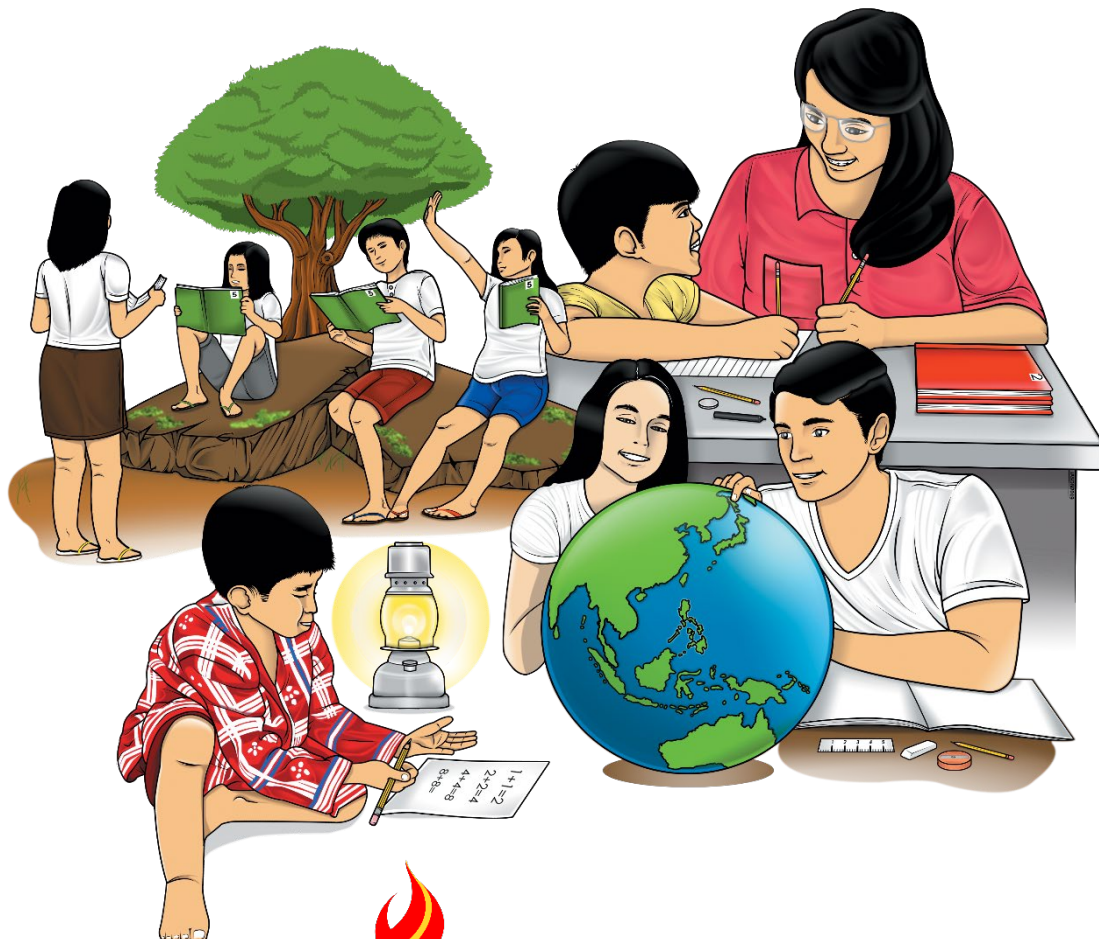


Senior High School

Earth and Life Science

Quarter 1 – Module 11: Formation of Rock Layers



Earth and Life Science
Alternative Delivery Mode
Quarter 1 – Module 10: Movements of Plates and Formation of Folds and Faults
First Edition, 2021

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Senior High School

Earth and Life Science

Quarter 1 – Module 11:

Formation of Rock Layers

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check you're learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



What I Need to Know

The content of this module focuses on the concepts of rock layer formation and its correlation. Every rock layer is, for the most part, one of various parallel rock layers that lies upon another which exhibits specific or similar characteristics.

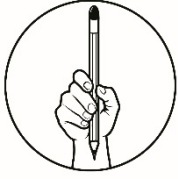
Since the concept about rocks and its types were discussed in the previous lesson, this module serves as a continuation of how rocks produce strata and what they may become once they are separated from its original rock layer. It also involves the possibilities of knowing the relative age of each rock layer due to the presence of fossils it contains.

The module is divided into two lessons, namely:

- Lesson 1: Rock Layers
- Lesson 2: Correlation of Rock Layers

After going through this module, you are expected to:

1. describe how layers of stratified rocks are formed.
2. describe the different laws of stratigraphy.
3. determine how geologists correlate rock layers.
4. reflect on human environmental practices that may contribute to the alteration on the Earth surface, particularly the rock layers; and
5. illustrate an outcrop of rock layers applying the law of stratigraphy.



What I Know

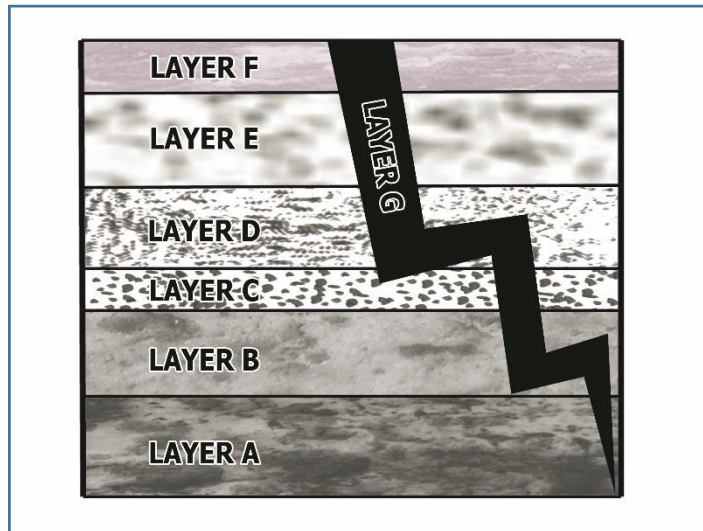
Before you use this module, take the Pretest below.

Directions: Read each item carefully. Choose the letter of the best answer and write the chosen letter on a separate sheet of paper.

1. Which field of science deals with the study of rock layers?
 - A. Geology
 - B. Paleontology
 - C. Petrology
 - D. Stratigraphy
2. Which processes most often cause fossil evidence to be preserved in rock?
 - A. melting and faulting
 - B. weathering and erosion
 - C. folding and metamorphism
 - D. cementation and deposition
3. Which of the following laws of stratigraphy gives emphasis on the assemblage of fossils embedded on rock layers.
 - A. Law of Conformities
 - B. Law of Superposition
 - C. Law of Faunal Succession
 - D. Law of Original horizontality
4. What can be concluded if a dike protrudes through several layers of rock?
 - A. A batholith resides nearby.
 - B. A volcano is within the area.
 - C. It is formed before the rock layer.
 - D. The rock layers are formed before the dike protrudes.
5. What can you infer when a sandstone comes in contact with a granite?
 - A. The granite is older than the sandstone.
 - B. The granite is younger than the sandstone.
 - C. The granite was intruded into the sandstone.
 - D. The granite and the sandstone have the same age.
6. Who proposed the Law of Uniformitarianism?
 - A. Aristotle
 - B. Nicolas Steno
 - C. James Hutton
 - D. James Chadwick

7. Which principle states that the physical, chemical, and biological processes that work today are the same forces that worked in the past?
- Principle of Intrusions
 - Principle of Unconformities
 - Principle of Uniformitarianism
 - Principle of Original Horizontality

For item nos.8-10, refer to the diagram of rock strata to answer the questions that follow.



8. What principle of stratigraphy is depicted in the picture?
- Principle of Unconformities
 - Principle of Uniformitarianism
 - Principle of Original Horizontality
 - Principle of Cross-cutting relationship
9. Which layer of rock is the youngest?
- Layer F
 - Layer G
 - Layer E
 - Layer A
10. What is the correct sequence in the relative age of rock from youngest to oldest?
- Layer A, B, C, D, E, F, G
 - Layer G, F, E, D, C, B, A
 - Layer A, B, G, C, D, E, F
 - Layer G, F, E, D, C, B, A

11. Which type of dating method can be used in rock layers applying the Law of Superposition?
- A. Absolute Dating
 - B. Isotopic Dating
 - C. Radioactive Dating
 - D. Relative Dating
12. According to the Law of Superposition, where are the oldest fossils usually found?
- A. somewhat near the surface
 - B. at the top of the rock layers
 - C. in the middle of the rock layers
 - D. near the bottom of the rock layers
13. Which principle uses dikes and faults in sequencing events?
- A. Inclusions
 - B. Faunal succession
 - C. Original Horizontality
 - D. Cross-cutting relationship
14. Which of the following is NOT generally part of angular unconformity?
- A. Erosion
 - B. Folding
 - C. Marine Regression
 - D. Metamorphism
15. How is the principle of original horizontality described?
- A. All rocks were originally horizontal.
 - B. Each layer of rock is older than the one above it.
 - C. The original crust of the earth was almost perfectly flat.
 - D. Layers of sediments are deposited in a nearly horizontal orientation.

Lesson

1

Rock Layers

Are the current features of the Earth the same as they were 4.6 billion years ago? Well, the answer is no. The Earth had undergone geological alterations and evolutionary processes that changed its features. The exogenic and endogenic processes that happened on the surface and within the inner portion of the Earth may contribute to these alterations that occurred. The rocks are being studied by geologists because they contain clues of what the Earth had been in the past.

In this module, the formation of rock strata will be determined including the order of rock layers, the manner on how rock layers are formed or deformed due to physical factors and the age of rocks using the relative and absolute dating method.



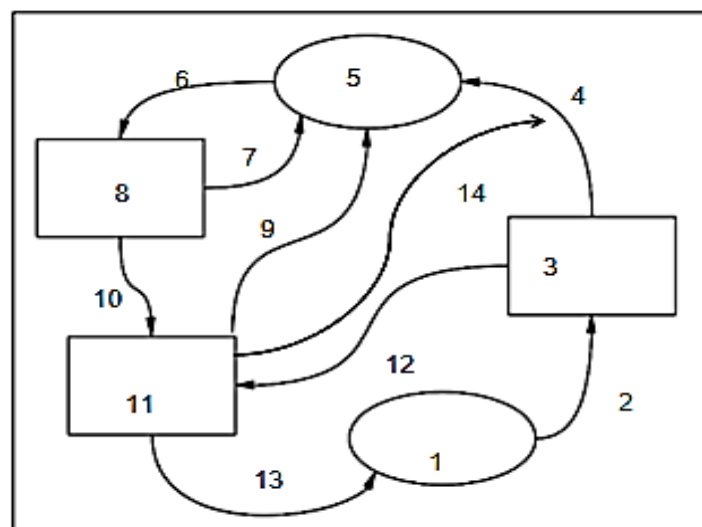
What's In

Before proceeding to the content of this module, let us first have a review on the learnings that you gained in our previous lesson related to rocks and rock cycle.

Try to complete the rock cycle using the terms and the processes given. Write the term/s in the box/circles and processes/events in between the arrows to show the connections in the rock cycle.

TERMS:
IGNEOUS ROCK
SEDIMENTARY
ROCK
METAMORPHIC
ROCK
MAGMA
SEDIMENTS

PROCESSES:
Weathering and Erosion
Melting
Deposition and Burial
Compaction and Cementation
Heat and pressure
Metamorphism
Solidification



ROCK CYCLE

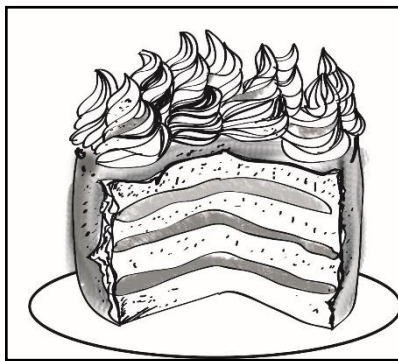


Notes to the Teacher

The learners shall be given time to complete the rock cycle. This serves as the springboard for the lesson in rock layers. In the review, they may use the choices twice, thrice, and more according to the concept behind the rock cycle. The teacher may call a learner to discuss his/her output.



What's New



If you will be given a cake for your birthday, how many layers do you wish to have? How many flavors do you want? What will be the order of flavor in each layer?

If you apply pressure on cakes, it will be deformed, flattened, or twisted. Just like the layers in the cake, rocks can also form layers due to sediments deposited on rocks or some forces that act on it which causes its deformation. These are forces that may bring alteration to rock layers or the change in its formation in the Earth's surface.



What is It

The idea behind the concept that the Earth is billions of years old originated in the work of **James Hutton**. Hutton concluded that there are forces that change the landscape of the Earth in the past. This conclusion is based on his observation in the geological processes that were taking place in his farm.

His Principle of Uniformitarianism states that the current geologic processes, such as volcanism, erosion, and weathering, are the same processes that were at work in the past. This idea was refined by other geologists that although the process of the past and the present are the same, the rates of this process may vary over time. The Earth's history was studied using the different records of past events preserved in rocks. The layers of rocks are like the pages in our history books.

How are rock layers formed?

Stratified rocks, also known as derivatives rock, may be fragmental or crystalline. These rocks are products of sedimentary processes. These are made of visible layers of sediments. The formation of rock layers depends on its stratigraphy and stratification.

Stratigraphy

It is the branch of geology that deals with the description, correlation, and interpretation of stratified sediments and stratified rocks on and within the Earth.

It is the study of the rock layers(strata).

Likewise, it will give you clues to the location of ancient seas, mountains, plateaus and plains.

Stratification

It is also known as bedding, which is the layering that happens in sedimentary and igneous rocks formed at the surface of the Earth that comes from lava flows or other volcanic activity.

It is expressed by rock layers (units) of a general tabular or lenticular form that differ in rock type.

As early as the mid 1600s, Danish scientist **Nicholas Steno** studied the relative position of sedimentary rocks. Sedimentary rocks are formed particle by particle, bed by bed, and the layers are piled one on top of the other. These rock layers are also called strata.

Stratigraphic Laws

Stratigraphic laws are basic principles that all geologists use in decoding or deciphering the spatial and temporal relationships of rock layers. These include the following: Original Horizontality, Lateral Continuity, Superposition, Cross Cutting, Law of Inclusions and the Law of Faunal Succession.

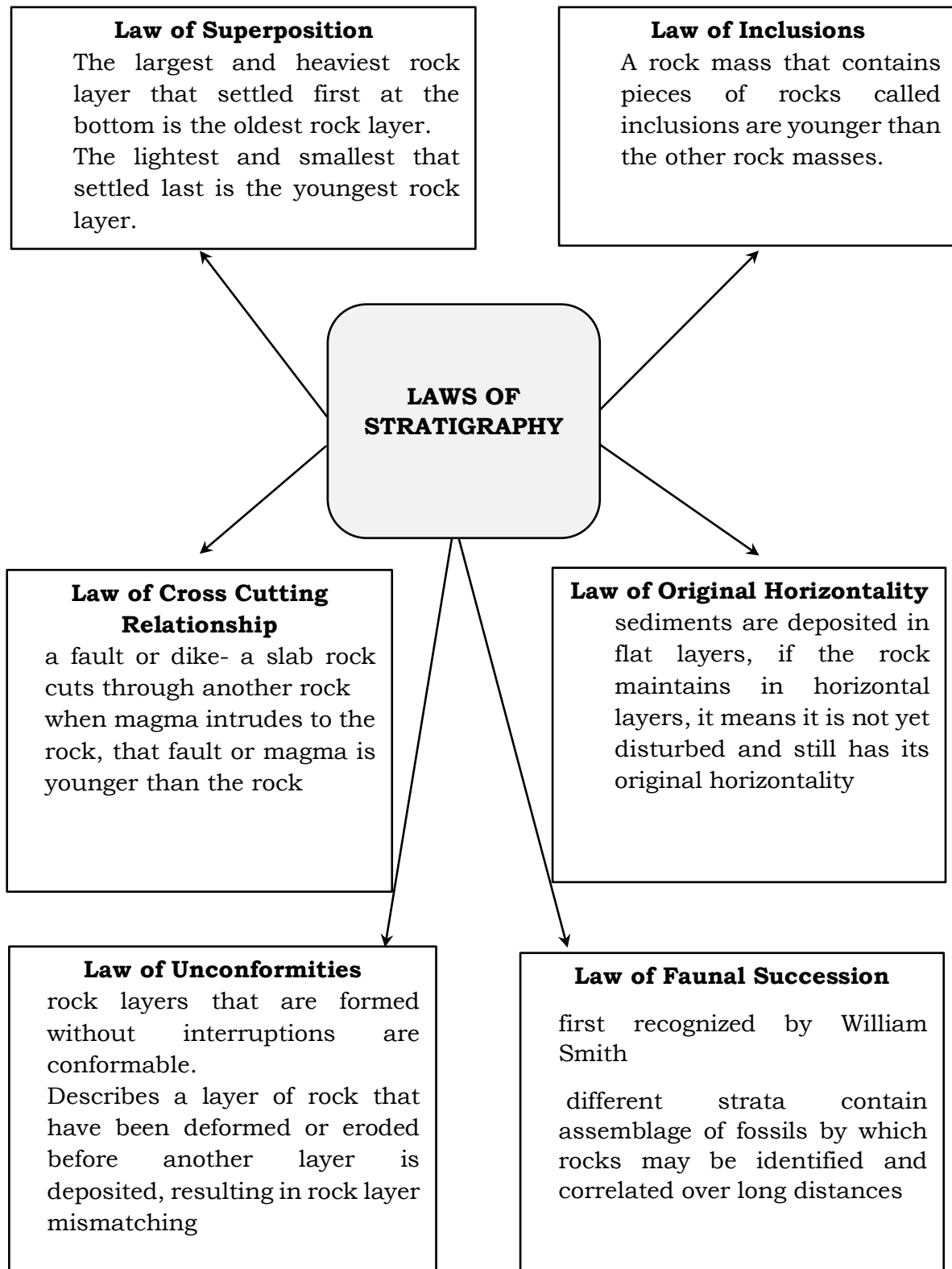
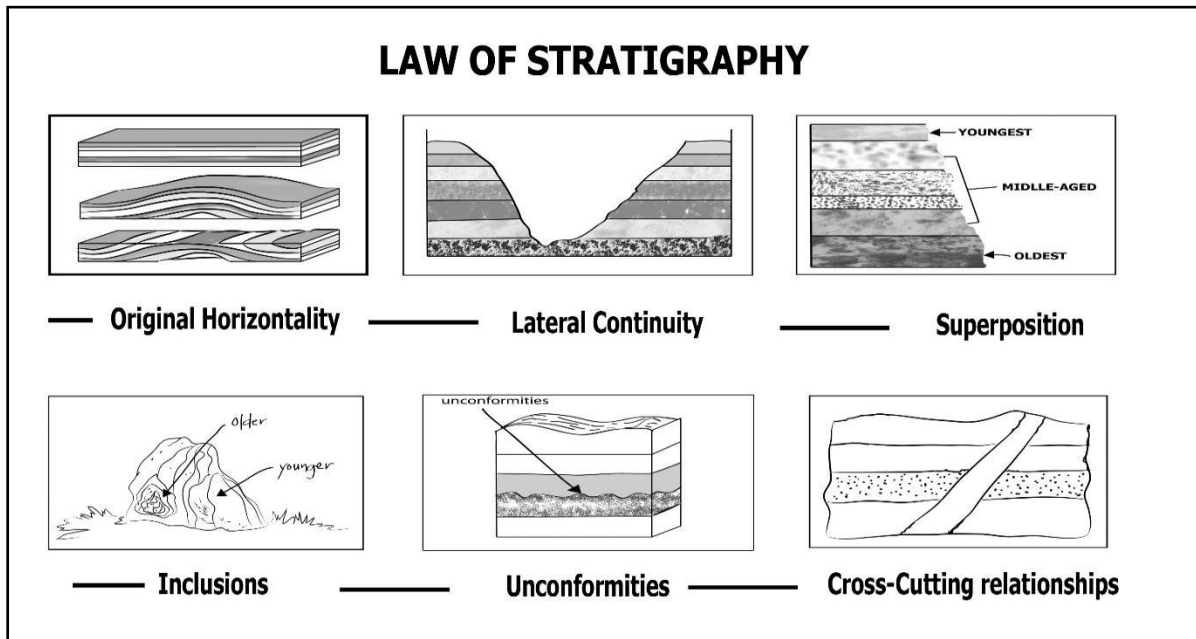
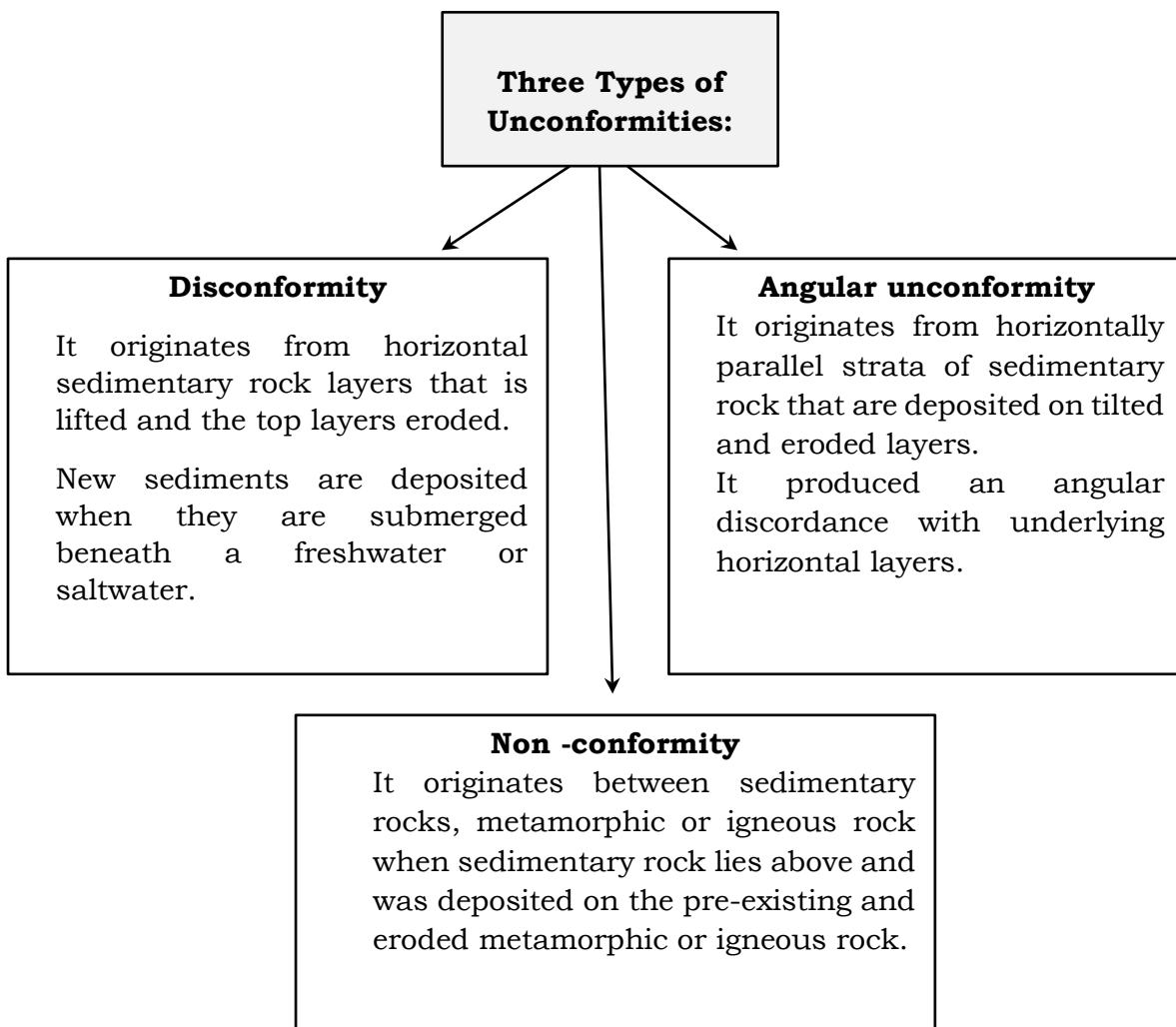
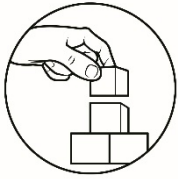


Figure 1. The Steno's Law of Stratigraphy



The Law of Stratigraphy shown -in Figure 1 indicates deposition, reshaping and deformations of the rock layers due to geological processes.

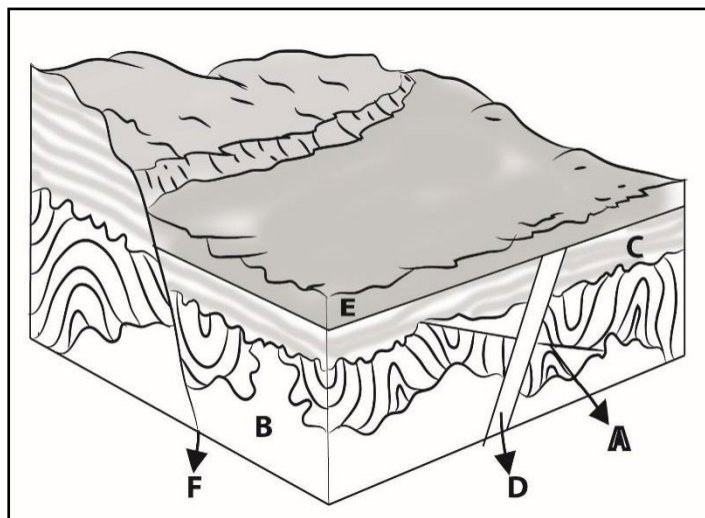




What's More

Activity 1.1 - Who's Older, Who's Younger?

The rock layers below labelled A to F undergo a sedimentary process that results in changes in rock form. Use the diagram of a rock layer below to complete and answer the questions.



Guide Questions:

1. In what layer was the first rock formed? _____
2. What letter is the second layer of the rock? _____
3. What happens in the rock represented by letter D? (cutting, or insertion) _____
4. What three layered letters is cut by letter D? _____
5. What takes place in letter F? (fault, folds) _____
6. What environmental factors occur in letter E? (weathering and erosion, volcanic eruption) _____
7. Which rock layer is the oldest? _____
8. Which rock layer is the youngest? _____
9. Which layer describes the law of horizontal continuity? _____
10. Which layer shows an angular conformity? _____

Activity 1.2 Word Pool

Read the words in the box and the statements below. Fill the blanks with the words/phrases that best complete the sentences.

cross-cutting	sedimentary
erosion	stratification
extrusive	superposition
fault	unconformity
intrusion	younger

1. The process in which sedimentary rocks are arranged in layers is called _____.
2. The law of _____ relationship happens when a layer of rocks torn apart and igneous rock fill in the spaces.
3. On the Earth's surface, weathering and _____ make rock fragments.
4. The law of _____ states that sedimentary rocks are layered from the oldest to the youngest and oldest rocks are found at the bottom.
5. A/an _____ is a break in the rocks that make up the Earth's crust, along which rocks on either side have moved past each other.
6. A/an _____ rock is formed when a magma never makes it to the surface.
7. In the law of _____ rock was uplifted, eroded from the surrounding rock, and will be replaced by sediments.
8. A/an _____ rock is formed by the accumulation, deposition, and cementation of organic particles or minerals.
9. When lava solidifies upon reaching the surface, it usually forms a/an _____ rock in rock layers.
10. Rock that forms intrusions on other rocks is _____ than the other rock layer.

Activity 1.3 Match it!

Match the descriptions in Column A with the terms in Column B. Choose the letter of the correct answer.

COLUMN A

1. Unconformities are sedimentary rock layers that are tilted to form a wave or angle in rock layers.
2. Rock layers contain embedded fossils by which rock may be identified.
3. Magma intrudes to the rocks; this magma is younger than the rock.
4. Exist between sedimentary and metamorphic rocks when sedimentary rocks lie above and were deposited in the pre-existing and eroded rocks.
5. Largest and heaviest rock layer that settled first at the bottom is the oldest rock layer:

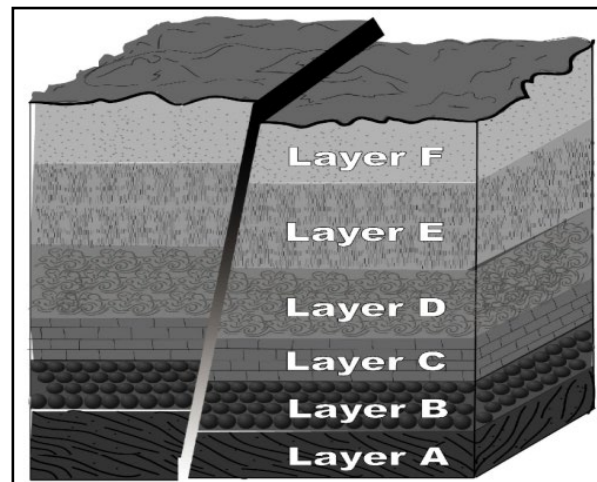
COLUMN B

- A. Superposition
- B. Angular conformity
- C. Cross cutting relationship
- D. Faunal Succession
- E. Non conformity

Activity 1.4 Brain Pop

Study the rock strata on the right and try to answer the questions in the left.

1. What geologic process takes place in cracks or breaks in the rock?
2. If an igneous rock is introduced in the breaks, what law of stratigraphy best explains this occurrence?
3. How will you characterize the dikes in the cracks, is it older or younger than layer F?



4. What law best describes the position of rock layers in layer A to F
5. Which is younger, layer F or the intrusions in the rock?

Lesson

2

Correlation of Rock Layers

Have you experienced playing or fitting cut out patterns or puzzles?

One of the pieces of evidence used by geologists in tracing the history of the Earth was with the identifications and the correlations of rock layers. Rock layers were subjected to alteration due to different geologic processes that act or apply on it. Such forces could result in tilting, uplifting, compression, and subductions of rock layers. These rock layers have the tendency to be separated from each other. One way of how these rock layers are identified is with the utilization of correlation.

Why do geologists need to correlate rock layers?

The history of earth is preserved in its rock layers. Unfortunately, no single location on earth has a continuous set of layers due to erosion or ceased deposition. Instead, geologists study rock sequences at many places around the world, measure the depth of the layers, record what kind of rock is in each layer, and see if there are any fossils present. Geologists represent the layers of rock by drawing a picture of the sequence – this is called a **stratigraphic column**.

Geologists need to correlate rocks from one place to another to get a more complete record of Earth's history over time. They try to determine the relative age of widely separated strata or rock layers. They used correlation, trying to fit together sedimentary strata in different places, just like a cut-out puzzle.



What's In

In the previous lesson, you had learned that rock layers may undergo different formations due to several geologic processes taking place in each rock layer. These concepts of stratigraphy are all stated in the Steno's Law of Stratigraphy.

Let us find out if you can still remember how this law can characterize each rock layer pictured below. Identify the pictures which are best explained by the Laws of Stratigraphy in the box below. Choose the letter of the correct answer.

- | | |
|-------------------------------|------------------|
| A. Original Horizontality | D. Superposition |
| B. Cross Cutting Relationship | E. Unconformity |
| C. Lateral Continuity | |

1. _____

2. _____

3. _____

4. _____

5. _____



What's New

How do geologists correlate rock layers?

The process of showing that rocks or geologic events occurring at different locations are of the same age is called **correlation**. Geologists have developed a system for correlating rocks by looking for similarities in composition and rock layer sequences at different locations.

The geological technique of correlation provides information that has taken place in Earth's history at various times that occurred. There are different methods in correlating rock layers, these include:

1. **Rock types and its characteristics**
 - color, texture, hardness, composition, or its mineral content
 - the harder and more densely packed the particles are, the older the rock and the deeper the layer it came from.

2. **Index fossil**

- also known as guide fossils or indicator fossils, are fossils used to define and identify geologic periods (or faunal stages)

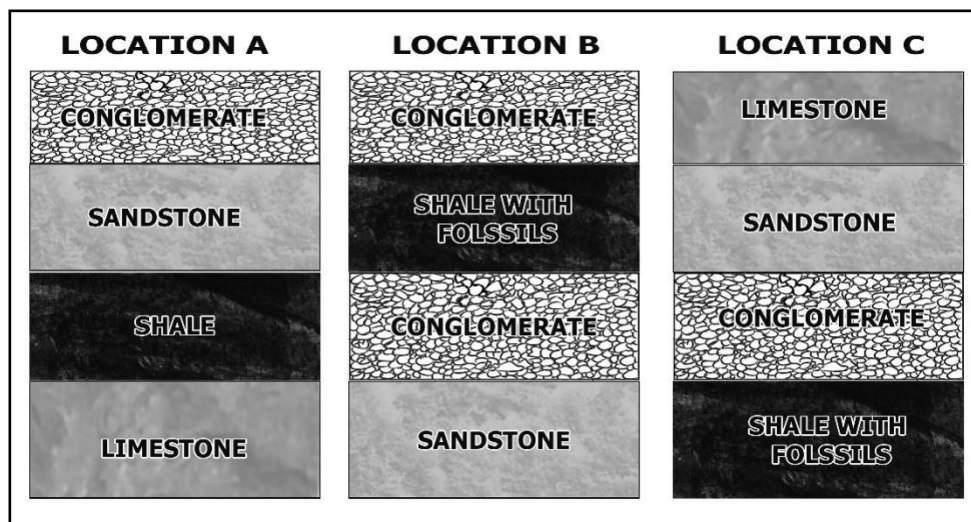
3. **Bedrock**

- a deposit of solid rock that is typically buried beneath soil and other broken or unconsolidated material (regolith).
- made up of igneous, sedimentary, or metamorphic rock, and it often serves as the parent material for regolith and soil.

How to match correlate rock layers?

Matching of rock layers may be determined by merely looking at its features. Look at the three columns of rock layers below. Let us determine how they are correlated.

Figure 2. Stratigraphic Column in Different Location



These three columns represent rock layers from three separate locations or outcrops. Some columns may be missing layers due to erosion. No single column represents a complete record. Your job is to line them up, so a complete record of the region can be seen. Find one or more layers present in all columns that can be matched like a puzzle.

Figure 3. Stratigraphic Column Matching up of Rock Layers

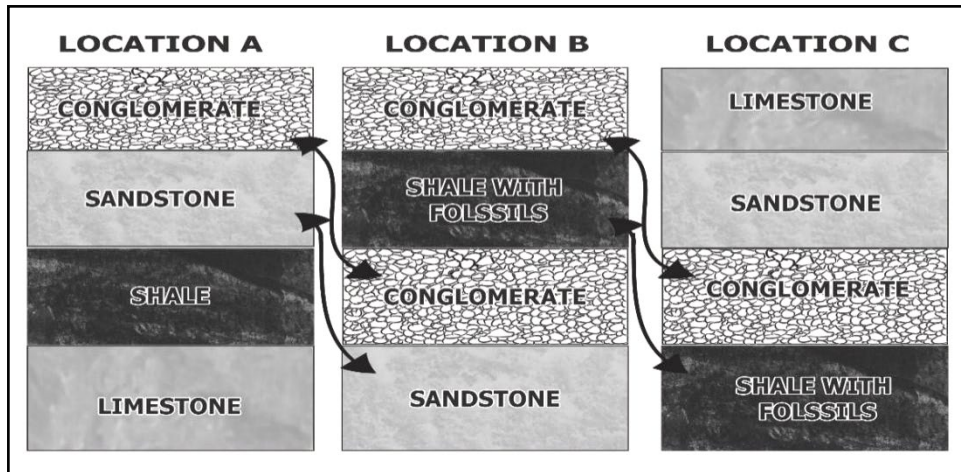
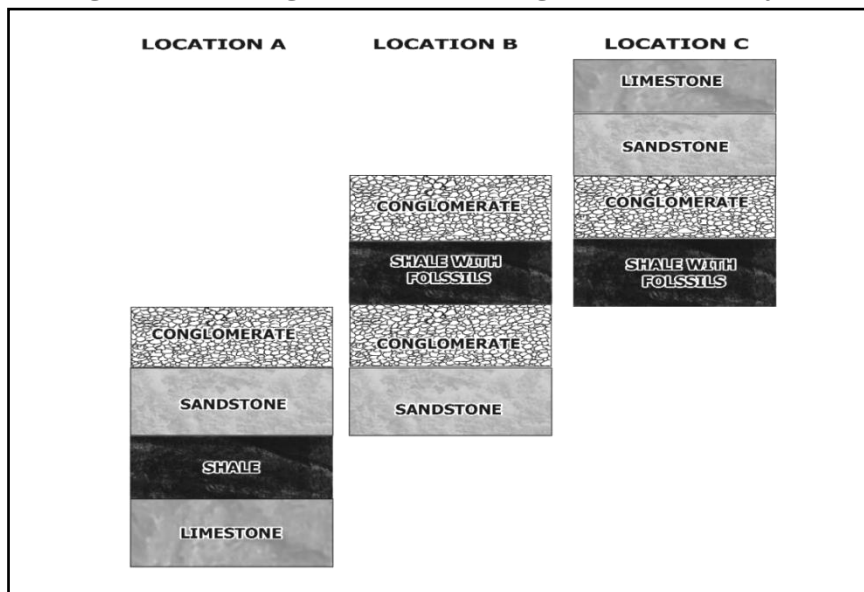


Figure 4. Strategic Column Fitting of the Rock Layers



After matching correlated rock layers, we can determine the relative age of each layer according to the law of superposition. Limestone in location A is the oldest and limestone in location C is the youngest rock layer. While those rock layers having the same composition, textures, and fossil content were considered as rock layers with the same age.

In matching up rock layers, superposition and crosscutting are helpful. When rocks are touching one another, the lateral continuity rock layers aid to match up with the layers that are nearby. Geologists then match, or correlate, the different shorter sequences to create a geological column that spans further back into earth's past.

Correlations involve matching a particular rock unit in one exposure with its counterpart at a different locality. By correlating various rock vulnerabilities separated by great distances, geologic maps can be constructed, and the original geographical extent of the rocks can be estimated.

Types of Correlation

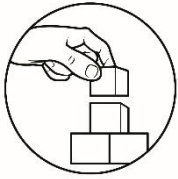
A) Physical Correlation is accomplished by using several criteria such as color, texture, and types of minerals contained within a stratum which make it possible for geologists to classify a stratum specifically.

B) Fossil Correlation is a principle that geologists use to determine the age of rock. It uses fossils with unique characteristics, such as geologically short lifespan and easily identifiable features, and uses this information to estimate the age of a rock layer in other areas that contain the same type of fossil or group of fossils.

There are fossils which are used to date the layers of rock that they are found in. Fossils that can be used in this way are called **index fossils**, and rock layers with the same index fossils in them can be correlated.

Criteria to be considered in identifying index fossils include:

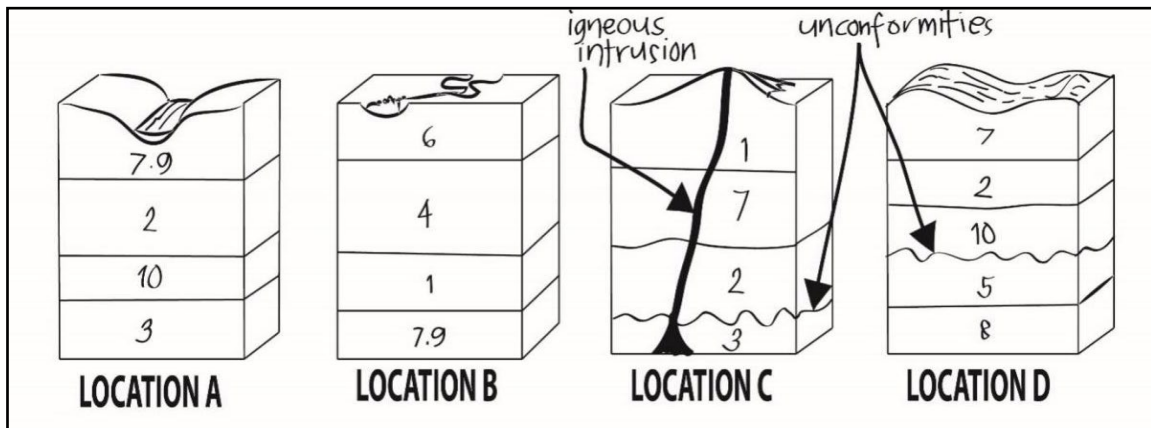
1. The fossilized organism must be easily recognizable, and it must be easy to identify because of its uniqueness.
2. Fossils must be geographically widespread or found over large areas so that it can be used to match rock layers separated by huge distances.
3. Fossils must have lived for only a short time, so that it appears in only the horizontal layer of sedimentary rocks.



What's More

Activity 1.5 Mind Tickle

A. Look at the columns of rock layers. Analyze each figure and answer the questions that follow.



Analysis:

1. Arrange the rock layer from oldest to youngest. Use the number in the designated rock layers.

Youngest _____

Oldest _____

2. Is the intrusion of igneous rock younger or older? _____
3. What rock layer is common in each rock column? _____
4. What environmental condition takes place in rock layer no.3? (Fault, erosion)
5. In what earth's feature is the rock layer in outcrop C probably located? (Volcano, sea)
6. Which outcrop/s show examples of unconformity? _____
7. What type of igneous rock maybe deposited in outcrop C? (Batholith, granite)
8. Which layer is considered as the beds? _____
9. Which outcrop/location shows subsidence? _____
10. What geologic process happens in outcrop B? (Folding, fault)

B. Building Vocabulary Words

Arrange the scrambled letters of the term/s being described by the given statement.

TERMS	DESCRIPTIONS
1. I N T U I S O I R N	It is the action of the process of forcing the body of igneous rock between sedimentary rocks.
2. D X N E I S S O F L I	- It is used to define and identify geologic periods.
3. N E O R I S N O	-The action of surface processes that removes soil, rock, or dissolved material from one location to another.
4. K R O C Y S R L E A	It is made up of sedimentary and igneous rock that was formed at the Earth's surface.
5. N O R L T O I E C R A	The process of showing that rocks or geologic events occurring at different locations are of the same age.



What I Have Learned

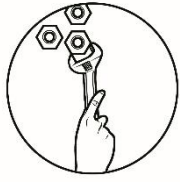
Activity 1.6 Sum It Up!

Read the statement in each item and choose the correct answer in the parenthesis. Identify the law or principle of stratigraphy being described by the given statement.

1. A piece of granite contained within a sandstone would be (older, younger) than the sandstone.
This is an example of the principle of _____.
2. A fault cutting through a series of layers of rocks is (older, younger) than the rock layers.
This is an example of the principle of _____.
3. In a series of layers, the youngest layer is on the (bottom, middle, top) of the sequence.
This is an example of the principle of _____.
4. Sedimentary rocks that are folded must be (older, younger) than the forces which deformed them.
This is an example of the principle of _____.
5. In undisturbed layers of rocks, sediments that form sedimentary rock are deposited in horizontal layers that are (younger, older)
This is an example of the principle of _____.

Things to Ponder

- Most sedimentary rocks are laid down in flat, horizontal layers.
- Stratigraphy is the science that deals with characteristics of layered rocks and how these rocks are used to trace the history of the Earth.
- Stratification is the layering that happens in sedimentary and igneous rocks which formed at the surface of the Earth that comes from lava flows or other volcanic activity.
- Rock layers are called strata.
- Law of cross-cutting relationships happens when a fault or dike or magma that intrudes into the rock, is younger than the rock.
- Law of inclusions is when the rock mass with inclusion is younger.
- Law of original horizontality is a flat rock that maintains its horizontal layer without being distracted for a long period of time.
- Law of superposition states that older rock layer is found at the bottom while younger rock layer is found at the top.
- Law of faunal succession states that different rock layers contain particular fossils by which the rocks may be identified and correlated.
- Law of unconformity implies a substantial gap or break in rock layer sequence due to uplift and erosion.
- Index fossil are fossils used to define and identify geologic periods.



What I Can Do

From the lists of human activities and practices, tell how these practices may trigger the alterations of rock layers.

<i>Human Activities/Practices</i>	<i>How it will affect the rock layers?</i>
1. Mining	
2. Quarrying	
3. Kaingin system of farming	
4. Converting elevated areas into subdivisions and roads	
5. Forest denudation	

Analysis:

1. Which in the list of human practices can be considered as detrimental to human and other living things?
2. What will be the impact of this human practices in geological processes such as weathering and erosion?
3. How will you address the result of these practices and its magnitude to the government since your generation are considered as the hope of the motherland?



Assessment

Directions: Read each statement and choose the letter of the correct answer.

1. What is the relative position of the oldest rock layer as stated in the principle of Superposition?
 - A. at top
 - B. at the bottom
 - C. at the middle
 - D. at random location

2. Which process is involved when sedimentary rocks are arranged in layer?
 - A. Deposition
 - B. Foliation
 - C. Sedimentation
 - D. Stratification

3. Which term in the list is associated with rock layers?
 - A. Defoliation
 - B. Extrusion
 - C. Intrusion
 - D. Strata

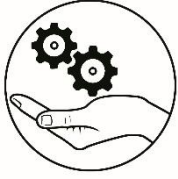
4. What type of rock/s usually undergo cross- cutting on rock layers?
 - A. Igneous Rock
 - B. Metamorphic Rock
 - C. Sedimentary Rock
 - D. Stratified Rock

5. Why is there a need for correlation of rock layers?
 - A. It gives the relative age of the rocks.
 - B. Fossils embedded in the rock layers serve as a proof of their correlation.
 - C. It provides information that the rock layers are connected to each other long ago.
 - D. All of the above

6. Which principles states that geological processes operating at the present time are same processes that have operated in the past?
 - A. Cross-cutting relationship
 - B. Original horizontality
 - C. Uniformitarianism
 - D. Inclusion

7. Which of the following shows a method of correlation?
- A. similarity of rock types
 - B. presence of index fossil
 - C. sequence of mineral content on rock
 - D. all of the above
8. If an igneous rock A crosscuts sedimentary rock B, what will be the relative age/position of igneous rock A?
- A. Igneous rock A will be on top of rock B.
 - B. Igneous rock A is older than sedimentary rock B.
 - C. Igneous rock A is younger than sedimentary rock B.
 - D. Igneous rock A is at the same age with sedimentary rock B.
9. Which of the following is NOT a type of unconformity?
- A. Angular
 - B. Disconformity
 - C. Nonconformity
 - D. Uniformity
10. When sedimentary rocks deposited in flat layers are left undisturbed it follows the statement in which of the given principles?
- A. Cross-cutting Relationship
 - B. Fauna Succession
 - C. Original Horizontality
 - D. Superposition
11. What can be inferred if you find an outcrop of mud cracks in gray shale? It can be inferred that the area was once _____.
- A. a beach
 - B. a desert
 - C. a tidal flat
 - D. deep under the ocean
12. Which of the following occurrences alters a rock layer quickly?
- A. earthquakes
 - B. rain
 - C. rivers
 - D. snow
13. What makes index fossils useful in identifying the relative age of rocks?
- A. They are short-lived.
 - B. They are radioactive.
 - C. They are old enough to be analyzed.
 - D. They are present in both young and older rocks.

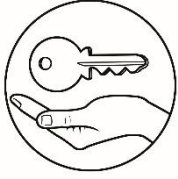
14. Which type of conformities state that sedimentary rocks, when tilted or folded, are overlain by more flat-lying layer of rock?
- A. Angular Conformity
 - B. Disconformity
 - C. Nonconformity
 - D. Inclusion
15. What will be the position of the youngest beds in undisturbed sedimentary deposits?
- A. They stay at the bottom.
 - B. They are found on the top rock layer.
 - C. Youngest beds are separated from sedimentary deposits.
 - D. Neither b nor c



Additional Activities

Illustrate an outcrop of a rock layer applying the principle or the laws of stratigraphy similar to your previous activity. Use the legend of what will be present in these particular layers in the outcrop. The guide of what you're going to put in your outcrop are found in the table below. Indicate them in your outcrop or block diagram. Be creative in presenting your output. Place your illustration in the box.

Label	Description
Lost before tilt	This was the last layer to be formed before the rocks tilted.
Oldest rock	The rock layer is below all the others.
Youngest rock	This is the younger rock above all the others.
Second oldest rock	The rock layer is just above the oldest.
Thinnest rock	It is the thinnest rock layer found between the fifth and the third rock layer
Above the erosion	This layer forms on top of earlier rocks after it was tilted and eroded away.



Answer Key

<p>LESSON 1: Rock Layer What I Know 1. D 2. D 3. C 4. A 5. A 6. C 7. C 8. D 9. B 10. B 11. D 12. D 13. D 14. D 15. D</p> <p>ROCK LAYER What's in Magma Solidification Igneous Rock Weathering and Erosion Sediments Deposition and burial Weathering and erosion Sedimentary rock Weathering and erosion Metamorphism Metamorphic Rocks</p> <p>12. Heat and pressure 13. Melting 14. Weathering and erosion</p> <p>What's More ACTIVITY 1.1 B A Cutting C, A, B Fault Erosion A E C 10. B</p>	<p>ACTIVITY 1.2 Stratification Cross-cutting Relationship Erosion Superposition Fault Intrusion Unconformity Sedimentary Extrusive Younger</p> <p>ACTIVITY 1.3 B D C E A</p> <p>Activity 1.4 1 Fault Cross cutting Younger Superposition Intrusion is younger</p> <p>LESSON 2: CORRELATION What's In D A E C B</p> <p>ACTIVITY 1.5 A Youngest - 6 4 1 7.9 2 10 3 5</p> <p>Oldest 8 Younger 3. Layer 7 4. Erosion 5. Volcano 6. Location C & D 7. Batholith 8. Layer 8 9. Location A or Outcrop A 10. Folding</p>	<p>ACTIVITY 1.5 B Intrusion Index fossil Erosion Rock layers Correlation</p> <p>What I've Learned Unconformity, younger Cross cutting, younger Superposition, top Angular conformity Original horizontality, younger</p> <p>Assessment B D C C D D D D D C C D A D C D D C D D D D C D A D C 15. B</p>
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Rubrics for the Additional Activities

Criteria	4	3	2	1
<i>Organization</i>	Exceeds all of the requirements outlined in the guidelines and instructions.	As specified in the directions/ instructions, include all of the essential elements.	One or more of the needed elements as mentioned in the directions/ instructions are not present.	Several necessary components are missing from the outcrop
Creativity	Exceptionally intelligent and one-of-a-kind in demonstrating profound comprehension	Thoughtfully and distinctively delivered; at times smart in demonstrating comprehension of the topic	A few unique touches improve the project and demonstrate a grasp of the material.	Shows little creativity, originality and/or effort in understanding the material
Content	Demonstrates a comprehensive knowledge of the work's topics	Demonstrates comprehension of the lesson's main concepts	Demonstrates a fairly limited comprehension of the lesson.	Does not demonstrate comprehension of the lesson Misses plot points and has several misinterpretations

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