



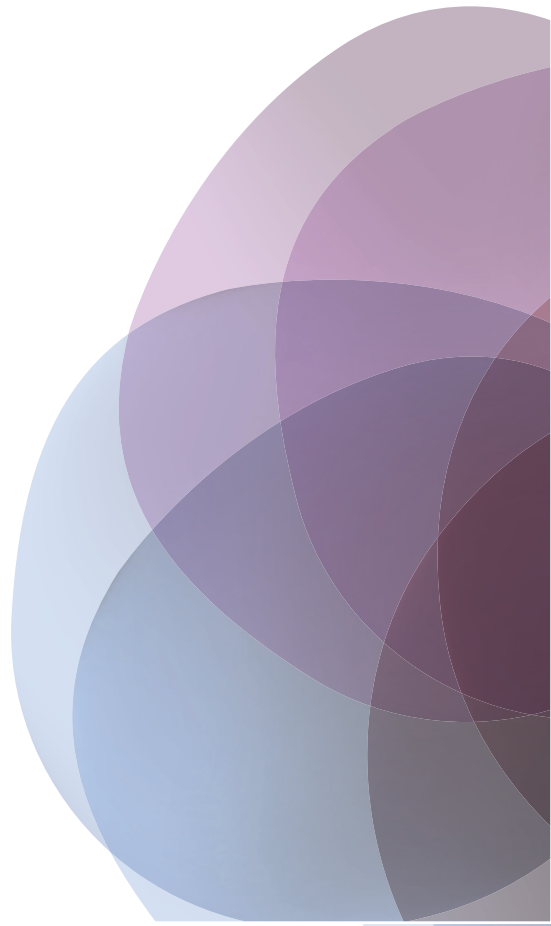
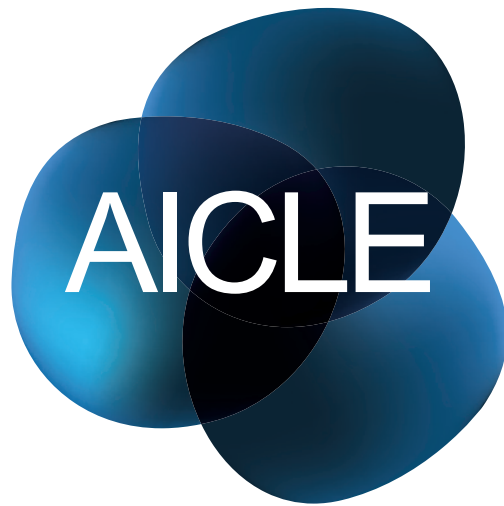
Ciencias naturales

Secundaria



JUNTA DE ANDALUCÍA

Inglés



Identificación del material AICLE

TÍTULO	Earth's internal energy
NIVEL LINGÜÍSTICO SEGÚN MCER	A.2.1
IDIOMA	Inglés
ÁREA / MATERIA	Ciencias Naturales
NÚCLEO TEMÁTICO	Transformaciones geológicas debido a la energía interna de la Tierra.
GUIÓN TEMÁTICO	Concepto de energía como motor de cambios y eje central para explicar los movimientos de las placas tectónicas y como consecuencia de ello se desarrollan los fenómenos geológicos más espectaculares que son Terremotos y volcanes.
FORMATO	Material didáctico en formato PDF
CORRESPONDENCIA CURRICULAR	2º de Educación Secundaria
AUTORÍA	Fernando Sánchez García
TEMPORALIZACIÓN APROXIMADA	9 sesiones (3 semanas)
COMPETENCIAS BÁSICAS	<ul style="list-style-type: none">- Conocimiento e interacción con el medio físico. Por medio de los diferentes acontecimientos geológicos que se producen actualmente y los producidos con anterioridad y cuyos efectos pueden verse en el entorno- Digital y tratamiento de la información. A través de prensa escrita y digital sobre movimientos de tierra y erupciones volcánicas- Social y ciudadana. A través de la concienciación sobre medidas de seguridad y preventivas ante este tipo de fenómenos- Aprender a Aprender. Con la conexión conceptual de las diferentes partes de la secuencia didáctica, lo cuál puede servir para entender la secuencia causa-consecuencia la cuál estará influenciada en gran medida por la prevención que oportunamente se haga
OBSERVACIONES	La competencia de comunicación lingüística es una competencia tratada de forma continuada tanto en inglés como en español.

Tabla de programación AICLE

OBJETIVOS	<ul style="list-style-type: none"> - Interpretar y producir con propiedad, autonomía y creatividad mensajes que utilicen códigos artísticos, científicos y técnicos - Comprender los principios básicos que rigen el funcionamiento del medio físico y natural, valorar las repercusiones que sobre él tienen las actividades humanas y contribuir activamente a la defensa, conservación y mejora del mismo como elemento determinante de la calidad de vida 				
CONTENIDOS DE CURSO / CICLO	Bloque 4. Transformaciones geológicas debidas a la energía interna de la Tierra Transferencia de energía en el interior de la Tierra				
TEMA	<ul style="list-style-type: none"> - Las manifestaciones de la energía interna de la Tierra: erupciones volcánicas y terremotos - Valoración de los riesgos volcánico y sísmico e importancia de su predicción y prevención - Identificación de rocas magmáticas y metamórficas y relación entre su textura y su origen - Manifestaciones de la geodinámica interna en el relieve terrestre. 				
MODELOS DISCURSIVOS	<ul style="list-style-type: none"> - Leer y escuchar las lecturas sobre los puntos del tema - Expresar opiniones y conceptos adquiridos. En cada una de las actividades planteadas - Relacionar los diferentes contenidos entre sí para obtener una red de relaciones lo más extensa posible - Consensuar tareas de cooperación en pequeño y gran grupo 				
TAREAS	<ul style="list-style-type: none"> - Ejercicios de vocabulario específico con definiciones monolingües - Realización de mapas conceptuales en los que se relacionan los diversos conceptos - Preparar presentaciones para el resto de compañeros en formato digital - Construir modelos sencillos de las teorías estudiadas 				
CONTENIDOS LINGÜÍSTICOS	<table border="0"> <tr> <td data-bbox="448 1303 903 1794"> FUNCIONES: <ul style="list-style-type: none"> - Describir de forma sucinta los efectos de terremotos y el aspecto de volcanes en erupción. - Relacionar las manifestaciones externas observadas con la energía interna de la Tierra. - Discutir y argumentar el origen de los desastres naturales y como pueden amplificarse o amortiguarse dependiendo de las construcciones que el ser humano realiza en la superficie de la Tierra. - Sintetizar la evolución que la energía interna de la Tierra tiene desde el centro de la misma hasta la superficie como origen de múltiples cambios en la superficie de la Tierra. - Contrastar con datos obtenidos de los medios de comunicación populares y de más carácter científico la actividad incesante que se desarrolla en una Tierra dinámica </td> <td data-bbox="927 1303 1166 1570"> ESTRUCTURAS: Did you find....? Look for information Can you spell..... Can you repeat May I? Complete this chart with Find this concept Connect with linkers In my opinion this is right </td> </tr> <tr> <td colspan="2" data-bbox="927 1615 1461 1794"> LÉXICO: Energy, Continents, Tectonic Plates, Theory, Crust., Lithosphere , Drift, Continental drift, Fit, Fossils, Climate, Wandering, Evidences, Core, Mantle, Lateral slipping, Convergent, , Divergent, Rift Boundary, Molten rocks, Damages, Intensity, Earthquake, Volcano, Seafloor spreading, Lava, Epicentre, Hypocentre., Pyroclastic, Fumaroles, Geyser, Hot spring. </td> </tr> </table>	FUNCIONES: <ul style="list-style-type: none"> - Describir de forma sucinta los efectos de terremotos y el aspecto de volcanes en erupción. - Relacionar las manifestaciones externas observadas con la energía interna de la Tierra. - Discutir y argumentar el origen de los desastres naturales y como pueden amplificarse o amortiguarse dependiendo de las construcciones que el ser humano realiza en la superficie de la Tierra. - Sintetizar la evolución que la energía interna de la Tierra tiene desde el centro de la misma hasta la superficie como origen de múltiples cambios en la superficie de la Tierra. - Contrastar con datos obtenidos de los medios de comunicación populares y de más carácter científico la actividad incesante que se desarrolla en una Tierra dinámica 	ESTRUCTURAS: Did you find....? Look for information Can you spell..... Can you repeat May I? Complete this chart with Find this concept Connect with linkers In my opinion this is right	LÉXICO: Energy, Continents, Tectonic Plates, Theory, Crust., Lithosphere , Drift, Continental drift, Fit, Fossils, Climate, Wandering, Evidences, Core, Mantle, Lateral slipping, Convergent, , Divergent, Rift Boundary, Molten rocks, Damages, Intensity, Earthquake, Volcano, Seafloor spreading, Lava, Epicentre, Hypocentre., Pyroclastic, Fumaroles, Geyser, Hot spring.	
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CRITERIOS DE EVALUACIÓN	<ul style="list-style-type: none"> - Saber cuál es el origen de la energía geotérmica - Explicar por qué se mueven las placas litosféricas - Describir cómo se producen los volcanes - Explicar cómo se producen los terremotos - Describir los elementos de un terremoto - Describir los desastres que puede ocasionar un terremoto y un volcán 				



Brainstorm



Energy is.....
I heard news about an earthquake in.....
In my opinion it depends on.....



Volcano, Damages, ash, break up, furniture movement.



1.-The Earth's Internal Energy (Introduction).

There is a lot of evidence of the Earth's internal energy:

- The inside of the Earth is hotter than the outside. According to the most widely accepted theory, the origin of this internal heat is due to how our planet was formed. The heat generated during this process is maintained in the inside of the Earth, although the external layer (the crust) has cooled.
- The continents are moving.
- The Earth's internal energy produces brusque movements in the crust: EARTHQUAKES
- Volcanoes expel very hot materials.

These are the most important phenomenon that we can see, and we'll be studying them!



2.- The continents are moving.

The lithosphere is fragmented

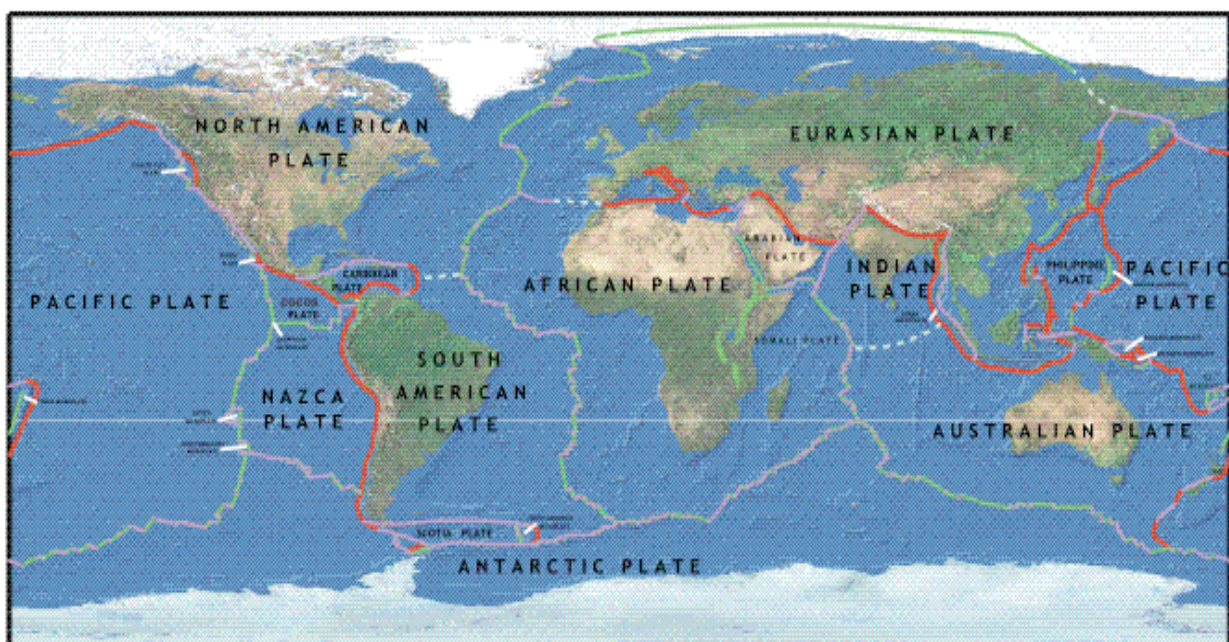


The lithosphere is the most external layer of our planet; it consists of a series of enormous fragments, the tectonic or lithospheric plates.

These fragments are like the pieces of a puzzle and they are moving, although very slowly.

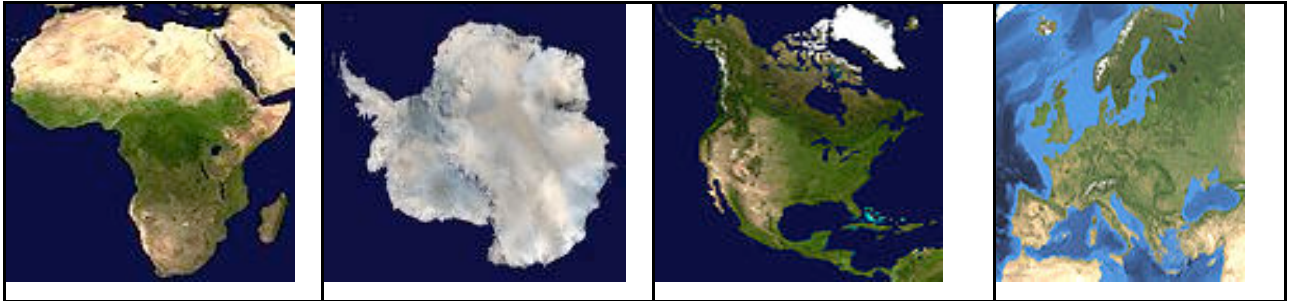
The main lithospheric plates are:

The Pacific plate	The South American plate	The African plate	The Eurasian plate
The Indo-Australian plate	The Antarctic plate	The Nazca plate	North American plate





A.0. Now have a look at the previous illustration and match each continent or country in the photo with the corresponding plate.



1

2

3

4



5

6

7

- I can't find a photo for the plate.....
- Photo number one is Africa so it matches with plate

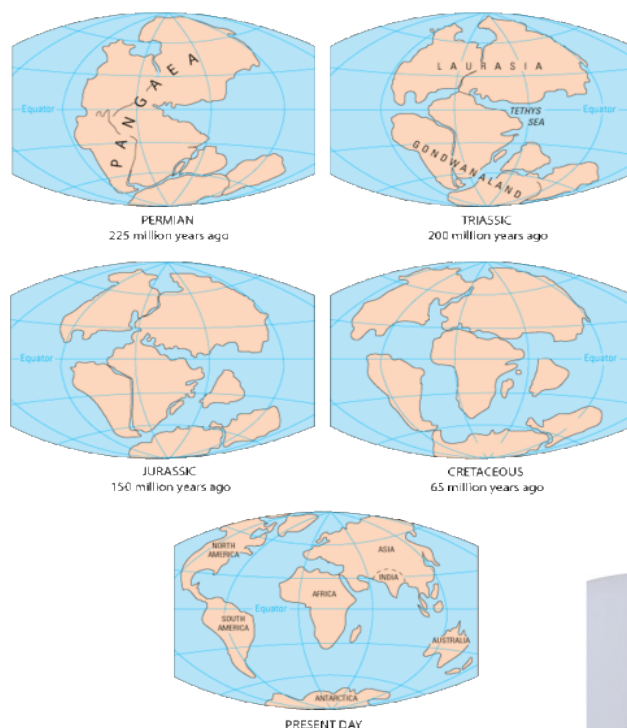
Who knows what plate goes with photo number.....?
Which photo matches the Eurasian Plate?

The Lithospheric plates are continuously moving, crashing into each other at some points and separating in others. These movements are due to the internal energy of the planet.

2.1. Wegener Theory.

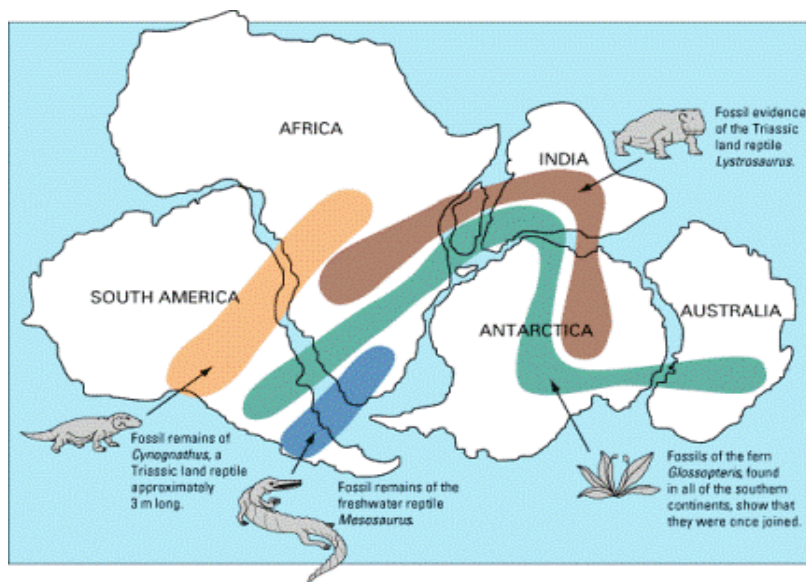
In 1915, Alfred Wegener (1880-1930) first proposed the theory of continental drift, which states that parts of the Earth's crust slowly drift atop a liquid core. Wegener hypothesized that there was an original, gigantic super continent 200 million years ago, which he named Pangaea, meaning "All-Earth". Pangaea was a super continent consisting of all of Earth's land masses.

Pangaea started to break up into two smaller super continents, called Laurasia and Gondwanaland. It formed the continents Gondwanaland and Laurasia, separated by the Tethys Sea. By the end of the Cretaceous period, the continents were separating into land masses that look like our continents.



2.2. Evidence supporting continental drift.

The Earth's crust is constantly moving, both vertically and horizontally, at rates of up to several inches a year. When the plates move, the continents and ocean floor above them move as well. Continental Drift occurs when the continents change position in relation to each other. While tectonic plates is a relatively new idea, scientists have been gathering data in support of the Continental Drift theory for a very long time. Wegener used the fit of the continents, the distribution of fossils, a similar sequence of rocks at numerous locations, ancient climates, and the apparent wandering¹ of the Earth's Polar Regions to support his idea.





Now sum up the concepts you've just learned.
Key words: Energy, Crust, Movement, Plate, Drift, evidence,



A.1. Pangaea Puzzle Pieces

Procedure

Prior Knowledge

Some volunteers will tell what they know about tectonic plates.

- Display a globe or world map and look carefully at the continents.
- Talk about how Europe, Africa, South America, and North America might fit together as puzzle pieces.
- Discuss what might explain this fit. Point out that millions of years ago the continents were joined together in one super continent called Pangaea.

Materials

- photocopies of worksheets 1-3 of the continental puzzle pieces (Appendix)
- Photocopy of worksheet #4
- Lightweight cardboard
- Glue or glue stick
- Scissors
- Large sheet of background paper (blue would be best)

What to do

- Glue the pages with continents onto cardboard,
- Cut out each continent or land mass to make the eight puzzle pieces. Cut out only the general shape of the continents, not all of the finer details.
- Note: the modern shape of the continents is probably not the exact shape they had 240 million years ago, so the puzzle pieces won't all fit perfectly.
- Once the puzzle pieces are ready, talk about the different types of evidence.
- Note that there are several letters written on the edges of many of the pieces.

Key Words

- Pangaea
- Paleozoic Era
- Panthalassa
- Mesozoic Era
- Rift
- Atlantic Ocean
- Alfred Wegener
- paleoclimate
- Continental Drift Hypothesis

A plate tectonic is a fragment of the...
Africa might fit with
North America might fit with.....
In my opinion Wegener was right because there are lots of
In my opinion Pangaea was a super continent a long time ago because there are similar fossils in and in
The reason why the continents are separated today is

The key to the letters is as follows:

- F = fossils M = mountain belts G = glacial deposits Arrows show the orientation of glacial striations

Notes:

- Central America did not exist 240 million years ago, so another puzzle piece will be on top of it. You may fold Central America under, or cut it off.
- Use the “geologic evidence” shown by the letters, as well as the puzzle-like fit of the continents, to reconstruct or reassemble Pangaea.
- Begin the reconstruction by finding the North American continent
- Compare the completed puzzles with Worksheet #4.



Once all the puzzles have been arranged correctly, compare them with the next figure which illustrates what the ancient shorelines probably looked like. Discuss the differences between the “old” shoreline shapes and “today’s” shoreline shapes. Where is Panthalassa?



A.2. Word search. Find the words from the list.

w e g e n e r a a f e o o e n e o w
e c o r e e m w r n t l e a n i n c
p a n g a e a c e n c m m a t w t e
a a d t g g n e i a r a e e e a t n
u t w a g c t n e g u g d l r e g a
m e a d e g l i o g s m e e r n g d
c o n t i n e n e n t a l d r i f t
a n a o e g c m e o p r r e l n c a
n n l t r w e s w i w d i u n a n w
t a a i g n e r e m l a e c a r c m
d g n t a w c i l s a r n a m g l w
o t d d l s n e r l t c g n a d n o
a a o u s n o w f a a r w o l m g o
p n e m d n a d d d n m p d t d r e
a e g e c e c g c e m c c t a a r t
w e e n c a n l w c t t n e n a n n
n e n n a n r p p g m m a t w m r i
g o t o d e l o d t w t c n n r p e

gondwanaland
pangaea
wegener
mantle
crust
magma
continental drift
core

Did you find?
Is there a word next to
this one?
Which way
does.....go?
(forwards/backwards/
down/up/diagonally)



A.3. Now, match each word on the right with its definition on the left. Then, write the words and the definitions in your notebook. One person should write all the words and definitions on the board.



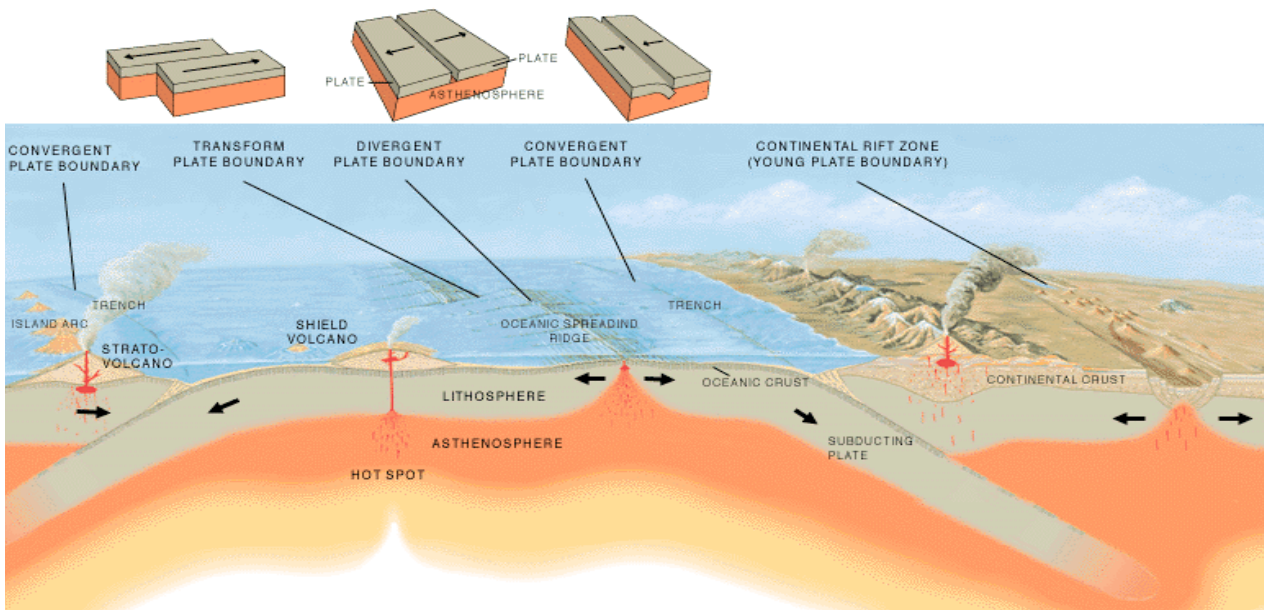
- Section of the crust that move independely
- The Southern supercontinent formed after Pagaea broke up
- Meaning "all-Earth"
- Famous scientist that proposed the theory of continental drift.
- Layer of the Earth on which crust float
- Thin outer surface of the earth
- Hot molten rock of the mantle
- Theory that states continents were joined at one time
- Innermost layer of the Earth

- Core
- Crust
- Mantle
- Gondwanaland
- Tectonic plate
- Continental drift
- Alfred Wegener
- Pagaea
- Magma



2.3. Types of continental movement

At the boundaries of the plates, various deformations occur as the plates interact; they separate from one another (sea floor spreading), collide (forming mountain ranges), slip past one another (subduction zones, in which plates undergo destruction and re-melting), and slip laterally. The types of movement are: Divergent - Convergent - Lateral Slipping





A.4. Now you will listen to three definitions. Please match each one with the previous concepts (divergent, convergent, lateral slipping).



Definition # 1:
Definition # 2:
Definition # 3:

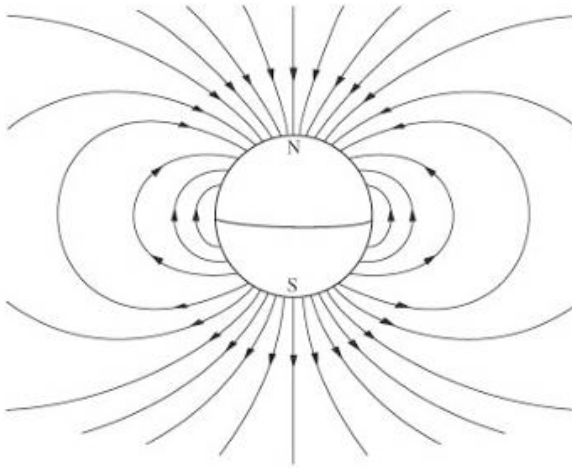
Can you repeat the definition.....?
Can you spell.....?



A.5. You are going to listen to an interesting explanation of the Earth's magnetic fields and seafloor spreading , but some word or words are missing so pay attention carefully and fill in the gaps with the word or words that you'll hear. Good luck!



Reading: The Earth's magnetic fields and sea-floor spreading:



Although _____ do not understand all of the details, they know that motions of molten metals in the Earth's _____ generate our planet's magnetic field. Movement of molten iron and nickel generates electrical and _____ fields that produce the Earth's magnetism. The flows of these molten metals in the Earth's outer core are not perfectly _____ over time, so the Earth's magnetic field changes over time as well. The _____ Magnetic

Poles wander over time; the North Magnetic Pole moved some 1,100 km (684 miles) during the _____. The strength of the Earth's magnetic field varies as well; it has been _____ ever since around 1850. Over the course of Earth's history the magnetic field has actually _____ many times, with north becoming south and vice versa!

Basaltic lava contains iron-bearing _____ such as magnetite, which act like compasses . That is, as these iron-rich minerals cool below their Curie Point , they became magnetized in the direction of the _____. Studies of ancient magnetism (paleomagnetism) recorded in rocks of different ages provide a record of when the Earth's magnetic field reversed _____.

When research scientists used magnetometers to study the ocean floor, they discovered a surprising pattern. _____ variations showed that, in many areas, alternating bands of rocks recording normal and reversed polarity were arranged symmetrically above mid-ocean ridges.

Can you repeat the paragraph?
 How many words are there in thegap of the paragraph?
 Who can explain to me what the wandering is?
 Is there anybody who can explain what the Curie point is?
 I think this evidence is important to know because

Activity.

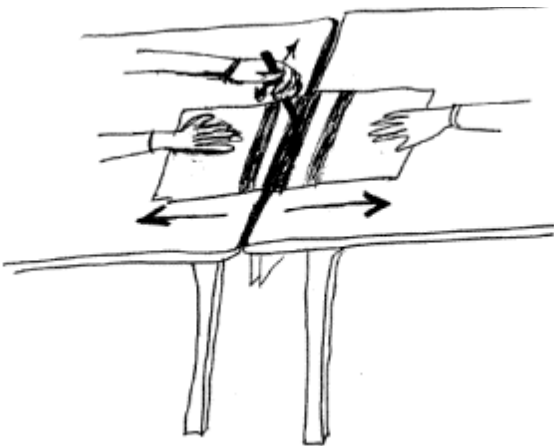
We will do an interesting activity that will help us to understand the fundamental concept of captured magnetism directions on the sea floor of the Atlantic Ocean and which provides key evidence for the tectonic plates theory.

Materials Needed:

2 markers (at least two different colours)
 2 pieces of paper (A4)
 2 desks.

Directions (work in pairs):

- Turn your two desks so that they are facing each other almost touching.
- Each student should put a piece of paper in the small gap between the desks. You should insert the paper as far in as it will go.
- Practice pulling both papers out of the desk at the same time and at the same rate of movement (this is the seafloor spreading).
- Each of you should take a different coloured marker.



- Start with a little bit of paper showing as you both slowly pull the paper out at the same rate (look at the illustration).
- One of you must draw a coloured line on both pieces of paper along the gap between desks (ridge) so that there is a strip of colour parallel

• This colour represents rocks that are formed with their magnetic minerals facing toward a magnetic pole (N)

- Pull the pieces of paper some a little more and stop.
- This represents what happens after years have passed, so:
- A new seafloor has been created.
- The Earth's magnetic pole has changed.
- The second student must draw a new line with their coloured marker and make the same type of coloured line as the first one.
- This colour represents rocks that are formed with their magnetic minerals facing toward a new magnetic pole.(S)
- Continue to pull the piece of paper and draw new lines taking your turns with the markers.

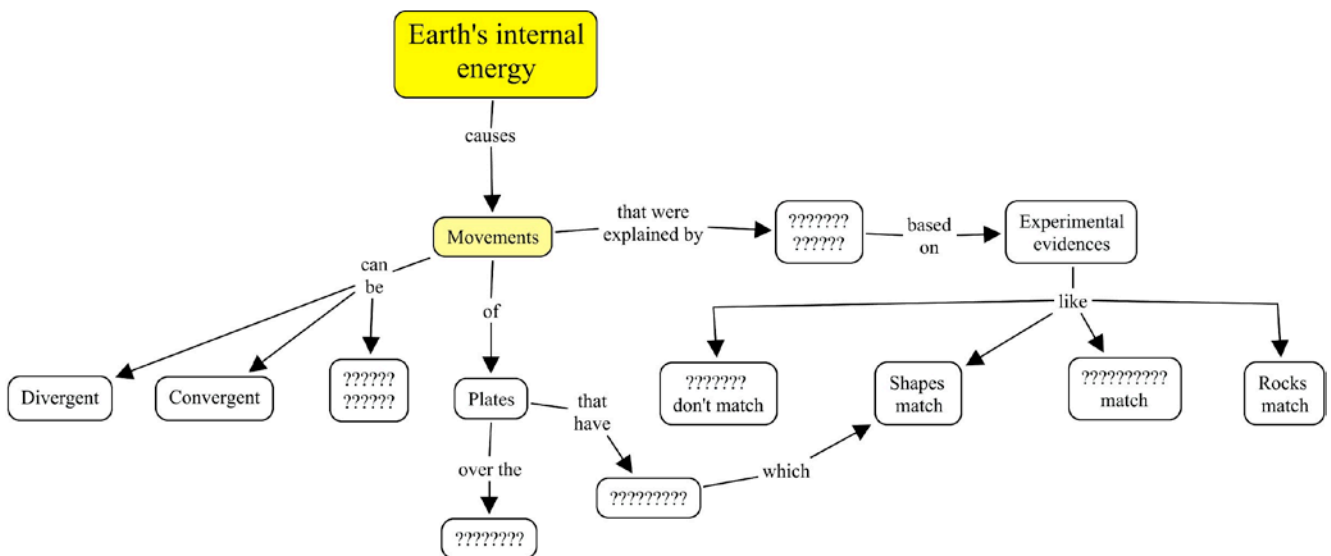
To summarize:

- Tape the papers together down the centre (what would be the middle of your ocean ridge) and label the following:
 - The rift zone.
 - The strips of colour that represent N(normal) polarity and those represent S (reversed) polarity.
 - Where the oldest rocks are.
 - Where the youngest rocks are.
- Put your names on the paper model.
- Describe, in detail, what the activity is shows and what it represents.
Make sure to emphasize the mirror image effect



A.6. Copy and complete the following C-map in your notebook. Use the words from the chart below.

A volunteer must copy their C-map on the blackboard and discuss the different options with classmates



Lateral Slipping Mantle Continents Plants-animals Positions
Alfred Wegener

I putunder.....
Where does.....go?

- Now, use your hand to illustrate the differences between the different types of plate movements.





3.- Volcanoes

A volcano is an opening in the planet's surface or crust which allows hot molten rock and ashes to escape along the Earth's surface. Over time, these openings slowly turn into mountains. The different materials ejected from volcanoes include, but are not limited to:



Gases: water vapour, carbon dioxide, nitrogen, sulphur, and other less abundant gases.

Lava Flows:

Lava flows are produced by the magma which reaches the Earth's surface. This lava then begins to flow down the side of the mountain. The main types of lava flows are:



Pahoehoe (pronounced "pah-hoy-hoy" - a Hawaiian term), which has a smooth surface with wrinkles in it, creating a silky-appearance. The aa (pronounced "ah-ah" - a Hawaiian term-) flow which is rough in appearance, and it is also sharp and blocky



Pyroclastic Material:



Pyroclastic material is characterized by the rapid expansion of lava, rocks, and glass fragments which blow out in many pieces varying greatly in size.

Nuee-ardente: an extremely fast-moving body of lava and gas. A nuee-ardente can be extremely devastating due to its rapid movement.



Discussion:

Can you explain to me why a nuee-ardente moves so fast
In my opinion,.....



A.7. Baking soda and vinegar volcano.

Materials

- 6 cups flour
- 2 cups salt
- 4 tablespoons cooking oil
- warm water
- plastic water bottle (33 cL)
- dish washing detergent
- food colouring
- vinegar
- baking dish or other pan
- baking soda (Sodium bicarbonate)



Procedure: Listen to the following instructions in detail. Try to understand them, and ask any questions that you may have before we start.

1. First make the 'cone' of the baking soda volcano. Mix flour, salt, cooking oil, and water. The resulting mixture should be smooth and firm.
2. Stand the bottle in the baking pan and mould the dough around it into a volcano shape. Don't cover the hole or drop dough into it.
3. Fill the bottle most of the way full with water and a bit of food colouring (this can be done before sculpting as long as you don't take so long that the water gets cold).
4. Add detergent to the bottle and its contents.
5. Add baking soda to the liquid.
6. Slowly pour vinegar into the bottle.

Discussion:

I think this amount of detergent it is too much because.....
Why does the vinegar have to be the last ingredient.....?



3.1. Types of volcanoes.

Since each volcanic eruption is different, we can identify various eruption types or styles. The most common types of eruptions are represented by the eruptions that take place on the islands of Hawaii.

- Volcanoes in Hawaii

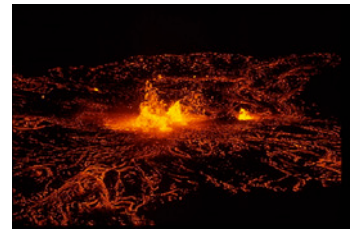
Hawaiian eruptions are characterized as low energy eruptions of basaltic lava and gases, these eruptions are considered non-explosive eruptions.

- Stromboli (Strombolian) volcano.

Strombolian eruptions are more explosive than Hawaiian eruptions

- Mount/Montagne Pelée (Pelean):

Pelean eruptions are severe and create hazardous pyroclastic flows



3.2. Volcanism attenuated.

When an active volcano is near by, An active volcano can emit temperature gases. These are the most commonly found in:

- Fumaroles

They are openings in the Earth's crust, often in the vicinity of volcanoes, which emit steam and gases such as carbon dioxide, sulphur dioxide, hydrochloric acid, and hydrogen sulphide

- Hot springs

They are springs that are produced by the emergence of geothermal heated groundwater from the Earth's crust.

- Geysers

A geyser is a hot spring characterized by intermittent discharge of water ejected turbulently and accompanied by a vapour phase (steam)



Explain how you can differentiate between different types of volcanoes. Explain the differences between geysers, hot springs and fumaroles.





A.8. As a class, make a C-map using these words and relating to the concepts that you just learned.

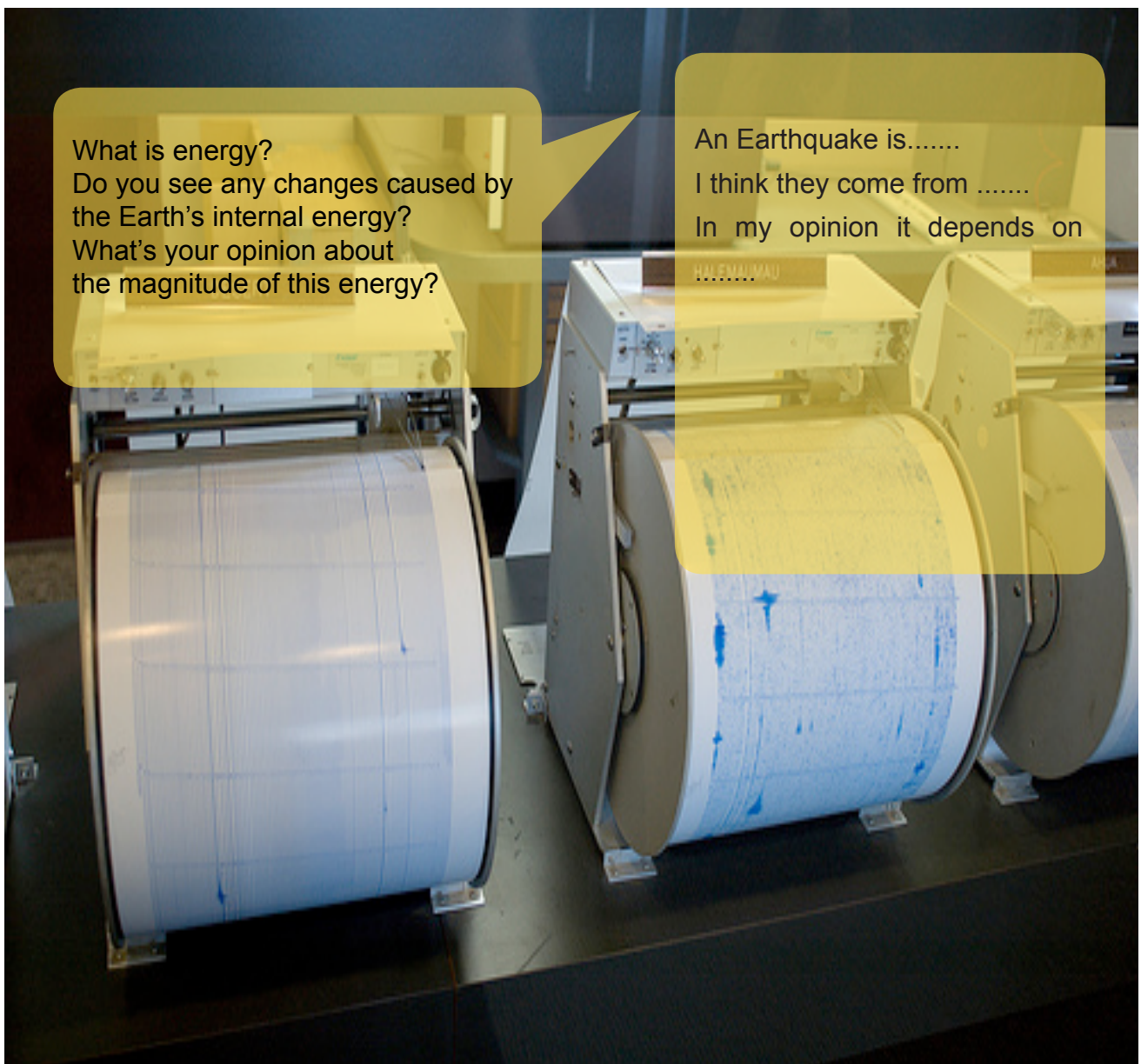


Crust rupture Volcanoes Materials ejected Types of volcanoes
Lava Mantle Outer layer



4.- Earthquakes.

Brainstorm.



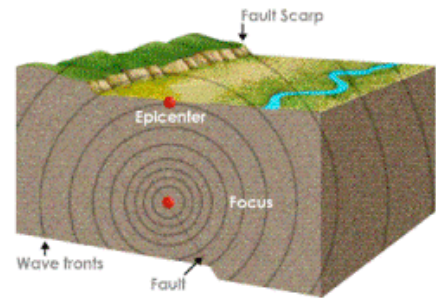
What is energy?
Do you see any changes caused by the Earth's internal energy?
What's your opinion about the magnitude of this energy?

An Earthquake is.....
I think they come from
In my opinion it depends on

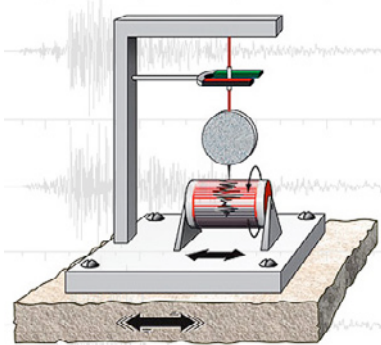
What is an earthquake?



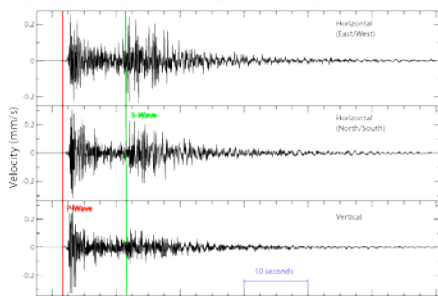
An earthquake is what happens when two blocks of the Earth suddenly slip past one another. The surface where they slip is called the fault or fault line. The location below the Earth's surface where the earthquake starts is called the hypocenter, and the location directly above it on the surface of the Earth is called the epicentre



How do scientists measure the size of earthquakes?



The size of an earthquake depends on the size of the fault and the amount of slip on the fault. Scientists use seismogram recordings made on the seismographs at the surface of the Earth to determine how big an earthquake was. A short wiggly line that doesn't wiggle very much means that it was a small earthquake, and a long wiggly line that wiggles a lot means that it was a large earthquake.



Discussion:
 Can you explain to me the differences between seismographs?
 Are there any seismograph stations in ?

The size of the earthquake is called its magnitude (Richter scale).

Richter Magnitudes	Earthquake Magnitudes Effects
Less than 3.5	Generally not felt, but recorded.
3.5-5.4	Often felt, but rarely causes damage.
Under 6.0	At most slight damage is caused to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1-6.9	Can be destructive in inhabited areas up to about 100 kilometres wide and where people live.
7.0-7.9	Major Earthquake. It can cause serious damage over larger areas.
8 or greater	Great Earthquake. It can cause serious damage in areas several hundred kilometres wide.

Scientists also talk about the intensity (Mercali scale) of shaking from an Earthquake, and this varies depending on where you are during the Earthquake

Mercali Magnitudes	Earthquake senses
I	People do not feel any movement.
II	A few people might notice movement if they are at rest and/or on the upper floors of high buildings.
III	Many people indoors feel movement. Hanging objects swing back and forth. People outdoors might not realize that an earthquake is occurring.
IV	Most people indoors feel movement. Hanging objects swing. Dishes, windows, and doors rattle. The earthquake feels like a heavy truck hitting the walls. A few people outdoors may feel movement. Parked cars rock.
V	Almost everyone feels movement. Sleeping people are awakened. Doors swing open or closed. Dishes are broken. Pictures on the wall move. Small objects move or are turned over. Trees might shake. Liquids might spill out from open containers
VI	Everyone feels movement. People have trouble walking. Objects fall from shelves. Pictures fall off walls. Furniture moves. Plaster in walls might crack. Trees and bushes shake. Damage is slight in poorly built buildings. No structural damage.
VII	People have difficulty standing. Drivers feel their cars shaking. Some furniture breaks. Loose bricks fall from buildings. Damage is slight to moderate in well-built buildings; considerable in poorly built buildings.
VII	Drivers have trouble steering. Houses that are not bolted down might shift on their foundations. Tall structures such as towers and chimneys might twist and fall. Well-built buildings suffer slight damage. Poorly built structures suffer severe damage. Tree branches break. Hillsides might crack if the ground is wet. Water levels in wells might change.

IX	Well-built buildings suffer considerable damage. Houses that are not bolted down move off their foundations. Some underground pipes are broken. The ground cracks. Reservoirs suffer serious damage
X	Most buildings and their foundations are destroyed. Some bridges are destroyed. Dams are seriously damaged. Large landslides occur. Water is thrown on the banks of canals, rivers, lakes. The ground cracks in large areas. Rail road tracks are bent slightly.
XI	Most buildings collapse. Some bridges are destroyed. Large cracks appear in the ground. Underground pipelines are destroyed. Rail road tracks are badly bent
XII	Almost everything is destroyed. Objects are thrown into the air. The ground moves in waves or ripples. Large amounts of rock may move

A.9. As a class, make a C-map using the words below and relating to the information that you have just learned.

Earthquake Epicentre Hypocentre Richter scale Mercali Scale

Earth's surface

A.10. Word search. Find the words from the list.

n	e	s	t	r	e	t	a	t	a	t	i	r	a	g	k	a
r	k	o	a	i	n	t	a	n	e	n	g	g	l	l	g	v
o	e	e	l	c	o	n	v	e	r	g	e	n	t	p	n	p
t	l	e	t	e	t	n	e	g	r	e	v	i	d	e	c	e
d	l	n	r	h	p	l	a	e	e	t	l	p	p	r	e	a
t	e	g	e	g	l	i	e	c	p	n	l	p	t	p	t	l
g	y	y	n	i	o	n	c	p	l	p	k	i	i	g	e	o
e	l	p	a	n	r	q	h	e	s	o	t	l	r	i	a	e
l	l	e	r	i	a	r	n	y	n	p	v	s	m	e	r	t
a	a	r	i	l	o	e	e	g	p	t	l	l	a	o	t	c
t	c	p	n	a	i	t	n	i	s	o	e	a	p	o	h	g
g	r	c	i	s	a	h	e	h	l	n	c	r	g	r	q	e
s	e	t	a	l	p	c	i	n	o	t	c	e	t	s	u	y
k	m	c	l	a	l	t	e	i	p	a	e	t	n	n	a	v
i	t	r	p	v	p	i	y	i	g	t	y	a	l	t	k	e
g	n	i	d	a	e	r	p	s	r	o	o	l	f	a	e	s
i	c	n	n	o	a	i	e	e	a	t	r	r	r	t	i	r

volcano
 lateral slipping
 tectonic plates
 earthquake
 convergent
 lava
 sea floor spreading
 divergent
 lapilli
 epicenter
 hypocenter
 mercalli
 richter

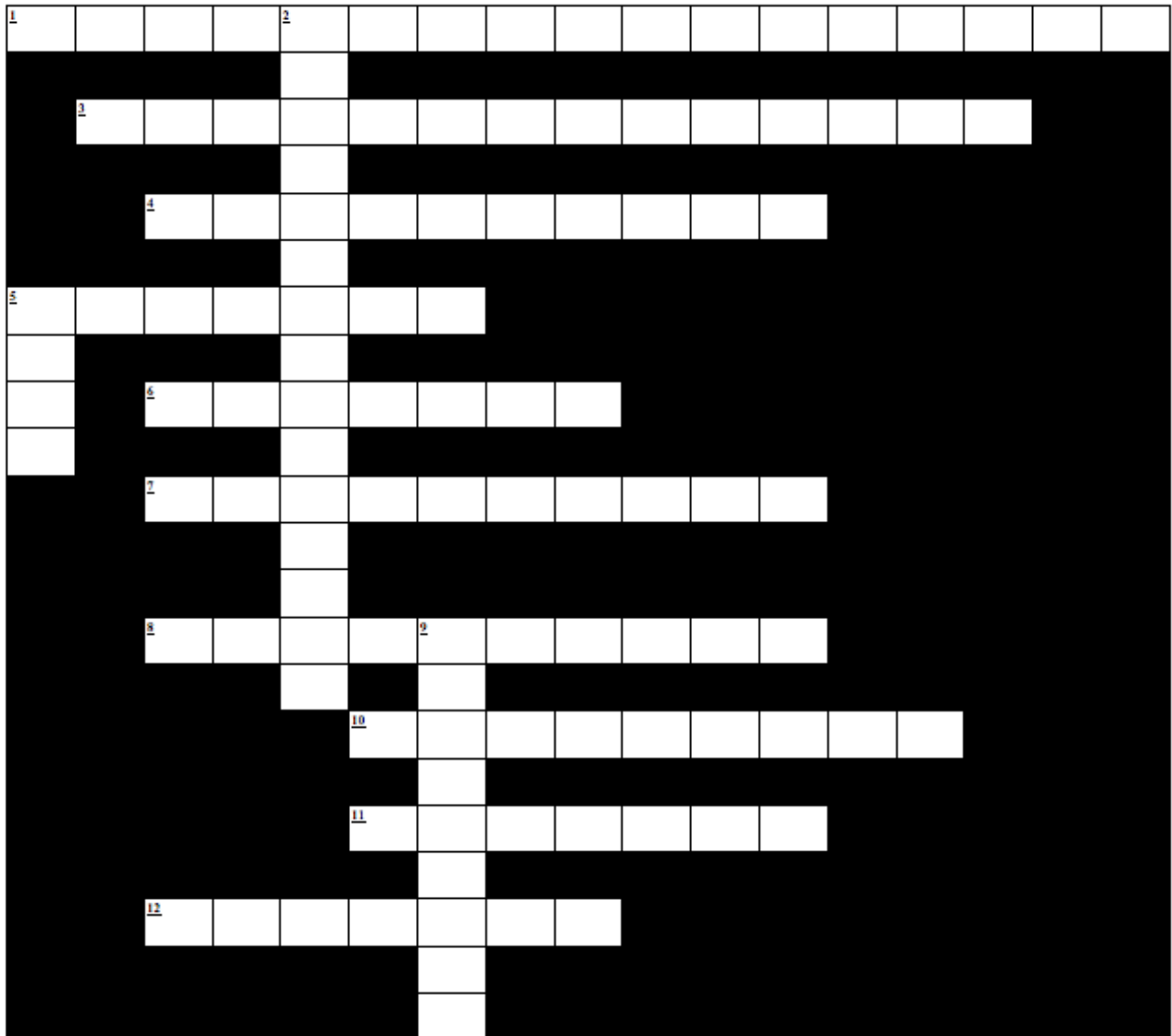


Discussion

Did you find?
 Is there any word next to this?
 What's the direction of? (forward/back/down/up/diagonal)



A.11. Complete the following crossword puzzle with words related to volcanoes and earthquakes



Across:

1. The process by which new oceanic crust is formed by lateral displacement of the plates
3. Sections of crust that move independently
4. A sudden violent movement of the Earth's surface
5. Small solidified fragments of lava
6. An opening in the Earth's surface or crust which allows hot molten lava to escape
7. The location where an earthquake starts
8. Type of movement where two plates collide
10. Type of movement where two plates are separated
11. The author of the "intensity" scale used to measure earthquakes
12. The author of the "magnitude" scale used to measure earthquakes

Down:

2. Two plates move sideways against each other
5. Molten rocks from the mantle reaching the Earth's surface
9. The location directly above the hypocenter on the surface

What is the first letter for..... across?
 What's number.....?
 How do you spell.....?

6

A.12. Have a look at the photo below.

- Describe what you see
- Write down what you think caused this
- How could you prevent this from happening?

There is a bridge.....
The building has.....
The car is under.....
In order to prevent they might.....
This is.....
In my opinion they should have used.....to build it.



A.13. Project



Here is a newspaper article about an earthquake in Spain

Spain hit by 6.3 magnitude earthquake
Sunday, April 11, 2010

The USGS has reported a 6.3 magnitude earthquake in Spain. It had a depth of 616.7 kilometres. The epicentre was located 25 kilometres north east from Granada, 106 kilometres north east of Malaga and 341 kilometres south of Madrid. It occurred on Monday at 00:08:10 local time (22:08:10 UTC).

People posted via Twitter that the earthquake was felt in Cadiz, Malaga, and Murcia. CNN reports there are no immediate reports of deaths, injuries or damages. "An earthquake with that depth means little damage is likely," seismologist Susan Potter told CNN. She also stated that "when an earthquake is deeper, the seismic energy is absorbed by the Earth, so there will be less damage expected in the epicentre area."

Meanwhile, almost a month ago, on March 1, the Spanish Geologist Luis Eugenio Suarez, said that the Granada area could suffer an earthquake within a short time, and with an intensity similar to that of the February 27 Cauquenes, Chile earthquake. Suárez commented that, "Spain is not like Chile," because the latter is located on a high seismic frequency area, but also noted that "once every hundred years, a destructive earthquake is produced in the peninsula."

The last earthquake in Spain was in Arenas del Rey, in Granada, 126 years ago, and reached a magnitude of 6.6, leaving between 750 to 900 dead, thousands injured and a lot of material destruction.

Using this information, pretend that you are a news reporter and present the news to your class. You can make a power point to help you. You should make sure to include the following:

A seismic map that includes Spain.
Photos of earthquake damage in Spain.
Seismologic observation sites in Spain.



What I learned.

- I can understand that energy causes a lot of changes
- I can explain how the plates are moving.
- I can understand evidence that supports the Wegener theory.
- I can identify the different parts of a volcano.
- I can explain how an earthquake starts.
- I can describe the effects of an earthquake depending on the site where it develops.

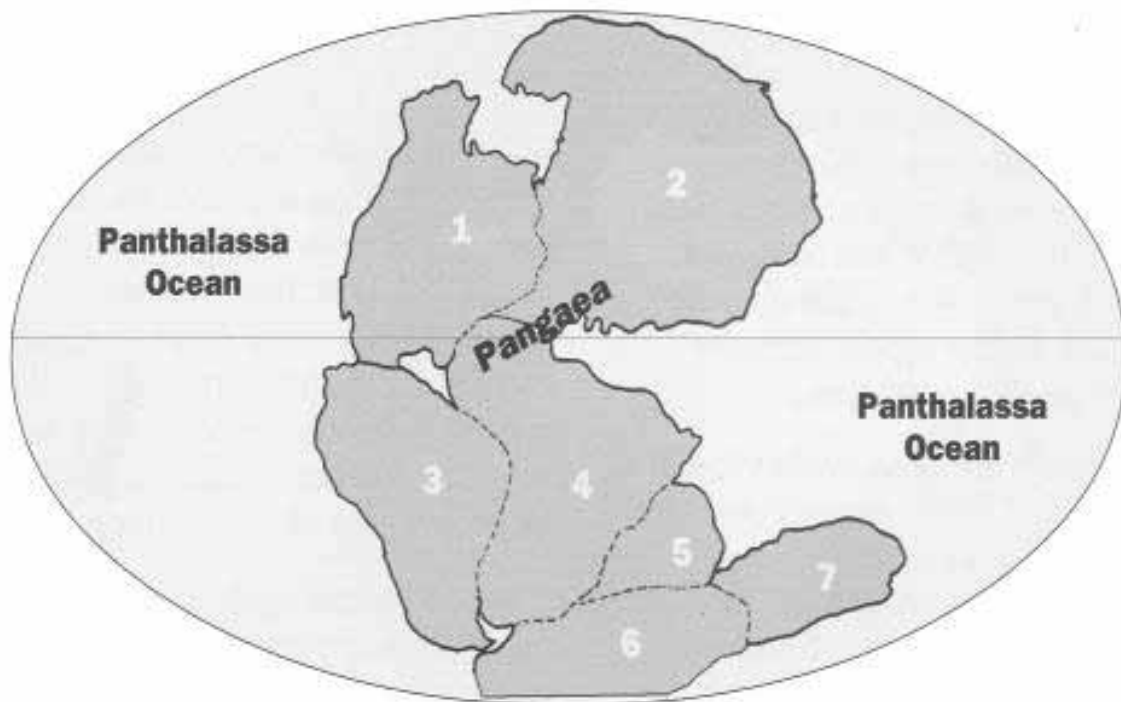
APPENDIX.

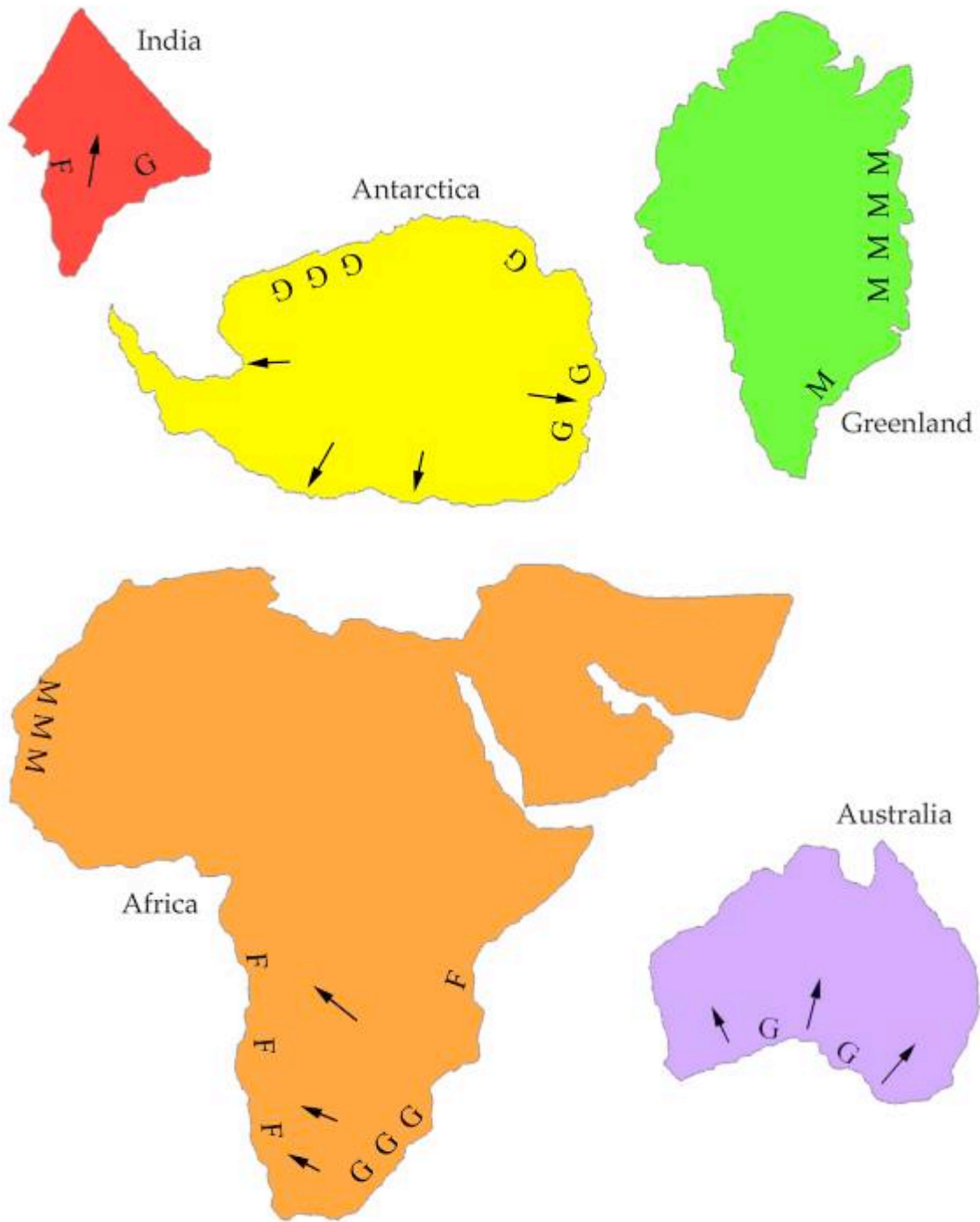
A.1.

Objectives:

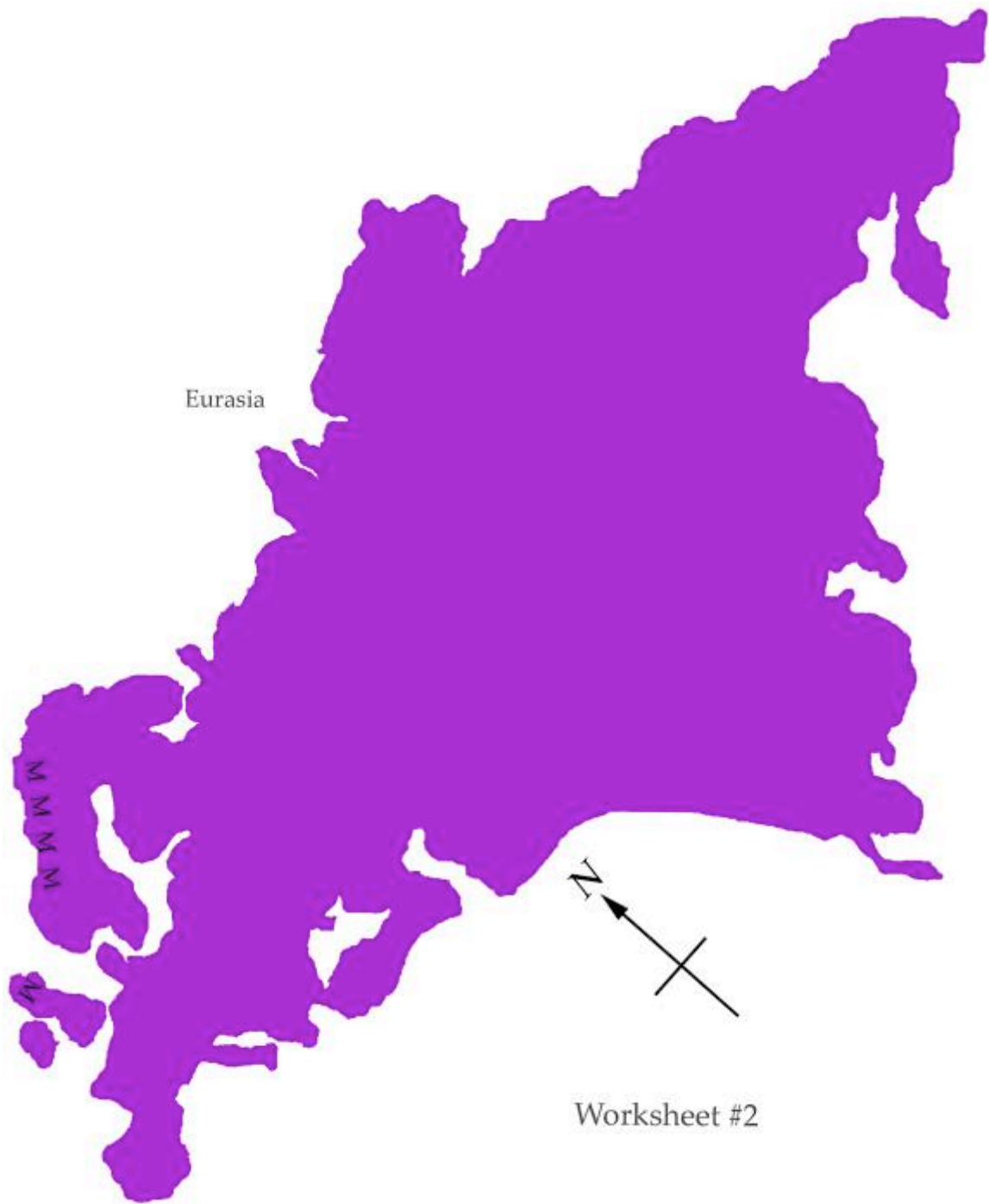
Students will:

- Use logic and evidence to reconstruct the position of large islands and continents as they appeared 220 million years ago.
 - Understand the theory of continental movement and tectonic plates.
 - Describe how scientists use different kinds of evidence to form theories.
- Once all the puzzles have been arranged correctly, compare them with the next figure that illustrate what the ancient shorelines probably looked like.





Worksheet #1





Worksheet #3

