

# 10

Grade



(GCED)

# Global Citizenship Education

Lesson Exemplar

# SCIENCE

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**Editorial Board**

Writer: Melandro D. Santos

Layout Artists: John Ray D. Barcena and Ariel C. Malate

Language Editor: Caridad N. Barrameda

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**Consultants**

Bert J. Tuga, Jocelyn DR Andaya, and Rita B. Ruscoe

**Project Management Team**

*Project Director: Serafin A. Arviola Jr.*

*Deputy Project Director: Carl O. Dellomos*

*Core Team Members: Zyalie L. Bedural, Rowena R. Hibanada, and Gerry C. Areta*

*Faculty Assistant: Iona Ofelia B. Zanoria*

*Technical Assistants: II Timothy D. Salegumba and Jean Pauline E. Maur*

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**Learning Area:** Science

**Grade Level:** 10

**Quarter:** 1st

**GCED Domain/s:** Cognitive, Socio-Emotional, and Behavioral

**GCED Indicator/s:**

**Cognitive**

D1.1.a- Recognize complex situations or problems.

D1.1.e- Evaluate appropriate actions, consequences, and implications.

**Socio-Emotional**

D2.1.e Commit to assume responsibility, mutual assistance, cooperation, and collaboration in various contexts in the world

**Behavioral**

D3.1.d Initiates actions about local, national and global issues (i.e advocates for peace-oriented values, security and stability) which can be taken individually and collaboratively.

**GCED Theme and Topic:**

T.3.1 Environment and natural resources

**K to 12 Content Standard/s:**

The learners demonstrate understanding of the relationship among the locations of volcanoes, earthquake epicenters, and mountain ranges.

**Enhanced Content Standard/s:**

Ways of sorting materials and describing them as solid, liquid or gas based on observable properties

**Time Allotment:**

30 minutes



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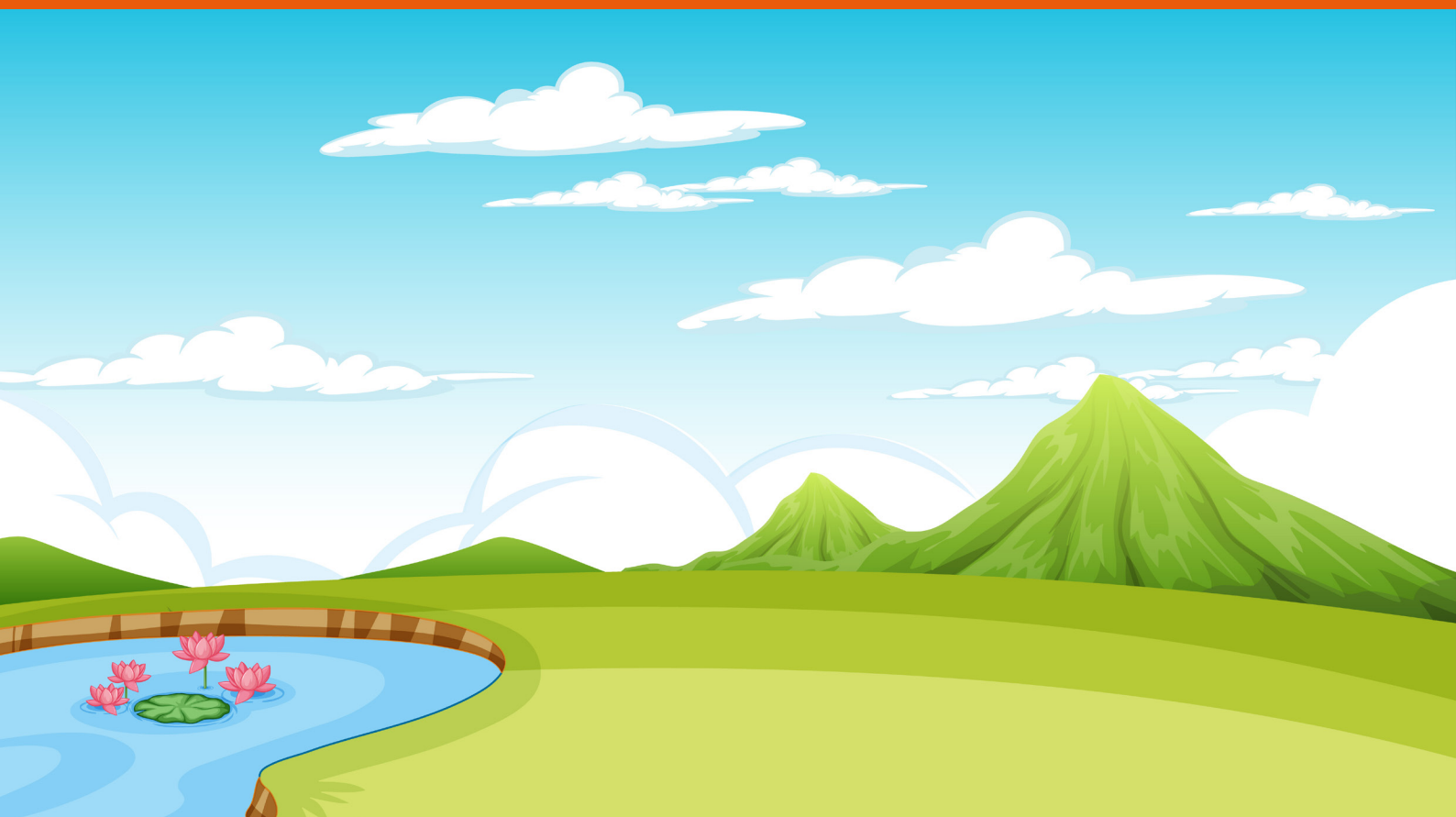
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# MOUNTAINS: THE NATURE'S WATER TOWERS

[Background vector created by brgfx - www.freepik.com](https://www.freepik.com/vectors/background)



# LESSON INTRODUCTION

According to United Nations, mountains cradle the 15% of the world's population and nurtures the half of the world's biodiversity areas. They provide home to many endangered species and supply all living creatures with freshwater for everyday life. Mountains are excellent sources of livelihood since they contribute to food and nutrition security. They provide land for crops, raising livestock, waterways for fisheries, and yield forest products such as fruit berries, mushrooms, honey, tea, and medicinal plants.

Unfortunately, mountains are under threat from climate change, unsustainable farming practices, mining, illegal logging, and poaching. Moreover, biodiversity loss and natural disasters contribute to the unstable environment for mountain communities. The degradation of ecosystem, loss of livelihoods and migration in mountains lead to the abandonment of ancient cultural practices and traditions that have sustained biodiversity for many generations.

On the other hand, we celebrate the World Day of Mountains every 11th day of December to create awareness about the importance of mountains and its people. The celebration encourages the public to launch projects and programs on mountain conservation and calls the national leaders to create policies that will improve the mountain people's standard living.

## LESSON OBJECTIVES

### (WHAT I NEED TO KNOW / ALAMIN)

At the end of the lesson, students are expected to:

- describe and differentiate the types of convergent boundaries;
- explain the processes that occur in convergent boundaries and
- create an awareness campaign material about the International Day of Mountains which promotes conservation and preservation of mountains' biodiversity.

# PRETEST

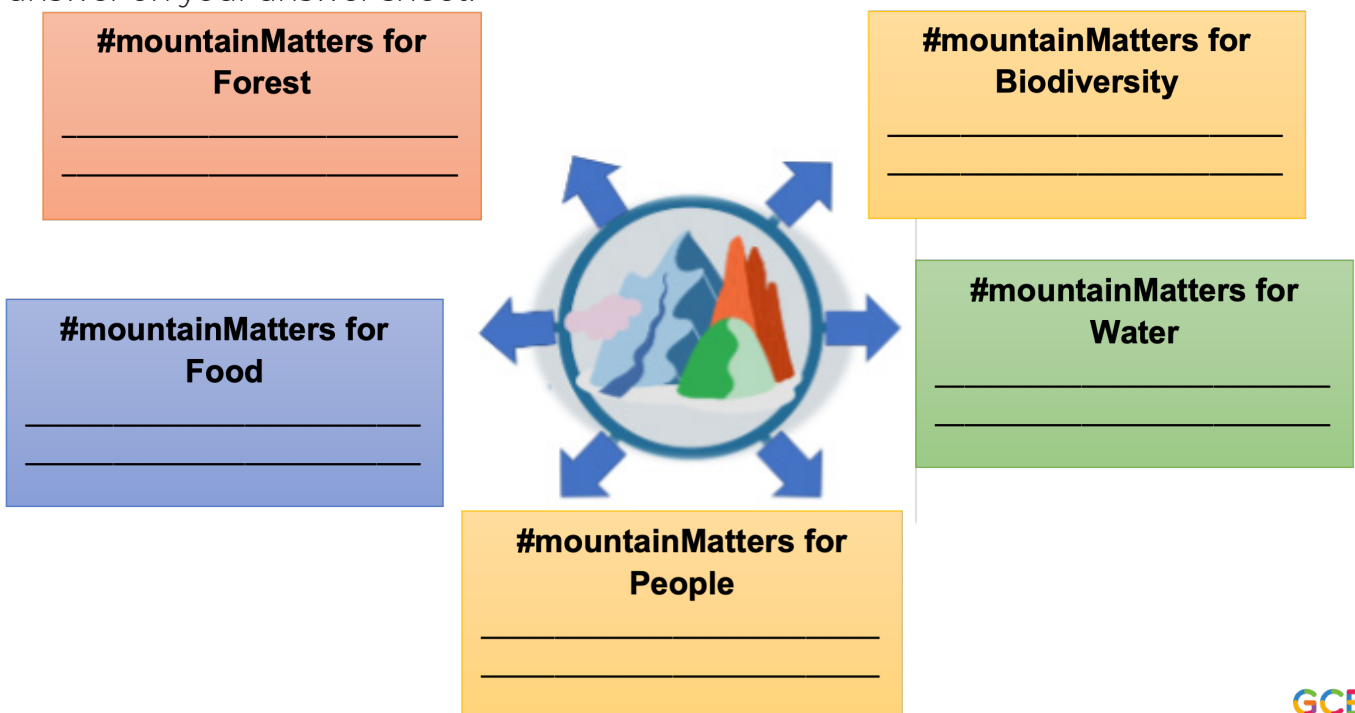
## (WHAT I NEED TO KNOW / SUBUKIN)

**Part 1. Directions:** Read and analyze each question carefully. Write the letter of the correct answer on your answer sheet.

- Which of the following correctly describes the convergent plate boundary?  
A. Plates are moving apart.                      C. Plates are moving towards each other.  
B. Plates are sliding each other.              D. Plates are grinding past each other.
- What type of landform is created when two continental plates collide with each other?  
A. Mountain range                                      C. Submarine valleys  
B. Submarine trench.                                D. Volcanic island arc
- The Pacific Zone is known to be along converging plates. Which of these should you expect to see EXCEPT\_\_\_\_\_?  
A. Active volcanoes                                  C. Rift Valleys  
B. Mountain ranges                                  D. Volcanic Island arc
- What will happen if two oceanic plates meet?  
A. One plate slide past the other.              C. Plates sinks into the mantle.  
B. The colder and denser plate sinks.        D. Volcanic Island arc
- Which of the following is formed after continental plate and oceanic plate converged?  
A. Continental rift valley                            C. Mountain ranges  
B. Mid- Ocean ridge                                D. Volcanic mountain arc

### Part 2. Graphic organizer:

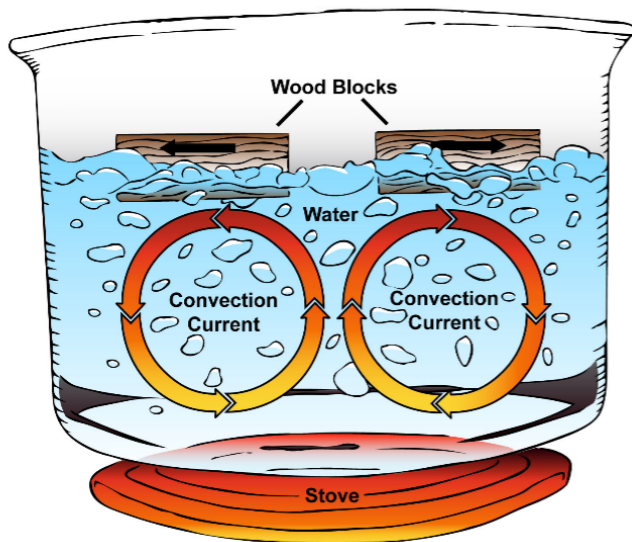
**Directions:** Read and analyze each question carefully. Write the letter of the correct answer on your answer sheet.



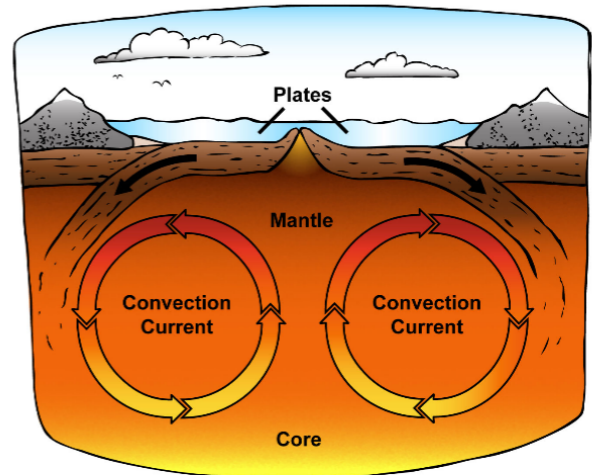
# LESSON PROPER

## REVIEW (WHAT'S IN / BALIKAN)

Picture A.



Picture B.



<https://philheron.com/2018/10/26/delving-into-the-earths-deep-interior-the-future-of-plate-tectonics/>

<https://sites.google.com/a/ocsb.ca/1-cgc-1d-2017/a-unit-2-3-natural-disasters--earthquakes/1-4-convection-currents/2-convection-currents?tmpl=%2Fsystem%2Fapp%2Ftemplates%2Fprint%2F&showPrintDialog=1>

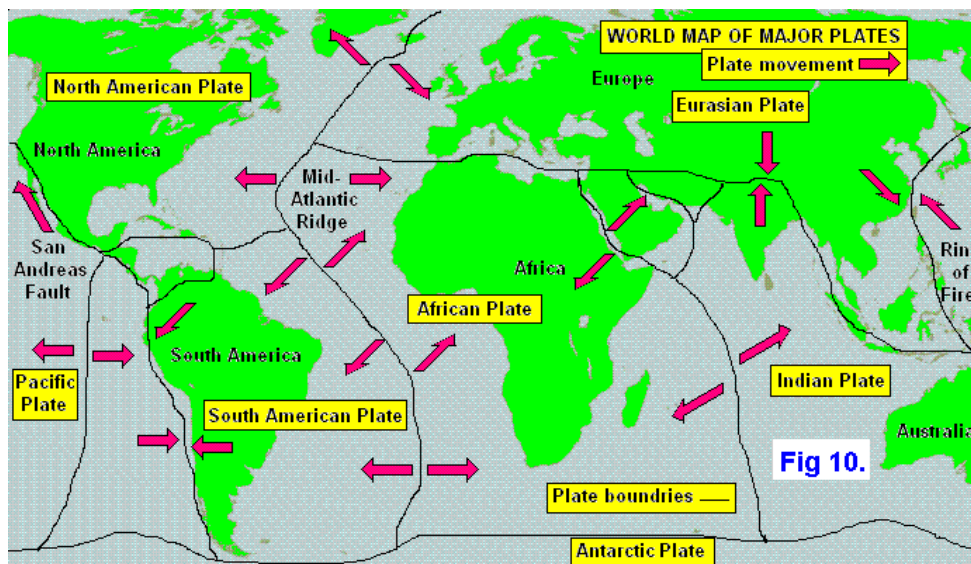
Pictures A and B illustrate the convection currents in fluids. In picture A, the wood blocks above move as the water heats up, in what direction do convection currents move on each side of the spreading center? In what direction would plates move as a result?

### CAUSES OF THE PLATE MOVEMENT

Tectonic plates rest on a layer of soft, hot rock called asthenosphere. This earth layer and the mantle below it moves by convection current. As you have observed in picture A the water at the bottom heats up, becomes less dense and rises. At the surface, it cools down and becomes less dense and sinks. Again, the water will be heated and then rise again.

Comparing pictures A and B, the rock in the asthenosphere behaves in the similar way. The hot soft rock rises, cools and sinks and then heated and rises again. This continuous rising and sinking motion is called convection current, a motion that transfers heat in a material. However, the convection current in the mantle is slower than those in boiling water. The plate materials only move a few centimeters per year.





### World Map of Major Plates

<https://docbrown.info/page21/GeoChangesANS08.htm>

As scientists studied the Earth’s plates, the sea floor, and the asthenosphere, they agreed to the Theory of Plate Tectonics. The theory states that the Earth’s lithosphere is made up of huge plates that moves over the surface of the Earth. These plates could not move and shift without affecting other plates nearby. Other plates could move apart, push together or slide past to each other. In a nutshell, plate movements cause great changes in the Earth’s crust. Scientists found that most of earthquakes, volcanoes and mountain ranges appear where tectonic plates meet.

The map of major plates shows the earth’s tectonic plates and the direction which they move. How many major plates are shown in the map? Are most of the plates shown moving apart or pushing toward each other? Where on the map are the two plates pushing each other? If the Himalaya Mountain range is located between the Eurasian plate and Indian plate, what do you think is happening to the height of this mountain? You will answer those questions and will learn more about converging tectonic plates as you go through this lesson.

## LESSON PROPER

### ACTIVITY (WHAT’S NEW / TUKLASIN)

#### Activity 1: Modeling Collisions

In this activity, you will model the collision of two continental plates. Prepare two sets of 1 cm thick, soft bound book. Place the two sets of books on the flat surface facing each other. Slowly push the sets of books so that they will collide with each other. Continue to push until the paper in one of the stacks folds over.



## Guide questions

Q1: What do you think will happen when the stacks of paper collide with each other?

Q2: Are all the pieces of the paper pushed upward? What happens to the pieces that are not pushed upward?

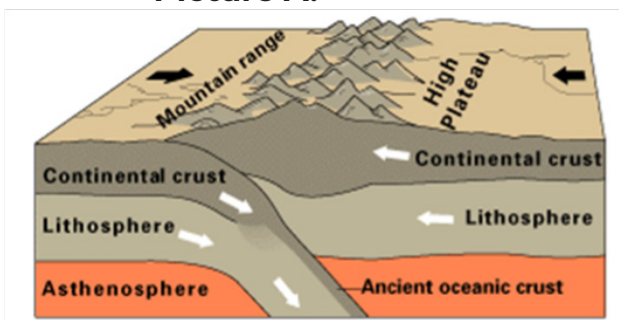
Q3: What kind of landform will most likely result from this continental-continental plate collision?

Q4: If these papers are rocks, what is the result when the rocks are permanently deformed without breaking as it responds to stress?

Q5: What is the result when the rocks are placed under much stress that it can no longer stretch or flow?

## Activity 2: Collisions Reimagined

Picture A.



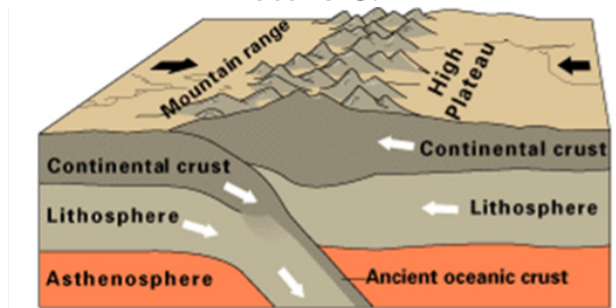
**CONTINENTAL TO CONTINENTAL  
CONVERGENCE**

Picture B.



**OCEANIC TO CONTINENTAL  
CONVERGENCE**

Picture C.



**OCEANIC TO OCEANIC  
CONVERGENCE**

[http://commons.wikimedia.org/wiki/File:Continental-continental\\_convergence](http://commons.wikimedia.org/wiki/File:Continental-continental_convergence) [https://commons.wikimedia.org/wiki/File:Active\\_Margin.svg](https://commons.wikimedia.org/wiki/File:Active_Margin.svg)

**Procedure:** Study and compare pictures A, B, C. Observe what happens when

- Continental crust converges with continental crust. (Picture A)
- Oceanic crust converges with continental crust. (Picture B)
- Oceanic crust converges with oceanic crust. (Picture C)

Answer the guide questions below and summarize them by filling out the table below.

## Guide Questions

Q1: What happens when a continental crust collides with another continental crust?  
What type of landform is created after this collision?

Q2: What happens when an oceanic crust collides with a continental crust?  
What was produced after this collision?

Q3: What happens when an oceanic crust collides with another oceanic crust?  
What was produced after this collision?

<b>CONVERGENCE</b>	<b>Picture A: Two Continental crusts</b>	<b>Picture B: Oceanic and Continental crusts</b>	<b>Picture C: Two Oceanic crusts</b>
<b>What happens?</b>			
<b>What was formed after the collision?</b>			

**Optiona activity:** Collisions Simulated PhET-based interactive simulation of plate tectonics.



• For online simulation, visit [https://phet.colorado.edu/en/simulation /plate-tectonics\\*](https://phet.colorado.edu/en/simulation/plate-tectonics) a through web browser. Offline versions can be downloaded and installed. Once installed, simple click the PhET icon to open the installed program. After the simulation opens, play with the control, navigate, and click the plate motion folder.

• The University of Colorado shares the Phet Simulations for public use and made it available for offline version. The PhET Interactive Simulations Project is under the Creative-Commons-Attribution 3.0 and the creative Commons GNU General Public License at <https://phet.colorado.edu>

## Procedure

1. Choose one type of convergence by dragging each crust indicated on the screen.
  - a. Continental crust converges with continental crust.
  - b. Oceanic crust converges with continental crust.
  - c. Oceanic crust converges with oceanic crust.
2. "Tick" the automatic mode and the convergent plate motion.
3. Click the "Play" button on the right side to start with the simulation.
4. Observe what happens as the plates collide with each other. Take note of what was formed after the collision.
5. Repeat procedures 1-4 using another type of convergence.

## Guide Questions

Q1: What happens when a continental crust collides with another continental crust? What type of landform is created after this collision?

Q2: What happens when an oceanic crust collides with continental crust? What was produced after this collision?

Q3: What happens when an oceanic crust collides with another oceanic crust? What was produced after this collision?

# LESSON PROPER

## DISCUSSION (WHAT IS IT / TALAKAYIN)

You have read earlier that those tectonic plates are pushed together at convergent boundaries wherein the crust is either folded or destroyed. When two plates with continental crust collide, they will crumple and fold the rock between them. A plate with older and denser oceanic crust will subduct beneath another plate. The crust melts in the asthenosphere. Subduction is the process in which one plate sinks under another plate. There are three types of convergent boundaries: continental to continental convergence, continental to oceanic convergence and oceanic to oceanic convergence.

Continental to continental convergence occurs when two plates carrying continental crust collide with each other. Because both crusts are of the same density, neither of the plates can sink beneath the other. Their edges will crumple and fold as they keep on moving. The European Alps and the Himalayan Mountain range appear along the continent-continent convergence. The former was formed by the collision of African and the European Plates, while the latter was formed by the collision of the Indian and the European Plates. Both are kinds of folded mountains. Folded mountains are formed when rock layers are squeezed together and pushed upward as continents collide resulting compression folds and uplift the rock. On the other hand, fault-block mountains are formed when the tension in the earth's crust causes the earth's crust to break into several normal faults.



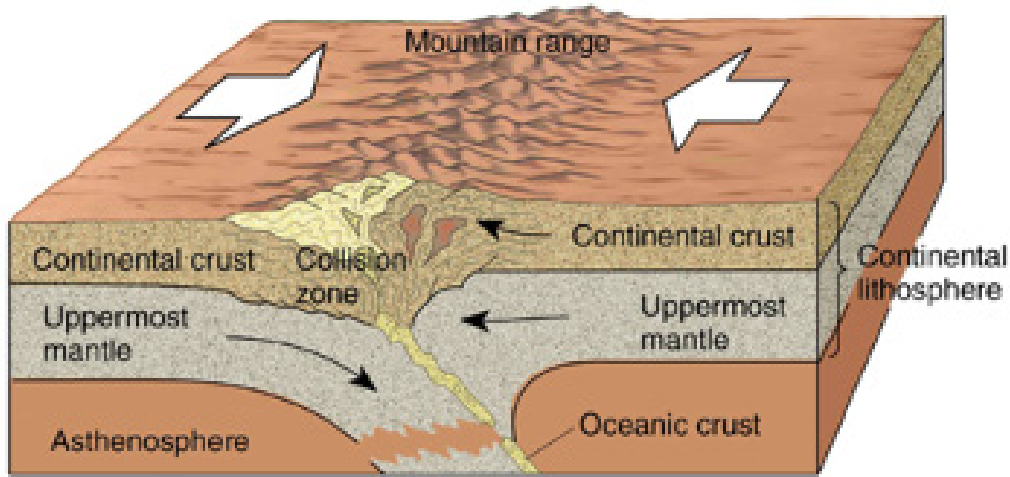
**Himalaya Mountain Range**



**European Alps**

<https://www.deccanherald.com/science-and-environment/changes-in-groundwater-cause-himalayan-slip-813631.html>  
<http://justfunfacts.com/interesting-facts-about-the-alps/>





### Formation of Mountain

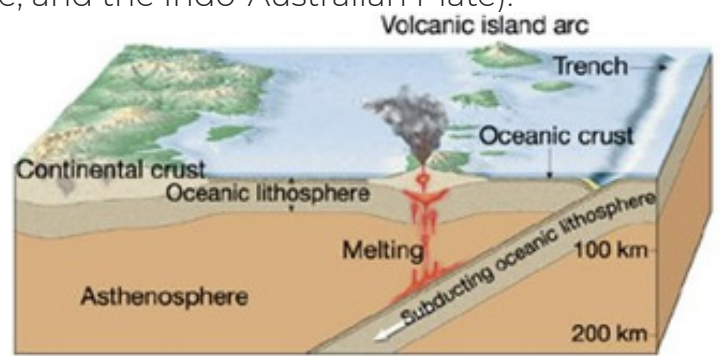
Range <https://flowwella.com/s/3ed7/D19B4722-79EB-4235-868C-6193FEA3270E>

**Oceanic to oceanic convergence** occurs when one plate with oceanic crust sinks under another plate with oceanic crust. The older plate sinks because it is colder and denser than the younger plate.

As the subducting oceanic crust moves towards the Earth's mantle and heats up, the molten rock expands, making it less dense, and begins to rise towards the surface of the non-subducting oceanic plate. This results to the formation of a volcano on the surface of the non-subducting oceanic plate, where this molten rock, in the form of magma, is extruded. When a series of these volcanoes form along an oceanic-oceanic convergent plate boundary, it is called an island arc. The Philippines is essentially a series of volcanic arcs. Many of the thousands of islands which make up the Philippines are classified as island arcs which were formed because of subduction after the collision of the three plates (the Eurasian Plate, the Philippine Sea Plate, and the Indo-Australian Plate).



### Philippine Islands



### Philippine Islands

<https://www.bbc.com/>  
<https://osu.instructure.com/courses/29009/pages/essential-concept-18-volcanoes-and-plate-tectonics>

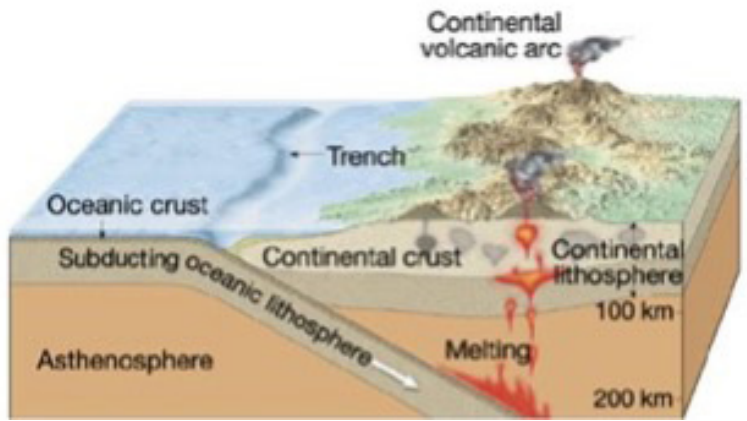
Oceanic to Continental Convergence occurs when ocean crust sinks under continental crust. The oceanic crust sinks because it is colder and denser than the continental crust.

At these sites, deep sea trenches are formed along with coastal volcanic mountains. The Andean Mountain chain in South America is an example of ocean-continent subduction zone. Volcanic Mountain are formed when molten rock erupts onto earth's surface. At the convergent boundaries, the movement of the plates causes the hot mantle rocks to rise beneath the plates. The molten rock rises to the surface and erupts.



### Andes Mountain Chain

<https://www.sciencedirect.com/topics/earth-and-planetary-sciences/continental-arc>



### Formation of Continental Volcanic

[Archttps://osu.instructure.com/courses/29009/pages/essential-concept-18-volcanoesand-plate-tectonics](https://osu.instructure.com/courses/29009/pages/essential-concept-18-volcanoesand-plate-tectonics)

# LESSON PROPER

## ENRICHMENT ACTIVITIES (WHAT'S MORE / PAGYAMANIN)

### GCED Cognitive Indicators

**D1.1.a-** Recognize complex situations or problems.

**D1.1.e-** Evaluate appropriate actions, consequences, and implications.

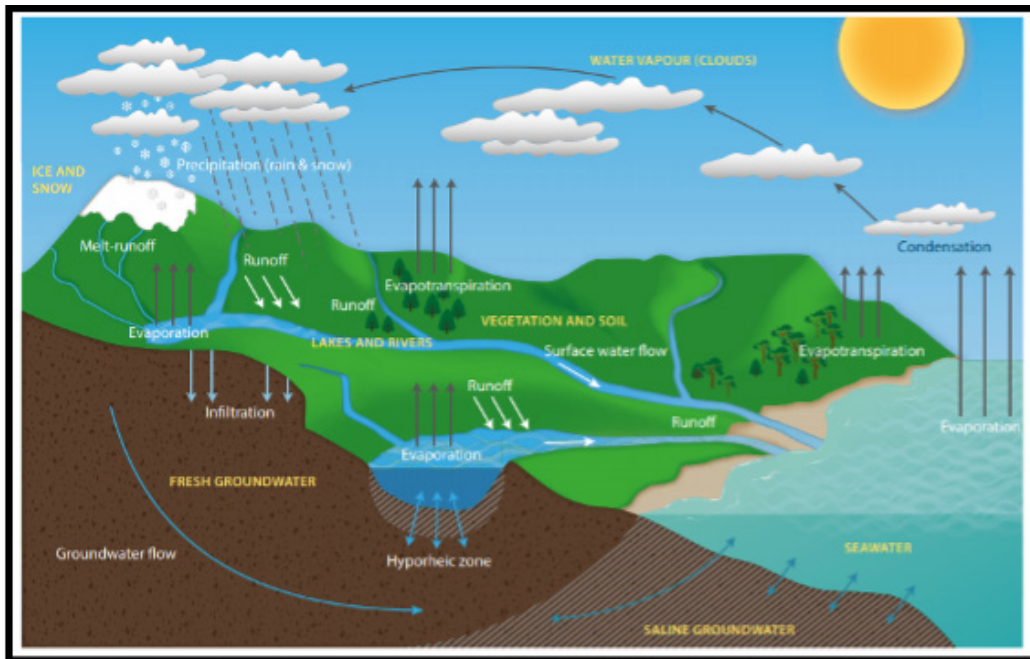
### GCED Socio- emotional Indicators:

**D2.1.e** Commit to assume responsibility, mutual assistance, cooperation, and collaboration in various context in the world.

### Activity 3: Water towers

**Direction:** Interpret the picture of water cycle below. You are also encouraged to watch the video entitled "The Nature in Water Security": <https://vimeo.com/56355651> and learn more about how destruction and disturbances of mountain ecosystems have wide-reaching global consequences.

Write a summary of the role of mountain in the water cycle and explain how mountains supply us with clean fresh water. Use a separate sheet of paper. You will be guided by the following questions below in creating the summary.



[https://upload.wikimedia.org/wikipedia/commons/d/d2/Diagram\\_of\\_the\\_water\\_cycle\\_including\\_some\\_human\\_activity.pdf](https://upload.wikimedia.org/wikipedia/commons/d/d2/Diagram_of_the_water_cycle_including_some_human_activity.pdf)  
<https://upgro.files.wordpress.com/2018/03/water-module-student-resource-web.pdf>

Q1: Why are mountains called the water towers of Earth?

Q2: What is the role of the mountain in the water cycle?

Q3: Based on the picture, how do mountains sustain and support life on Earth?

Q4: What is the importance of mountains in protecting biodiversity?

Q5: Why should we care about mountains? What can we do to protect them?

## LESSON PROPER

### GENERALIZATION (WHAT I HAVE LEARNED / ISAISIP)

**Lithosphere** is made of many plates. It is split into large and small slabs of rocks called tectonic plates, which fit together like a jigsaw puzzle. Most of the tectonic plates contain both continental and oceanic crusts. Tectonic plates have different boundaries. A boundary is where the edges of two plates meet. A convergent boundary occurs where plates move together. There are three types of convergent boundaries, these are:

1. **Continental-continental collisions** occur where two continental plates collide, crushing and folding rocks between them until these rocks push high enough to form mountains.

2. **Oceanic-oceanic subductions** occurs where two oceanic plates collide and the older denser plate sink beneath the top plates forming deep ocean trench and volcanic arcs.

3. **Oceanic and continental subductions** occur where an oceanic plate sinks beneath the continental plate, forming deep ocean trench and volcanic coastal mountains.

Mountains are the source of the world's major rivers which provide freshwater for drinking, domestic purposes, irrigation, industry, and hydropower to more than half of humanity. It holds the world's most important source of green and renewable energy, which supplies rapidly growing cities of population in and around mountains.



- Mountains are home to 12% of the world's population and boost the world's fastest growing global tourism industry.
- Mountains provide key resources such as minerals, timber and crops which are sources of livelihood and income.
- Mountains host more than half of the world's biodiversity protected areas. It provides us with essential goods and services such as timber, medicinal plants, and recreational landscapes. They also host a great variety of locally adapted crops and livestock.
- Mountains in the Southeast Asia and the Pacific are considered part of the world's most significant and most threatened centers of biodiversity; its mountain areas are of key global significance.

## LESSON PROPER

### REFLECTION (WHY IS IT MEANINGFUL AND RELEVANT / ISAPUSO)

#### **GCED Socio- emotional Indicators:**

**D2.1.e** Commit to assume responsibility, mutual assistance, cooperation, and collaboration in various context in the world.

#### **#MountainMatters**

But how do these mountains support biodiversity and sustain life in our planet? What makes mountain so special? Why should mountains matter to me?

Mountains are the result of land being pushed together over millions of years. They covered the 27% of our planet's land surface and considered to be highly valuable because they support and sustain life on Earth. Mountains help to collect clean, and provide clean water. They supply the 60 to 80% of all freshwater resources for our planet. Mountains are excellent sources of food and livelihood. They produce six most important food crops (potatoes, maize, barley, sorghum, apples, tomatoes) worldwide. They attract 15-20% of global tourism because of their beautiful sceneries. Furthermore, mountains support the 25% of terrestrial biodiversity by keeping the 28% of the Earth's forests that serves as habitat for both plants and animals.

In the Philippines, there is a long mountain range called Sierra Madre which serves as a natural shield against typhoons coming from the Pacific Ocean. It is considered "the backbone of the Luzon Island" because it covers the island's northeast coast. This mountain is very important to the country's national development because its range comprises numerous watersheds that afford irrigation water for nearby agricultural lands. Furthermore, it supports several major infrastructures which includes irrigation dams, water utility and power plants, that serves the adjacent urban settlements and Metro Manila.



**Directions:** Write your answers to the guide questions on a separate sheet of paper.

## Guide Questions

- Have you ever tried visiting the nearest local mountain in your area? What kind of forest products your family had bought during your visit?
- How do you describe the products produced by the nearest local mountain in your area?
- How does it sustain and support the needs/livelihood of the people living in the nearby communities?
- Why should mountains matter to me?
- How can I help preserve mountains?

Optional activity for Online Distance Learning

## Think, Pair and Share (TPS)

**T: (Think)** Reflect to the guide questions above.

**P: (Pair)** Collaborate with your classmates by posting your answers on Padlet provided by the teacher. Padlet is virtual bulletin board, where students and teachers can collaborate, reflect, share ideas and photos online. Visit <https://padlet.com> and watch the video tutorial using this link: <https://www.youtube.com/padlet>.

**S: (Share)** Share your answers and insights during online class discussion.

# LESSON PROPER

## APPLICATION (WHAT I CAN DO / ISAGAWA)

### GCED Indicator: Behavioral :

**D3.1.d.** Initiate actions about local, national, and global issues (i.e., advocacies for values and stability which taken individually and collectively)

### Activity: Climb every mountain

**Direction:** Create an awareness campaign material for the International Day of Mountains using available art supplies at home.

Draw or paint why mountains matter to you. Think about what was discussed in the lesson and how they are related to your life. You may also include your favorite mountain in your output. You are encouraged to share the artwork using your social media accounts. Together with your post, share your commitment-statement as a global citizen. As a global citizen I pledge to support the International Day of Mountains by...

Use the hashtags linked to your campaign material for the International Day of Mountains and be part of this annual celebration. (#MountainMattersforwater, #MountainMattersforfood, #MountainMattersfor biodiversity, #MountainMatters for forest, #MountainMattersforpeople). You will be guided by the rubric for visual art provided here.

## Rubric for Visual Art

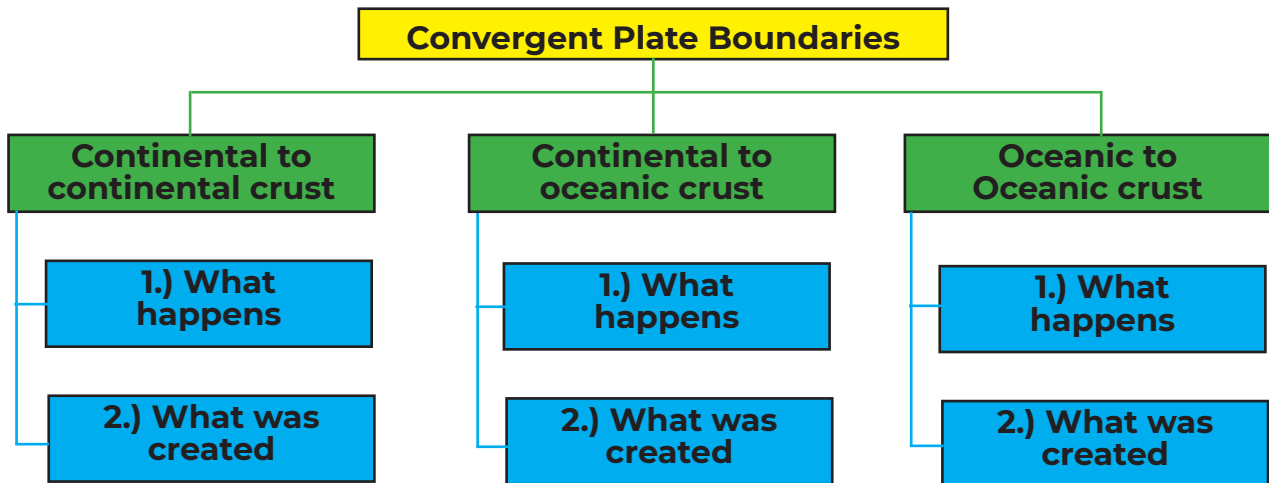
	4. EXCEEDS	3. MEETS	2. PARTIALLY MEETS	1. DOES NOT MEET
<b>The HAND</b> Art production: Craftsmanship, understanding and applying media, techniques, and processes	Project beautifully/ arefully made. Put me and effort into completion of artwork	Project finished with most details uses techniques appropriately	Uses and displays understandings of techniques in a minimum standard	Minimal application of skills and techniques unfinished project
<b>The MIND</b> Intellectual Curiosity, using knowledge and critical thinking	Demonstrates comprehensive knowledge and expressive ideas Shows outstanding achievement toward goals	Demonstrates broad knowledge of many contexts Shows satisfactory achievement toward goals	Demonstrates some knowledge of contexts Limited achievement of goals and objectives	Demonstrates little of no knowledge of contexts No effort toward goals and objective
<b>The SPIRIT</b> Application to life Exploration of self, Originality and personal expression	Project finished with total originality after thorough experimentation	Project finished but not completely original, problem solved logically	Project finished but no evidence of experimentation or originality	Project is unfinished or finished with much help and solutions from others
<b>Criticism/Reflect</b> Reflecting and assessing characteristics and merits of their work and work of others	Analyses and conclusions are accurate, detailed, and consistent with artwork	Analyses are consistent with data	Some understanding of analysis and project goals	Unclear or inaccurate understanding of topic and how to communicate artwork

<https://lansingcatholicvisualarts.weebly.com/art-project-rubric.html> y.com/art-project-rubric.html

# ASSESSMENT

## TAYAHIN

**Part 1: Multiple Choice.** Analyze the given graphic organizer. Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.



### Choices

- A. Ocean trench or submarine valleys and volcanic island arcs.
- B. Ocean trench or submarine valleys and volcanic coastal mountains.
- C. Mountain ranges
- D. A denser plate subducts beneath the other plate. As one plate subducts, water from the subducting lithosphere induces partial melting of the mantle material to form magma. The magma rises and breaks through the crust.
- E. Plate tectonic movements have squeezed rock layers of the two colliding plates tighter like accordions.
- F. The denser crust undergoes subduction process or bending of the crust towards the mantle. The subducted crust will melt forming magma. Water from the subducting crust will make magma to rise and reach the crust again and causing the formation of volcanic coastal mountains.

## Part 2: Graphic Organizer

**Direction:** Directions: Based on what you have learned in this lesson, give six ways to protect and conserve our mountains.



# ANSWER KEY

## SUSI SA PAGWAWASTO

### Pretest

1. C.
2. A.
3. C.
4. B.
5. D.

### Post Test

1. E.
  2. C.
  3. F.
  4. B.
  5. D.
6. A.

### Activity 1 : Modeling Collisions

**Q1:** What do you think will happen when the stacks of paper collide with each other?

**Q2:** Not all the pieces of the paper pushed upward. The pieces of papers that are not pushed upward slide with each other.

**Q3:** Mountain ranges will most likely result from this continental-continental plate collision.

**Q4:** Folding is the result when the rocks are permanently deformed without breaking as respond to stress.

**Q5:** Faulting is the result when the rocks are placed under much stress that it can no longer stretch or flow.

### Activity 2 : Collisions Re-imagined Possible Answers to Guide Questions

**Q1:** When a continental crust collides with another continental crust, Mountain ranges will be created after this collision.

**Q2:** When an oceanic crust collides with a continental crust, one denser oceanic plate subducts with the less dense continental plate. Deep sea trench and volcanic continental arc will be produced after this collision.

**Q3:** When an oceanic crust collides with another oceanic crust, one denser oceanic plate subducts with the other less dense oceanic plate.

Deep sea trench and volcanic island arc will be produced after this collision.

CONVERGENCE	Picture A: Two Continental crusts	Picture B: Oceanic and Continental crusts	Picture C: Two Oceanic crusts
<b>What happens?</b>	Without subduction Two plates collide, crushing and folding rocks	With Subduction Denser oceanic plate subducts to continental plate	With Subduction Denser oceanic plate subducts to less dense oceanic plate
<b>What was formed after the collision?</b>	Mountain ranges	Deep sea trench and volcanic continental arc.	Deep sea trench and volcanic island arc.

## **Optional Activity : Collisions Simulated**

### **Possible Answers to Guide Questions**

**Q1:** When a continental crust collides with another continental crust, Mountain ranges will be created after this collision.

**Q2:** When an oceanic crust collides with a continental crust, one denser oceanic plate subducts with the less dense continental plate.

Deep sea trench and volcanic continental arc will be produced after this collision.

**Q3:** When an oceanic crust collides with another oceanic crust, one denser oceanic plate subducts with the other less dense oceanic plate.

Deep sea trench and volcanic island arc will be produced after this collision.

## **Activity 3 : Water Towers**

### **Possible Answers**

**Q1:** Mountains are called the water towers of Earth because they are the source of fresh water supply to rivers and other freshwater sources. This freshwater arrives from melting snow that produces streamflow that winds up in streams, rivers, lakes and eventually oceans.

**Q2:** Mountains serves as the barrier to incoming air masses. When the air, hits the mountains, they are forced to move upwards and begin to condense. When there is enough condensation, rain clouds would be formed which could lead to precipitation.

When precipitation occurs in the mountain, the water coming from the rain would flow through streams. Water from the mountains may also move through groundwater aquifers.

**Q3:** Mountains sustain and support life on Earth by collecting, cleaning, supplying, and nourishing all living creatures in the planet with bountiful freshwater.

**Q4:** Mountains are home to many different animals and plants that exist. 25% percent of all land animals live in mountain regions.

**Q5:** We should we care about mountains because they provide us for water for drinking, domestic use, irrigation, industry, and hydropower. Most of the rivers have their sources in mountains, and people relies on water from these rivers for domestic irrigation, industry, and the generation of hydroelectric power. These waters are also essential to the health of ecosystems since they provide nutrients for aquatic life and dilute pollutants generated in the lowland areas.

To protect mountains, we should, conserve water, buy local food, plant local trees, visit a mountain for holidays, minimize the use of plastic products and pick up waste and recycle.

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# WORKSHEET 2

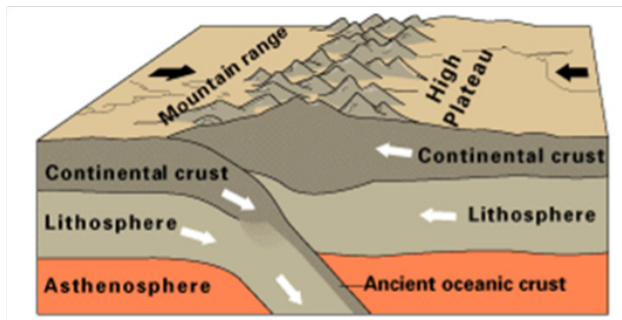
## Collision Reimagined

Name: \_\_\_\_\_  
Year and section: \_\_\_\_\_

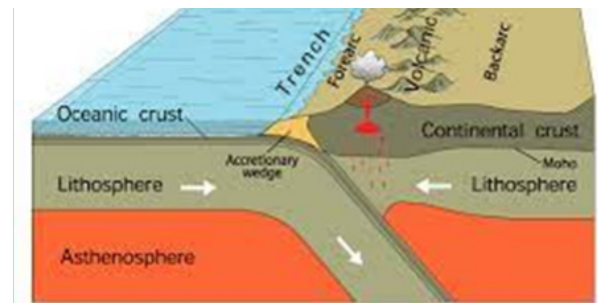
SCORE \_\_\_\_\_  
Date: \_\_\_\_\_

### Worksheet 2: Collision Reimagined

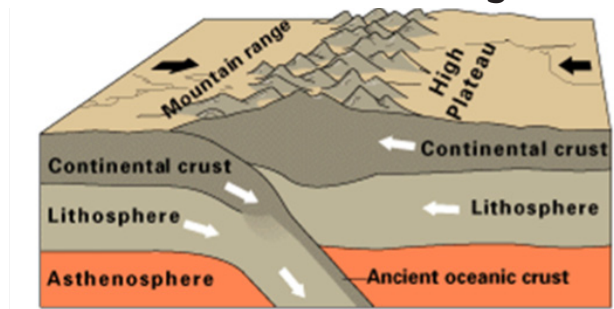
**Picture A.**  
**Continental to Continental**



**Picture B.**  
**Oceanic To Continental**



**Picture C.**  
**Oceanic to Oceanic Convergence**



### Procedure

1. Study and compare pictures A, B, C. Observe what happens when
  - Continental crust converges with continental crust. (Picture A)
  - Oceanic crust converges with continental crust. (Picture B)
  - Oceanic crust converges with oceanic crust. (Picture C)
2. Answer the guide questions below and summarize them by filling out the table below.

### Guide Questions

**Q1:** What happens when a continental crust collides with another continental crust?  
What type of landform is created after this collision?

**Q2:** What happens when an oceanic crust collides with a continental crust?  
What was produced after this collision?

**Q3:** What happens when an oceanic crust collides with another oceanic crust?  
What was produced after this collision?

CONVERGENCE	Picture A: Two Continental crusts	Picture B: Oceanic and Continental crusts	Picture C: Two Oceanic crusts
What happens?			
What was formed after the collision?			

Name: \_\_\_\_\_  
Year and section: \_\_\_\_\_

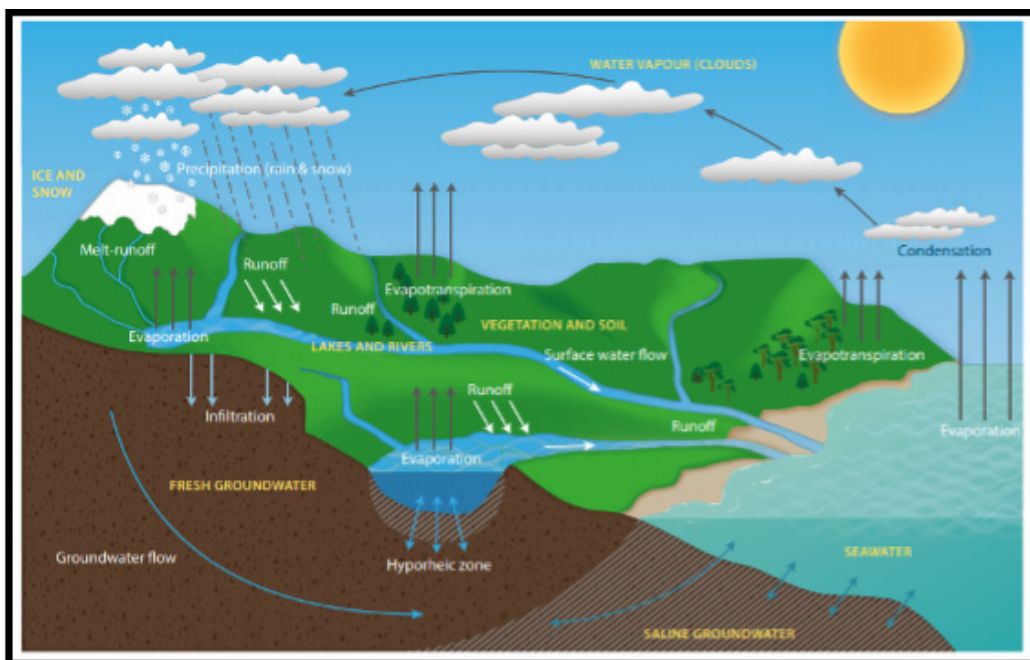
SCORE \_\_\_\_\_  
Date: \_\_\_\_\_

**Worksheet 3: Collision Reimagined**

**Directions:** : Interpret the picture of water cycle below. You are also encouraged to watch the video entitled “The Nature in Water Security”: <https://vimeo.com/56355651> and learn more about how destruction and disturbances of mountain ecosystems have wide-reaching global consequences. Write a summary of the role of mountain in the water cycle and explain how mountains supply us with clean fresh water. Use a separate sheet of paper. You will be guided by the following questions below in creating the summary.

**WATER CYCLE**

<https://upgro.files.wordpress.com/2018/03/water-module-student-resource-web.pdf>



**GUIDE QUESTIONS**

**Q1:** Why do mountains are called the water towers of Earth?

\_\_\_\_\_

**Q2:** What is the role of the mountain in the water cycle?

\_\_\_\_\_

**Q3:** Based on the picture, how do mountains sustain and support life on Earth?

\_\_\_\_\_

**Q4:** What is the importance of mountains in protecting biodiversity?

\_\_\_\_\_

**Q5:** Why should we care about mountains? What can we do to protect them?

\_\_\_\_\_



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