARS

GET YOUR BRAND NEW MAGAZINE | INSIDE TODAY | IT'S MADE FOR SUNDAY

The Sunday Mail, March 13, 2011

Research to answer the following questions.

Why is the origin of the word tsunami?

_____

_____

_____

_____

_____

Explain the difference between a tidal wave and a tsunami.

_____

_____

_____

_____

_____

What are the characteristics of a tsunami?

a. How fast do they travel? _____

b. How many waves are there in a tsunami? _____

c. Which wave tends to be the largest and so most destructive? _____

d. How far apart are the waves? _____

Tsunamis

There are three types of tsunamis; local, regional and distant.
Explain the characteristics of each of these.

Local:	Regional:	Distant:

Explain how each of the following can cause a tsunami:

Earthquakes:	Volcanic eruptions:	Landslides:

How does tsunami energy travel across the ocean and how far can tsunami waves reach?

What determines how destructive a tsunami will be near the origin and at a distant shore?

Tsunamis

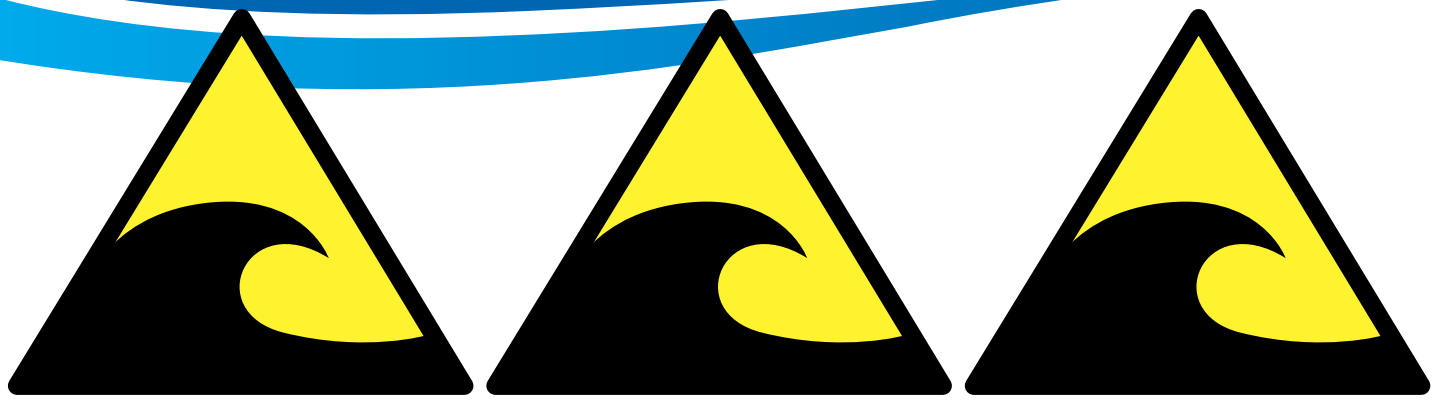
What happens when a tsunami approaches land?

Where do tsunamis usually occur?

Can tsunamis be predicted?

Explain how tidal waves are caused.

World's Worst Tsunamis



Tsunamis are one of mother nature's worst nightmares.
Create your own list of some of the most destructive tsunamis in the last 100 years.

Research links :
http://geography.about.com/od/hazardsanddisasters/a/deadliest-tsunamis.htm
http://www.australiangeographic.com.au/journal/the-10-biggest-tsunamis-in-history.htm

Location	Date	Magnitude of earthquake	Devastation
Chile	1960	8.3	• 23,000 deaths in Chile • Generated a Pacific-wide tsunami killing 61 people and destroying 540 homes in Hawaii

WEATHER AND CLIMATE CHANGE

Meteorology

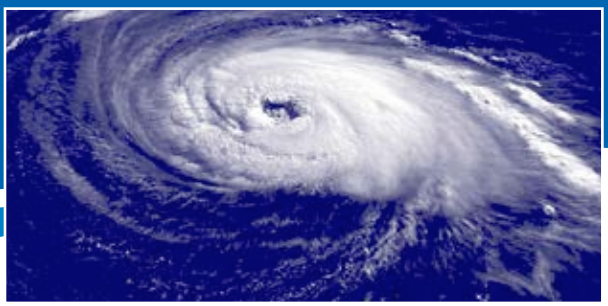


Photo: oceanservice.noaa.gov

Answer the following questions:

Define meteorology.

What is a meteorologist?

What do meteorologists do?

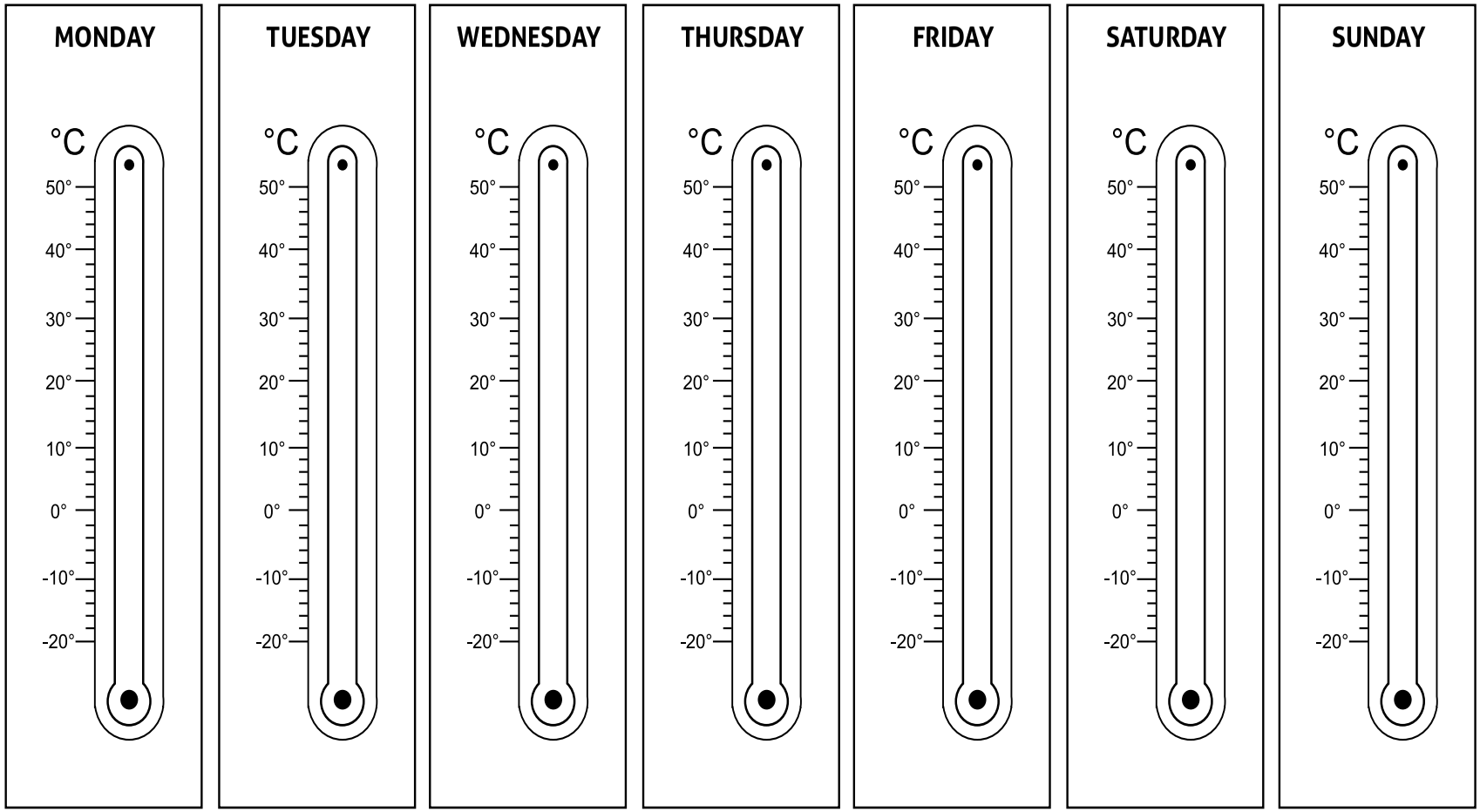
Where do meteorologists work?

What tools do meteorologists use?

What education/training do meteorologists need?

Weekly average temperature record

Shade in the average daily temperature for a week.



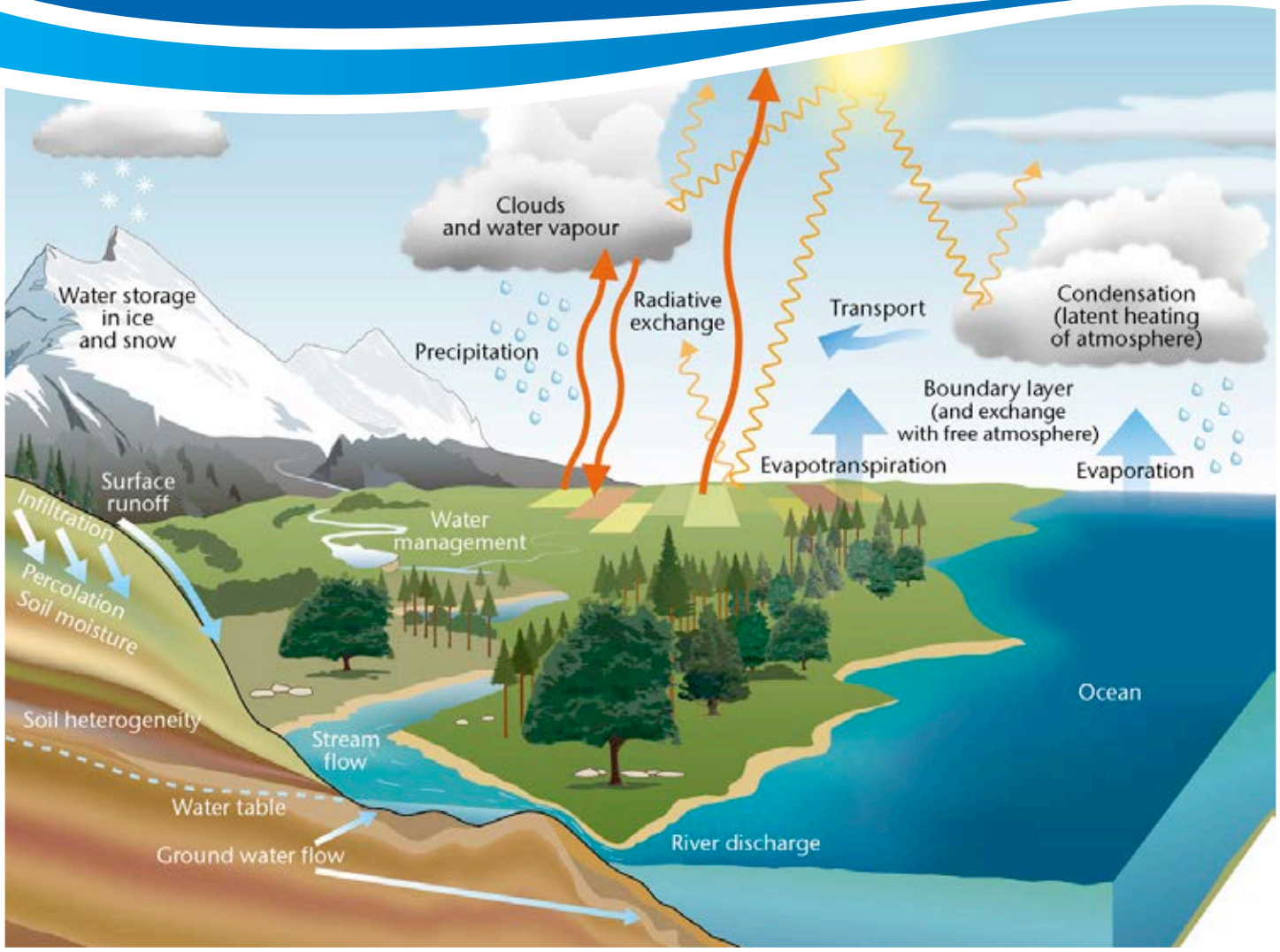
Summarise your findings for the week. _____

_____

_____

_____

The Water Cycle



Explain the processes involved in the water cycle.

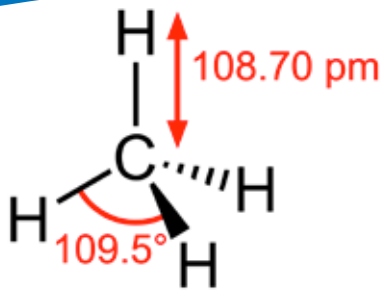
Image courtesy: http://www.metoffice.gov.uk/education

Pictionary

Do you understand the following scientific terms?
Create an illustration that best symbolises your understanding of each term.

atmosphere	ozone layer	pollutant
solar energy	photosynthesis	greenhouse effect
acid rain	deforestation	food chain

Dangerous Gases



Methane. Image: wikipedia.org

There are at least six gases that are implicated in global warming. They include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Choose one of these gases and research the following:

Research notes:

Name of gas:
Molecular structure:
What emits it?
How does it impact on air quality and global climate change?
How are different countries addressing its elimination?

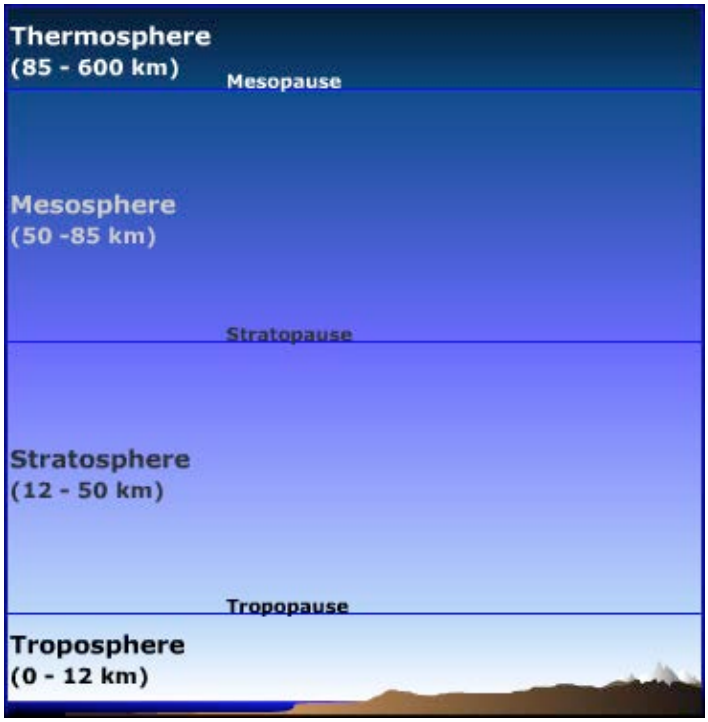
Write an encyclopedia entry or newspaper article about your findings.

The Atmosphere

Take a look at the cross-sectional diagram of the earth's atmosphere available online at the following link:
Earth's atmosphere
https://www.windows2universe.org/earth/Atmosphere/overview.html

Research to learn about each layer.

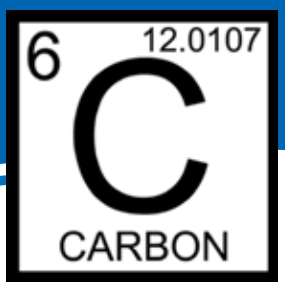
Summarise your information below.



Source: http://earthguide.ucsd.edu/earthguide/diagrams/atmosphere/

Troposphere
Stratosphere
Mesosphere
Thermosphere

Carbon Cycle



Carbon sinks store carbon and carbon sources release carbon. Illustrate how carbon is transferred between carbon sinks and carbon sources by researching and creating your own carbon cycle.

Climate Change

Write short paragraph responses to the following:

What is climate change?

_____

_____

What is the main cause of climate change?

_____

_____

What evidence allows us to conclude that the Earth's climate is changing?

_____

_____

How will climate change affect YOU?

_____

_____

List three actions that we can do today to combat climate change.

_____

_____

_____

What alternative energy sources are being developed?

_____

_____

_____

_____

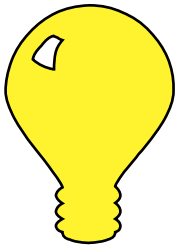
ENERGY

Photo: wikipedia.org

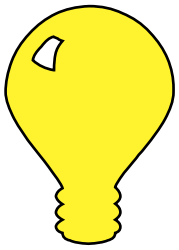
Electricity

Explain each of the following using words and diagrams.

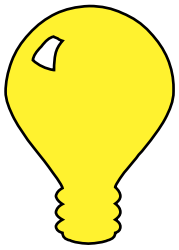
What is electricity?



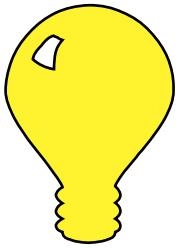
Where does it come from?



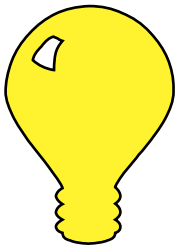
How is it made?



How does it get to your home?



How is it measured?



Safety and Electricity

Illustrate the following rules:

Never turn on a light switch or electrical appliance while you are wet or while you are in the bathtub.	
Never put any object other than a plug designed for that purpose into an electrical outlet.	
Stay away from areas or buildings marked with signs that read "Danger: High Voltage."	
Never, ever touch an outdoor electrical pole or wire that has fallen to the ground. It could kill you!	
Come inside during a thunderstorm (or even occasional flashes of lightning with no rain).	

Alternative Energy

Conduct a SWOT analysis on an alternative form of energy.

Energy _____

Strengths	Weaknesses
Opportunities	**Threats**

Renewable Energy Technologies

Explain why we need alternative energy sources?

1 _____

_____

_____

2 _____

_____

_____

3 _____

_____

_____

Chose one of the following:

SOLAR WIND BIOMASS GEO THERMAL WASTE TIDAL/OCEAN HYDRO

Create an advertising campaign to promote this form of alternative energy.
Devise a catchy slogan that you can use in your campaign to promote this form of energy.

Slogan: _____

_____

_____

_____

Campaign notes: _____

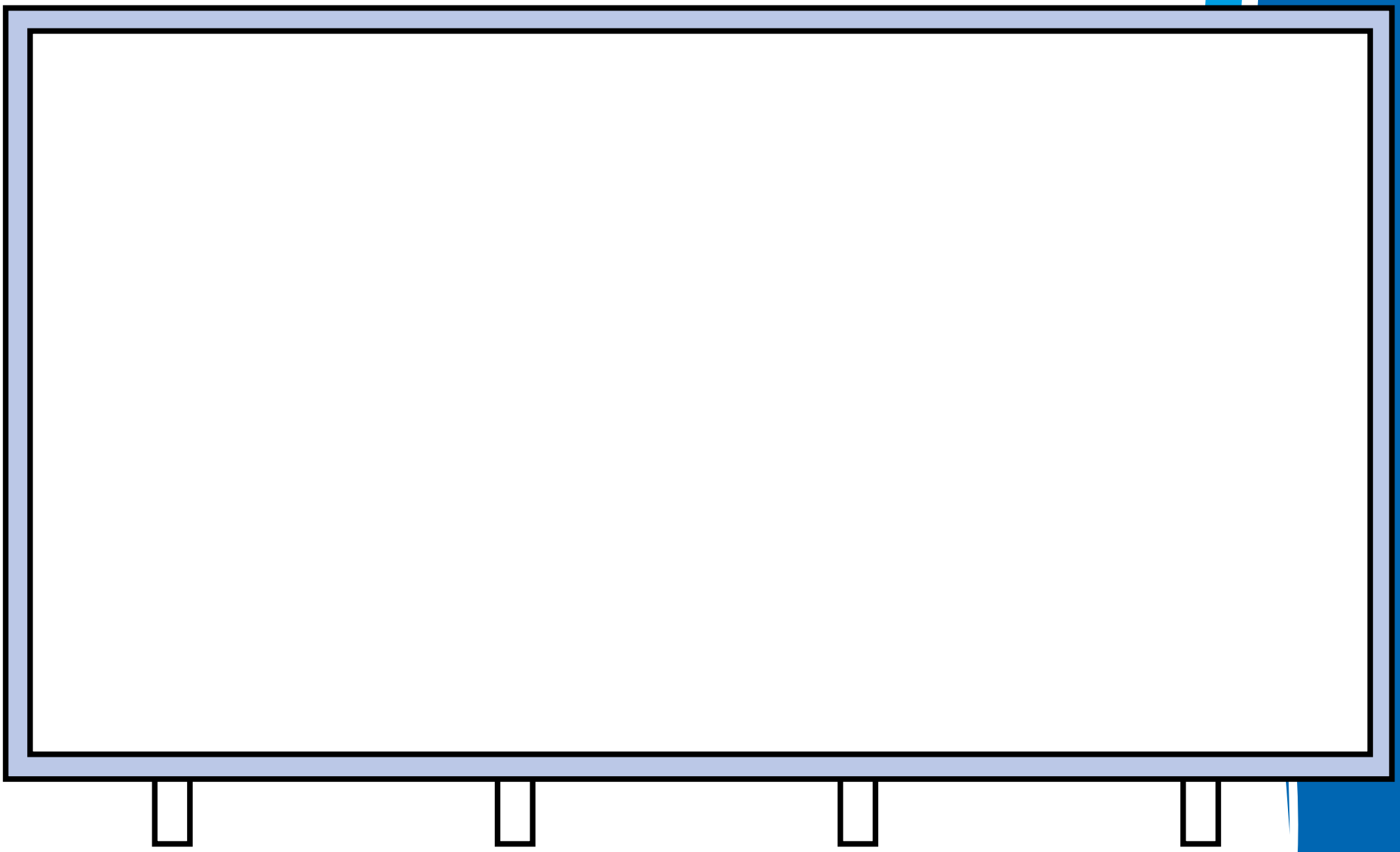
_____

_____

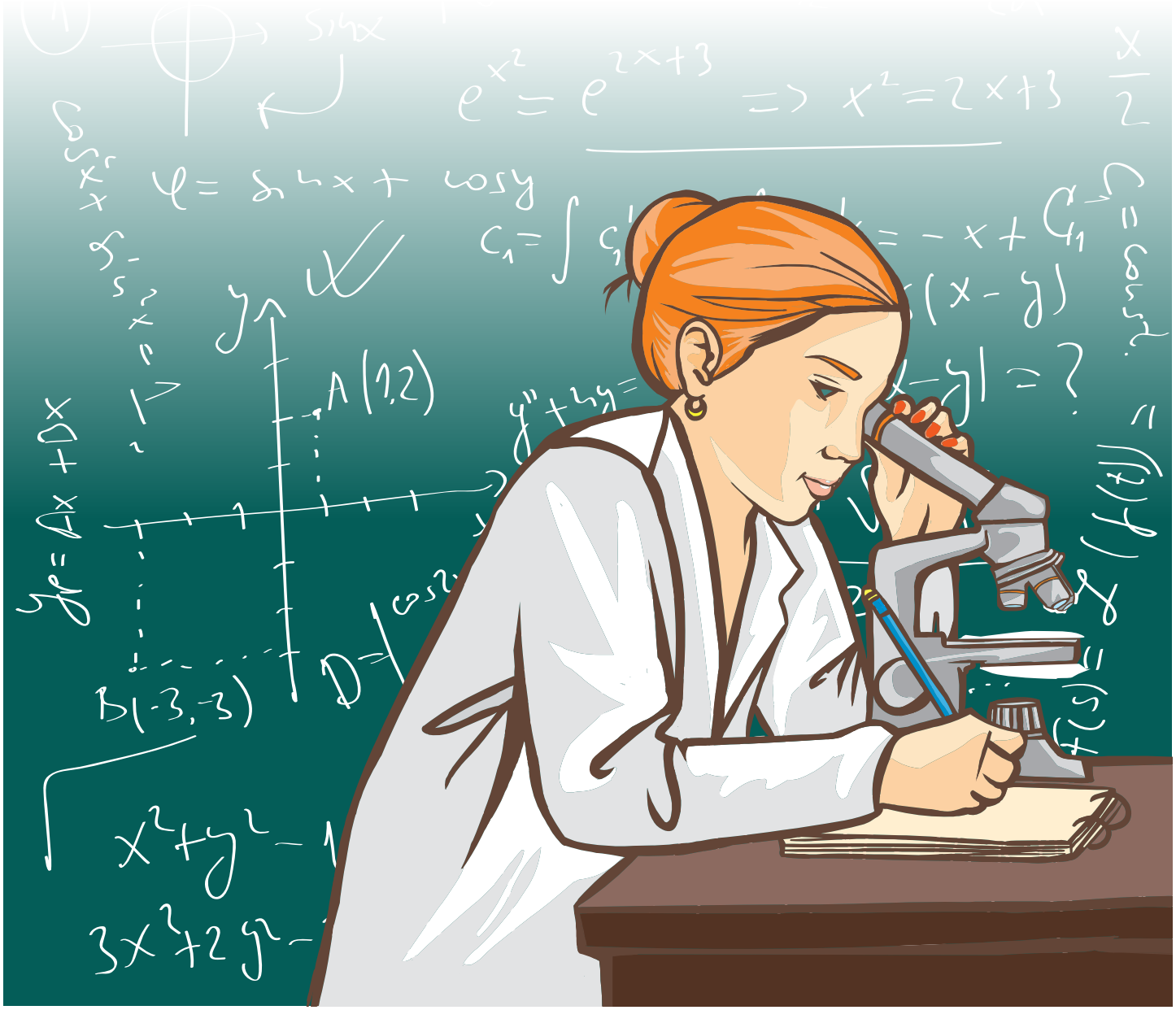
_____

Billboard Campaign

Create a billboard poster to promote an alternative form of energy.



SCIENCE TEMPLATES



Our Science Investigation

Question:

Apparatus:

Safety considerations:

List of variables:

Our Science Investigation

Predictions:

Methodology:

Results:

Evaluation of our investigation:

The Scientific Method

a way to solve problems

NOTES

Ask a question:

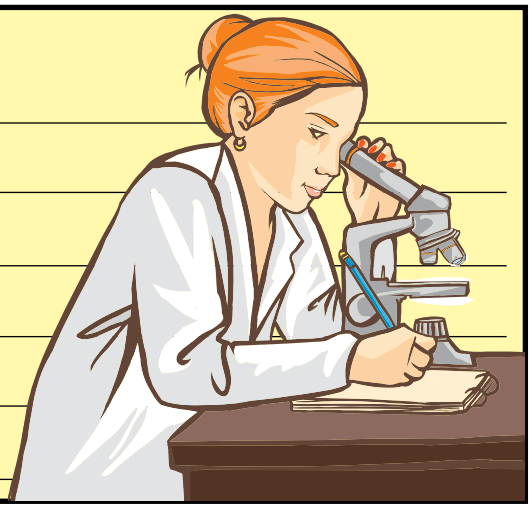
Do background research:

Construct a a hypothesis:

Test your hypothesis by doing an experiment:

Analyse your data and draw a conclusion:

Communicate your results/final report:



Experiment Report Template

Name: _____ Date: _____

Purpose: _____

Prediction/hypothesis: _____

_____

_____

_____

Materials used:

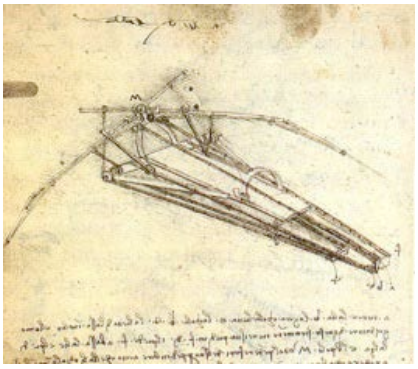
Experiment procedure:

Experiment results:

Conclusion:

GREAT SCIENTIFIC INVENTIONS

Alessandro Volta with the first electrical battery.
Volta is recognised as one of the most influential inventors of all time.



A design for a flying machine, (1488) Institut de France, Paris. Leonardo da Vinci.

Science and Invention magazine cover, November 1928.

Great Scientific Discoveries

Our world would not be as advanced as it is today without great scientific minds and their life-changing and sometimes life-saving inventions. Work with a classmate to research the great scientific inventions that have helped to change the world.

Rate what you believe to be the top five greatest scientific inventions.

Name of scientific invention	Scientist or Inventor	Impact on the world
1.		
2.		
3.		
4.		
5.		

Research a scientist

Name of scientist: _____

Important discovery: _____

Background information:	What events shaped or changed this person's life?
Facts about this scientist's achievements:	**Scientist's legacy:**

Scientific discoveries in our lives

Scientific discoveries improve our lives in many ways. They make our tasks easier, entertain us, improve our knowledge of the world, and even save lives.

List scientific discoveries for each of the following categories:

Scientific discoveries that save lives:	Scientific discoveries that entertain us:
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
Scientific discoveries that make our lives easier:	**Scientific discoveries that help us communicate:**
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Think of three items created by scientists or inventors that you use every day.
How different would your life be if these scientific discoveries or inventions has not been made.

_____

_____

_____

_____

_____

Timeline of modern science

Our history of discovery

List some of the scientific discoveries that made an impact in the following eras.
Summarise your information in bullet point form.

Date	Discovery	Impact
1500s:		
1600s:		
1700s:		
1800s:		
1900s:		

A decade of scientific discovery and innovation
Top 10 scientific discoveries from 1997 -2017.

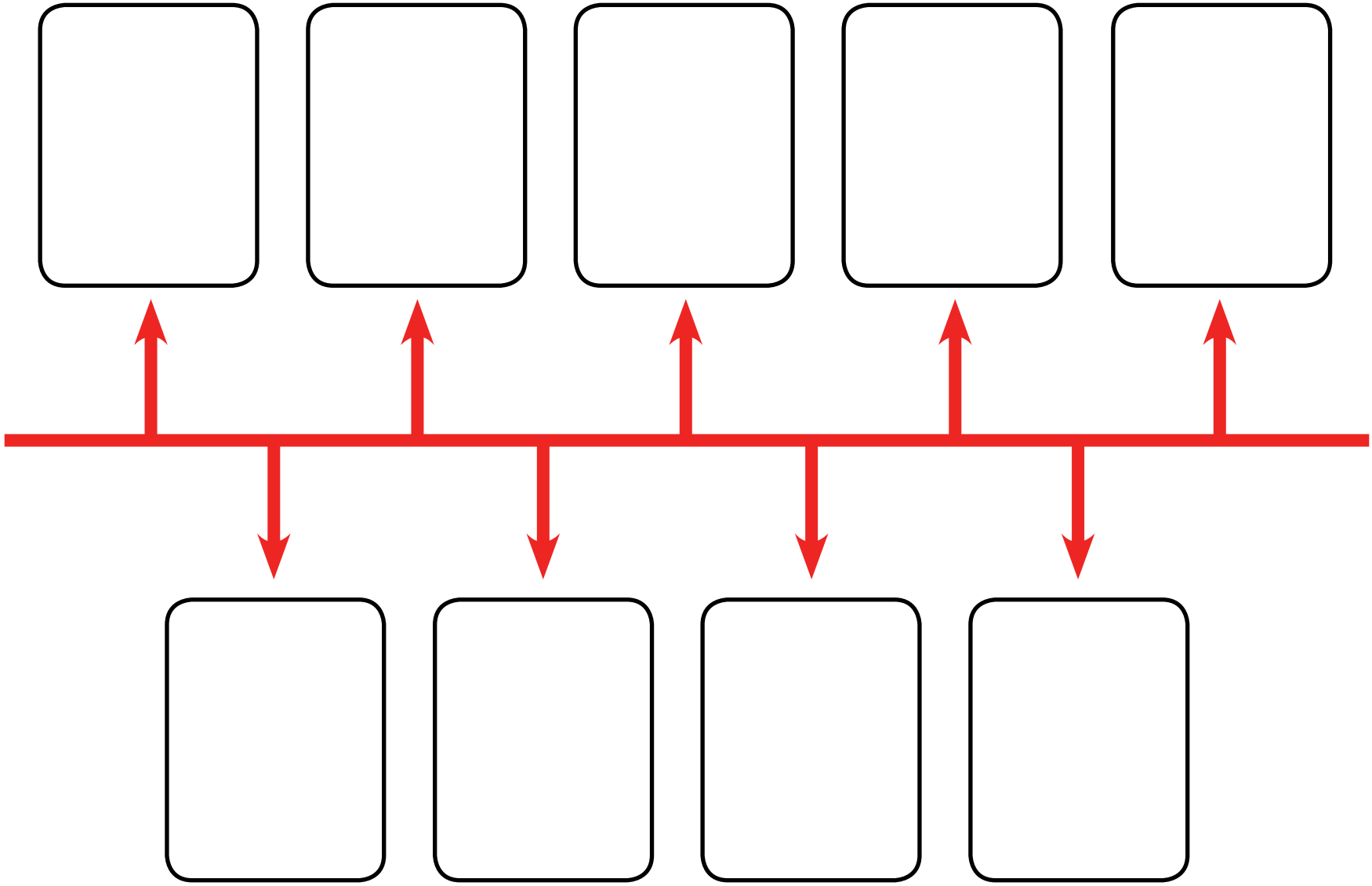
Research the scientific discoveries that have had a significant impact on society and culture as well as those that hold promise for future revolutionary applications.

Name of discovery/invention	Scientist/inventor	Why is this significant?
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Scientific discoveries timeline

Decade selected: _____

Use this timeline to mark out a decade of scientific discoveries. List the date, scientific discovery, name of scientist or inventor.



Science Award

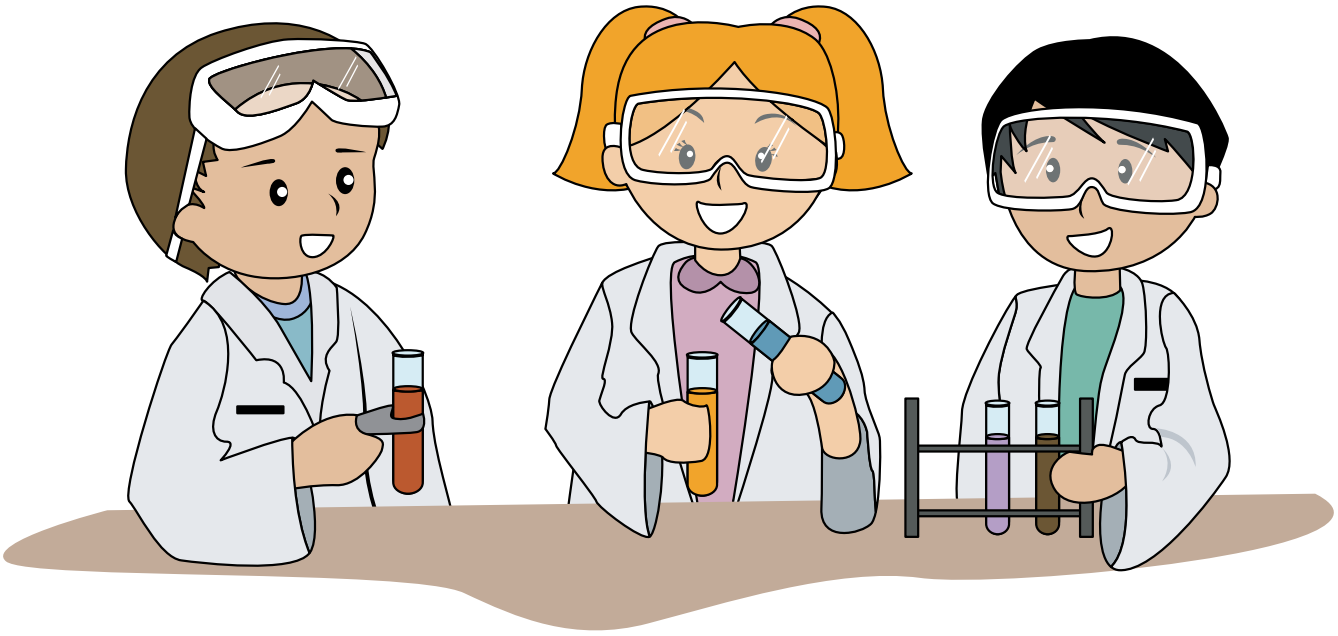
Presented to: _____

For: _____

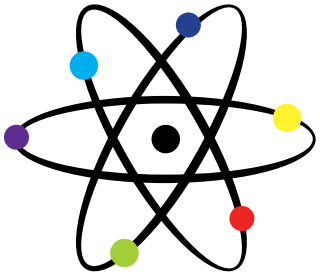
_____

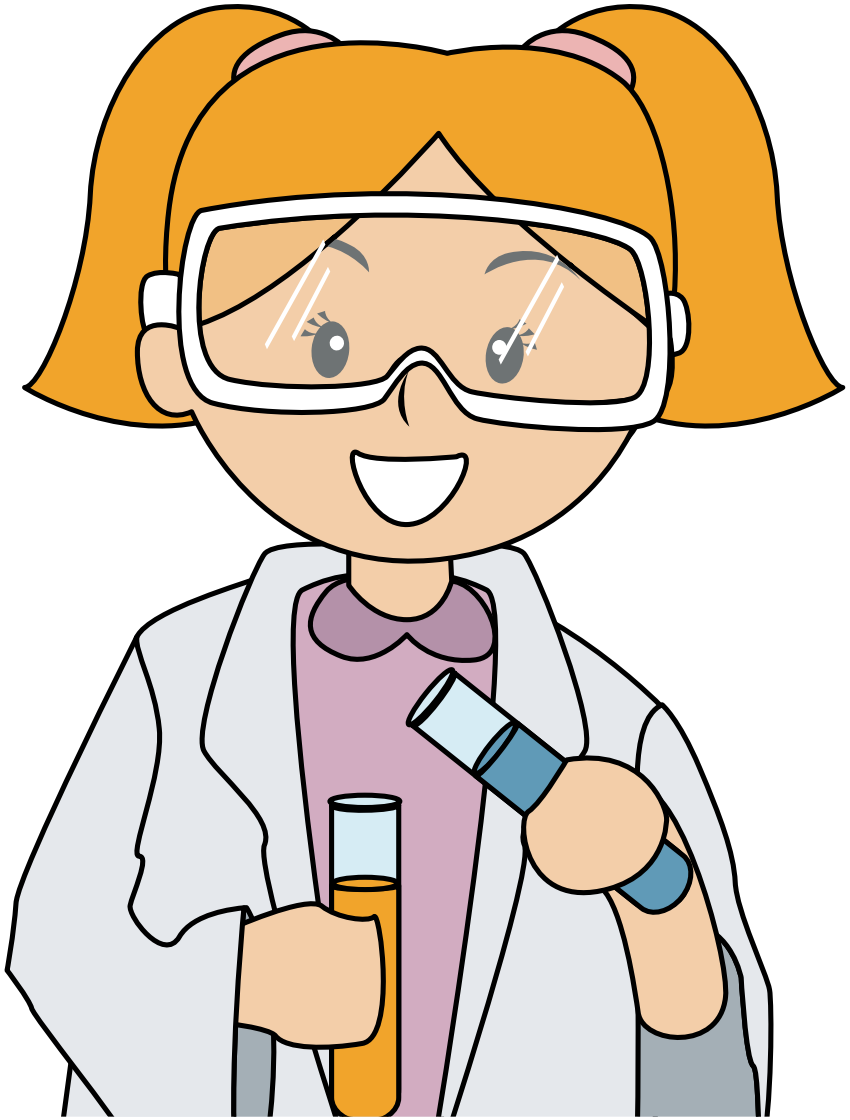
_____

Date: ____/____/____ Teacher: _____



Science Award





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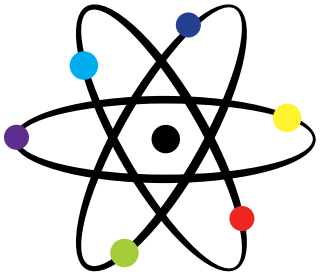
Date: ____/____/____ Teacher: _____

Science Award



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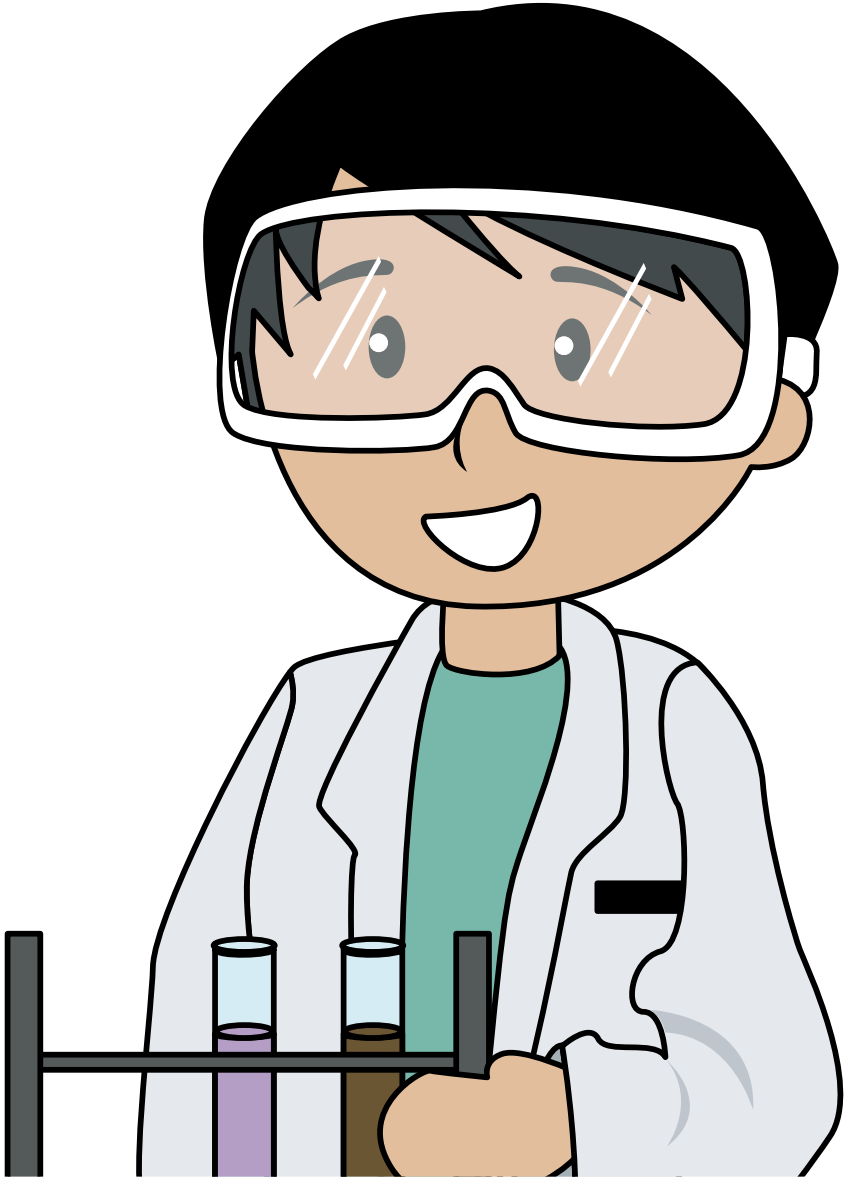
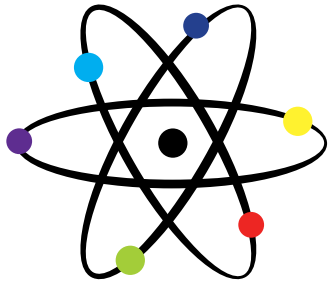
Date: ____/____/____ Teacher: _____



Science Award



Presented to: _____

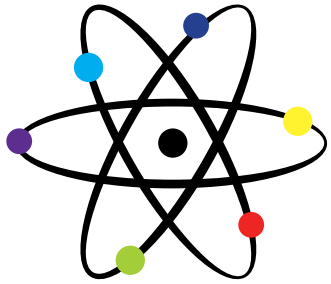
For: _____

_____

_____

Date: ____/____/____ Teacher: _____

Science Award



Presented to: _____

For: _____

_____

_____

Date: ____/____/____ Teacher: _____

WEBSITES FOR THE CLASSROOM

REMEMBER TO EVALUATE THE WEBSITE YOU ARE LOOKING AT!

- Currency
- Relevance
- Authority
- Accuracy
- Purpose

Australian Academy of Science - Science by Doing

https://www.science.org.au/learning/schools/science-doing

Schools

- Primary Connections
- **Science by Doing**
  - Professional learning resources
  - Curriculum resources
  - Research and evaluation
  - Science by Doing team
- Mathematics by Inquiry

General audience

Science by Doing

Science by Doing is a comprehensive online science program for Years 7 to 10 available free to all Australian students and teachers and supported by award winning professional learning modules and a research based professional learning approach.

For Australian teachers and students to access these exciting innovative resources simply register at sciencebydoing.edu.au.

For teachers registered with Scootle, the Science by Doing resources can also be accessed through the Scootle website.

Science by Doing improves science learning by:

- better engaging high school students through an inquiry approach; and by
- supporting teachers with relevant resources using innovative technology.

Science by Doing provides a practical way of implementing the Australian Curriculum: Science, and is managed by the Australian Academy of Science with funding from the Australian Government.

History and future

Pilot	2007-08	Proof of concept of inquiry science learning in high schools
Stage One	2009-11	Five professional learning modules Foundation curriculum unit Professional learning approach
Stage Two	2012-13	Eight online curriculum units
Stage Three	2013-16	Final eight online curriculum units Seven online professional learning modules Implement state based professional learning approach
Stage Four	2016-18	Revision of curriculum units with student e-workbook Implement Teacher Education approach for universities

More information about *Science by Doing*


About the program

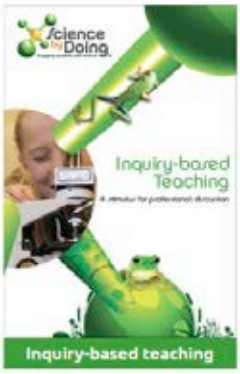

Curriculum units


Teacher materials

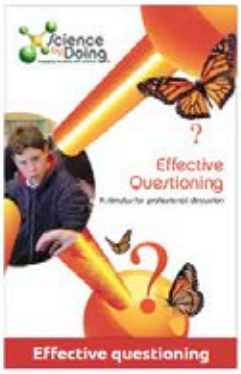

News and events


Snapshot examples

Click on each *Science by Doing* Professional Learning (PL) module to see a content preview.



Inquiry-based teaching



Effective questioning

Student learning

Assessment

Australian Inventions

http://www.australia.gov.au/about-australia/australian-story/austn-inventions

Related

Categories

- Inventiveness - technology and science

Stories

- Early Australian aviation
- Australian Indigenous tools and technology
- Royal Flying Doctor Service
- School of the Air

Listen

Australian inventions

Inventions are often taken for granted as we sometimes use them every day to help us stay healthy or make our lives easier.

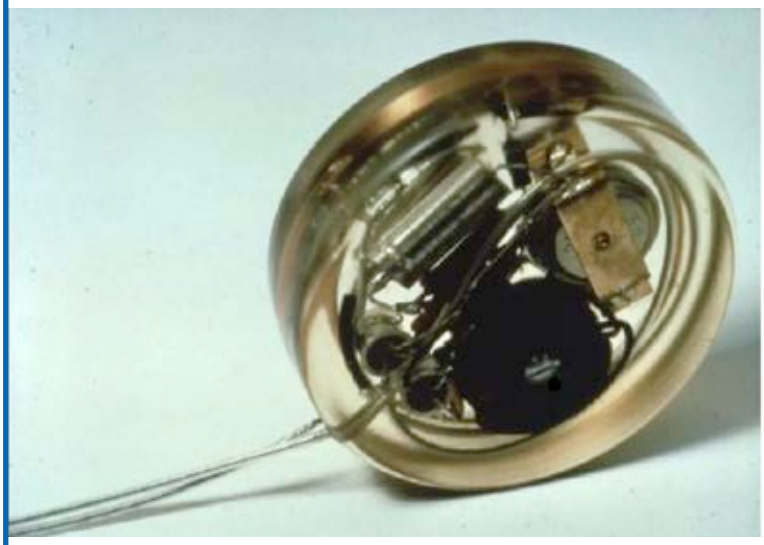
Australian inventions have assisted with everyday activities such as hanging out the clothes to dry on a rotary washing line, putting food into the fridge so it keeps fresh, drilling a hole in the wall so you can hang a picture, taking antibiotics to help a throat infection and hearing people laugh if you were born deaf.

The Hills Rotary Hoist, launched in 1946. Image courtesy of the Sydney Morning Herald.

Lawrence Hargrave, who achieved the first powered flight in 1894 with four box kites, was said to be symbolic of many Australian inventors and Australian innovation; 'He was interested in the invention, not the money to be made' (*Sydney Morning Herald*, 26 January 2005).

Aussie inventions – best inventions of all times

https://www.cnet.com/au/pictures/best-aussie-inventions-of-all-time/



13 OF 40

Best Aussie inventions of all time

1928: pacemaker

Aberdeen doctor JA McWilliam was the first to note that electricity could be used to stimulate the human heart in the 1880s; but the first doctors to create an apparatus for doing so were Dr Mark C Lidwell of the Royal Prince Alfred Hospital of Sydney, and physicist Edgar H Booth of the University of Sydney. In 1926, they devised a portable apparatus that plugged into an electrical outlet. On one pole was a pad soaked in saltwater to be applied to the patient's skin; the other was a long needle that was to be plunged into the patient's heart. Its first recorded success was at the Crown Street Women's Hospital in Sydney, where it was used to revive a stillborn infant in 1928.

An American doctor by the name of Albert Hyman was formally credited as the device's first inventor; however, his device didn't arrive on the scene until 1932. The oversight is usually accredited to the fact that Hyman named the pacemaker — and that he referred to the Australian inventor as Gould rather than his actual name, Lidwell.

Photo by: First pacemaker image by Professor Marko Turina, CC BY 3.0

Australian Inventions that changed the world

http://www.australiangeographic.com.au/topics/history-culture/2010/06/australian-inventions-that-changed-the-world/

Some of Australia's world-changing inventions: plastic money, Google maps, latex gloves and the electric drill.

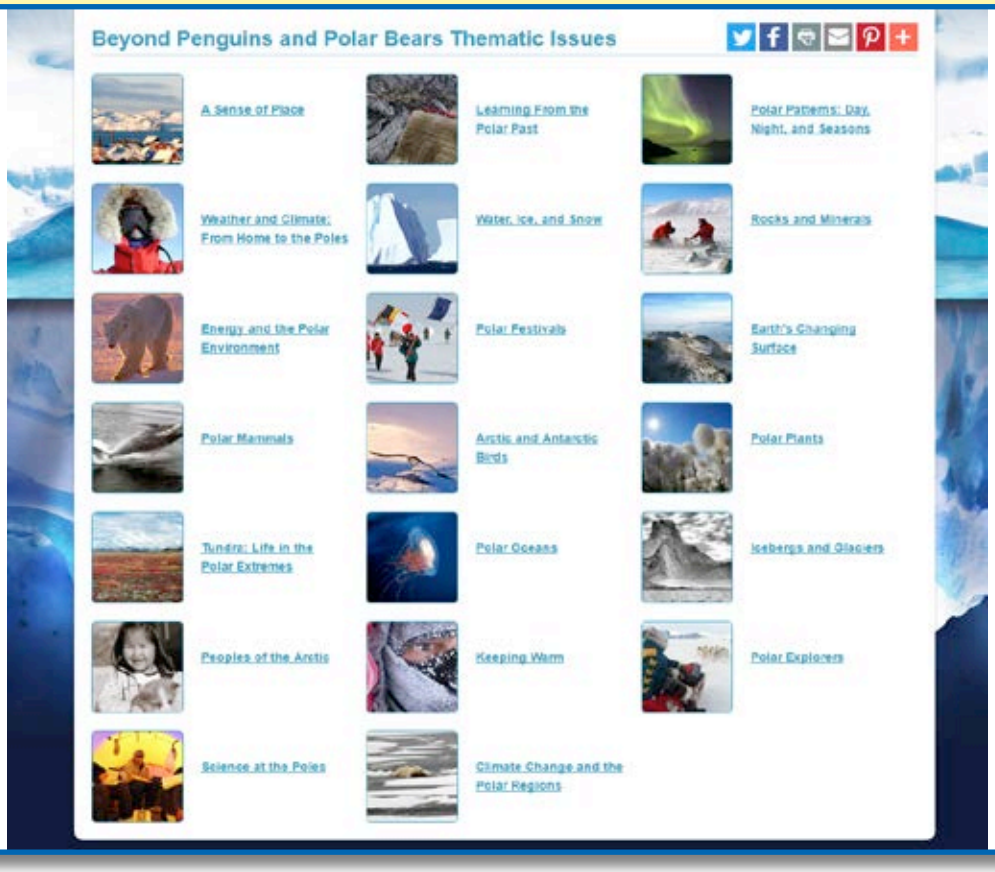
20 Australian inventions that changed the world

BY AG STAFF | JUNE 18, 2010

Australians can be an ingenious bunch. Here are some of the best inventions to have come out of the nation.

Beyond Penguins and polar bears

http://beyondpenguins.ehe.osu.edu



Beyond penguins and polar bears - Hands-On Science and Literacy Activities about Erosion, Volcanoes, and Earthquakes

http://beyondpenguins.ehe.osu.edu/issue/earths-changing-surface/hands-on-science-and-literacy-activities-about-erosion-volcanoes-and-earthquakes

Hands-On Science and Literacy Activities about Erosion, Volcanoes, and Earthquakes

Earth science concepts such as erosion, volcanoes, and earthquakes are best introduced through a combination of hands-on activity, children's literature, and multimedia resources. The slow, long-term process of erosion is difficult for students to conceptualize, so creating models of erosion can help. But, since students may be unfamiliar with volcanoes and earthquakes, models of these are not always accurate or helpful. Children's literature and multimedia resources, such as web sites and video clips, will help them picture the processes involved.

We've highlighted lessons about the topics of erosion, glaciers and glacial erosion, volcanoes, and earthquakes. As always, we've included suggestions for integrating literacy skills into these lessons. This month's Virtual Bookshelf and Feature Story provide additional resources for literacy integration.

For each science lesson, we've included the appropriate *National Science Education Standards*. You can read the entire *National Science Education Standards* online for free or register to download the free PDF. The content standards are found in Chapter 6.

Erosion

Big Rocks, Little Rocks (Grades K-1)
Students simulate erosion with cookies to learn that erosion breaks rocks into smaller pieces. This lesson meets the following content standards of the *National Science Education Standards*: Science as Inquiry and Earth and Space Science.

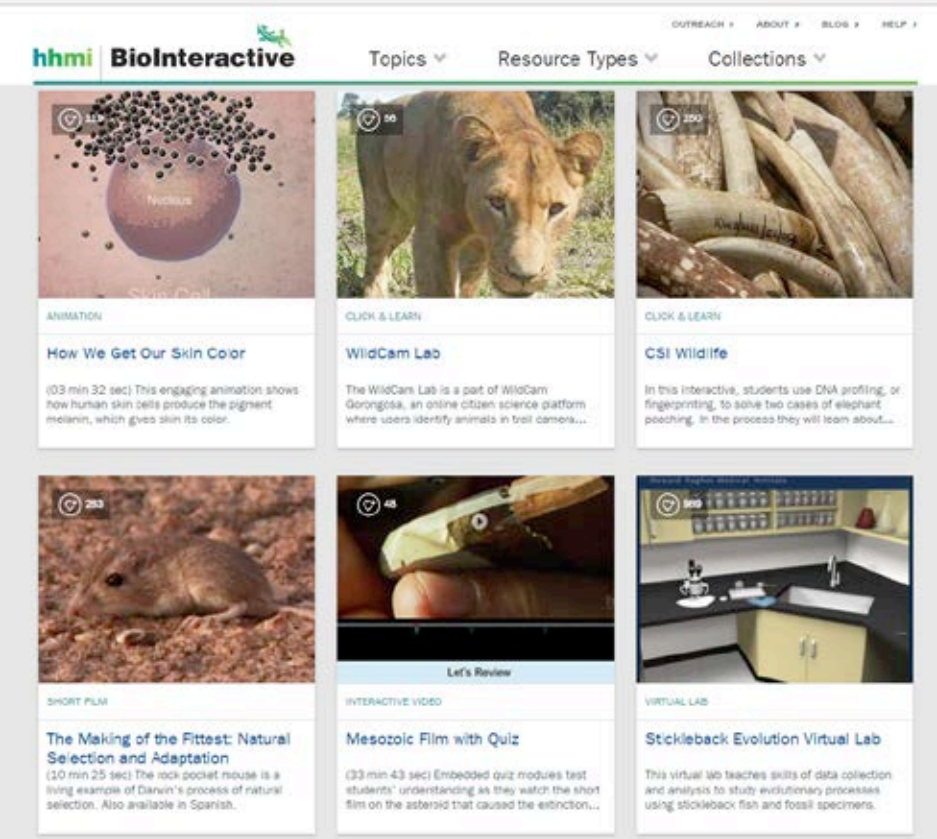
Our Ever Changing Earth (Grades K-5)
This lesson, originally written for grade 1, is broken into two parts: an introduction to plate tectonics and a study of weathering and erosion. Part One, which models plate tectonics without using sophisticated vocabulary, is not included in the *National Science Education Standards* for the elementary grades. This portion of the lesson may be better suited for students in upper elementary grades. Part Two, which involves modeling the various types of weathering and erosion, is appropriate for students in the primary grades. This lesson meets the following content standards of the *National Science Education Standards*: Science as Inquiry, Earth and Space Science, and Science in Personal and Social Perspectives.

To integrate literacy skills into these two lessons, try the following:

Collaborating on a Class Book: Exploring Before-During-After Sequences (Grades K-2)
Students and the teacher produce a class book through a group-writing activity, focusing on a basic before-during-after sequence of events. Though the lesson is written for the carving of a class jack-o-lantern, it could be customized for the topic of erosion and weathering. This lesson meets the following NCTE/IRA Standards: 1, 7, 12.

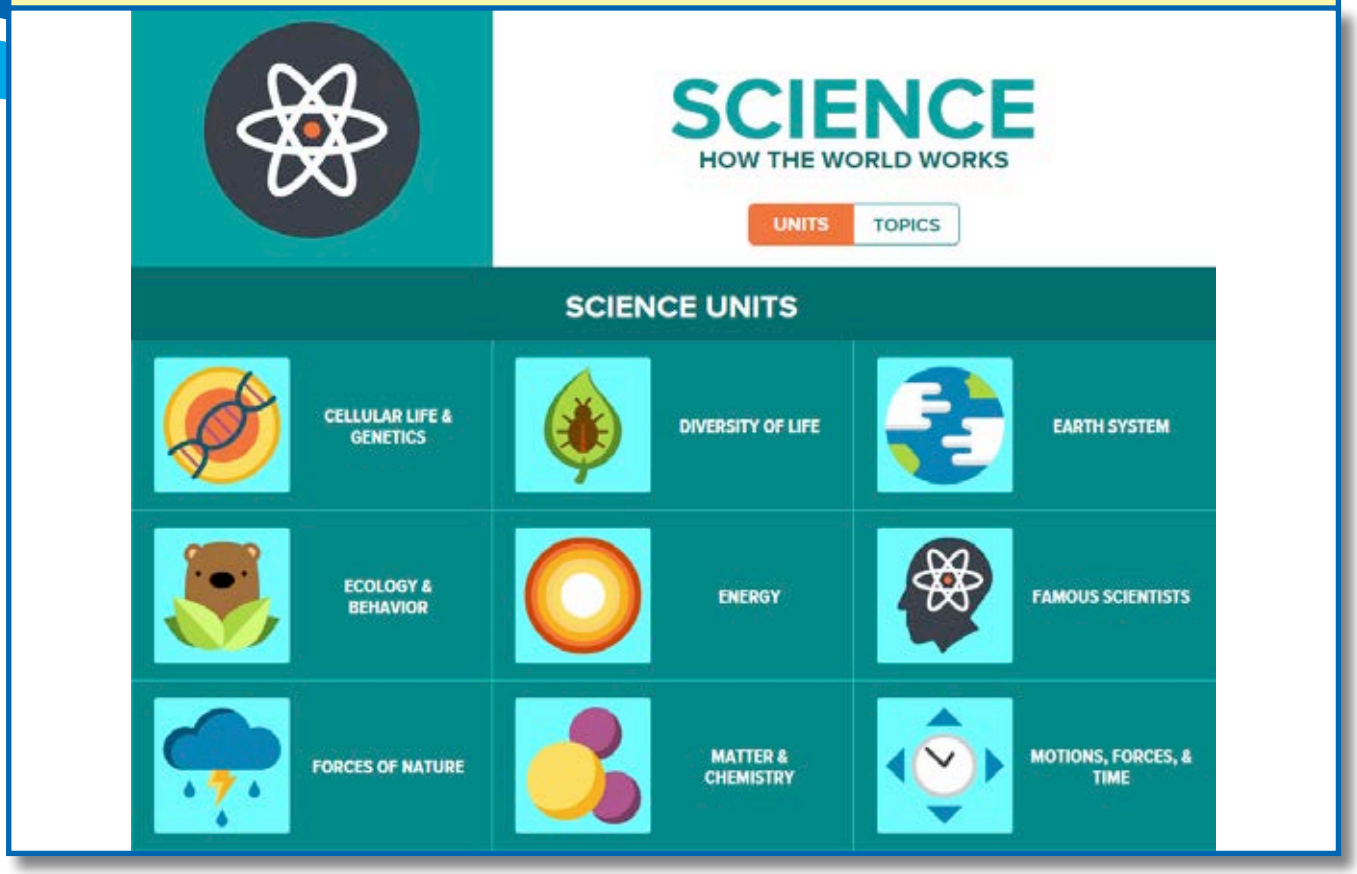
BioInteractive

http://www.hhmi.org/biointeractive



BrainPOP - SCIENCE

https://www.brainpop.com/science

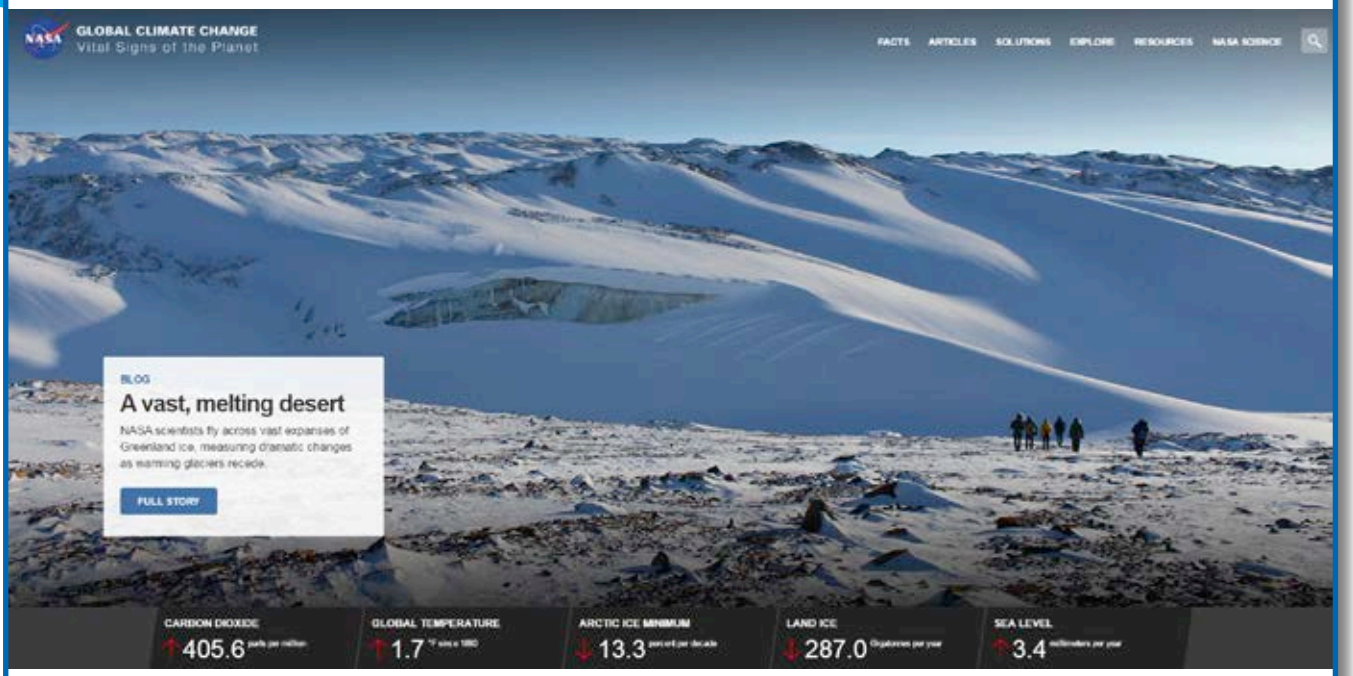


Climate Kids

https://climatekids.nasa.gov

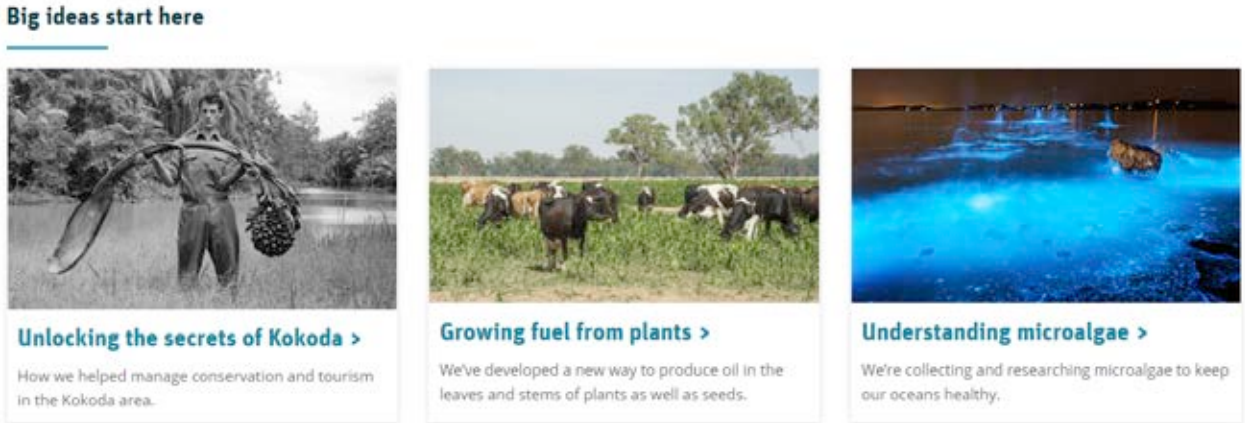
Climate change – NASA

https://climate.nasa.gov



CSIRO

http://www.csiro.au



CSIRO – Double Helix

http://www.csiro.au/en/Education/Double-Helix

Double Helix Lessons from CSIRO >

Mapped to the curriculum, Double Helix Lessons are classroom-ready interactive activities delivered digitally that provide teachers all the resources they need to teach science to Years 5 and 6.

Helix@CSIRO >

The Helix@CSIRO blog showcases the latest in science, maths, technology and engineering news, plus lots of fun activities and giveaways.

Subscribe to Maths by Email >

Sign up to Maths by Email for a free email newsletter that presents an interesting maths article, along with puzzles and problems to be solved.

Subscribe to Science by Email >

Sign up to Science by Email and receive a free weekly e-newsletter with the latest science news, a hands-on activity and quiz. Great for students, parents and teachers.

CSIRO – TOP INVENTIONS

http://www.csiro.au/en/About/History-achievements/Top-10-inventions

1. WiFi

Our wireless invention lies at the heart of what is now the most popular way to connect computers without wires. It is used in offices, public buildings, homes and coffee shops - often called 'WiFi Hotspots'. The invention came out of our pioneering work in radioastronomy.

That work involved complex mathematics known as 'fast Fourier transforms' as well as detailed knowledge about radio waves and their behaviour in different environments. Indoor environments are particularly difficult for the rapid exchange of large amounts of data using radio waves.

We solved these problems in a unique way at a time when many of the major communications companies around the world were trying, but with less success, to solve the same problem.

2. Plastic banknotes

A polymer prototype: the CSIRO $7 banknote.

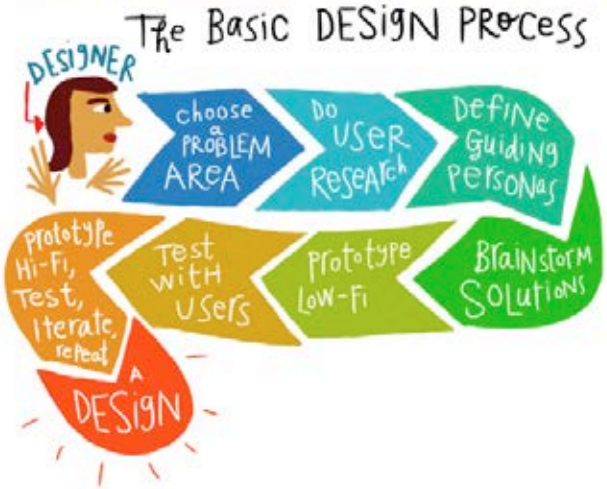
Australia's introduction of plastic bank notes with optically variable devices (OVDs), developed by CSIRO, was a world's first and represented a paradigm shift towards a currency secure against forgery. This was one of our longest and most successful research initiatives.

The research began in 1968 following a request from the Reserve Bank of Australia for a scientific solution to combat forgeries of the new decimal currency. Our solution was to have a see-through panel and hologram embedded in the note and to use plastic. In addition to their inability to be forged, the new notes were also more durable, more environmentally friendly and less likely to carry dirt and disease.

Developing a new product or service

http://www.legaltechdesign.com/LegalDesignToolbox/develop-a-new-project/

Going through a design process can lead you from an idea, or even just a problem area, to a strong, vetted, grounded concept of what product you should build.



It will lead you from idea to a well-planned idea that you can enlist a developer to actually code or build, and then return to you to implement.

Earth Science links

http://www.internet4classrooms.com/science_elem_earth.htm

7. **The Earth's Crust** - self-check from Quia
8. **Earthquakes for Kids** - rich with facts, information, and activities related to earthquakes, links to teacher resources, and more
9. **Earth Science Modules** - [K-4] online interactive games about weather, earth science, and biomes.
10. **Earth Science and Geology Resources** - Quia quizzes [grade 5]
11. **Earth, Sun and Moon** - enter the number of months to make the earth revolve around the sun one time
12. **Oceans** - a Quia quiz
13. **Plate Tectonics Part 1** - a gap-fill exercise
14. **Plate Tectonics Part 2** - a gap-fill exercise
15. **Rocks** - Repeat this activity several times. You'll get new matches each time.
16. **Rocks and the Rock Cycle** - in depth look at the rock cycle
17. **Soil - Underground Adventure** - What do you think life would be like if you lived underground? You've come to the right place to find out! [this expired page is from the Internet Archive known as the **Wayback Machine**]
18. **Soil Matchup** (3rd grade level) from Quia
19. **Soil Millionworm Game** from Quia [grade 3]
20. **Three Types of Rocks: self check** - a Quia quiz
21. **USGS Science Resources for K-6** - selected USGS educational resources that may be useful to educators in primary school grades
22. Water Cycle
    a. **Games and Activities about the Water Cycle** - from EPA - [K-3] [This expired link is available through the **Wayback Machine** Internet Archive. If the page doesn't load quickly click on **Impatient?** at the bottom right of the page.]
    b. **Games and Activities about the Water Cycle** - from EPA - [4-8] [This expired link is available through the **Wayback Machine** Internet Archive. If the page doesn't load quickly click on **Impatient?** at the bottom right of the page.]
    c. **Water Cycle** - Online lesson with activities and worksheets
    d. **Thristin's Water Cycle** - from EPA
    e. **Water Cycle** from Quia [grade 3]
    f. **Water Cycle** - animated movie. (need Shockwave) [this expired page is from the Internet Archive known as the **Wayback Machine**]

Explore Learning

https://www.explorelearning.com

Gizmos by Grade & Topic

Find Gizmos organized by grade level and topic.

MATH

Grade 3-5
- Number and Operations
- Algebra
- Geometry
- Measurement
- Data Analysis and Probability

Grade 6-8
- Number and Operations
- Algebra
- Geometry
- Measurement
- Data Analysis and Probability

Grade 9-12
- Number and Operations
- Algebra
- Geometry
- Measurement
- Data Analysis and Probability

SCIENCE

Grade 3-5
- Physical Science
- Life Science
- Earth and Space Science
- Technology and Engineering
- Science Skills

Grade 6-8
- Physical Science
- Life Science
- Earth and Space Science
- Technology and Engineering
- Science Skills

Grade 9-12
- Chemistry
- Physics
- Biology
- Earth and Space Science
- Technology and Engineering
- Science Skills

Browse Other Lists: All Gizmos

Exploratorium - Tools

https://www.exploratorium.edu/education/designing-teaching-learning-tools

Websites: Smaller sites within our main website are full of rich science content for educators and learners. Geometry Playground for example, has hands-on activities that spark students' interest in geometry. Some of the activities are in Spanish as well as English and are designed for classroom use but can also be used by families or other groups. Faultline is another microsite suitable for teachers. It focuses on earthquakes, covers all the basics of seismic science, and includes hands-on activities.

Educator Learning Commons: This library and information hub supports the educational, professional development, and research needs of Exploratorium Teacher Institute alumni by providing access to a variety of electronic, multimedia, and print-based learning resources and technology.

Publications: Over decades, we've developed a rich body of work related to teaching and learning. There are publications for educators to use in the classroom including *Human Body Explorations*; reports and papers, such as *Art as a Way of Knowing*; many papers documenting the results of formative evaluation of learning at exhibits, and more.

Digital Library: The collections in our digital library include images, educational activities in PDF and HTML formats, QuickTime movies, streaming media, and audio files related to interactive exhibits and scientific phenomena. Educators can search, select, and download digital files for individual, noncommercial educational use.

Color Uncovered iPad App: This interactive iPad book focuses on the surprising side of color through illusions, articles, videos, and activities—and can be used as a teaching tool in or out of the classroom. In keeping with our commitment to hands-on learning, some of the activities work with simple items such as a CD, a drop of water, or a piece of paper.

Sound Uncovered iPad App: Hear with your eyes, see with your ears, test your hearing, make and modify recordings—this app puts you at the center of the experiment. Explore the surprising side of sound with Sound Uncovered, an interactive collection featuring auditory illusions, acoustic phenomena, and other things that go bump, beep, boom, and vroom.

Snacks: "Snacks" are miniature versions of some of the most popular exhibits at the Exploratorium. Here, educators can explore a variety of them and learn how to build them for their classrooms using common, inexpensive, easily available materials.

Science Teaching Tips Podcasts: We have nearly 70 science-teaching podcasts. They offer pedagogy tips, science history, hands-on activities, and other ideas for science classrooms.

Extreme Science
http://www.extremescience.com/

Home | Animal Kingdom | Earth | Ocean | Resources | Space | Time | Weather | Science Tutors | About

SCIENCE ROCKS!

Extreme Science is the place online to find the **biggest**, **baddest**, and the best in the world of extremes and learn about the science behind what makes each the most extreme example of its kind. Here you'll find **world records** in natural science, including earth science and the plant and animal kingdom, as well as **extreme weather records**, and much more wild, weird, and out-there stuff.

Browse the latest Top 9 Rated reviews of the best and newest products available online. Visit HotRate for a great range of products that you won't find anywhere else.

You'll also find the most complete collection of science and technology information and resources available on the Internet, including resources for students working on science fair projects and teachers needing **content for science lessons**.

Choose your favorite subject and prepare to entertain your brain. Need help with dissertation writing? Visit http://dissertationexpert.org/ Very good dissertation writing guides, tips and prompts.

Great solution to get PhD thesis writing help online here.
online cna classes
Need research paper assist? We can point on them -> domyresearchpaper.
Click here to read binaryoptionrobotinfo.com trading software review
Learn more about technical warm water underfloor heating from UHS. Fine Mesh Metals: Educate customers and advise on how to best use wire mesh.
Find educational children's product reviews and the speciality toys by visiting MyKidNeedsthat.com
Complete an accredited online high school program at Excel High School.
Northgate Academy offers online Homeschool programs for high school students.

Select Language

Today is April 26th, 2017

Favorites


Largest Ocean Carnivore


Biggest Carnivorous Fish


Biggest Fish

Famous scientists
https://www.famousscientists.org

Famous Scientists

About 2.3 million years ago our very earliest ancestors invented their first primitive tool, the split stone, which they used for cutting and scraping.

Modern humans first appeared about 200,000 years ago. About 50,000 years ago they (or should that be we?) began to use language, symbols and more complex tools.

As inventions and discoveries added to one another, human civilization, technology, and science advanced and evolved.

If you're looking for scientists in particular fields, you could try our pages here:

- Astronomers
- Biologists & Health Scientists
- Chemists
- Geologists & Paleontologists
- Mathematicians
- Physicists

Famous scientists – Unsung heroes of DNA

https://www.famousscientists.org/unsung-heros-of-dna

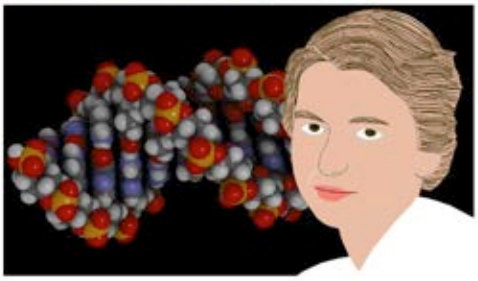
The Unsung Heros of DNA (Not Rosalind)

By The Doc

DNA's structure and replication mechanism were discovered by Francis Crick and James Watson in 1953 – the greatest discovery in twentieth century biology.

Remarkably, neither Crick nor Watson had performed a single successful DNA experiment themselves. Each of them had been funded to work on other projects. Watson and Crick, along with Maurice Wilkins, received the 1962 Nobel Prize in Medicine for their work.

Rosalind Franklin – No longer unsung



Rosalind Franklin's role as chief data provider for the discovery had faded into obscurity until James Watson revived interest in her work with his controversial 1968 book *The Double Helix*.

Watson portrayed Rosy – as he called her – in an unflattering light. He made amends slightly in an epilogue in which he said his intention in the book was to convey his actual impressions as a young man during the discovery period and – particularly with Rosalind Franklin – his impressions had often been wrong. Watson added the epilogue after he received outraged reactions to his first draft of the book from Francis Crick and Maurice Wilkins.

Rosalind Franklin had died in 1958 and was in no position to comment on the book.

Famous scientists – Top 100

https://www.famousscientists.org/popular/

Luis Alvarez 1911 – 1988.
The iridium layer, dinosaur death by meteorite impact, and subatomic particle discoveries.

André-Marie Ampère 1775 – 1836.
Discovered that wires carrying electric current can attract and repel magnetically; founded electromagnetic theory.

Anaximander c. 610 BC – c 546 BC.
An ancient scientific revolution: the first person in history to recognize that our planet is free in space and does not need to sit on something.

Mary Anning 1799 – 1847.
Ancient animals, fossils, and paleontology: discovered the first complete specimen of a plesiosaur; deduced the diets of dinosaurs.

Archimedes c. 287 BC – 212 BC.
Founded the sciences of mechanics and hydrostatics, calculated pi precisely, devised the law of exponents, created new geometrical proofs, invented numerous ingenious mechanical devices, and more.

Aristarchus c. 310 BC – c. 230 BC.
Promoted the idea that the earth follows a circular orbit around the sun eighteen centuries before Nicolaus Copernicus resurrected the idea.

Famous scientists

http://www.biographyonline.net/scientists/top-10-scientists.html

Top 10 Greatest Scientists

A list of the top 10 scientists of all time.

Sir Isaac Newton (1642–1726) Newton was a polymath who made investigations into a whole range of subjects including mathematics, optics, physics, and astronomy. In his *Principia Mathematica*, published in 1687, he laid the foundations for classical mechanics, explaining law of gravity and the laws of motion.

Louis Pasteur (1822–1895) Pasteur contributed greatly towards the advancement of medical sciences developing cures for rabies, anthrax and other infectious diseases. Also invented the process of pasteurisation to make milk safer to drink. He probably saved more lives than any other person.

Galileo (1564–1642) Creating one of the first modern telescopes, Galileo revolutionised our understanding of the world, successfully proving the Earth revolves around the Sun and not the other way around. His work *Two New Sciences* laid the groundwork for the science of Kinetics and strength of materials.

Marie Curie (1867–1934) Polish physicist and chemist. Discovered radiation and helped to apply it in the field of X-ray. She won the Nobel Prize in both Chemistry and Physics.

Famous scientists

http://www.sciencekids.co.nz/sciencefacts/scientists.html

Albert Einstein

Albert Einstein changed the world of science with his brilliant work in theoretical physics. His theories, equations and ideas became the stuff of legend and his image is known around the world.

Isaac Newton

Isaac Newton developed the theory of universal gravitation as well as his famous three laws of motion, forever leaving his mark on physics, astronomy and mathematics.

Galileo Galilei

Italian scientist Galileo developed telescopes and used them to make revolutionary observations about our solar system, discovering new objects like the moons that orbit Jupiter.

Charles Darwin

Charles Darwin introduced the idea of natural selection to the world, backing up his theories on evolution with substantial observational data recorded on his long sea voyages.

Johannes Kepler

Johannes Kepler was a famous German astronomer and mathematician who made a number of scientific breakthroughs including his three laws of planetary motion.

Louis Pasteur

French chemist and microbiologist Louis Pasteur created a new level of understanding regarding microorganisms, the causes of disease and disease prevention.

Ernest Rutherford

Often referred to as the father of nuclear physics, New Zealand born chemist Ernest Rutherford won a Nobel Prize in chemistry, developed a new model of the atom and mentored other scientists.

Jane Goodall

Jane Goodall is known for her life long study of the behavior of chimpanzees in social situations as well as being a tireless animal rights advocate and humanitarian.

Michael Faraday

What British physicist and chemist Michael Faraday lacked in formal education he more than made up for with brilliant experimental techniques and revolutionary electromagnetism ideas.

Edwin Hubble

Edwin Hubble was a major contributor in the field of astrophysics, helping open our eyes to the idea of other galaxies. He was honored by NASA who named the Hubble Space Telescope after him.

Pierre & Marie Curie

The husband and wife combination of Pierre & Marie Curie contributed much to science through both their own individual work and their combined research efforts in the field of radioactivity.

James Maxwell

Scottish physicist James Maxwell brought together the ideas of electromagnetic fields, describing their nature in publications such as 'A Dynamic Theory of the Electromagnetic Field'.

Stephen Hawking

British theoretical physicist Stephen Hawking is famous for his work on black holes. He also wrote books such as 'A Brief History of Time', enabling a wide audience to appreciate his ideas.

Aristotle

Aristotle's famous work covered many subjects. He wrote about philosophy, politics, logic and music as well as developing many new and influential scientific ideas.

Nikola Tesla

Nikola Tesla contributed to physics and engineering with a range of futuristic inventions, dramatic demonstrations and the development of alternating current electricity.

Nicolaus Copernicus

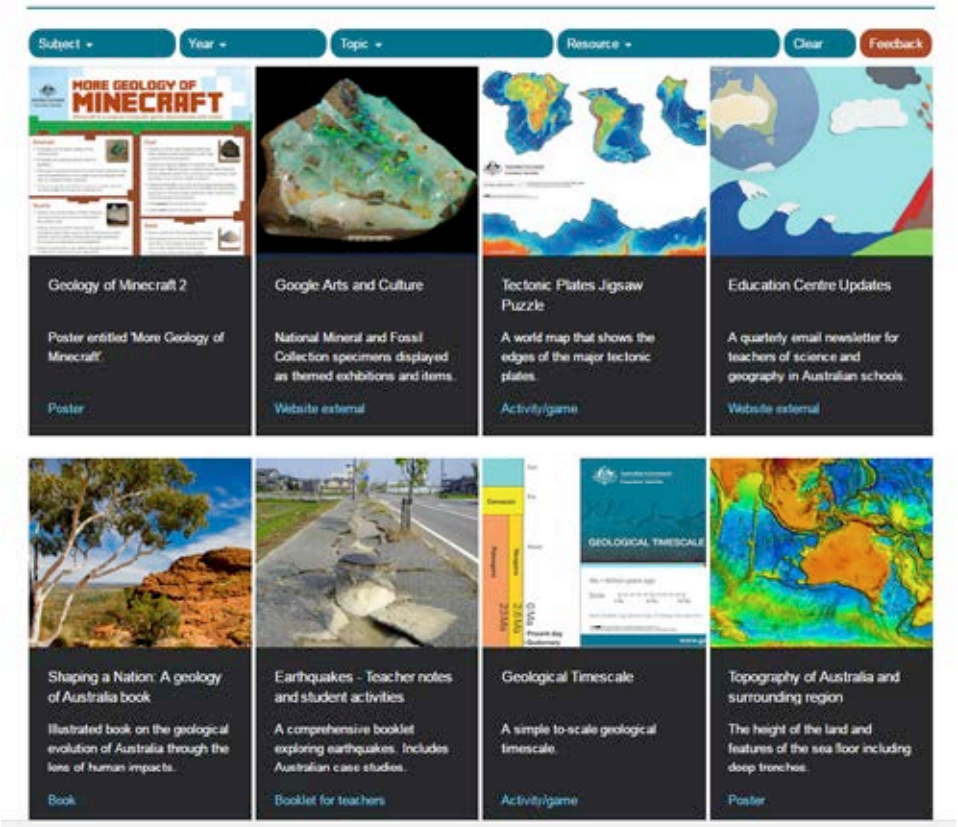
At a time when astronomers believed the Earth was at the center of the Universe, Nicolaus Copernicus developed a radical new theory, kick starting modern astronomy in the process.

Funology

http://www.funology.com/

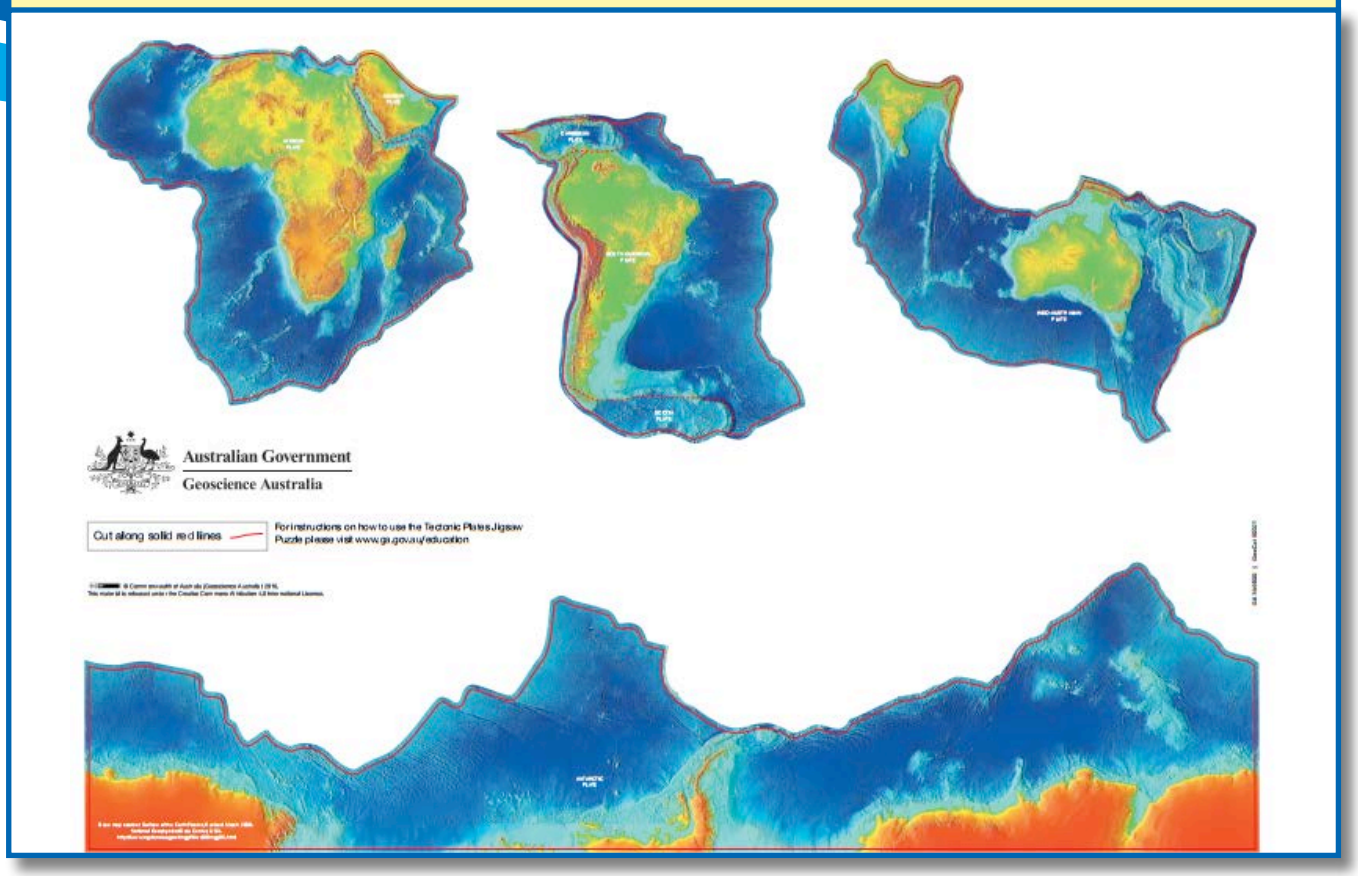
Geoscience resources

http://www.ga.gov.au/education/classroom-resources/classroom-resources



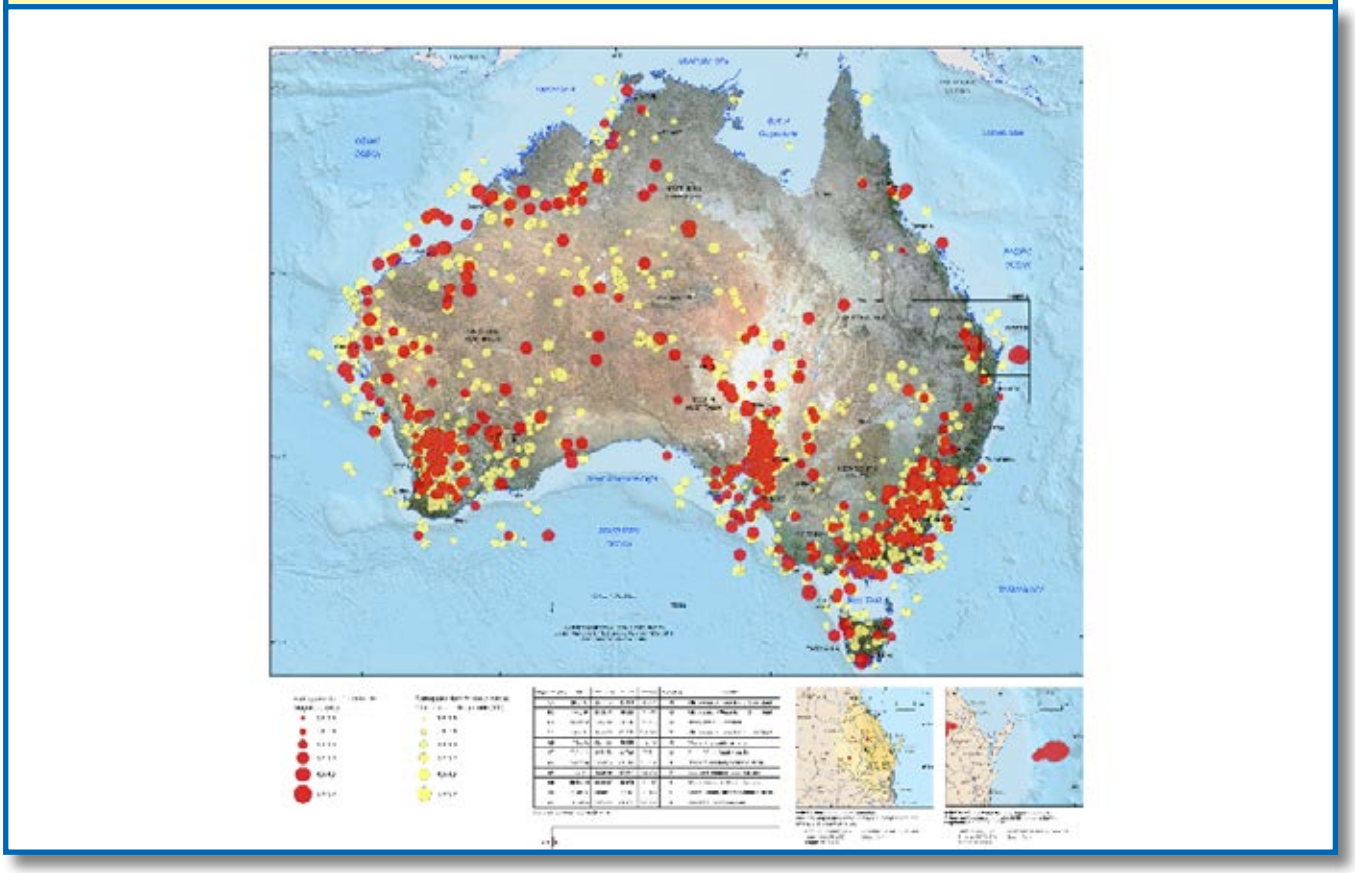
Geoscience resources – Tectonic plates jigsaw

https://d28rz98at9flks.cloudfront.net/90021/Tectonic_Plates_Jigsaw_Puzzle_pieces.pdf



Geoscience resources - Australian Earthquakes

https://d28rz98at9flks.cloudfront.net/100306/100306.pdf



Geoscience resources - Weathering, erosion, landforms and regolith – Teacher's Notes

https://d28rz98at9flks.cloudfront.net/75055/Rec2013_016_Teacher_Notes.pdf

Record 2013/16 | GeoCat 75055

Weathering, erosion, landforms and regolith

Teacher notes and student activities

Geoscience resources – Tsunamis

http://www.ga.gov.au/scientific-topics/hazards/tsunami/basics/causes

What causes Tsunamis?

Contents

Tsunami are waves caused by sudden movement of the ocean due to earthquakes, landslides on the sea floor, land slumping into the ocean, large volcanic eruptions or meteorite impact in the ocean.

Earthquakes

Most tsunami are caused by large earthquakes on the sea floor when slabs of rock move past each other suddenly, causing the overlying water to move. The resulting waves move away from the source of the earthquake event.

View animation to see how undersea earthquakes can cause tsunami

Landslides

Underwater landslides can cause tsunami as can terrestrial land which slumps into the ocean.

View animation to see how underwater landslides can cause tsunami.

Volcanic eruptions

Less common are tsunami initiated by volcanic eruptions. These occur in several ways:

- destructive collapse of coastal, island and underwater volcanoes which result in massive landslides
- pyroclastic flows, which are dense mixtures of hot blocks, pumice, ash and gas, plunging down volcanic slopes into the ocean and pushing water outwards
- a caldera volcano collapsing after an eruption causing overlying water to drop suddenly.

View animation to see how volcanic eruptions can cause tsunami.

History of inventions

http://www.inventored.org/k-12/inv-hist.html

Interesting Historical Invention Links

A.C. Gilbert's Discovery Village, Salem, OR About toy inventors and their inventions.
According to Mark Twain, "A country without a patent office and good patent laws ...
African American Invention Express - Kids car - Note: Very slow download time.
American Inventors and Inventions
Anti-Monopoly
Antique Radio
Apple Timeline
Archimedes
Austin Children's Museum's Inventions Exhibit

Alexander Graham Bell	Bell Notebooks
	Bell's Tellephone
	Alexander Graham Bell Links
	Alexander Graham Bell
	STEVEN S. RAAB AUTOGRAPHS - CATALOG 19 BUSINESS PEOPLE & INVENTORS
	Brain Spin by AT&T
	Alexander Graham Bell 1847-1922 Inventor

CENTURY OF RADIOLOGY
Children's Museums - A list by state
Chicago Children's Museum website
Children's Discovery Museum of San Jose
Chewing Gum
Classroom is a museum of African-American inventions
Cryptography Five Great Inventors of 20th Century
Dead Inventors' Corner
Did a West Virginian Invent Radio?
Discovery Channel Inventors and Inventions
Do You Know... when it was invented?

Edison	Edison International Kids Page
	Edison NHS: Kid's Corner: Edison's Inventions
	Thomas Edison's Home Page
	Portraits of the Inventor as a Young Man (Edison)
	Edison National Historic Site
	Thomas A. Edison

History of Science and Technology

https://www.fi.edu/history-of-science-and-technology

Recreation

Bicycle Memorabilia, Bicycle Technology, Colonial Currency

Benjamin Franklin

Franklin's Glass Armonica, Franklin's Lightning Rod, Nini Medallion

Computing

Burroughs Adding Machine, The Hollerith Electric Tabulating System

Electricity

Edison's Light bulb, The X-Ray Tube

Flight

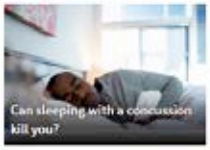
Airfoil Collection, Wright Brothers' Notebooks, Wind Tunnel

Instrumentation

Patent Models, Maillardet's Automaton, Steam-Powered Coin Press

How Stuff Works
http://science.howstuffworks.com

RIGHT NOW IN SCIENCE



How Stuff Works – Innovation
http://science.howstuffworks.com/innovation

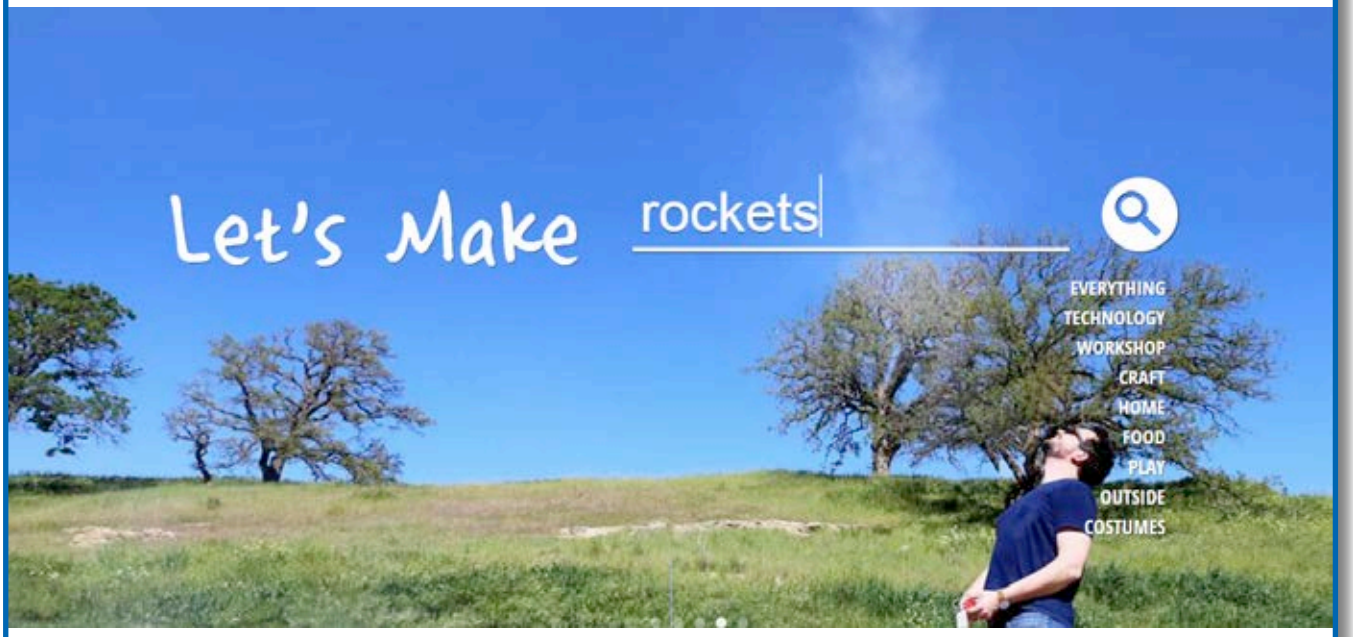
Big Thinkers
A few incredible individuals are responsible for some of the biggest innovations. Learn about those who changed the world by thinking outside the box. See more »

Edible Innovations
From the deceptive simplicity of bread to the fascinating world of molecular gastronomy, learn all about the food you eat with these articles about edible innovations. See more »

Everyday Innovations
Have you ever wondered how black lights, or mirrors work? This collection of articles will explain the workings of some of the most common inventions and innovations you come into contact with everyday. See more »

Famous Inventors
Famous inventors are few and far between. Most people know about famous inventions but there are only a handful of well-know famous inventors. In this section we'll examine famous inventors and their amazing ideas. See more »

Instructables
http://www.instructables.com/



Invention resources
http://lemelson.mit.edu/resources

Invention resources – Inventors

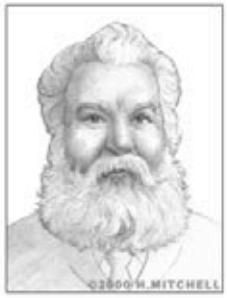
http://lemelson.mit.edu/search-inventors

Angela Belcher

Genetically engineers viruses to create new products

Over hundreds of millions of years, microorganisms have become efficient at building practical, durable structures and materials from available elements, working at nanoscale dimensions.

Alexander Graham Bell



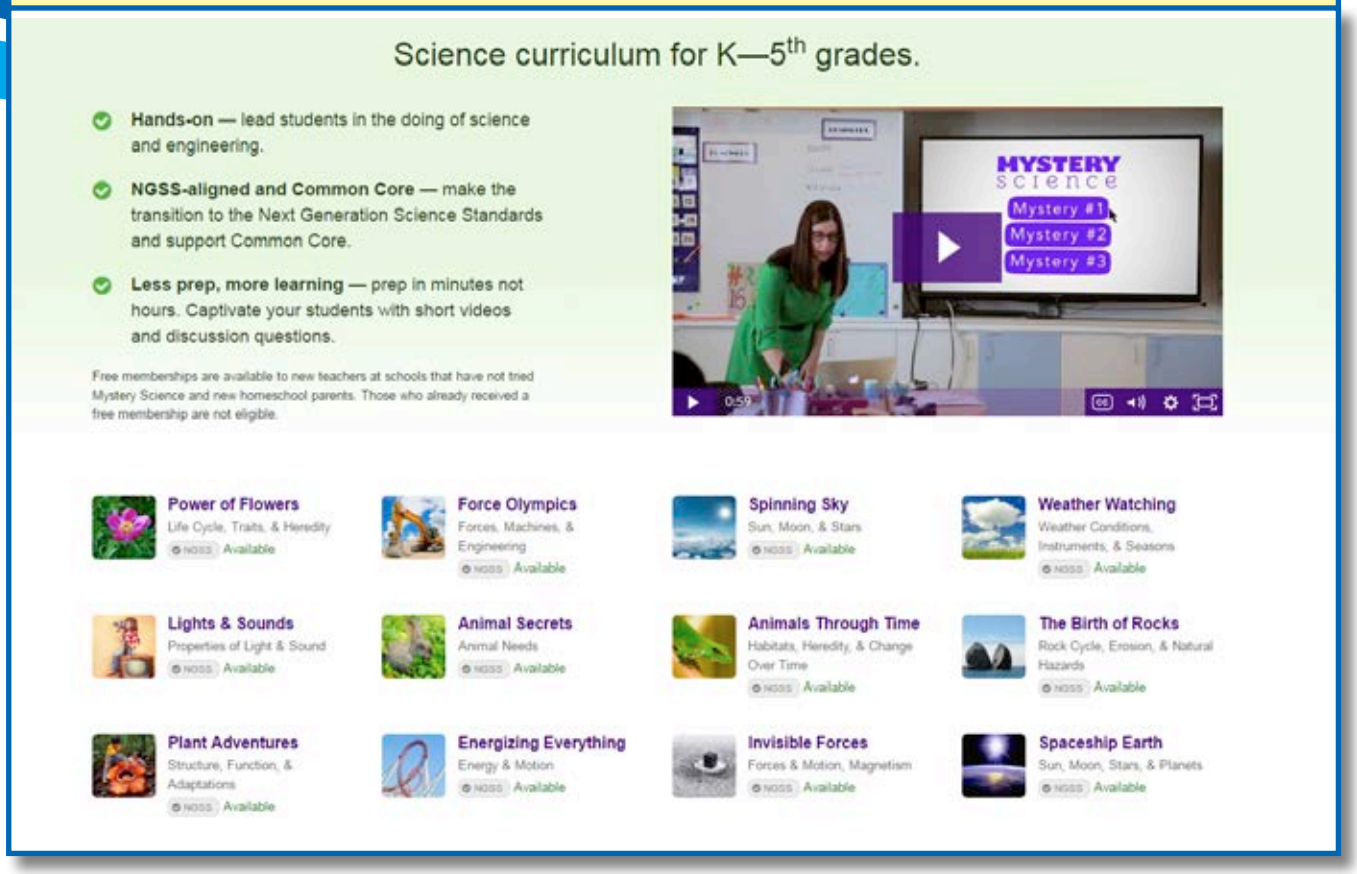
The Telephone

When the word "inventor" is mentioned, Alexander Graham Bell, creator of the telephone, is undoubtedly one of the first names that springs to mind.

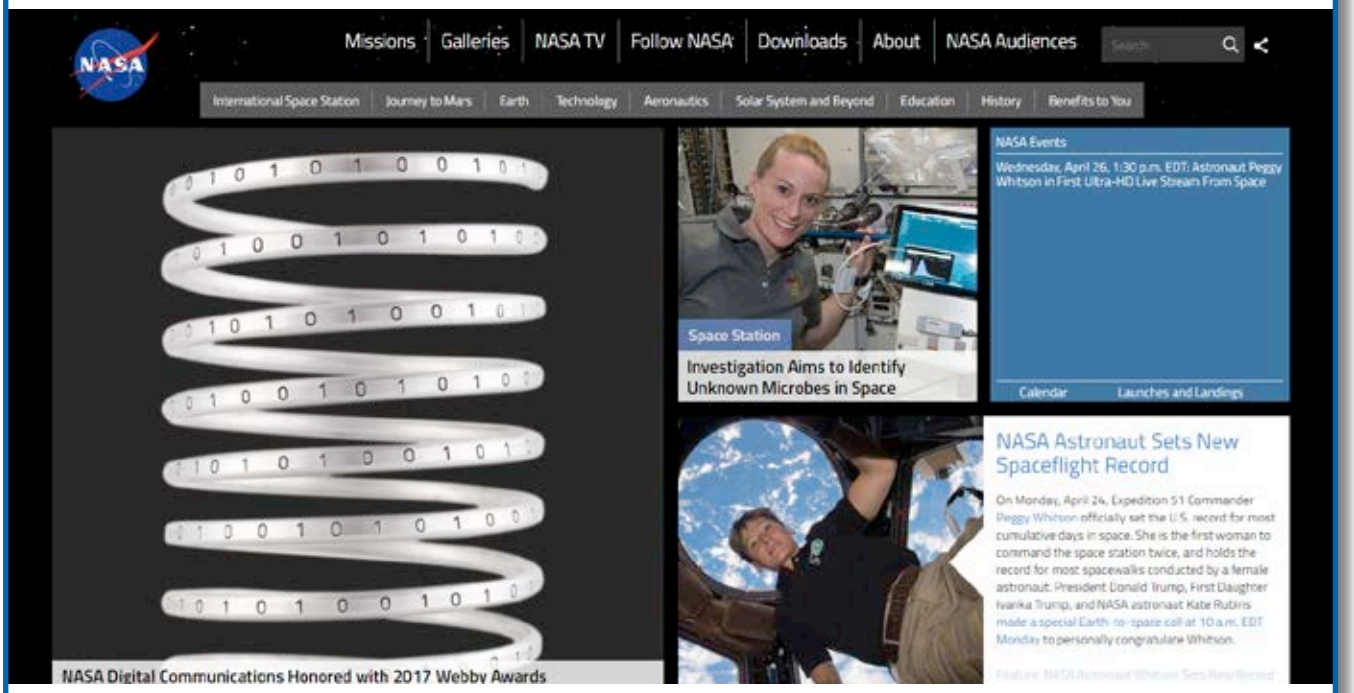
Lawrence Hall of Science

http://static.lawrencehallofscience.org/kidsite

Mystery Science
https://mysteryscience.com



NASA
https://www.nasa.gov

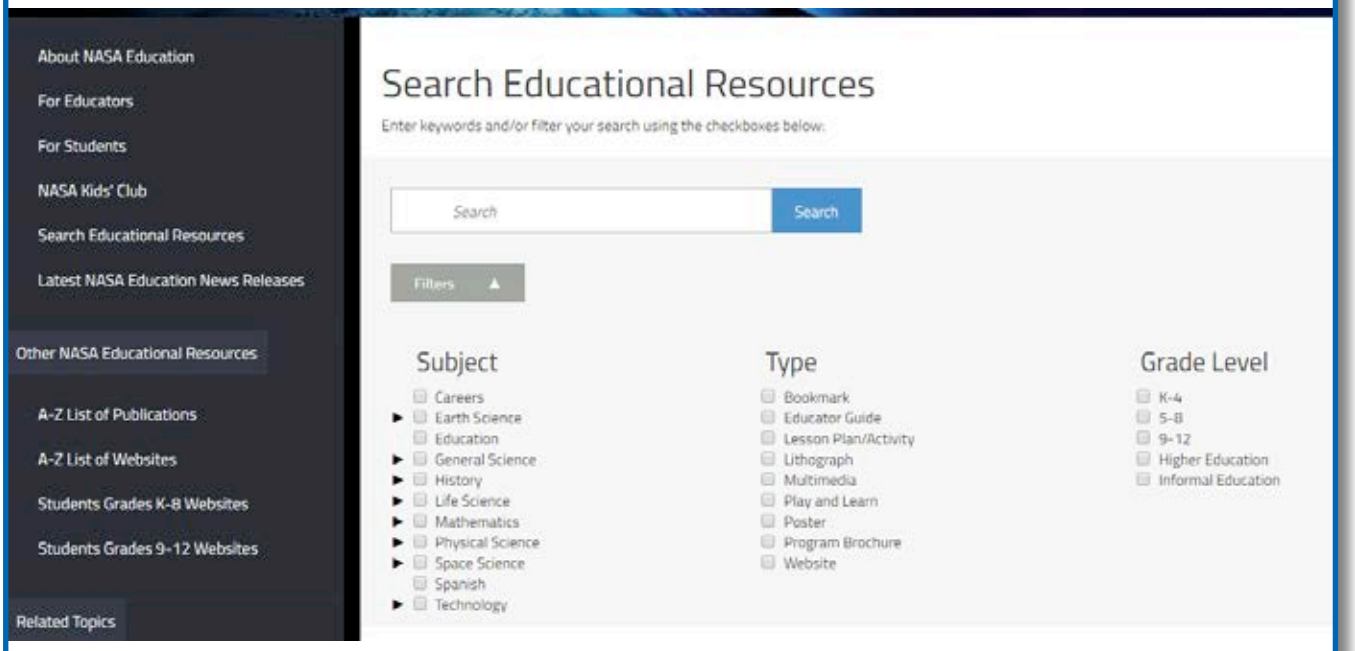


NASA Education

https://www.nasa.gov/offices/education/about/index.html

NASA education resources

https://www.nasa.gov/education/resources

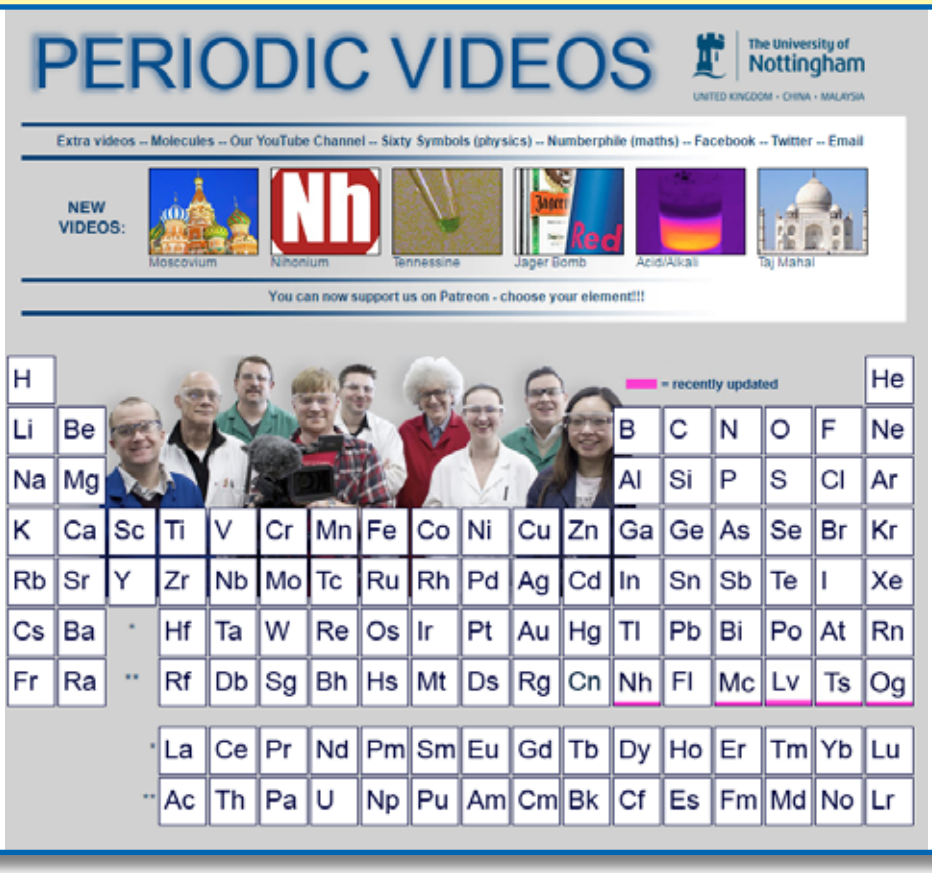


NASA Space Place
https://spaceplace.nasa.gov

NOVA Labs - Energy
http://www.pbs.org/wgbh/nova/labs/lab/energy

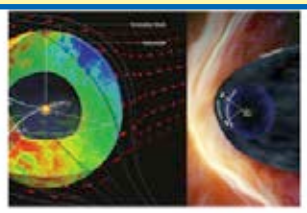
Periodic videos

http://www.periodicvideos.com/



Science and Astronomy

http://www.space.com/science-astronomy



Sun's Magnetic Shield May Be a Bubble, Not Comet-Shaped

April 25, 2017 | Article

The sun's magnetic "sphere of influence" that surrounds our solar system is shaped like a bubble, rather than having a long, comet-like tail as many scientists previously thought, new observations suggest.

Read More »

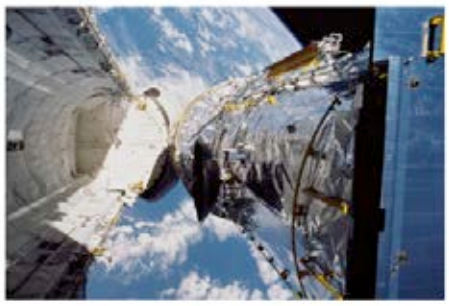


Image of the Day

April 25, 2017 | Image Album

On this day in 1990, NASA's space shuttle mission STS-31 deployed the Hubble Space Telescope into orbit. The telescope was launched to capture images of the cosmos with unprecedented clarity, but a flaw in its mirror left the telescope nearsighted.

VIEW ALBUM

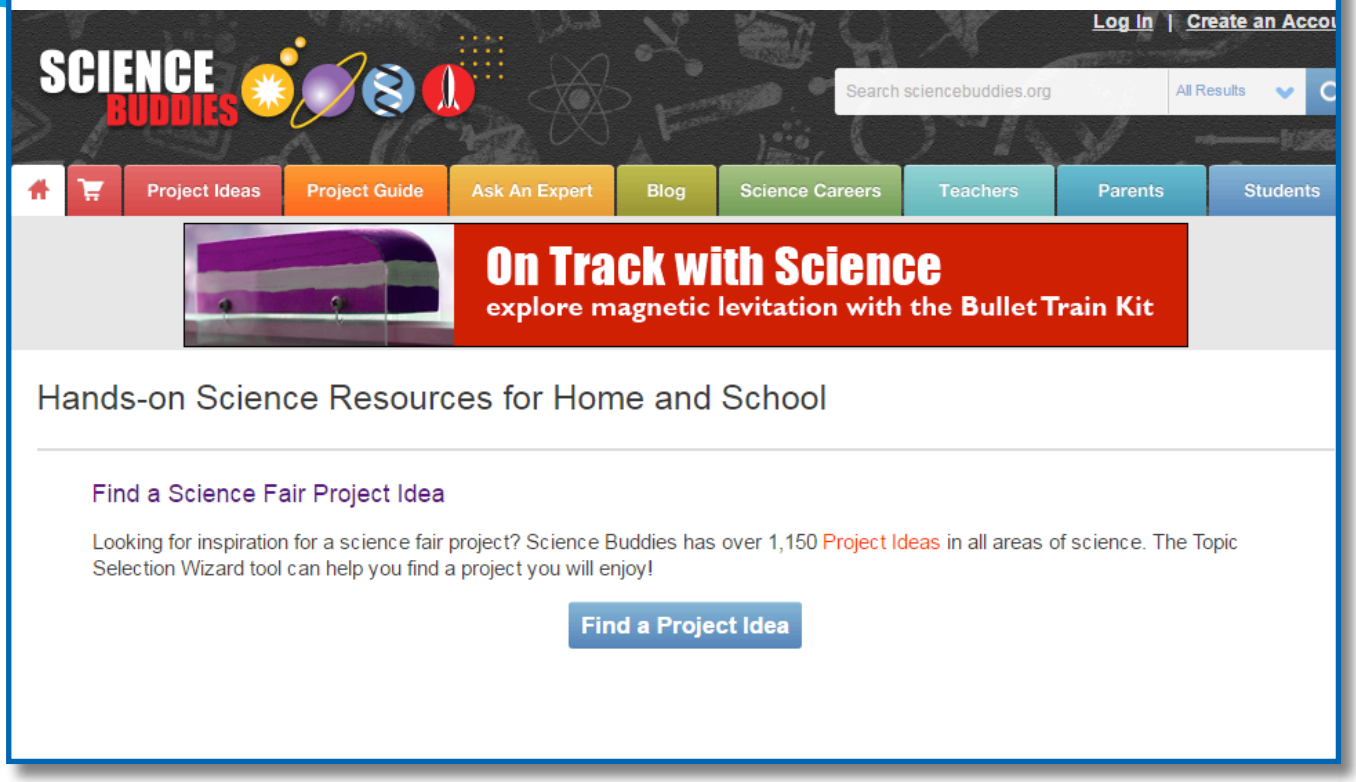
'Build Spaceships, Not Walls': One Student's Take at the March for Science | Video

April 25, 2017 | Video

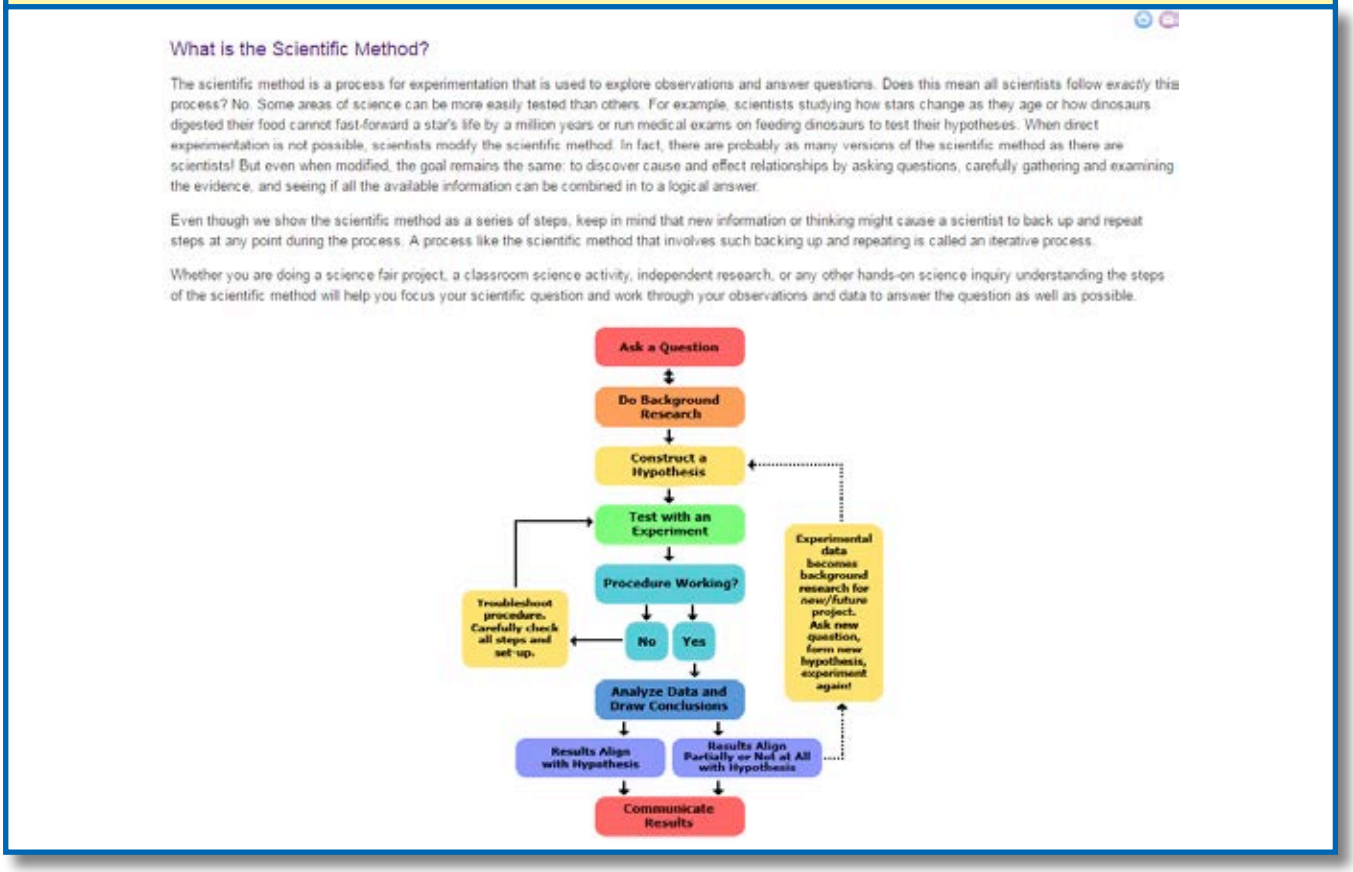
Paige Campbell, an astrophysics and meteorology student of Pennsylvania State University, explains why she's marching in the March for Science in Washington D.C. on April 22, 2017.

Read More »

Science Buddies
http://www.sciencebuddies.org

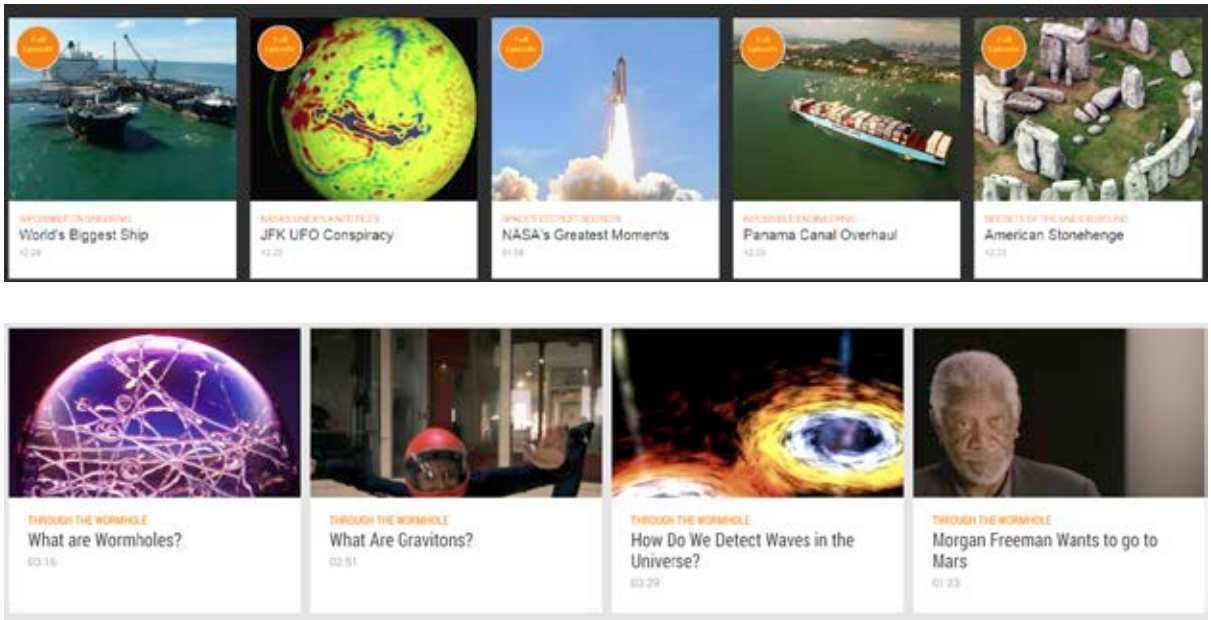


Science Buddies – Scientific Method
http://www.sciencebuddies.org/science-fair-projects/project_scientific_method.shtml



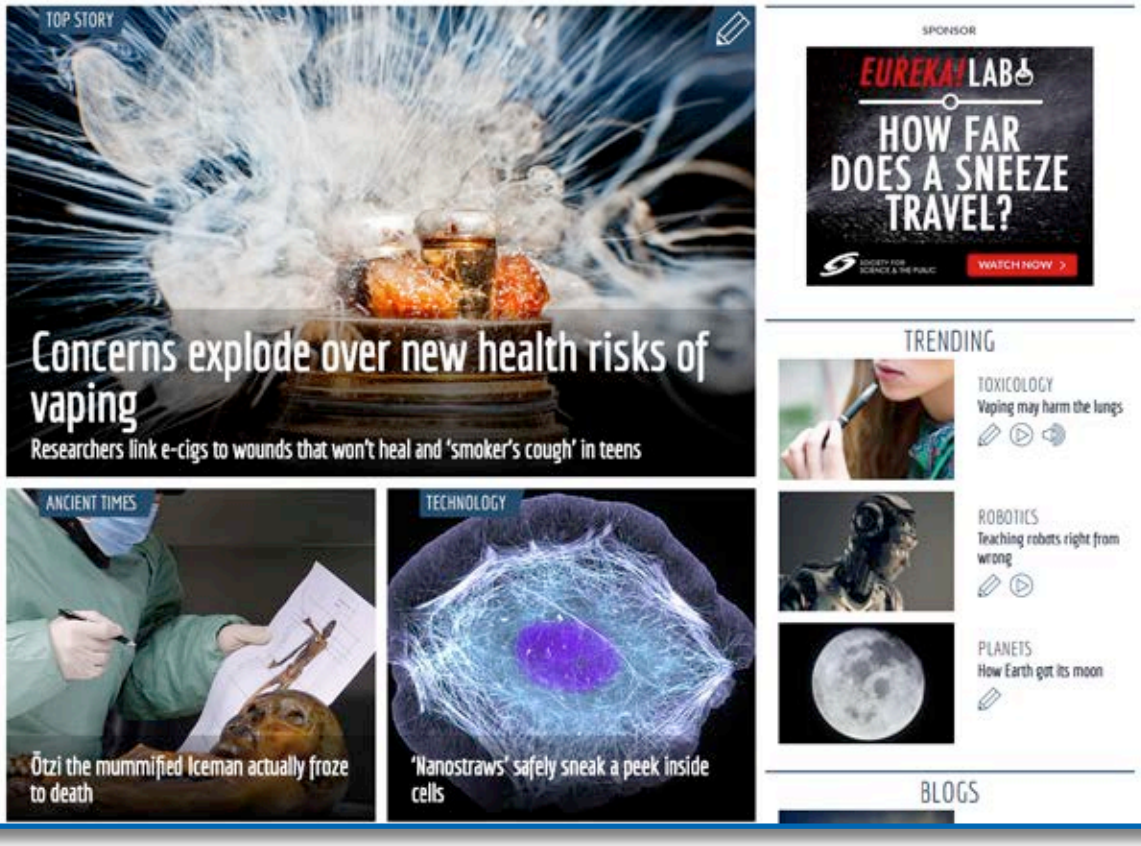
Science Channel

http://www.sciencechannel.com



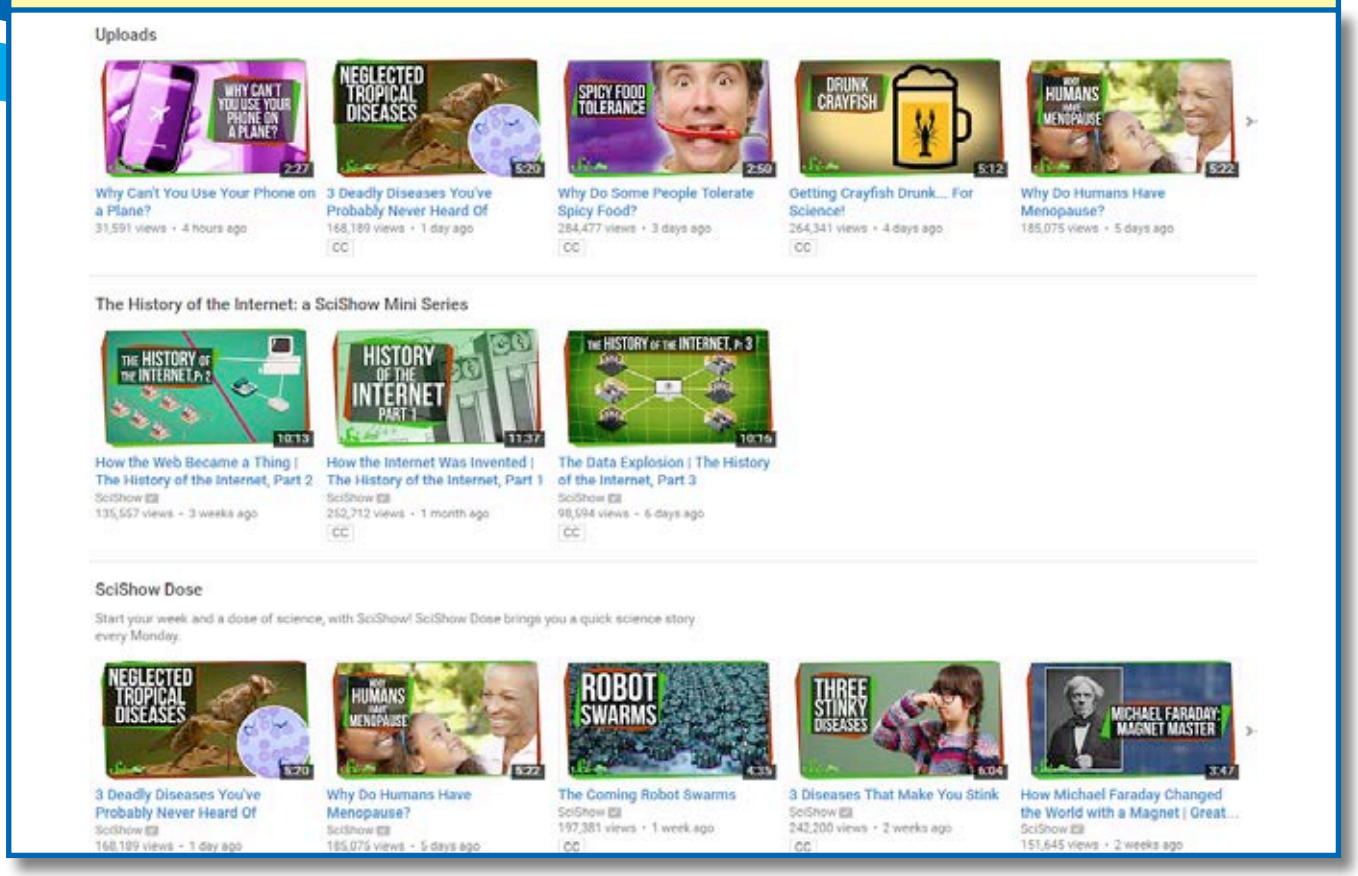
Science News

https://www.sciencenewsforstudents.org/



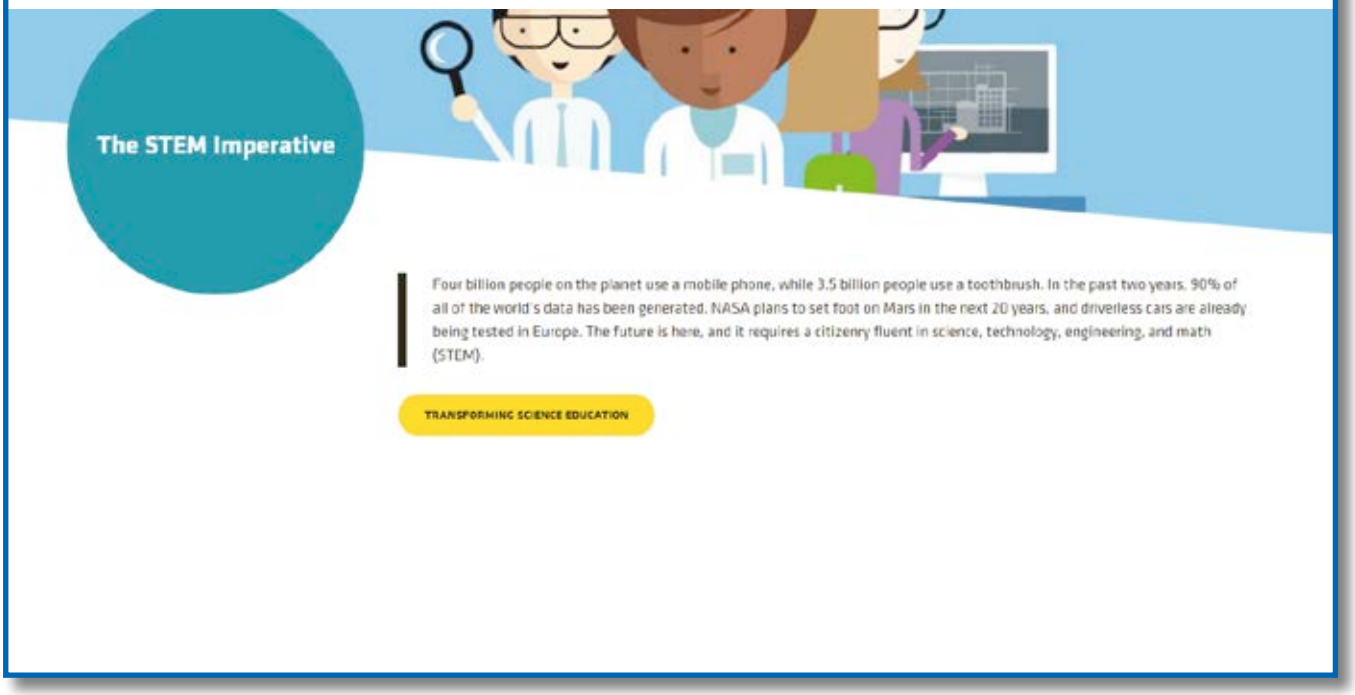
SciShow

https://www.youtube.com/scishow



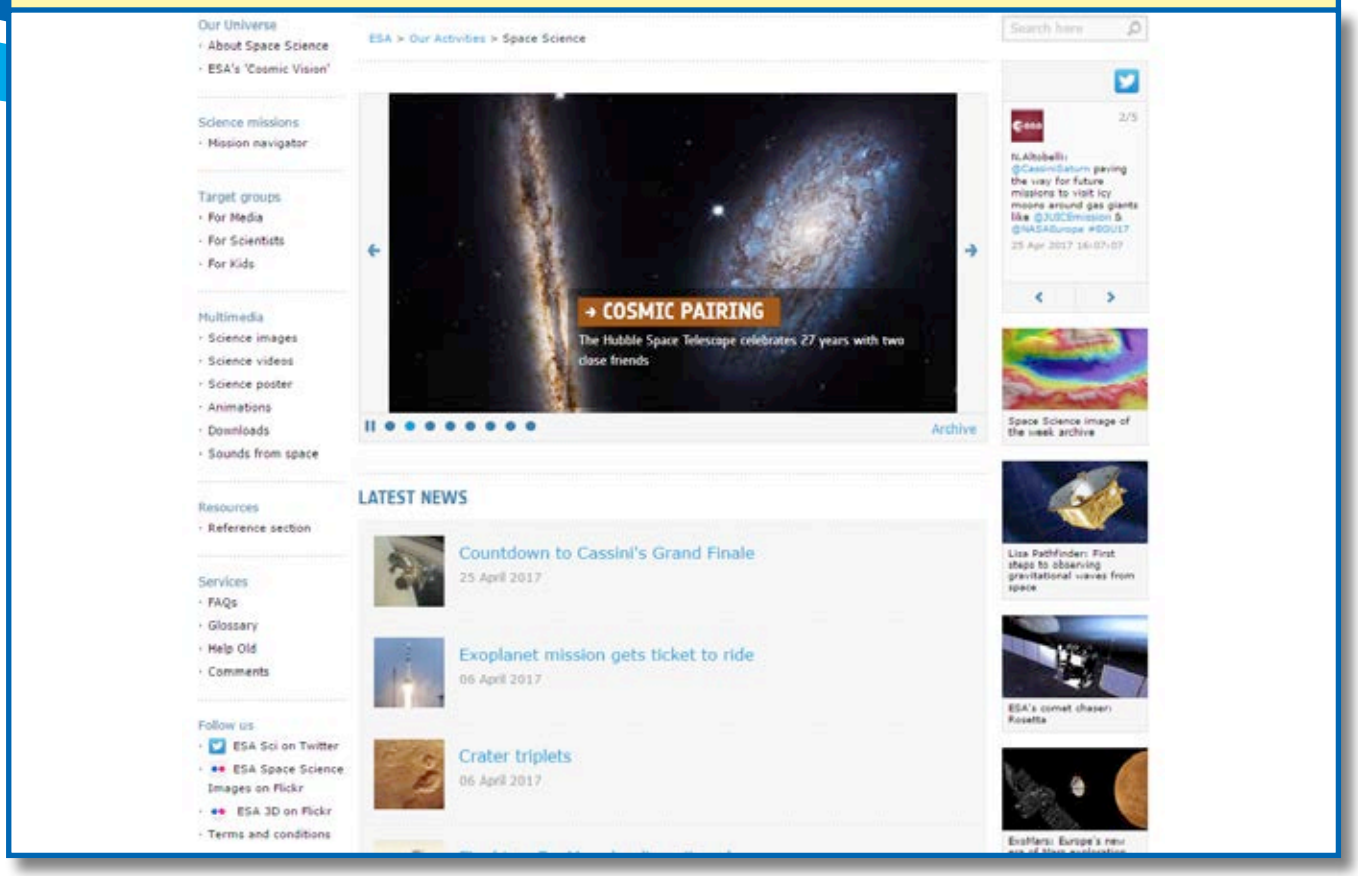
Smithsonian Science Education Centre

https://ssec.si.edu



Space Science – ESA

http://www.esa.int/Our_Activities/Space_Science



Space Science – ESA – Classroom resources

http://www.esa.int/Education/Classroom_resources

Solar System and Universe

Explore the Solar System from your classroom with inspiration from ESA's missions to the Sun and Planets and enrich your astronomy lessons through imagery from space telescopes and cutting edge astrophysics data. See classroom resources here.

Earth and environment

Gain a new perspective on geography by using satellite images of the Earth to investigate environmental issues such as weather and climate, global change and natural disasters. The physics behind remote sensing of the Earth is also addressed. See classroom resources here.

Astronauts and the International Space Station

Let ESA's astronauts inspire your students through this extensive collection of videos and online lessons, covering diverse topics related to living and working in the International Space Station and performing research in microgravity. See classroom resources here.

Rockets and technology resources

Train the rocket scientists of the future using resources linked to ESA's launch vehicles and technology programmes that bring cutting edge space research down to Earth. See classroom resources here.

STEM sites

http://www.mastersindatascience.org/blog/the-ultimate-stem-guide-for-kids-239-cool-sites-about-science-technology-engineering-and-math/

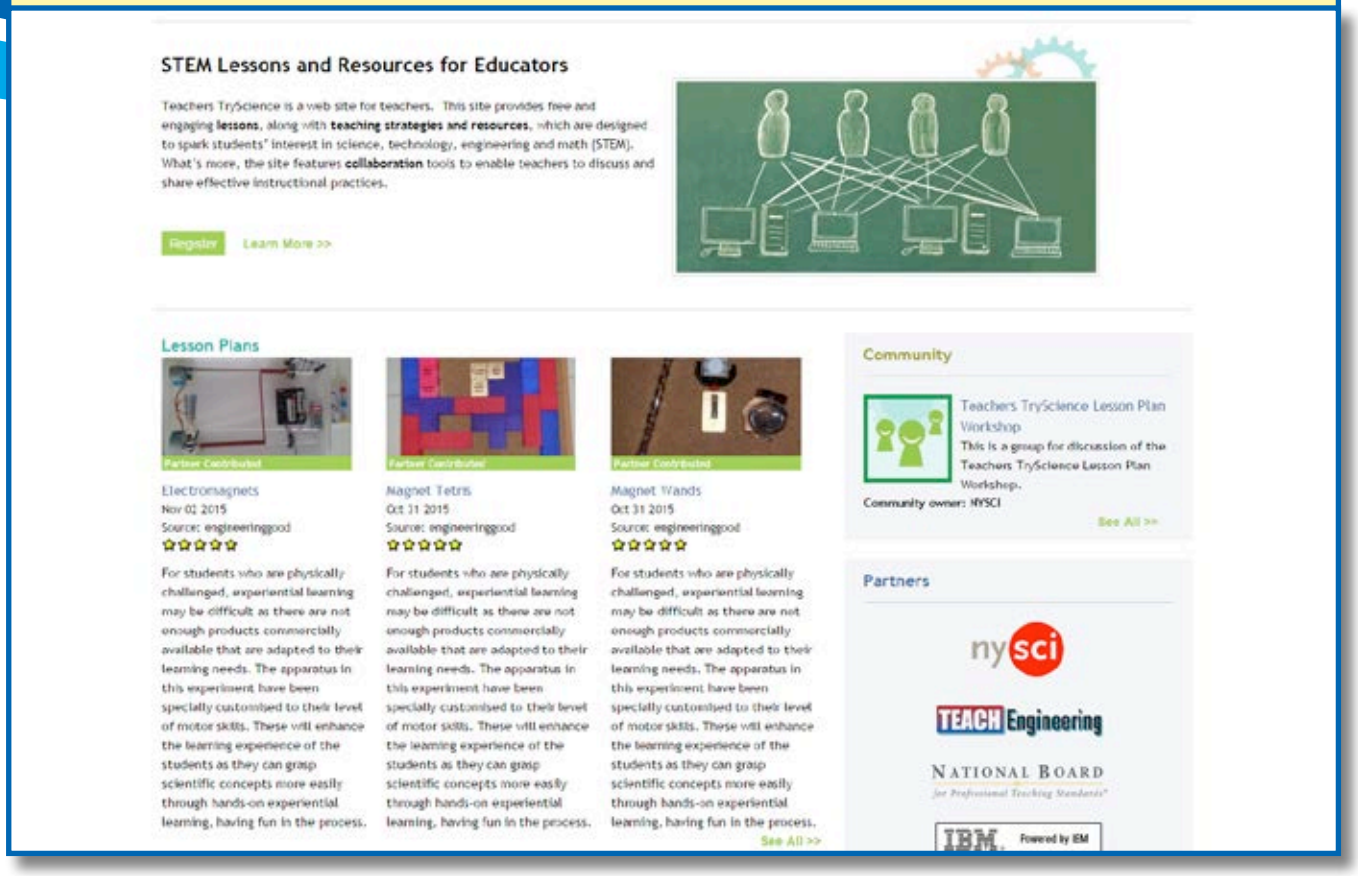
STEM Fun for Kids Grades K-12

Cool STEM Websites

- Ask Dr. Universe: Washington State University's Ask Dr. Universe allows kids to explore various STEM topics and get answers to common questions. Have a question not covered on the site? Submit it on their "Ask" page!
- Code.org: No one is too young (or old, I might add) to code. Learn how to build an iPhone game, write your first computer program, draw in JavaScript and much more.
- Engineering, Go for It! (eGFI): Discover the nuts and bolts of engineering. This website contains advice on careers, entertaining info on all kinds of fields and links to the eGFI magazine.
- EPA Students: Searching for news on the environment, homework resources, info on contests or ideas for an environment-based school project? Check out this website run by the Environmental Protection Agency.

Contents [hide]

Try Science
http://www.tryscience.org



Understanding Science
http://undsci.berkeley.edu

Understanding Science – Teaching tools

http://undsci.berkeley.edu/teaching/teachingtools.php

Here we provide several tools that can be helpful to you and your students: the Science Checklist, several versions of the Science Flowchart, and the Science Toolkit. Their specific applications are addressed within each Teacher Lounge (K-2, 3-5, 6-8, 9-12, and 13-16).

- The Science Checklist (PDF) looks at what makes science science — the key features that set science apart from other human endeavors. The checklist examines the nature of science.
- **The Science Flowchart** looks at how science really works. It portrays scientific inquiry as a dynamic process. The Flowchart appears in several formats:

  Science Flowchart mapping tool — an interactive journaling tool that allows students to document, annotate, and reflect upon their own and others' scientific research process.

  Simple Science Flowchart (PDF) — depicting the four primary components of the process; there is also a Spanish language version

  Complex Science Flowchart (PDF) — depicting the detailed version of the four components; there are also Spanish (18" x 24" poster), French, Japanese, Swahili, and German language versions, as well as a black & white and two blank versions — one in color and one with no color — so that your students can fill in the activities of their own investigations.

  Complex Flowchart Horizontal Poster (PDF) — a landscape-oriented poster that can be printed at a copy shop (dimensions are 37" x 25" so 1/2" can be trimmed from each side, following printing, to remove white margin)

  Complex Flowchart Vertical Poster (PDF) — a portrait-oriented poster that can be printed at a copy shop (dimensions are 25" x 37" so 1/2" can be trimmed from each side, following printing, to remove white margin).

  Science Flowchart for grades K-2 (PDF) — a useful tool for teachers of K-2 students identifying the primary areas of the process best covered at these grade levels

  Science Flowchart for grades 3-5 (PDF) — useful for both teachers and their students with modified language appropriate for students at these grade levels.

Science reports and publications

https://www.science.org.au/support/analysis/reports

Reports and publications

The Academy engages in a range of different projects across a broad scope of sectors and stakeholder groups. Browse through this list of published reports to track down a particular document or to discover other projects of interest.

Discovery machines: Accelerators for science, technology, health and innovation

2016

Discovery machines: Accelerators for science, technology, health and innovation is the third in a series of Future Science reports supported by the Defence Science and Technology Group. The report explores the science of particle accelerators, the machines that supercharge our ability to discover the secrets of nature and have opened up new tools in medicine, energy, manufacturing, and the environment as well as in pure research.

More

Energy for Australia in the 21st Century: The central role of electricity

2016

Energy for Australia in the 21st Century: The central role of electricity is the second in a series of Future Science reports supported by the Defence Science and Technology Group. The report outlines the challenges posed by Australia's aging infrastructure when trying to respond to rapidly evolving technologies.

More

Three D Printing

https://3dprinting.com/what-is-3d-printing/

What is 3D printing?

3D printing or additive manufacturing is a process of making three dimensional solid objects from a digital file.

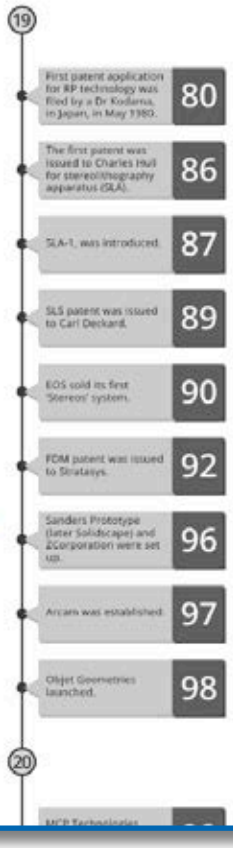
The creation of a 3D printed object is achieved using additive processes. In an additive process an object is created by laying down successive layers of material until the object is created. Each of these layers can be seen as a thinly sliced horizontal cross-section of the eventual object.

Three D Printing – History

http://3dprintingindustry.com/3d-printing-basics-free-beginners-guide/history/

The earliest 3D printing technologies first became visible in the late 1980's, at which time they were called Rapid Prototyping (RP) technologies. This is because the processes were originally conceived as a fast and more cost-effective method for creating prototypes for product development within industry. As an interesting aside, the very first patent application for RP technology was filed by a Dr Kodama, in Japan, in May 1980. Unfortunately for Dr Kodama, the full patent specification was subsequently not filed before the one year deadline after the application, which is particularly disastrous considering that he was a patent lawyer! In real terms, however, the origins of 3D printing can be traced back to 1986, when the first patent was issued for stereolithography apparatus (SLA). This patent belonged to one Charles (Chuck) Hull, who first invented his SLA machine in 1983. Hull went on to co-found 3D Systems Corporation – one of the largest and most prolific organizations operating in the 3D printing sector today.

3D Systems' first commercial RP system, the SLA-1, was introduced in 1987 and following rigorous testing the first of these system was sold in 1988. As is fairly typical with new technology, while SLA can claim to be the first past the starting post, it was not the only RP technology in development at this time, for, in 1987, Carl Deckard, who was working at the University of Texas, filed a patent in the US for the Selective Laser Sintering (SLS) RP process. This patent was issued in 1989 and SLS was later licensed to DTM Inc, which was later acquired by 3D Systems. 1989 was also the year that Scott Crump, a co-founder of Stratasys Inc. filed a patent for Fused Deposition Modelling (FDM) – the proprietary technology that is still held by the company today, but is also the process used by many of the entry-level machines, based on the open source RepRap model, that are prolific today. The FDM patent was issued to Stratasys in 1992. In Europe, 1989 also saw the formation of EOS GmbH in Germany, founded by Hans Langer. After a dalliance with SL processes, EOS' R&D focus was placed heavily on the laser sintering (LS) process, which has continued to go from strength to strength. Today, the EOS systems are recognized around the world for their quality output for industrial prototyping and production applications of 3D printing. EOS sold its first 'Stereos' system in 1990. The company's direct metal laser sintering (DMLS) process resulted from an initial project with a division of Electrolux Finland, which was later acquired by EOS.



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