MINISTRY OF EDUCATION

NATIONAL CENTRE FOR EDUCATIONAL RESOURCE DEVELOPMENT

NATIONAL SCHEME FOR SECONDARY SCHOOLS

GEOGRAPHY

GRADE 10

ACKNOWLEDGEMENTS

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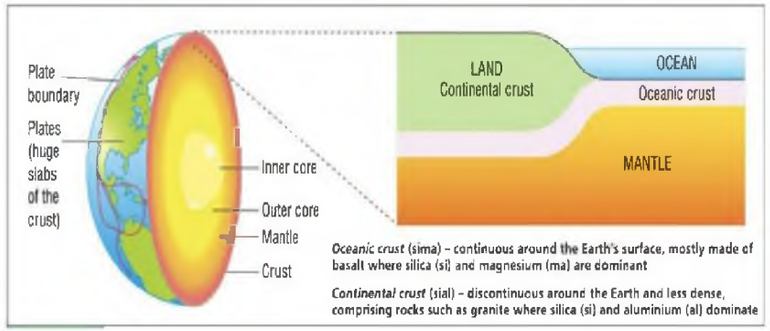
Curriculum Area: Geography **Grade 10**

					WEEK 1
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
SECTION II - NATURAL SYSTEMS **Structure of the Earth**	Students will: i. describe the internal structure of the earth. ii. describe the types and characteristics of crusts.	**a. Internal structure of the earth** The earth is made up of three main layers: i. crust ii. mantle iii. core These layers become denser toward the centre of the Earth. Crust – the thin solid outer layer that extends to a thickness of about 70km below the surface. There are two types of crust: continental crust and oceanic crust. Continental crust- forms the continents/land masses. Silica (si) and aluminium (al) are very common. When combined with oxygen, they make up the most common rock, granite. Oceanic crust – this is found below the oceans. The crust is made up of mainly basalt. Silica (si) and magnesium (ma) are dominant. Mantle- found between the crust and the core. It makes up about 82% of the volume of the Earth. It extends to a depth of approximately 2900 km.	Drawing and labelling diagrams of the structure of the earth and describing the types of crusts. Writing sentences describing each type of crust. Creating poems describing the structure of the earth. Making models illustrating the structure of the earth.	Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. p. 2. Waugh, D. Geography: An Integrated Approach, Nelson Thornes, 2009. p. 10. Guinness, P. et al. Geography for CSEC, 2nd Edition, United	Complete objective-type questions on the structure of the earth. Oral presentation of the model to the class.

		Core- the innermost layer of the Earth. It is very dense and extremely hot. At the centre of the earth, the temperature rises to about 5500 degrees Celsius. The centre of the earth is approximately 6400 km below the surface.  Adapted from Geography for CSEC (p.2), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae.		Kingdom, Nelson Thornes, 2016. p. 5 Video Link: Earth's Internal Structure - YouTube	
Additional Materials	Video Link: (35) Layers of the Earth based on chemical composition and physical properties - YouTube (35) Geography - Grade 9: Structure of the Earth - YouTube				

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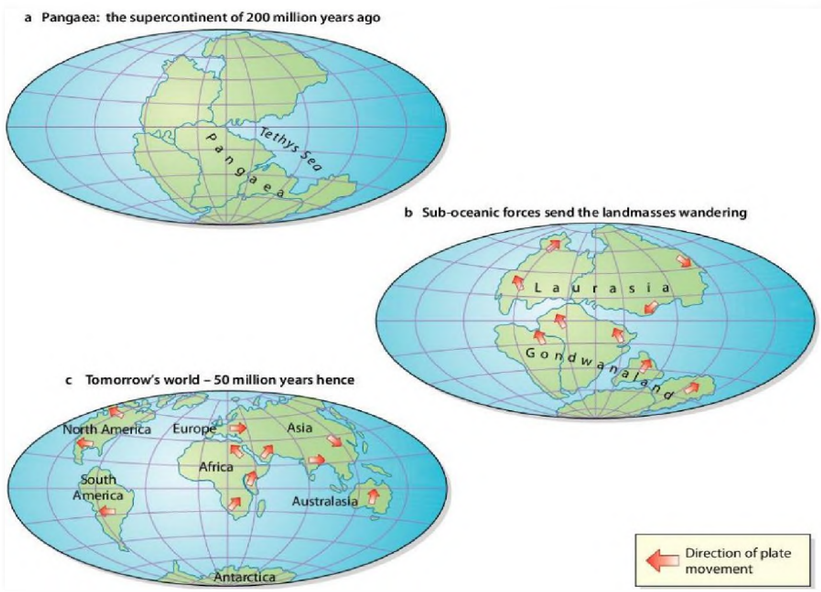
					WEEK 2
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Plate tectonics	Students will: i. Explain the theory of plate tectonics.	**a. History of Theory** In 1912, Alfred Wegener published his theory of continental drift. The theory states that the continents slowly drifted apart from one supercontinent called Pangaea which existed 200 million years ago.  Adapted from Geography: An Integrated Approach (p.12), by D. Waugh, 2009, Nelson Thornes	Creating a picture journal explaining the theory of plate tectonics. The journal should include the following: - Images (drawings or pictures of the continents then and now) - Pictures of animals, plants and rocks that are similar on continents. Debate for or against the theory of plate tectonics proposed by Alfred Wegener.	Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. p.3. Guinness, P. et al. Geography for CSEC, 2nd Edition, United Kingdom, Nelson Thornes, 2016. p. 6	3-2-1 strategy - 3- things you found out on the theory of plate tectonics 2- interesting things about the theory of plate tectonics 1-question you still have about the theory of plate tectonics Make models to show how the continents have changed over time.

		Evidence to support the theory of Continental Drift - Similarity in the structure and composition of rocks and mountain ranges in South America and West Africa. - The fit of the continents (the jigsaw effect) - Identical species of land-based fossils (creatures that could not fly or swim) have been found on continents that are today separated by wide oceans. - The rocks on the ocean floor become steadily older the further they are from the middle of the ocean.			Oral presentation of the model to the class.

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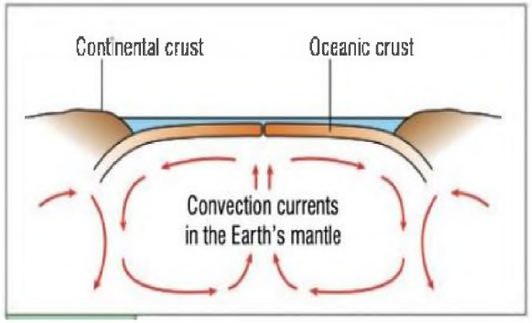
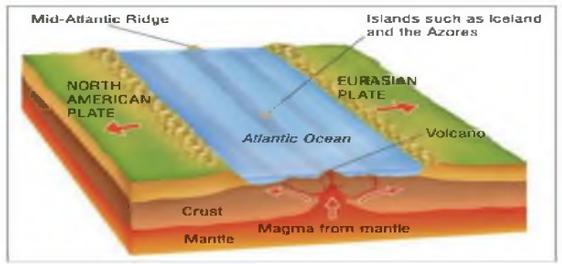
					WEEK 3
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Plate tectonics cont'd	Students will: i. describe the global distribution of plates. ii. explain the movement of plates. iii. examine the types of plate boundaries.	**a. Global distribution of plates** There are seven very large/major plates: i. Pacific ii. North American iii. South American iv. Eurasian v. African vi. Indo-Australian vii. Antarctic And several smaller/minor plates e.g., i. Cocos ii. Nazca iii. Caribbean **b. What causes plates to move?** Plates move because of what happens in the mantle below. The intense heat coming from the earth's core causes the magma in the mantle to move very slowly in giant convection currents.	Inserting tectonic plates on a world map and indicating the direction of its movement. Writing sentences explaining how/why plates move. Drawing and labelling diagrams explaining divergent plate boundaries.	Waugh, D. Geography: An Integrated Approach, Nelson Thornes, 2009. pp. 12-13. Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. p. 3. Guinness, P. et al. Geography for CSEC, 2nd Edition,	Fix a puzzle to show the global distribution of plates. Make a model of divergent plate boundaries. Demonstrate to the class how the plates move and state the resulting features.

		 **Movement of Convection Currents** Adapted from Geography for CSEC (p.3), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae. **Types of plate boundaries** There are three types of plate boundaries: i. Divergent, ii. Convergent (Collision and Subduction), and iii. Transform. i. **A divergent plate boundary (Constructive margin)** – occurs when two plates move away from each other. A new crust is formed at this boundary as magma moves up from the mantle		United Kingdom, Nelson Thornes, 2016. pp. 6 -7	

		below. Features: underwater volcanoes, mid-oceanic ridges, islands, rift valleys.  Adapted from Geography for CSEC (p.4), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae.			

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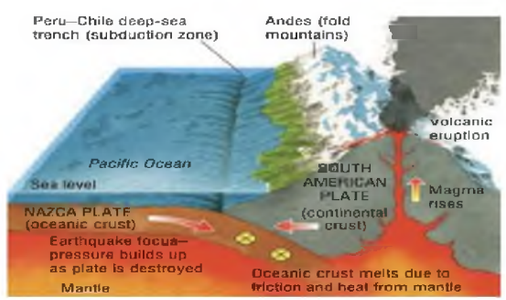
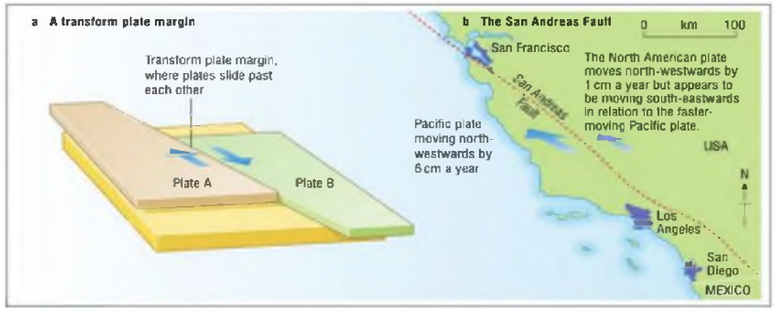
Curriculum Area: Geography **Grade 10**

					WEEK 4
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Plate tectonics cont'd	Students will: i. examine the types of plate boundaries.	**ii. Convergent plate boundary (Destructive margins)** There are three types of Convergent boundaries: 1. Oceanic- Continental (Nazca plate subducting under the South American Plate): When an oceanic plate and a continental plate converge, the denser oceanic plate sinks beneath the continental plate. This results in a subduction zone. Features: Volcanic Island arc, Ocean trenches, Earthquakes and accretionary wedges.  Adapted from Geography for CSEC (p.4), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae. 2. Continental–Continental (e.g. Indian Plate and Eurasian Plate)- when two plates of continental crust converge, they form a	Drawing and labelling diagrams explaining convergent and transform plate boundaries. PowerPoint/ flip chart presentations on convergent and transform plate boundaries	Waugh, D. Geography: An Integrated Approach, Nelson Thornes, 2009. pp. 12-13. Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. p.3. Guinness, P. et al. Geography for CSEC, 2nd Edition,	Create a T-Chart and insert the plate boundaries and the associated features. Make models of convergent and transform plate boundaries. Demonstrate the movements at each margin and state the associated activity at each.

		collision margin. Here, there is no subduction since both are of the same density. Instead, the layers in the seabed between them crumple to form fold mountain ranges. Features: Fold mountains, earthquakes 3. Oceanic-Oceanic (e.g., Pacific and Mariana plates) -where two oceanic plates converge, the older and denser one slides beneath the other. Features: Trenches, earthquakes, island arcs and volcanoes occur at this boundary iii. **Transform plate boundary (conservative margins)** - plates slide past each other at this boundary. Crust is neither created nor destroyed nor is there any volcanic activity.  Adapted from Geography for CSEC (p.5), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae.		United Kingdom, Nelson Thornes, 2016. pp.6 - 7	

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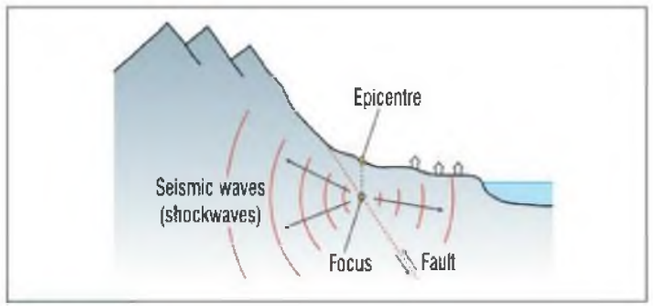
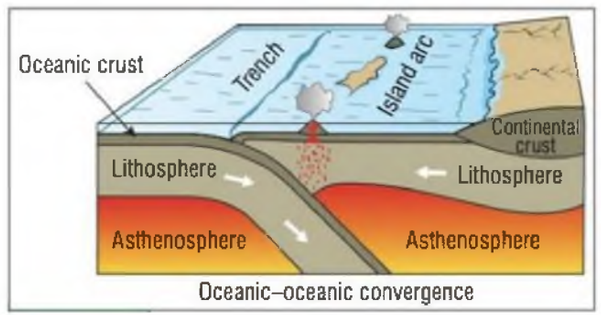
WEEK 5

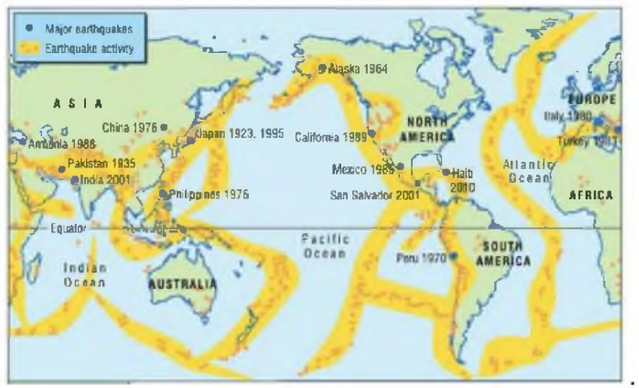
TOPIC/ SUB-TOPIC	GENERAL OBJECTIVE	CONTENT	ACTIVITY	RESOURCE	EVALUATION STRATEGY
Plate tectonics cont'd	Students will: i. describe the consequences of the movement of plates. ii. outline the distribution of earthquakes, island arcs, volcanoes, fold mountains, major faults and ocean trenches.	**Consequences of the movement of plates** i. Earthquakes – Sudden movements of the Earth's crust along fault lines as a result of the release of energy from the focus or hypocentre deep within the earth. The following are features of an earthquake: Focus- the point within the crust where an earthquake originates. Epicentre- the point on the ground surface immediately above the focus or hypocentre. Seismic waves- shockwaves that radiate out from the focus.  Adapted from Geography for CSEC (p.8), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae.	Discussing the consequences of the movement of plates in the Caribbean and around the world Identifying areas on a world map where earthquakes, island arcs, volcanoes, fold mountains, major faults and ocean trenches are found.	Waugh, D. Geography: An Integrated Approach, Nelson Thornes, 2009. pp. 16 -22. Guinness, P. et al. Geography for CSEC, 2nd Edition, United Kingdom, Nelson Thornes, 2016. pp. 14-18. Wilson, M. The Caribbean Environment for	Idea Spinner: The teacher created a spinner marked into 4 quadrants and labelled "Predict, Explain, Summarize, Evaluate. 'Is Guyana likely to experience volcanic activity?' List countries that are likely to experience earthquakes, or have island arcs, volcanoes, fold mountains, major

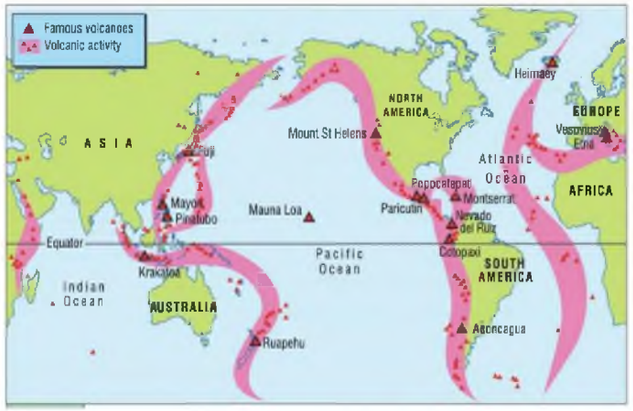
		ii. Volcanoes – are tall conical landforms resulting from the emission of lava, rocks, ash, steam and poisonous gases. The majority of volcanoes are found along plate margins. For example, the ring of fire is where the greatest concentration of volcanoes lies. iii. Island arcs and ocean trenches – these are landforms associated with mid-oceanic convergent plate margins. As one oceanic plate dives beneath another, a deep ocean trench is formed. As the plate subducts, melting occurs forming magma. This rises to the surface to form volcanoes which eventually break the water's surface to form islands. A series of volcanoes along the length of a plate margin creates an island arc.  Adapted from Geography for CSEC (p.10), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae.		CSEC Geography, 5th Edition, Oxford University Press, 2016. pp.10-15.	faults, and ocean trenches around the world.

iv. Major faults-Tectonic **ACTIVITY** can cause extensive fracturing or faulting of the crust. This occurs at transform plate boundaries where opposing forces tear the rocks apart, for example, the San Andreas Fault.

v. Fold Mountains – At convergent and collision margins, ocean sediments and continental crust can buckle and fold as a result of the enormous pressures squeezing the rocks together. Huge fold mountain ranges, like the Andes and Himalayas, can form as these folded rocks are thrust upwards by the converging plates at these plate margins.

Major earthquake zones around the world



		Adapted from Geography for CSEC (p.8), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae.  **Global distribution of volcanoes** Adapted from Geography for CSEC (p.9), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae.				

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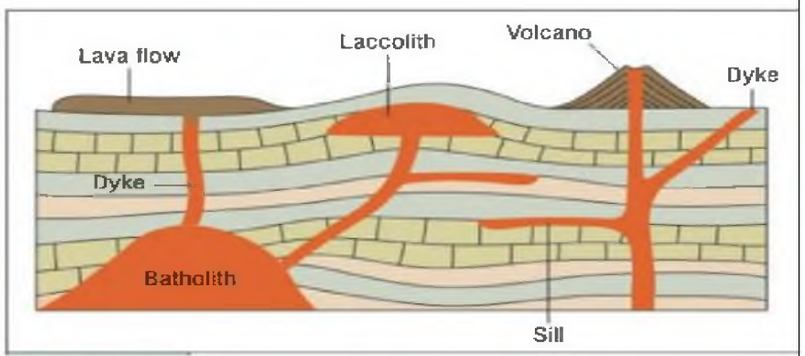
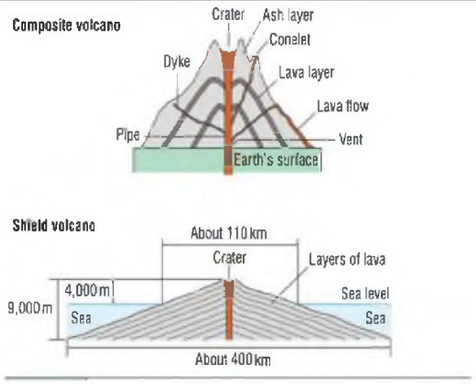
Curriculum Area: Geography **Grade 10**

					WEEK 6
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Intrusive and Extrusive volcanic features	Students will: i. explain the formation of intrusive and extrusive volcanic features.	**Intrusive volcanic features** These are features that are formed as a result of magma cooling and solidifying before it reaches the surface. Some intrusive features are: Dykes, sills, batholiths and plugs.  Adapted from Geography for CSEC (p.12), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae. **Extrusive Volcanic features**	Drawing a map of the world to insert the location of intrusive and extrusive volcanic features. Drawing and labelling diagrams of intrusive and extrusive volcanic features Power point presentations on intrusive and extrusive volcanic features	Waugh, D. Geography: An Integrated Approach, Nelson Thornes, 2009. pp. 16-22. Guinness, P. et al. Geography for CSEC, 2nd Edition, United Kingdom, Nelson Thornes, 2016. pp. 14-18. Wilson, M. The Caribbean Environment for	T-Chart showing the types of features of intrusive and extrusive volcanoes. Make models to illustrate intrusive and extrusive volcanic features. Oral presentations on model to the class. Quick notes: Explain how volcanic features change over time.

		These are features formed when magma pours out onto the surface as lava. **Types of lava** The type of lava usually influences the shape of the external feature. Basic lava is non-viscous and Acidic lava is viscous. **Composite cones and shield volcanoes** **Composite** -Steep conical volcano -Typically formed at destructive plate margins -Acidic magma (lava) -Explosive eruptions **Shield** -Flat and broad volcano -Typically formed at constructive margins -Basic magma (lava) - Gentle eruptions	Read case studies on volcanic ACTIVITY.	CSEC Geography, 5th Edition, Oxford University Press, 2016. pp.10-15.	

		 Adapted from Geography for CSEC (p.13), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae. **Lava plateaus** are formed by numerous successive eruptions of basaltic lava through fissures or cracks on the Earth's surface without erupting explosively. Types of lava plateaus e.g., dome-shape. **Caldera:** a volcanic eruption may be so explosive that the whole top of the volcano sinks into the magma below. A huge crater is left which may be many kilometers in diameter.			

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					WEEK 7
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
The rock cycle. **-Types of rocks**	Students will: i. describe the characteristics and formation of igneous rocks, sedimentary rocks and metamorphic rocks.	**The rock cycle** The rocks on the earth's surface are in a constant state of change due to processes such as weathering, and erosion. The recycling of the earth's rocks is termed the rock cycle. **The three types of rock are:** **Igneous rocks-** rocks such as granite and basalt are formed from the crystallization of magma. They are usually hard and resistant to erosion. **Sedimentary rocks-** are formed by the accumulation of materials derived from the erosion and weathering of pre-existing rocks and from organic sources (sediments). They tend to be weaker than igneous and metamorphic rocks are more easily eroded. **Metamorphic rocks-** these rocks are formed as a result of intense heat, pressure, and/or mineral-rich fluid. They are strong and resistant to erosion, forming mountain ranges in many parts of the world. Examples: slate from clay, quartzite from sand, and marble from limestone.	Virtual tour or slide share to view the types of rocks worldwide. Collecting samples of the various types of rocks in their home/school community. Have an exchange session where students from other locations in Guyana send pictures/videos of samples of rocks in their area.	Bunnett, R. B. Physical Geography in Diagrams, Longman. p. 18. London, N. and Wraith, M. Principles of Geography for CXC, Longman Group, UK. pp.16 – 17 Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 26-27.	Mini exhibition on rocks collected. Oral presentation to the class. Quick write/speak: Name the rock type shown in the pictures [can use actual samples collected] and give evidence to support your response.

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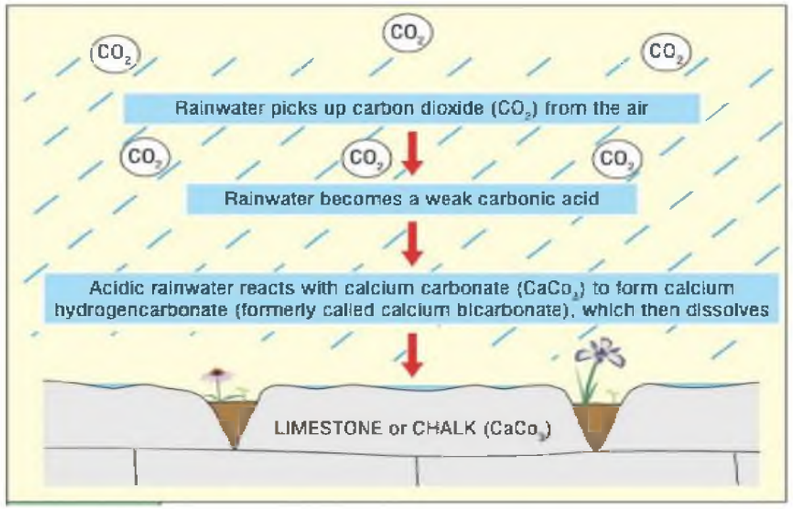
Curriculum Area: Geography **Grade 10**

					WEEK 8
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Weathering **1. Physical** **2. Chemical** **3. Biotic**	Students will: i. define weathering. ii. differentiate between physical, biotic and chemical weathering. iii. describe the physical, biotic and chemical weathering processes.	**Weathering** is the process that causes the breaking down or dissolving (disintegration and decomposition) of rocks and minerals on the earth's surface by the effects of air, water, and biological organisms. No movement is involved in this so the breakdown of the rock is said to be *in situ*- in other words, in the same place. **Physical/ mechanical weathering**- the disintegration of rocks without chemical change. **a. Frost action/Freeze-thaw/Frost shattering** **b. Exfoliation** **c. Pressure release** Rocks expand when heated and contract when cooled. Regular temperature fluctuations will weaken the outer skin, eventually causing it to flake away. **Biological weathering**	Defining the term weathering. Draw a chart naming the types of weathering and differentiating among them. PowerPoint/ slide share/ flipchart/ draw images explaining the processes of the different types of weathering. Drawing and labelling diagrams illustrating the different weathering processes	London, N. and Wraith, M. Principles of Geography for CXC, Longman Group, UK. pp. 25-26. Bunnett, R. B. Physical Geography in Diagrams, Longman. pp. 39-40. Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide,	Take and Pass: Group students to share or collect information from each member of the group on the processes of weathering. Create a flipchart to illustrate the types of weathering and their processes. Multiple choice test on the types of weathering.

		This involves living organisms such as plants and animals. For example, tree roots can prise apart joints in rocks. Animals such as earthworms burrow into the soil and weaken rocks. **Chemical weathering** involves chemical changes taking place within the rock when water reacts with the mineral grains in rocks to form soluble salts and new minerals. **Types of chemical weathering** **a. Carbonation** **b. Oxidation** **c. Solution**  Adapted from Geography for CSEC (p.20), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae.		United Kingdom, Nelson Thorne, 2012. 18-21. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 30-33.	

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					WEEK 9
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Mass Movement/ Wasting **Slow Movement -soil creep -landslides**	Students will: i. define mass movement/ wasting. ii. describe the conditions under which mass movement/ wasting occurs. iii. outline the results of mass movement/ wasting and the conditions under which each occurs.	**Mass movement/wasting** is the continuous downhill movement of soil and rock under the influence of gravity. **Results/types of mass movement** **(1) Soil creep** is the slowest type of mass movement. It is a major type of mass movement that can occur on slopes. **(2) Landslide**- a sudden downslope movement of part of a hillside. Landslides can involve large blocks of rock sliding downhill very rapidly.	Defining mass movement. Group discussions on the conditions under which mass wasting occurs. Power point presentations on the effects of each type of mass wasting on the environment.	London, N. and Wraith, M. Principles of Geography for CXC. Longman Group, UK. pp. 27-28. Bunnett, R. B. Physical Geography in Diagrams, Longman. p. 44. Ross, S. et al. Geography for CSEC, Caribbean Examinations	Fill in your thoughts- Soil Creep is a _____ type of mass movement. Newspaper Headline: Students create a headline that captures the main idea of mass wasting. Create a flip chart to illustrate the types of mass

	iv. evaluate the effects of each type of mass movement/ wasting on the environment. v. illustrate each type of mass movement/ wasting.		Case study on landslides and their effects in a chosen area.	Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 22-23. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 34-35.	movement and their effects.

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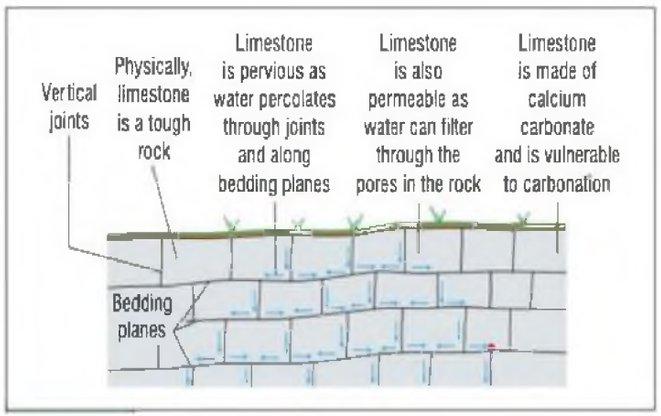
					WEEK 10
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Limestone Environments in the Caribbean **-Characteristics of Limestone in the Caribbean** **- Surface landforms in limestone environments in the Caribbean including Barbados and Jamaica.**	Students will: i. describe the characteristics of limestone in the Caribbean. ii. describe the process of solution and carbonation operating in limestone. iii. identify and describe the surface limestone environment.	Limestone is one of the world's most common types of rock. It is a sedimentary rock that forms in shallow seas under tropical conditions. **Characteristics of Limestone**  Adapted from Geography for CSEC (p.25), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae. **Carbonation-** ***See week 8.***	Viewing videos/illustrations and identifying the process responsible for the formation of various limestone features. T-Chart categorizing limestone features as surface features and underground features Writing summaries explaining the formation of each feature. Drawing and labelling diagrams of surface	Bunnett, R. B. Physical Geography in Diagrams, Longman. pp. 64-65 Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 24-26. Wilson, M. The Caribbean Environment for	Compile a scrapbook of limestone features and the places where these are found in the Caribbean and around the world. Oral Presentation of scrapbook to the class. Quick-write based on landforms in limestone environments in the Caribbean.

	iv. explain how each of these features is formed. v. illustrate the surface features of limestone environments.	**Solution**- Both rainwater and ground water are important in the process of solution. They absorb carbon dioxide and other gases from the air or soil to form a slightly acidic solution. When this acidic solution soaks through the rocks it breaks them up by removing the soluble particles. The solution is a very powerful weathering process in limestone because the calcium carbonate contained in it is converted to calcium hydrogen carbonate by the action of the slightly acidic groundwater or rainwater. **Surface features:** swallow holes, clints and grikes, surface depressions or dolines and cockpits.	features in limestone environments.	CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 36-45.	Make models of surface limestone features. Oral presentations on the models.

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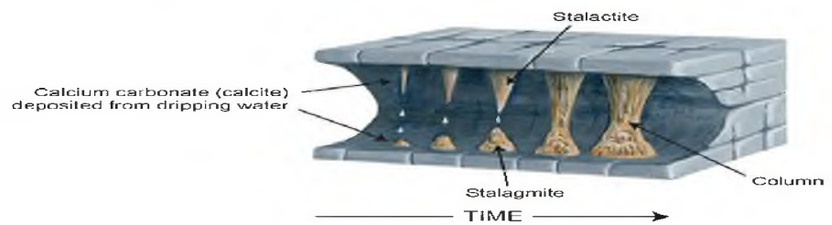
					WEEK 11
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Limestone Environments Cont'd Underground features	Students will: i. identify underground features of the limestone environment ii. explain how each of these features is formed. iii. illustrate underground features of the limestone environment.	**Underground features** Caverns and Caves- as water flows along joints and bedding planes it is often confined into small spaces. This increases water pressure and can enable the water to be a powerful erosive force, carving passages and enlarging them to form underground caverns. Stalactites and Stalagmites- when calcium-rich water drips from the ceiling it leaves behind calcium in the form of stalactites and stalagmites. Stalactites hang from the cave ceiling, while stalagmites extend upwards from the cave floor. Pillars- occur when stalagmites and stalactites join as a result of continuous deposit from the ceiling of the cave to the ground. Development of stalactites and stalagmites in a cave  Underground rivers- may flow through limestone to emerge as resurgences on the ground surface.	Illustrating and labelling underground features. Explaining the formation of each feature. .	Bunnett, R. B. Physical Geography in Diagrams, Longman. pp. 64-66. Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 26-29. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 36-45.	Make models of underground features in a limestone environment. Oral presentations on the models. Multiple choice test on limestone environment in the Caribbean.

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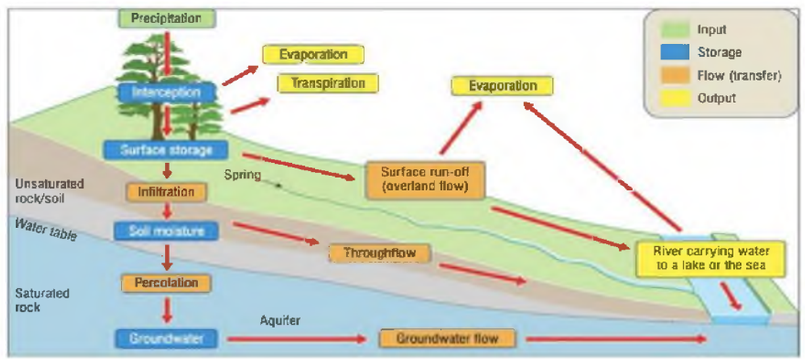
Curriculum Area: Geography **Grade 10**

WEEK 12

TOPIC/ SUB-TOPIC	GENERAL OBJECTIVE	CONTENT	ACTIVITY	RESOURCE	EVALUATION STRATEGY
The Hydrological cycle **The processes of the Hydrological Cycle.**	Students will: i. describe the processes of the hydrological cycle. ii. draw a diagram to illustrate the hydrological cycle. iii. describe the formation of springs, aquifers and the water table.	Water constantly on the move is called the hydrological cycle. The hydrological cycle involves stores (e.g., oceans and ice) and flows (e.g., groundwater flow and rivers). **The processes of the Hydrological cycle:**  Adapted from Geography for CSEC (p.67), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae.	Illustrating and labelling each stage of the water cycle. Describing the formation of springs, aquifers, and the water table.	Bunnett, R. B. Physical Geography in Diagrams, Longman. pp. 41-43. Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 66-64. Wilson, Mark. The Caribbean Environment for	Make models on the processes of the Hydrological Cycle. Oral Presentations on the models. Summary Frames: the formation of springs, aquifers and the water table.

		Features of underground water: i. Water table: describes the boundary between water-saturated ground and unsaturated ground. Below the water table, rocks and soil are full of water. ii. Aquifers: can be described as pockets of water existing below the water table. iii. Springs: Springs are formed where the water table naturally meets the land surface, causing groundwater to flow from the surface and eventually into a stream, river, or lake.		CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 46-47.	

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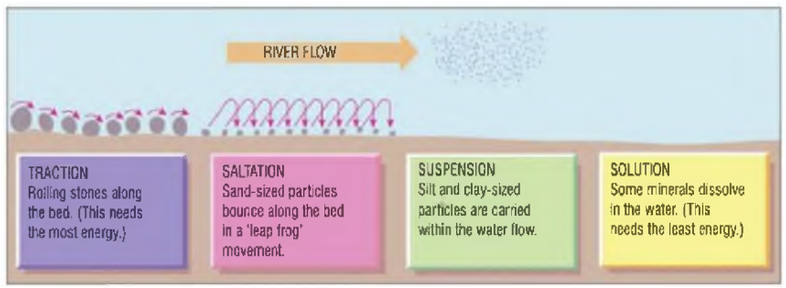
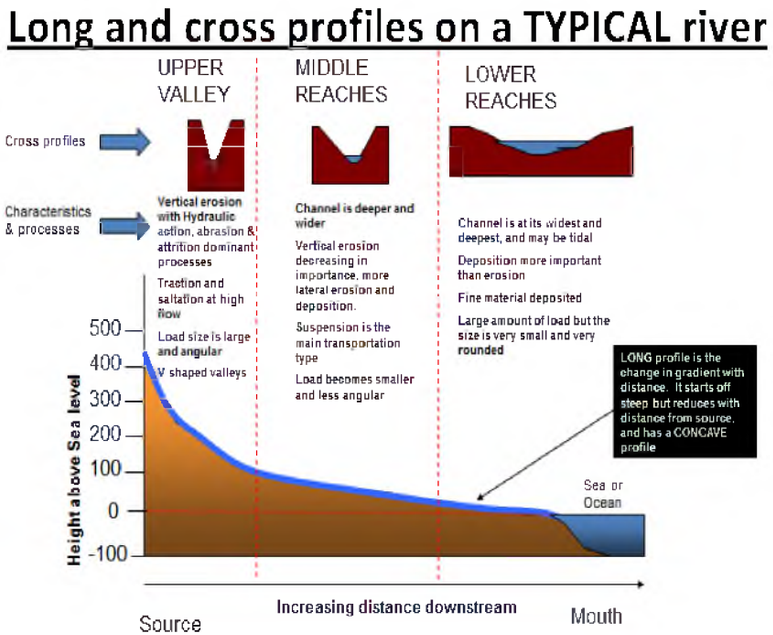
Curriculum Area: Geography **Grade 10**

WEEK 13

TOPIC/ SUB-TOPIC	GENERAL OBJECTIVE	CONTENT	ACTIVITY	RESOURCE	EVALUATION STRATEGY
Fluvial processes -Fluvial Landforms	Students will: i. describe river processes. ii. explain the formation of river landforms.	**Fluvial processes** **Transportation** -There are four processes by which a river's sediment or load can be transported downstream: traction, saltation, suspension, and solution.  Adapted from Geography for CSEC (p.68), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae. ***Erosion***-There are four processes of river erosion: hydraulic action, corrasion, attrition and solution. **Deposition**	Graphic Organizer- identifying and describing processes of river erosion and transportation. Describing the conditions in which deposition takes place. Illustrating and labelling diagrams of river landforms. Comparing the characteristics of the various courses of the river.	Bunnett, R. B. Physical Geography in Diagrams, Longman. pp. 45-58. Ross, S. et al. Geography for CSEC, - Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 68-75. Wilson, M. The Caribbean Environment for	Construct a model of a river valley showing the landforms at each course of the river. Oral Presentation on the model. Create a flipchart illustrating river landforms found in Guyana. Multiple choice test on river processes. Field report on river landforms

		Deposition takes place when velocity decreases and comes about when the gradient of the land over which the river is flowing is decreased. **River Landforms** **River Valleys** Typically, a river valley can be divided into three sections: the upper course, the middle course and the lower course. The diagram below shows the three sections of a river.	Power point presentations of the formation of landforms found at the upper and middle courses of the river.	CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 50-63 Video links: https://www.youtube.com/watch?v=rHwgk3TXz8Y https://www.youtube.com/watch?v=q89SDODBCYI https://www.youtube.com/watch?v=hdDO8aMAmOQ	found in your community/region.


Long and cross profiles on a TYPICAL river
UPPER VALLEY
MIDDLE REACHES
LOWER REACHES
Cross profiles
Characteristics & processes
Vertical erosion with Hydraulic action, abrasion & attrition dominant processes
Traction and saltation at high flow
Load size is large and angular
V shaped valleys
Channel is deeper and wider
Vertical erosion decreasing in importance, more lateral erosion and deposition.
Suspension is the main transportation type
Load becomes smaller and less angular
Channel is at its widest and deepest, and may be tidal
Deposition more important than erosion
Fine material deposited
Large amount of load but the size is very small and very rounded
LONG profile is the change in gradient with distance. It starts off steep but reduces with distance from source, and has a CONCAVE profile
Height above Sea level
500
400
300
200
100
0
-100
Sea or Ocean
Source
Increasing distance downstream
Mouth

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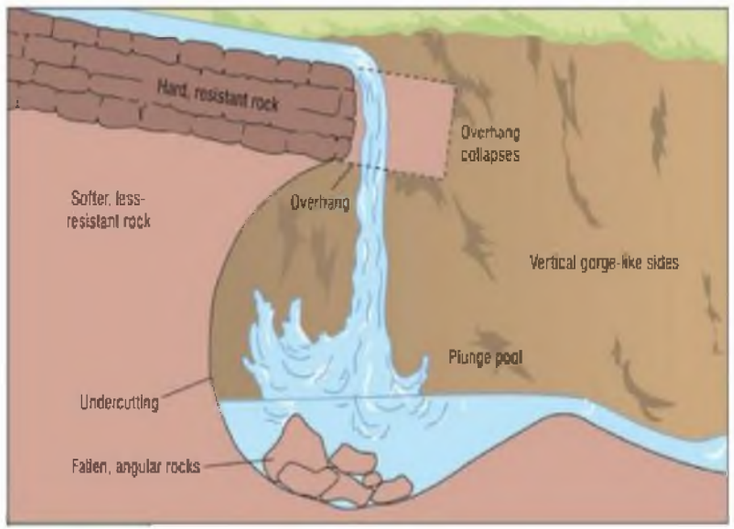
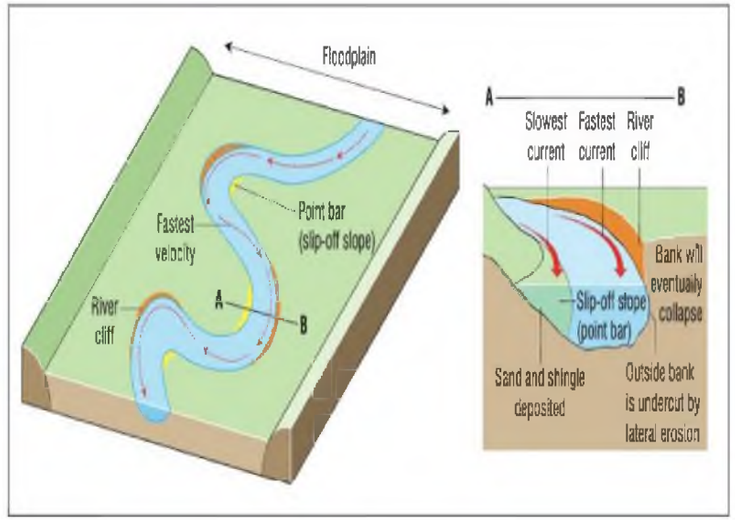
Curriculum Area: Geography **Grade 10**

					WEEK 14
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Fluvial processes -Fluvial Landforms	Students will: i. describe river processes. ii. explain the formation of river landforms.	**Waterfalls and gorges:** a waterfall is a sudden stop in the long profile of a river. It often forms when a river crosses a relatively hard band of rock.  Adapted from Geography for CSEC (p.71), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae.	View videos of river landforms in the upper course of the river in Guyana and other parts of the world. Drawing and labelling diagrams of landforms in the upper course of the river.	Bunnett, R. B. Physical Geography in Diagrams, Longman. pp. 45-58. Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 68-75. Wilson, M. The Caribbean Environment for	Construct a model of a river valley showing the landforms at each course of the river. Oral presentation models. Multiple choice test on the formation of river landforms. Field report on river landforms found in your community/region.

		Meanders: A meander is a bend in a river. A meander is formed because the river flows faster on the outside edge of any small curve and slower along the inside edge.  Adapted from Geography for CSEC (p.72), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae. **Braided Channels:** This occurs when a river divides for various distances into two or more channels. The channels are separated by islands of sediment called bars. Braiding occurs when the river carries a large load or when the volume of the water in the river changes rapidly from season to season.		CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 50-63.	

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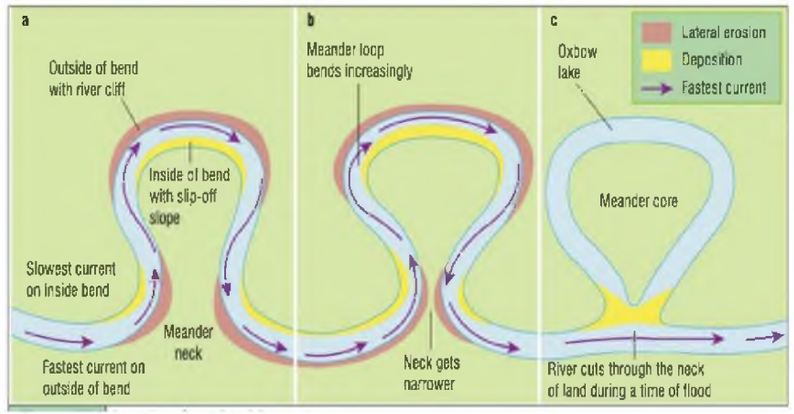
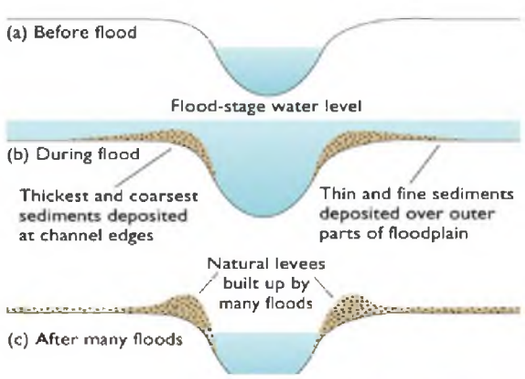
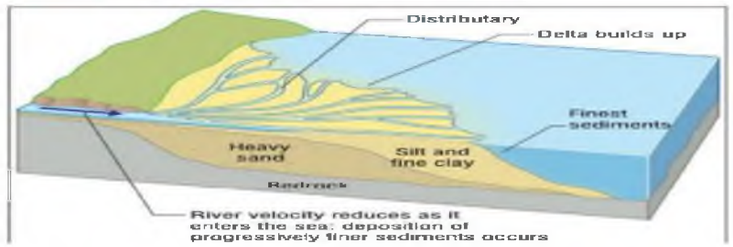
Curriculum Area: Geography **Grade 10**

WEEK 15

TOPIC/ SUB-TOPIC	GENERAL OBJECTIVE	CONTENT	ACTIVITY	RESOURCE	EVALUATION STRATEGY
Fluvial Landforms cont'd	Students will i. explain the formation of river landforms.	**Oxbow lake**s are horseshoe-shaped lakes that are found on river floodplains close to a meandering river.  Adapted from Geography for CSEC (p.73), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae. **Flood Plain:** In the middle and lower courses of a river, alluvium is deposited on the valley floor, mainly where the river floods. The wide flat deposits result form the floodplain of the river.	Powerpoint presentations of the formation of landforms found at the lower course of the river. Drawing and labelling diagrams of landforms in the lower course of the river.	Bunnett, R. B. Physical Geography in Diagrams, Longman. pp. 45-58. Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 68-75.	Construct a model of a river valley showing the landforms at each course of the river. Oral presentation on the models. Field report on river landforms found in your community/region. Create a collage of landforms found at each course of the river.

		Levees: When a river is flooded, it deposits material on its flood plain. The heaviest material is deposited near the river. After successive floods, natural embankments or raised banks called levees are created alongside the river.  **Deltas**: This is an extensive area of sediment formed by deposition at the mouth of a river or where a river flows into a lake.  Adapted from Geography for CSEC (p.75), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae. **Types of deltas: Fan-shaped or Arcuate, Bird's foot and Estuarine**	Gallery Walk- Images of landforms found at each course of the river.	Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 50-63. London, N and Wraith, M. Principles of Geography for CXC. Longman Group, UK. pp. 36-45.	

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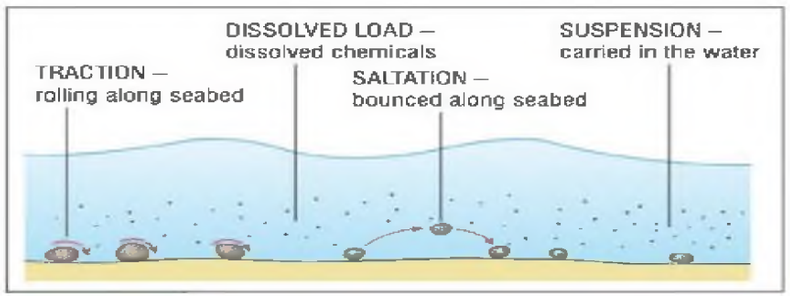
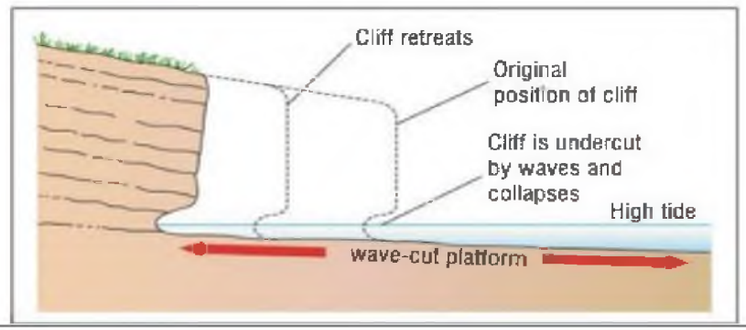
Curriculum Area: Geography **Grade 10**

					WEEK 16
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
The Coastal System **- Coastal Landforms**	Students will: i. describe wave processes. ii. explain the formation of coastal landforms.	**Coastal system –wave processes** **Erosion** - is the process whereby rocks are broken down by natural forces such as water and glaciers, resulting in sediments which are transported by rivers. **Erosion**: there are four processes of coastal erosion: hydraulic action, corrasion or abrasion, solution and attrition. **Transportation** The movement of sediments and other materials by suspension, solution, traction and saltation.  Adapted from Geography for CSEC (p.79), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae.	Drawing diagrams and labelling to show areas where hydraulic action, corrasion, solution and attrition might take place along the coast. Matching processes of transportation with the movement of sediments on the seabed. Creating a collage describing the process of longshore drift. Viewing videos on the formation of wave-cut landforms	Bunnett, R. B. Physical Geography in Diagrams, Longman. pp. 74-83. Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 76-85. Wilson, M. The Caribbean Environment for CSEC Geography, 5th	3 2 1 Strategy- 3 - describe 3 wave processes. 2- identify landforms formed as a result of wave processes. 1- question you still have about wave processes/ landforms. Answer objective-type questions on wave processes and coastal landforms.

		Deposition is the process in which sediments are carried from one location to another usually by wind and flowing water. Deposition occurs when waves and other ocean motions decrease in velocity. The smallest particles, such as silt and clay, are deposited away from the shore. **Erosional Landforms** **Cliffs and wave-cut platforms** ***A cliff*** is defined as a steep rock face. Where marine erosion is powerful, the coastline is eroded to form a cliff. ***A wave-cut platform*** is formed through a continual sequence of a wave-cut notch formation and cliff collapse, and the cliff line gradually retreats. In its place is a gently sloping rocky platform called a wave-cut platform. **Formation of cliffs and wave-cut platforms**  	Drawing and labelling diagrams of coastal erosion. Oral presentation on the formation of each feature.	Edition, Oxford University Press, 2016. pp. 70-80. London, N and Wraith, M. Principles of Geography for CXC. Longman Group, UK. pp. 47-54.	

		Adapted from Geography for CSEC (p.80), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae. **Headlands and Bays** **Headlands –** a section of rocky coastline that protrudes into the sea. **Bays-** a pronounced indentation in the coastline usually found between two headlands.			
SBA Guidelines	Students will select a **TOPIC/ SUB-TOPIC** for their SBA and write at least one aim of the study. The Aim of the Study must be clearly defined and focus on what the study intends to achieve. It should be stated as a direct or implicit question based on the syllabus and allow for the collection of primary data.				

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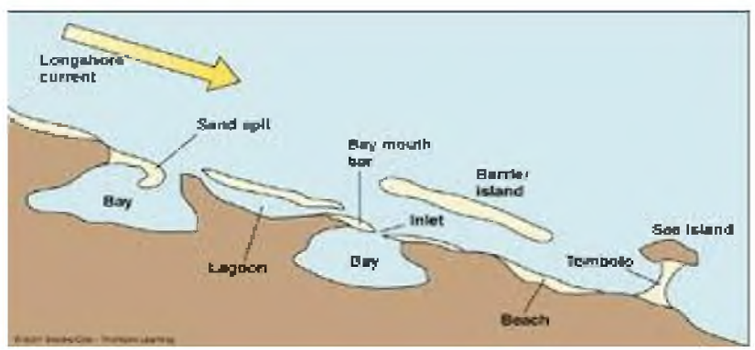
Curriculum Area: Geography **Grade 10**

					WEEK 17
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Coastal Landforms cont'd	Students will: i. explain the formation of coastal landforms.	**Caves, arches, and stacks** **Caves**: the processes of erosion are particularly active along lines of weakness in a headland such as a joint or fault. The energy of the waves is concentrated on these weaker points gouging out the rock to form a sea cave. **Arches:** If a cave is formed in an exposed headland, it enlarges until it runs right through this headland. The resulting feature is called an **arch.** **Stack:** Over time, erosion may act upon the arch, widening it until the roof collapses. The piece of rock which is left stranded away from the headland is called a **stack**. **Landforms of coastal deposition** **Beach:** A beach is a deposit of sand and or pebbles found on the coast. **Spit:** a narrow finger of sand or pebbles that juts out into the sea from land. It is formed when sediments transported along the coast by longshore drift are deposited at a bend in the coastline.	Viewing videos on the formation of coastal landforms. Drawing and labelling diagrams of landforms of coastal erosion. Oral presentation on the formation of each feature. Gallery Walk: coastal landforms formed by erosion and deposition.	Bunnett, R. B. Physical Geography in Diagrams, Longman. pp. 74-83. Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 76-85. Wilson, M. The Caribbean Environment for	Make models to illustrate coastal landforms. Oral Presentations on the models. Think-Pair-Share: Students respond to questions on coastal landforms. T-Chart on landforms and a description of how they are formed.

		Tombolo: occasionally a spit grows away from the shore and becomes attached to an island. **Bay-bar**: a long narrow deposit of sand or shingle that usually forms parallel to the coast. **Formation of spits, bay-bar, and tombolo**  		CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 70-80. London, N and Wraith, M. Principles of Geography for CXC, Longman Group, UK. pp. 47-54.	
SBA Guidelines	Formulating the aim(s) of the study. Behavioural terms such as describe, explain, and discuss must be used.				

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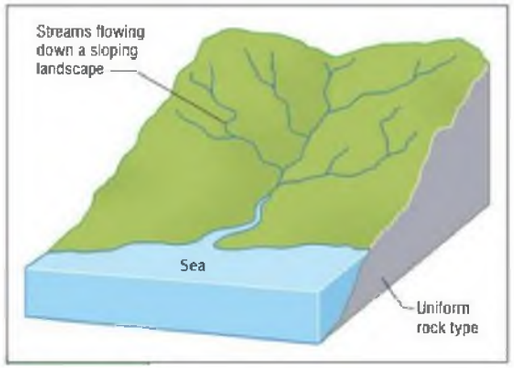
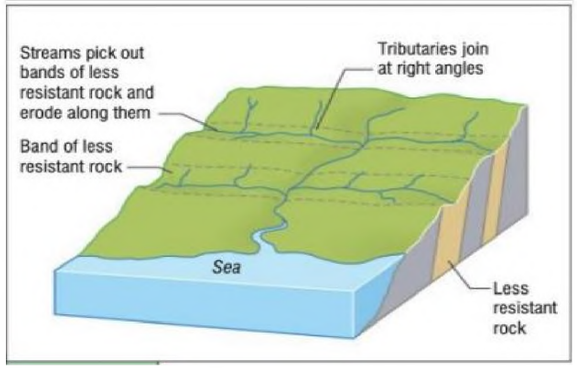
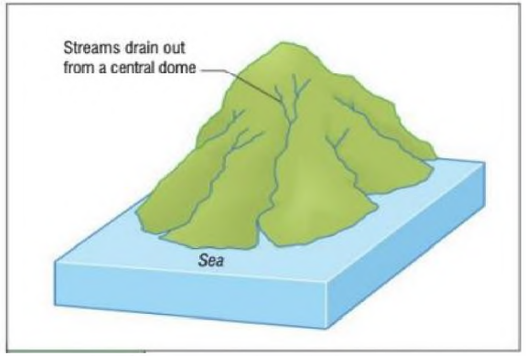
Curriculum Area: Geography **Grade 10**

WEEK 18

TOPIC/ SUB-TOPIC	GENERAL OBJECTIVE	CONTENT	ACTIVITY	RESOURCE	EVALUATION STRATEGY
Drainage Patterns	Students will: i. describe and illustrate drainage patterns. ii. explain the factors that contribute to their development	**Dendritic** drainage forms a tree-like drainage pattern that develops in gently sloping river basins with a uniform rock type.  Adapted from Geography for CSEC (p.86), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae. **Trellised** drainage resembles a rectangular grid with tributaries joining at right angles. This type of drainage pattern develops in areas with bands of alternating weak and resistant rocks.	Identifying/Classifying drainage patterns on topographic maps. Drawing diagrams of each type of drainage pattern. Writing sentences describing each drainage pattern.	Bunnett, R. B. Physical Geography in Diagrams, Longman. p. 59. Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 86-87. Wilson, M. The Caribbean Environment for	Use topographical maps to identify the various types of drainage patterns. Answer objective-type questions on the types of drainage patterns and how they develop. Summary Frames A _____ drainage pattern has a uniform rock structure. The Spokes of the bicycle wheel is

		 Adapted from Geography for CSEC (p.87), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae. **Radial** drainage commonly occurs when rivers flow downhill from a central dome or mountain.  Adapted from Geography for CSEC (p.87), by S. Ross, et al. 2012, Nelson Thornes. Copyright 2017 by Simon Ross, Alison Rae.		CSEC Geography, 5th Edition, Oxford University Press, 2016. p. 48. London, N and Wraith, M. Principles of Geography for CXC, Longman Group, UK. p. 46.	used to describe the _____ drainage pattern. The tree-like drainage pattern is called_____.
SBA Guidelines	Formulating the aim(s) of the study. Behavioural terms such as describe, explain and discuss must be used.				

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Curriculum Area: Geography **Grade 10**

					WEEK 19
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Coral Reefs **Types of Coral Reefs**	Students will: i. identify the types of coral reefs. ii. describe the conditions necessary for the successful formation of coral reefs in the Caribbean. iii. explain the importance of coral reefs to the Caribbean.	A **coral reef** is a hard, rocky ridge built up from the seabed by many tiny coral animals. It is one of the richest ecosystems on earth. **Types of Coral reefs:** **Fringing** coral reef grows seaward directly from the shore. They form borders along the shoreline and surrounding islands. **Atoll** coral reefs are usually circular or oval, with an open lagoon in the centre. **Barrier** coral reefs are similar to fringing reefs in that they also border a shoreline; however, instead of growing directly out from the shore, they are separated from land by an expanse of water. This creates a lagoon of open, often deep water between the reef and the shore. **Conditions necessary for the formation of coral reefs** 1. Temperature – corals only live in warm water that has an average temperature of 18 degrees Celsius. 2. Salinity- requires a certain balance in the ratio of salt to water. 3. Light–--corals thrive in shallow water conditions because the algae on which they feed require light to photosynthesize. 4. Clear well-aerated water.	Viewing pictures of the types of coral reefs. Reading notes on the conditions necessary for the successful formation of coral reefs. Using a world map to locate areas where coral reefs are likely found. Reading Case studies to discuss the importance and benefits of coral reefs. Viewing videos on coral reefs in the Caribbean.	Bunnett, R. B. Physical Geography in Diagrams, Longman. pp. 86-88. Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 88-91. Wilson, M. The Caribbean Environment for CSEC Geography, 5th	A case study report on a coral reef found in a named Caribbean country. Create a scrapbook on the types of coral reefs and their importance in a named Caribbean country.

		5. Presence of beneficial algae and fish- corals enjoy a symbiotic relationship with algae (zooxanthellae) and fish. Algae provides energy for the formation of corals. **Coral reefs are extremely important ecosystems providing a range of benefits.** 1. Coastal protection- acts as buffer zones, providing vital shoreline protection from storms and tsunamis. This reduces coastal erosion and the risk of flooding. 2. Beach development- the erosion of coral reefs creates the white sand that typically forms the beaches of the tropical coastlines. 3. Ecological benefits- they provide a home to over 25% of all known marine fish. 4. Socio-economic benefits- coral reefs are extremely important fishing grounds providing some 25% of developing countries' total fish catch. Additionally, they are popular tourist destinations providing a huge source of income and employment for thousands of people.		Edition, Oxford University Press, 2016. p. 48. London, N and Wraith, M. Principles of Geography for CXC, Longman Group, UK. pp. 81-85. Video link: https://www.youtube.com/watch?v=clC_joDCzu8	PowerPoint presentation on coral reefs found in the Caribbean, conditions necessary for coral reef formation and its importance.
SBA Guidelines	Formulating the aim(s) of the study. Behavioural terms such as describe, explain and discuss must be used.				

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Curriculum Area: Geography **Grade 10**

					WEEK 20
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Mangroves	Students will: i. describe the characteristics of the types of mangroves. ii. discuss the conditions under which mangroves thrive. iii. explain the importance of mangrove wetlands in the Caribbean.	Mangrove wetlands (also called mangrove forests) can be found in tropical and subtropical regions all over the world, including the Caribbean. Mangrove trees grow in coastal areas with low-oxygen soils where water flows slowly. Unlike most plants, they can thrive in brackish water, where freshwater and saltwater mix. **Importance of mangrove wetlands** 1. **Coastal protection** **Stabilize the coast:** The above-ground roots help to slow the flow of water, causing the deposition of sediment which would otherwise be carried into the sea. Their roots help bind the soil, preventing erosion. **Protect the coastline:** Mangrove forests help protect the coastline from wave erosion, storm surge, and hurricanes. **2. Ecological importance*:*** **Remove excess nutrients and pollutants:** Mangroves remove phosphates, nitrates, and other excess nutrients from the water before it enters the sea. They also can remove pollutants such as various heavy metals from the water. **Serve as a habitat:** The roots of the mangrove forests provide a home for many aquatic animals including fish, shrimp, crabs, and clams.	Group discussions on mangroves in Guyana. Asking and answering questions on mangroves. Watching videos on mangroves in Guyana.	Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 92-95. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. p. 86.	Conduct a field trip to a Mangrove Wetland. Have students complete a written report on their visit. The report should include (but is not limited to): Pictures on the types of mangroves, and the importance of mangroves to the community.

		3. Socio-economic benefits: **Provide RESOURCEs for people:** Mangrove wetlands provide many **RESOURCE**s. They are rich fishing grounds where shrimp, clams, crabs, fish, and other seafood can be caught. Also, many commercial species of fish, such as the rainbow parrotfish and goliath grouper, use the mangroves as nurseries. Thus, mangroves help support fisheries in places that are quite far away from them. The wood from the trees can be used for charcoal and as a building material. The bark contains tannins which can be used for tanning leather. Various parts of the trees, such as the leaves, roots, and bark can be used for medicinal purposes.		London, N and Wraith, M. Principles of Geography for CXC, Longman Group, UK. p. 101.	Create a poem/song on the importance of the mangrove wetlands to the environment and the conditions under which they thrive.
SBA Guidelines	**Location of the study**: Have students trace or draw a Map of Guyana showing the location of the study area.				

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Curriculum Area: Geography

Grade 10

					WEEK 21
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Weather and Climate **Factors affecting weather and climate.**	Students will: i. differentiate between weather and climate. ii. explain the factors that influence weather and climate.	**Weather and Climate** Weather refers to the atmospheric conditions over a short period. For example, hours, days, or weeks. Climate refers to the average or the highest and lowest rates of temperature, rainfall, humidity, wind, cloud cover, and air pressure over a long term. For example, a period of at least 30 years. **Factors influencing weather and climate.** - Latitude (Distance from the equator) - Altitude and relief (Height of the land) - Distance from the sea (Continentality) - Winds (Land and sea breeze and prevailing winds) - Ocean currents - Vegetation cover (evapo-transpiration)	Using compare cards to differentiate between weather and climate. Creating a T-chart to differentiate between weather and climate. Group discussions on factors affecting weather and climate. Using pictures or drawing diagrams explaining how latitude, altitude etc. influence weather and climate in a specific area.	Bunnett, R. B. Physical Geography in Diagrams, Longman. pp. 120-122. Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 88-91. Wilson, M. The Caribbean Environment for	Make models of weather instruments. Oral Presentations of the models Field trip to a weather station. A written report on the visit.

				CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 94-101. London, N. and Wraith, M. Principles of Geography for CXC, Longman Group, UK. pp. 64-70	
SBA Guidelines	**Location Map Cont'd:** the study area in relation to one or two major reference points (for example, the main town etc.) on their map of Guyana, the Atlantic Ocean and our continental neighbours, the three (3) main rivers, the 10 administrative Regions, the Capital City and all other towns, the main roads, and the study area.				

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Curriculum Area: Geography **Grade 10**

					WEEK 22
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
The Equatorial Climate **Tropical Marine Climate**	Students will: i. describe the characteristics of Equatorial and Tropical Marine Climates.	**Characteristics of Equatorial Climates** ***Temperature:*** The monthly average temperature is approximately 26 to 28 degrees Celsius. The yearly temperature range (the difference between the average temperature of the hottest and coldest months) is very small. The range of annual temperature may be as low as 3 degrees Celsius. The diurnal or daily temperature range (the difference between the maximum temperature in the day and the minimum temperature at night) is usually greater. ***Precipitation:*** These areas typically receive 2000 mm or more of precipitation per year. The majority of the year sees a lot of rain. The ITCZ has an impact on many tropical locations. Heavy rain and thunderstorms are brought to these locations by the ITCZ. ***Humidity*** is often fairly high all year long. **Characteristics of Tropical Marine Climates** ***Temperature:*** As the name implies, the sea has a strong influence on places which experience this type of climate. Regions which	Drawing a sketch map to show areas where equatorial and tropical marine climate occurs. Using an outline map of the world to highlight areas where equatorial and tropical marine climates occur. Writing summaries describing the characteristics of each climate. Interpreting climographs of the equatorial and tropical marine climate	Bunnett, R. B. Physical Geography in Diagrams, Longman. pp. 149, 151. Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 36-37. Wilson, M. The Caribbean Environment for	Objective-type questions on the characteristics of Equatorial and Tropical Marine Climate. T-Chart showing characteristics of Equatorial and Tropical Marine Climate. Write a weather report on the atmospheric condition of Equatorial and Tropical Marine

		experience a tropical marine climate have high temperatures all year round. The annual temperature range is often quite small. However, it can be up to 10 degrees Celsius in areas farther away from the equator. Temperatures are higher during the wetter season and lower during the drier season. ***Precipitation:*** Regions which have a tropical marine climate experience between 1200 mm and 2000 mm of rain yearly. Rainfall is seasonal to a certain extent. There are wet and dry seasons and there is more rainfall during the wet season and less rainfall during the dry season. The amount of rainfall is influenced by the Northeast Trade Winds which pick up much moisture over the Atlantic and often cause relief rainfall as they rise over mountainous areas in the region, Tropical/ Easterly waves and Hurricanes.		CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 114-115. London, N and Wraith, M. Principles of Geography for CXC, Longman Group, UK. pp. 82-85.	Climate over the last five (5) years.
SBA Guidelines	**Location Map Cont'd:** Students will choose or create appropriate symbols for the attributes inserted on the map to complete the legend/key on their location map of the study area.				

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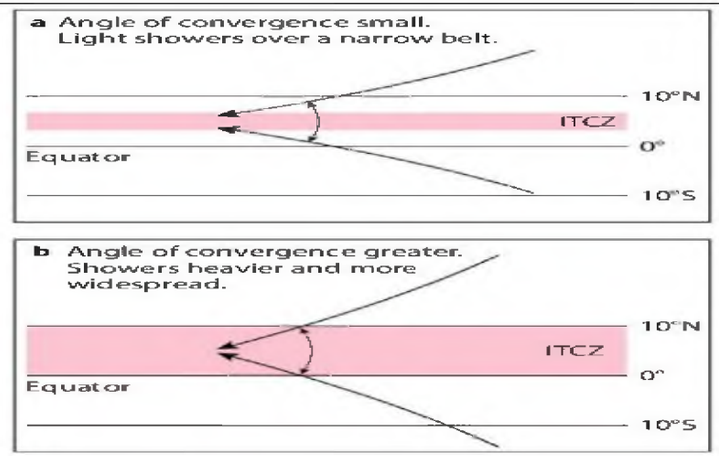
Curriculum Area: Geography

Grade 10

					WEEK 23
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Caribbean weather systems **Intertropical Convergence Zone (ITCZ)**	Students will: i. describe the formation of common weather systems in the Caribbean.	**The Inter Tropical Convergence Zone (ITCZ)** The name intertropical Convergence Zone (ITCZ) is given to the zone of low pressure which occurs roughly at the Equator. The Northeast Trade Winds and the Southeast Trade Winds blow from the subtropical high-pressure belts and converge there. When these two air masses come into contact, they force each other to rise. On rising the air is cooled, thus creating conditions favorable to rainfall. The conditions which occur at the ITCZ depend to a great extent upon the angle at which the two trade wind systems converge. If the angle is small, then only a limited amount of air rising takes place, and the weather is likely fine. But if the angle is large a great deal of air rising occurs. This results in the formation of a dense layer of cloud and rainfall is likely to be heavy and prolonged.	In pairs have students formulate a definition for weather systems. Reviewing weather reports on weather systems affecting the Caribbean. Viewing videos or reading notes on formation of each weather system in the Caribbean. Creating a weather forecast/ report of the conditions associated	Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 38-45. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 102-113.	Creating a timeline of the movement of the ITCZ and its associated weather conditions in the Caribbean. 321- 3- things you found out about the ITCZ. 2- effects of the ITCZ in a named Caribbean country. 1-question you have about the ITCZ.

		 The ITCZ is not stationary but moves slowly northwards and southwards. It follows a lag of 1-2 months for the passage of the overhead sun. The sun is at its furthest position south on December 22. At this time, the ITCZ is moving southwards across coastal Guyana. In the Caribbean region, the ITCZ reaches its most southerly position in February, when it is located over southern Guyana (2 degrees south). It then starts to move back northwards again. The sun is at its furthest position north on June 21st. The ITCZ reaches its most northern position in about August when it is centred around latitudes 10 degrees north to 12 degrees north.	with each weather system. Drawing diagrams or using pictures to show the symbols used to represent each weather system. PowerPoint presentation on the formation of the ITCZ and the effects it has on the Caribbean.	London, N. and Wraith, M. Principles of Geography for CXC, Longman Group, UK. pp. 73-77.	
SBA Guidelines	**Location Map Cont'd** – Students will insert the elements of the map: Title e.g., **GUYANA: Study Area, Charity, Essequibo Coast**; Border, Scale (from the map that was traced); Legend/key, North Arrow **Note: The map selected MUST have a SCALE**				

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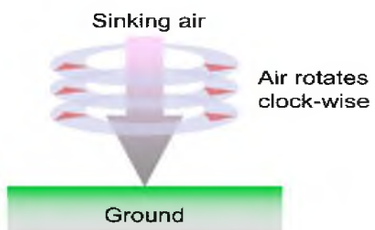
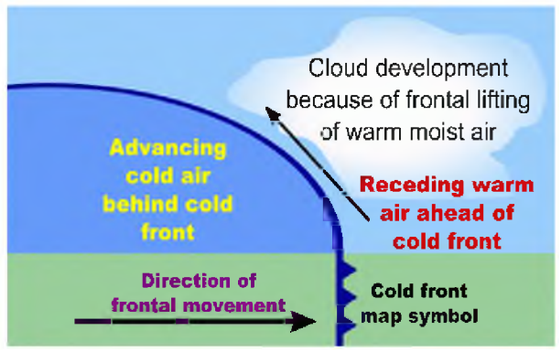
Curriculum Area: Geography **Grade 10**

					WEEK 24
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Caribbean weather systems **- Anticyclones** **- Cold fronts**	Students will: i. describe the formation of common weather systems in the Caribbean.	**Anticyclones** An anticyclone is an area of relatively high atmospheric pressure that causes settled weather conditions. The weather associated with anticyclones is often sunny and there will be little rainfall. The highest pressure is found in the middle of the anticyclone and lowest at the edges. Winds move around the anticyclone in a clockwise direction in the northern hemisphere.  **Cold fronts** A cold front is the boundary zone between an advancing wedge of cold air which is undercutting warmer air and forcing it to rise. Occasionally in the winter, cold air sweeps across parts of the northern Caribbean from North America.	Using annotated diagrams to describe the formation of anticyclones and cold fronts. Drawing the weather symbol used to represent anticyclones and cold fronts.	Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 38-45. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 102-113.	Answer objective-type questions on Cold fronts and Anticyclones. Write poems describing the weather conditions associated with anticyclones and cold fronts. Create a PowerPoint presentation on the formation of Cold fronts and Anticyclones and

		 Adapted from Weather Fronts: Science Town (p.1), by Lilholt,n.d, Word Press. Several features are usually associated with cold fronts in the Caribbean region. 1. The temperature may drop several degrees as the front passes. 2. As the front passes the wind usually changes direction and tends to become stronger. 3. There is an increase in the number of clouds with the development of cumulonimbus clouds. 4. Rainfall in the form of heavy showers along the line of the front and on either side of it.		London, N. and Wraith, M. Principles of Geography for CXC, Longman Group, UK. pp. 73-77.	the effects it has on the Caribbean.
SBA Guidelines	**Methodology:** Students will formulate appropriate data-collecting instruments e.g., questionnaires, interview sheets, observation sheets, checklists, etc.,				

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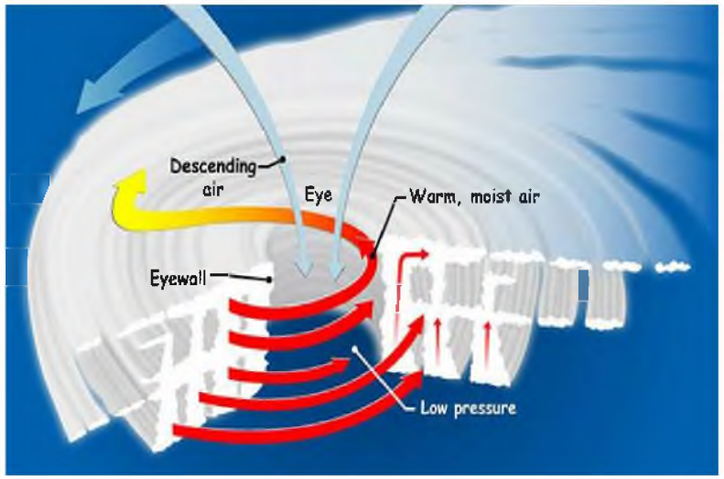
Curriculum Area: Geography **Grade 10**

					WEEK 25
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Caribbean weather systems Cont'd **- Tropical waves** **- Hurricanes**	Students will: i. describe the formation of common weather systems in the Caribbean. ii. discuss the role of the Civil Defense Commission (CDC) in disaster management in Guyana.	**Tropical waves/ Tropical Waves** are belts of relatively low pressure that travel across the Atlantic Ocean along the edge of the ITCZ at about 20 – 30 km per hour. They bring periods of unsettled weather with heavy rain, most commonly between May and November. **Hurricanes** A **hurricane** is a massive and very powerful tropical storm that can cause widespread destruction and loss of life. The Caribbean is often affected by hurricanes that form over the Atlantic Ocean off the West Coast of Africa and then move westwards. They usually occur between July and November. The official hurricane season is from June to November. **Weather conditions of hurricanes** Hurricanes tend to form under the following conditions: - over warm water (over 26 degrees Celsius) thus they occur in the tropics. - When sea temperatures are at their highest	Map Work- tracking the movement of tropical waves. Illustrating the structure of tropical waves. Predicting Hurricane Risk: -which period sees the most activity? - which areas are most at risk? Describing the trend of hurricane events during a typical storm season.	Ross, S. et al. Geography for CSEC, - Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 38-45. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 102-113.	Discuss the impact of Hurricane Ivan on Grenada in 2004 under the following: -physical -economic -social Paper and pencil test on Tropical waves and Hurricanes in the Caribbean.

		- At latitudes greater than 5 degrees North or South. Closer to the Equator the air is calm in the doldrums and there is not enough spin resulting from the rotation of the Earth. - In tropical regions of severe air instability (ITCZ), air is converging on the surface and rising rapidly. **Structure of a hurricane**  Adapted from Geo for CXC, n.d, Word Press.	Hosting a resource person from the CDC to have an interactive session with students on disaster preparedness and management.	London, N. and Wraith, M. Principles of Geography for CXC, Longman Group, UK. pp. 73-77.	Create a documentary on the role of the CDC and other organizations during a crisis.
SBA Guidelines	**Methodology**: Students will formulate appropriate data- collecting instruments e.g., questionnaires, interview sheets, observation sheets, checklists etc.,				

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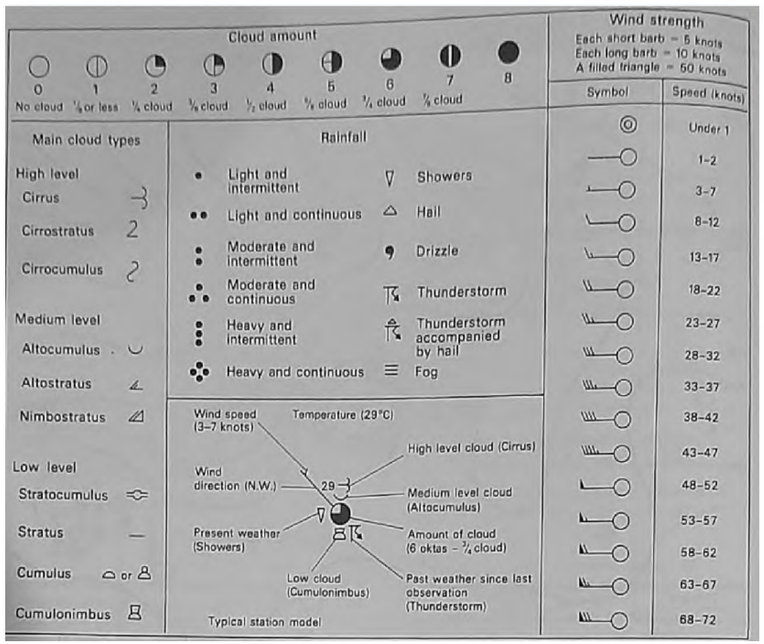
Curriculum Area: Geography **Grade 10**

					WEEK 26
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Weather Systems	Students will: i. illustrate weather systems, using isobars and relevant symbols.	 Adapted from Principles of Geography (p.), by N. London & M, Wraith, 1992, Longman Group. Copyright 1992 by Norrel A. London, Michael Wraith	Using pictures to identify the symbols used on weather maps. Drawing station models to illustrate weather patterns. Interpreting station models on weather maps Creating weather stations in various places in the Caribbean.	Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. p. 111. London, N. and Wraith, M. Principles of Geography for CXC, Longman Group, UK. pp. 72-73	Completing short answer exercises based on the topics and sub-topics of weather symbols. Multiple choice test/ Matching on the weather symbols.
SBA Guidelines	**Methodology**: Students will formulate appropriate data- collecting instruments e.g., questionnaires, interview sheets, observation sheets, checklists, etc.,				

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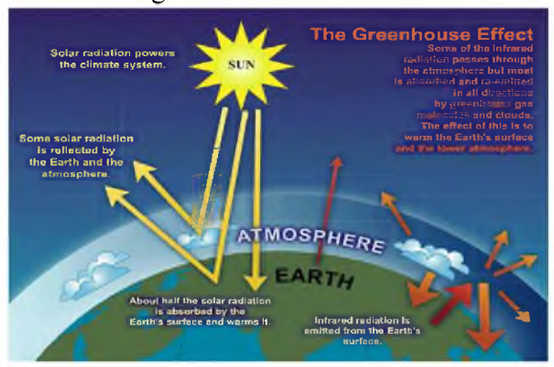
Curriculum Area: Geography **Grade 10**

					WEEK 27
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Global Warming	Students will: i. describe the "greenhouse effect". ii. examine how human activities contribute to global warming.	**Insolation:** The amount of solar energy received by the Earth is called insolation. The Sun's energy reaches the Earth as short waves. **Terrestrial Radiation:** The heat radiated by the Earth in the form of long waves is called terrestrial radiation. Terrestrial radiation is radiated in the form of long waves. **The Greenhouse Effect:** the process by which the sun's heat (radiation) is absorbed by the greenhouse gases and not reflected into space. The Earth has a natural greenhouse effect due to trace amounts of water vapour (H_2O), carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) in the atmosphere. This process makes Earth much warmer than it would be without an atmosphere. The greenhouse effect is one of the things that make Earth a comfortable place to live. 	Writing essays on ways human activities contribute to global warming. Reviewing case studies on the effects of global warming. Viewing videos on the effects of global warming.	Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 46-53. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 116-133.	Create a poster to show how human activities contribute to global warming. Oral Presentations. Create a video documentary on the effects of global warming.

		Adapted from Greenhouse Gases and Global Warming (p.1), by Ballotpedia, n.d, Word Press. **Human activities that contribute to global warming** ***Deforestation:*** The removal of trees also contributes to global warming. Trees and other plants absorb carbon dioxide and use it during photosynthesis. Therefore, our forests play a major role in using up the carbon dioxide in the atmosphere. **Agricultural activities**: Methane is released into the atmosphere because of agricultural activities such as the rearing of livestock and the production and processing of natural gas. Organic matter rotting in dump sites and elsewhere also releases methane. **Use of Fossil Fuels:** Carbon dioxide has increased from fossil fuel use. Burning of fossil fuels causes the release of large amounts of carbon dioxide into the air.		Video link: https://www.youtube.com/watch?v=VMG4aedbbJ8	
SBA Guidelines	**Methodology**: Students will formulate appropriate data- collecting instruments e.g., questionnaires, interview sheets, observation sheets, checklists, etc.				

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Curriculum Area: Geography **Grade 10**

					WEEK 28
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Consequences of Climate Change	Students will: i. compare the consequences of climate change in the Caribbean with either the United States of America (USA) OR the UK. ii. compare the measures taken to reduce the effects of climate change in the Caribbean and the USA OR the UK.	Consequences of Climate Change - Rising sea level (Due to melting of polar ice caps and resulting in increased incidence of coastal flooding; impacts on coral reefs, coastal wetlands and settlements, etc.) - More frequent and extreme weather events (hurricanes, heat waves, droughts, and floods) -Changing temperature and rainfall patterns - Changing ecosystems - Impacts on human health - Increasing the spread of certain diseases Consequences of Climate Change in the Caribbean and the UK **See appendices for additional information.** Measures to reduce the effects of climate change in the Caribbean and the UK **See appendices for additional information.**	Analyzing case studies of climate change in the USA and the Caribbean Presenting the findings of the causes and consequences of climate change in the USA and Caribbean and measures taken to curb climate change	Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 46-53. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 116-133.	Comparative study on the causes, consequences, and measures taken to combat climate change in the USA and Caribbean. Oral Presentations on the consequences of climate change. Write poems on the consequences of climate change.
SBA Guidelines	**Methodology**: Students will plan a field trip to collect data with the assistance of the teacher. E.g., choosing a date and time, mode of transportation etc.				

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Curriculum Area: Geography **Grade 10**

					WEEK 29
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Natural Vegetation -The Ways Natural Vegetation Adapts to Environmental Factors	Students will: i. describe the adaptations of vegetation to the environment.	**Adaptation in Arid/Dry Areas** 1. **Thick fleshy leaves** to store water. **2. Thick waxy cuticle** (a protective layer on the surface of stem and leaves) to prevent dehydration e.g., Cacti **3. Shallow root system** to collect small amounts of moisture. **4. Extremely deep root systems** tap into underground water. **5. Light-coloured leaves** or small reflective hairs to reflect excessive light, normally grey or silver. **6. Reduce leaf size or complete transformation of the leaves** e.g., thorns or spikes reduce transpiration and offer protection. **7. Production of thorns /spikes** to ward off predators e.g., cacti **Adaptation in Temperate and Cold Climates** **1. Their needles are long and thin.** Less surface area means that they have fewer stomata from which to lose water. Narrow leaves also help keep snow from building up and breaking branches. **2. Their needles have thick, waxy cuticles** to prevent water loss. **3. In the autumn, trees begin preparing for dormancy.** During dormancy, a tree's metabolism or internal processes slow down. By	Group discussions on adaptations of vegetation to the environment. Asking and answering questions Drawing and labelling diagrams showing adaptive features to various environments. Creating a picture collage depicting adaptions of vegetation to the environment	Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 54-63. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 134-141.	Complete short answer questions on Natural Vegetation. Create a flipchart depicting various adaptive features of natural vegetation.

		doing this, it can conserve energy to stay alive during the cold winter. **Adaptations to Salty Conditions (Mangroves)** Different types of adaptations to these conditions have been made: 1. Some mangroves almost completely exclude salt and if you squeeze their leaves, you get almost pure water. 2. The red mangrove contains a substance that keeps salt out. Often some salt slips through the waxy substance and this is sent to old leaves. The leaves fall off and the tree gets rid of the excess salt. 3. White mangroves use another technique and their leaves become speckled white by the salt that passes from the inside of the tree. The tree can close up the pores in the leaves and keep as much salt as it wants to.		London, N and Wraith, M. Principles of Geography for CXC. Longman Group, UK. pp. 91-101	
SBA Guidelines	**Methodology**: Students will write methodology to indicate how, when, and where the data will be collected and then embark on field visits. Note: Students will complete the site Map of the Area. **The site map** of the study area includes the boundaries, roads/streets, main buildings, other buildings etc. - Inserting the elements of a map: Title e.g., **SITE MAP: Charity, Study Area;** Scale (Not drawn to scale); Border, Key, North Arrow				

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Curriculum Area: Geography **Grade 10**

					WEEK 30
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Tropical Rainforest Biome	Students will: i. explain the characteristics of the Tropical Rainforest biome; ii. explain the impact of human activity on the Tropical Rainforests biomes in the Caribbean.	**Characteristics and adaptions in the Rainforest** **1. Bark.** In drier, temperate deciduous forests a thick bark helps to limit moisture evaporation from the tree's trunk. Since this is not a concern in the high humidity of tropical rainforests, most trees have a thin, smooth bark. The smoothness of the bark may also make it difficult for other plants to grow on their surface. **2. Lianas** are climbing woody vines that drape rainforest trees. They have adapted to life in the rainforest by having their roots in the ground and climbing high into the tree canopy to reach available sunlight. **3. Drip Tips**. The leaves of forest trees have adapted to cope with exceptionally high rainfall. It is thought that these drip tips enable raindrops to run off quickly. Plants need to shed water to avoid the growth of fungi and bacteria in the warm, wet tropical rainforest. **4. Buttresses**. Many large trees have massive ridges near the base that can rise 30 feet high before blending into the trunk. Buttress roots provide extra stability. **5. Prop and Stilt Roots** help give support and are characteristic of tropical palms growing in shallow, wet soils.	Using maps of the world to insert and name places where tropical rainforests are found. Using pictures or drawings to describe the features of the tropical rainforest biome. Creating posters to explain the positive and negative consequences of deforestation.	Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 54-63. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 134-141.	Complete short answer questions on Natural Vegetation. Create a flipchart depicting various adaptive features of the natural vegetation.

		Consequences of Deforestation in the Caribbean **Negative:** **Soil Erosion:** In forests, the trees protect the soil. When a forest is cleared, the soil is left exposed to the elements which causes soil erosion. Exposed soil is simply washed away during times of severe rains, frequently into streams and rivers, and taken farther downriver or into the sea. **Soil Degradation:** The soil's minerals and litter layers are exposed by deforestation. Given that vegetation cover mainly aids in soil formation and binding, its removal has a significant impact on the soil's properties, including aeration, water-holding capacity, and biological activity. When trees are cut down by logging, infiltration rates increase, and the soil is left naked and vulnerable to erosion and the accumulation of toxins. **See appendices for additional information**		London, N. and Wraith, M. Principles of Geography for CXC, Longman Group, UK. pp. 91-101. Video links: https://www.youtube.com/watch?v=yR3zGUXGHWQ https://www.botanic.co.uk/wp-content/uploads/2017/05/8_1__tttTeachers_Notes_Awesome_Adaptations.pdf	
SBA Guidelines	**Methodology**: Students will write methodology to indicate how, when, and where the data will be collected and then embark on field visits. Note: Students will complete the site Map of the Area. **The site map** of the study area includes the boundaries, roads/streets, main buildings, other buildings etc. - Inserting the elements of a map: Title e.g., **SITE MAP: Charity, Study Area;** Scale (Not drawn to scale); Border, Key, North Arrow				

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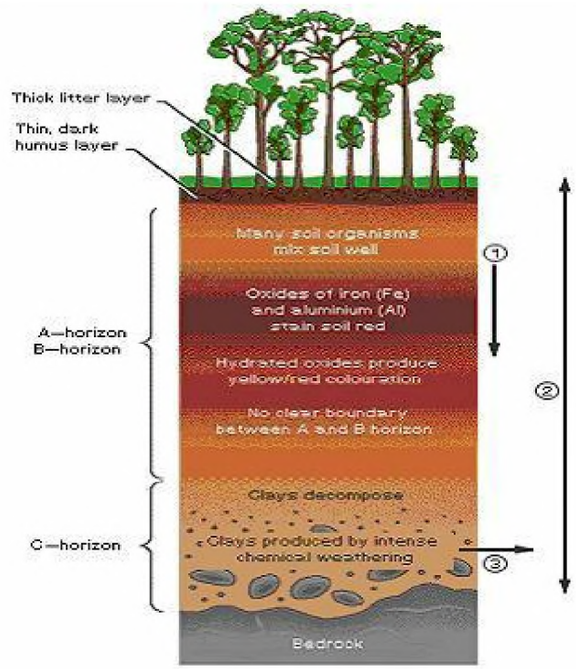
Curriculum Area: Geography **Grade 10**

					WEEK 31
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Soil **- Characteristics of Soil** **-Types of soil**	Students will: i. describe the main constituents of soil. ii. explain the factors influencing the formation of Latosols.	**Constituents of Soil:** - Mineral - Water - Organic matter - Gases - Microorganisms **Latosols** Latosols support the richest vegetation on the planet – the tropical rainforests. Rainforests contain tall trees such as mahogany and teak. However, the latosol is not fertile soil, but it supports lush rainforest vegetation. **Factors influencing the formation of Latosols.** - Climate, - Living organisms, - Lateralization, - Vegetation, and - Water in soil.	Locating area on a Map of the World where latosols are found. Making models of the latosol soil profile. Oral presentation on the factors influencing the formation of latosol	Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 64-65. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 154-155.	Respond to questions orally on latosols. Create a poster to show the latosols profile and the factors that influence its formation. Oral presentations on posters that were created.

		 Adapted from Tropical Rainforest Geography, n.d, Word Press.		London, N. and Wraith, M. Principles of Geography for CXC, Longman Group, UK. pp.102, 106. Video links: https://www.youtube.com/watch?v=6gxtj7DzgMU https://www.youtube.com/watch?v=6gxtj7DzgMU	
SBA Guidelines	**Presentation of data:** Students will use the data collected from the field visit/observation to construct tables, graphs, etc.				

NATIONAL SCHEME FOR SECONDARY SCHOOLS

Curriculum Area: Geography **Grade 10**

					WEEK 32
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Natural Hazards and Disasters	Students will: i. distinguish between a natural hazard and a disaster; ii. describe the impact of earthquakes, hurricanes, volcanoes, landslides, and flooding on the physical and human environments in the Caribbean.	1. Difference between a natural hazard and a disaster. (a) Natural hazard: a threat to the people and the environment resulting from processes or events associated with the lithosphere, biosphere, hydrosphere, and atmosphere. (b) Disaster: negative effects of the actual event on the physical and human landscapes, especially in areas of high population density. 2. Areas in Caribbean countries are at high risk from the hazards of earthquakes, hurricanes, volcanoes, landslides, and flooding. **Volcanic Hazards in the Caribbean** **Pyroclastic flows:** Pyroclastic flows are lava flows consisting of mixtures of rock debris and gas that travel along the ground at high speed. Travelling under gravity, they tend to flow down hillsides, along valleys, and towards the lower ground, although extremely powerful, or energetic, pyroclastic flows have been known to defy gravity and move uphill. **The Earthquake Hazard** ***Ground Shaking:*** Disruptive up, down and sideways vibration of the ground during an earthquake. If an earthquake generates a large enough shaking intensity, built infrastructure, like buildings and dams, and	Distinguishing between a natural hazard and a disaster. Giving examples of natural hazards. Identifying areas in Caribbean countries that are at high risk of hazards. Categorizing the impact of natural hazards as short-term and long-term.	Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 96-109. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 156-189.	Complete short answer questions on Natural Hazards and Disasters. Write essays on the impacts of natural hazards and disasters in a named Caribbean territory. .

		lifelines, such as power and water networks, can be severely damaged. In large earthquakes, whole districts can be devastated by the multiple consequences of ground shaking. **Hurricanes Hazards** ***Storm Surge:*** Storm surge and large waves produced by hurricanes can reach heights well over 20 feet and can span hundreds of miles of coastline. The destructive power of storm surges and large battering waves can result in loss of life, buildings destroyed, beach and dune erosion and road and bridge damage along the coast. Storm surge can travel several miles inland. In estuaries and bayous, saltwater intrusion endangers public health and the environment.		Video link: https://www.youtube.com/watch?v=-pO7nfep5I	
SBA Guidelines	**Presentation of data:** Students will use the data collected from the field visit/observation to construct tables, graphs etc.				

NATIONAL SCHEME FOR SECONDARY SCHOOLS

Curriculum Area: Geography **Grade 10**

					WEEK 33
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Natural Hazards and Disasters cont'd	Students should be able to: i. explain the responses of individuals, and national and regional agencies in the Caribbean to reduce the effects of natural hazards and disasters.	Responses of individuals, national and regional agencies to the risk of the hazards and the effects of natural disasters in the Caribbean **Short- and Long-Term Responses** **Short-term responses** Immediate responses are the aid and assistance given within the first few hours or days following a disaster. These are often referred to as emergency responses, and they are vital in reducing the death toll. Immediate responses include: -evacuating people following a warning, although this is mainly limited to volcanic eruptions as earthquakes occur without warning. -search and rescue effort, trying to rescue people trapped under rubble. -providing medical care for the sick and injured. -providing temporary shelter for those who have lost their homes. -providing food and clean bottled water. The main aim of immediate responses is to minimize the loss of life. **Long-term responses** Long-term responses are those that take place in the weeks and months after a hazard event and focus on the rebuilding and	Identifying and explaining each stage of the disaster management cycle. Analyzing the disaster management cycle. Illustrating the disaster management cycle. Researching and discussing short- and long-term responses.	Ross, S. et al. Geography for CSEC, Caribbean Examinations Council Study Guide, United Kingdom, Nelson Thorne, 2012. pp. 96-109. Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 156-189.	Create a disaster plan for their school or community. Create a poster illustrating the stages of the disaster management cycle.

		reconstruction of areas that have suffered extensive damage. The aim is to help people return to their normal lives as quickly as possible and to reduce the risk of damage from natural hazards in the future. Long-term responses include: - Restoring essential utilities that have been affected by the tectonic hazard event, for example repairing gas mains and electricity cables, to ensure that energy sources are restored, as well as repairing water pipes to make sure that people are not without a supply of drinking water for too long. - Repairing and rebuilding homes etc.– both domestic and commercial properties, but also there is the repair of transport infrastructure too, including roads and railways – this is extremely important as damaged infrastructure makes it very difficult to bring in emergency supplies. - Providing psychological/emotional support to affected persons etc.			
SBA Guidelines	**Presentation of data:** Students will use the data collected from the field visit/observation to construct tables, graphs etc.				

NATIONAL SCHEME FOR SECONDARY SCHOOLS

Curriculum Area: Geography **Grade 10**

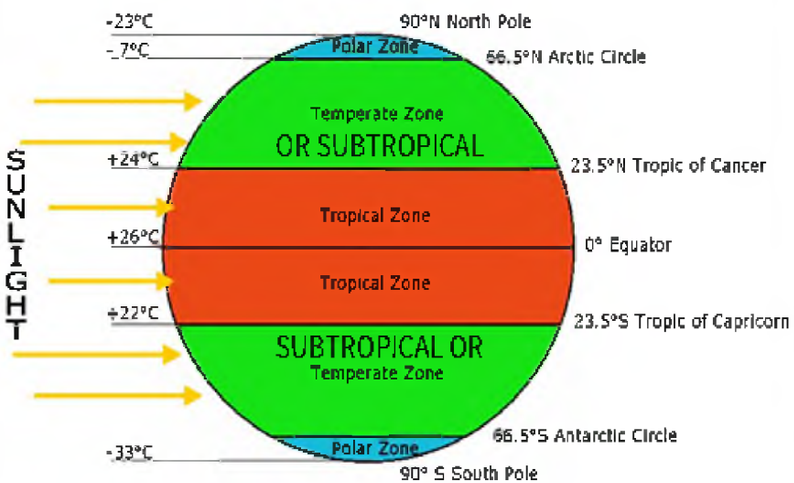
					WEEK 34
TOPIC/ SUB-TOPIC	**GENERAL OBJECTIVE**	**CONTENT**	**ACTIVITY**	**RESOURCE**	**EVALUATION STRATEGY**
Tables Graphs, Maps and Measures of Central Tendency	Students will: i. construct tables, graphs and draw diagrams; ii. use descriptive statics (mean, median and mode) to summarize data; iii. interpret graphs, tables, statistical maps and diagrams.	**Construction of Tables and Graphs** -Tables - Bar Graphs -Line Graphs -Divided Circles -Climate Graphs **Measures of Central Tendency (Most common)** -Mean, Median, and Mode **Interpretation of:** -Charts - Tables -Divided Circles -Bar Graphs and -Line Graphs -Population Pyramids -Climate Graphs - Dot Maps, Choropleth Maps, Isopleth Maps	Constructing tables, graphs, and drawing diagrams to show given data. Using descriptive statics (mean, median, and mode) to summarize data. Writing summaries and discussing trends based on the data provided on graphs, tables, statistical maps, and diagrams.	London, N. and Wraith, M. Principles of Geography for CXC, Longman Group, UK. pp. 9-15.	Complete exercises on constructing tables, graphs, diagrams, and maps. Quiz on the calculation of mean, mode, and median and description of graphs, tables, and diagrams.
SBA Guidelines	**Presentation of data:** Students will use the data collected from the field visit/observation to construct tables, graphs, etc.				

NATIONAL SCHEME FOR SECONDARY SCHOOLS

Curriculum Area: Geography

Grade 10

WEEK 35

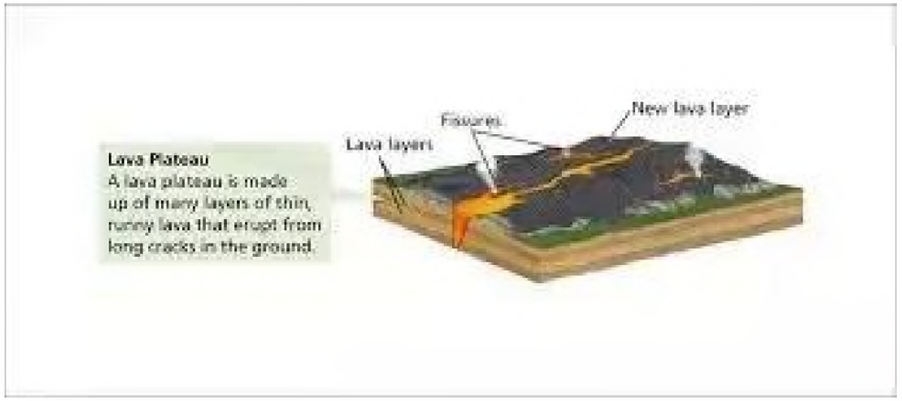
TOPIC/ SUB-TOPIC	GENERAL OBJECTIVE	CONTENT	ACTIVITY	RESOURCE	EVALUATION STRATEGY
Location and Time	Students will: i. distinguish between lines of latitude and longitude; ii. identify the main lines of latitude and longitude; iii. illustrate earth's latitudinal zones; iv. name and locate	**Lines of Latitudes** are horizontal lines that measure the distance north or south of the equator. Latitude is the angular distance of a point or place measured from north or south of the equator. **Lines of Longitudes** are vertical lines that measure east or west of the meridian in Greenwich, England. Longitude is the angular distance of a point or place measured east or west of the Prime Meridian or Greenwich.  Adapted from Climatic Zones, by K, Pillay, 2023, qrlearn.	Distinguishing between lines of latitude and longitude. Illustrating the latitudinal zones. Identifying the main lines of latitude and longitude. Naming and locating places from its latitude and longitude.	Wilson, M. The Caribbean Environment for CSEC Geography, 5th Edition, Oxford University Press, 2016. pp. 301-302	Locate places on the world map. Respond orally to questions on location and time. Complete exercises on the calculation of time.

	places from its latitude and longitude; v. describe the inter-relation between Earth's rotation, longitude and time.	Together, latitude and longitude enable cartographers, geographers, and others to locate points or places on the globe. **Longitude and Time** The Earth completes a rotation at 360°. That gives a day and a night which is 24 hours. **The steps used to find the value of each longitude for calculating the time are:** Now to get the zones we divide, 360/24 = 15°. Hence, every 15° represents 1 hour and every 1° represents 4 minutes.			
SBA Guidelines	**Presentation of data:** Students will use the data collected from the field visit/observation to construct tables, graphs, etc.				

Appendices

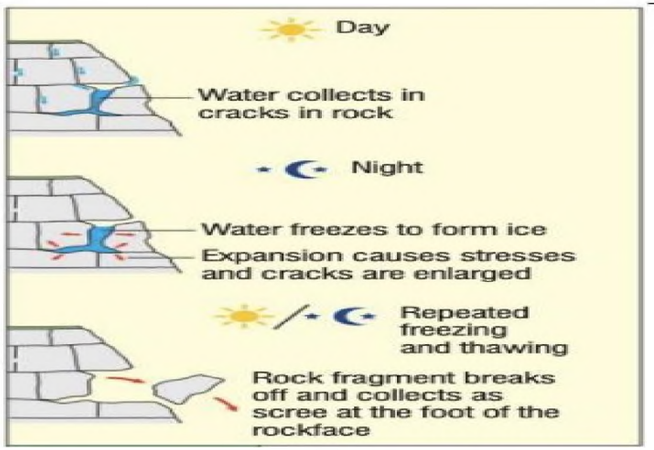
A. Intrusive and Extrusive Volcanic features

Intrusive Volcanic features	**Extrusive Volcanic features**
These are features that are formed as a result of magma cooling and solidifying before it reaches the surface. Some intrusive features are: 1. Dyke- this is formed when magma passes through cracks or joints that cut across beds(layers) of rock. 2. Sill- when magma forces its way between beds of rock it may solidify to form sill. 3. Batholith- this feature forms when a giant underground reservoir of magma cools and hardens to form granite. 4. Plug: This is a vertical pipe of rock, formed when molten material in the vent of a volcano cools and hardens. **Extrusive features** **Calderas:** a volcanic eruption may be so explosive that the whole top of the volcano sinks into the magma below. A huge crater is left which may be many kilometres in diameter.	These are features formed when magma pours out onto the surface as lava. **Types of lava** The type of lava usually influences the shape of the external feature. *Basic lava* is non-viscous. It has a lower silica content, so it flows more easily. Volcanic activity is less violent, and the lava may flow a long way before it solidifies. It produces landforms with lower, less steep slopes. *Acid lava* is viscous (thick and sticky). It is rich in silica which makes it explosive. It solidifies on contact with air often blocking the plug and causing pressure to build. **Lava plateaus** are formed by numerous successive eruptions of lava through fissures or cracks on the Earth's surface. The lava that flows out then cools down and leads to the formation of an elevated piece of land called a plateau e.g. The Deccan plateau in India.

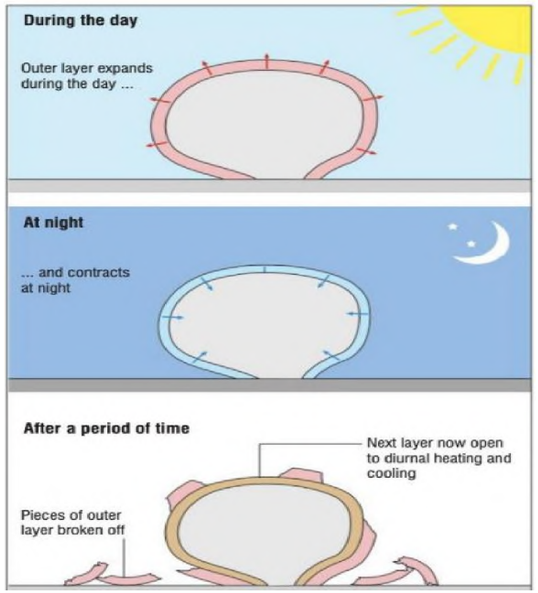
	

B. Weathering

Frost action/Freeze-thaw/ Frost shattering This physical weathering process requires the following: - Plenty of rainfall - Frequently fluctuating temperatures above and below freezing. - Bare rocks with cracks or holes exposed to the surface.	**Exfoliation** Rocks expand when heated and contract when cooled. Regular temperature fluctuations will weaken the other skin, eventually causing it to flake away.



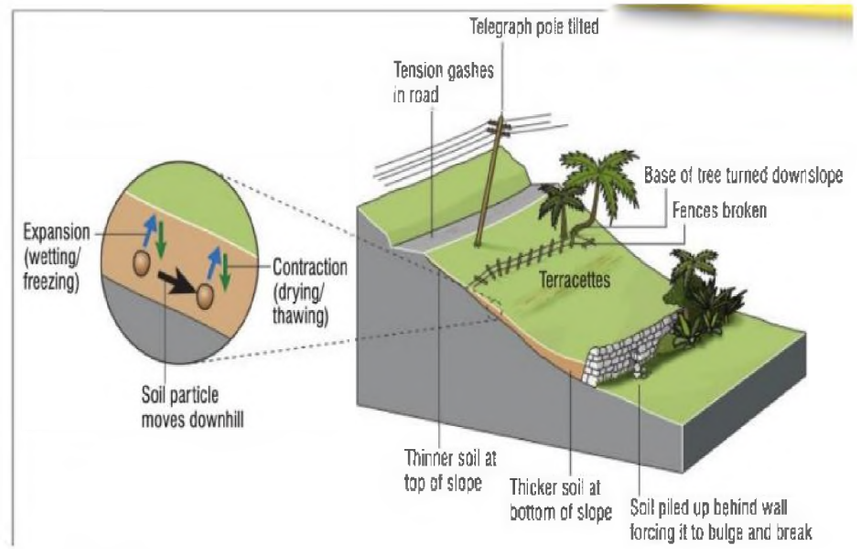
Note: Much of the Caribbean is too warm for frost action to occur and at the other extreme Antarctica is too cold. When frost action affects rocks on an exposed cliff or mountainside, angular rock fragments collect at the base to form scree.

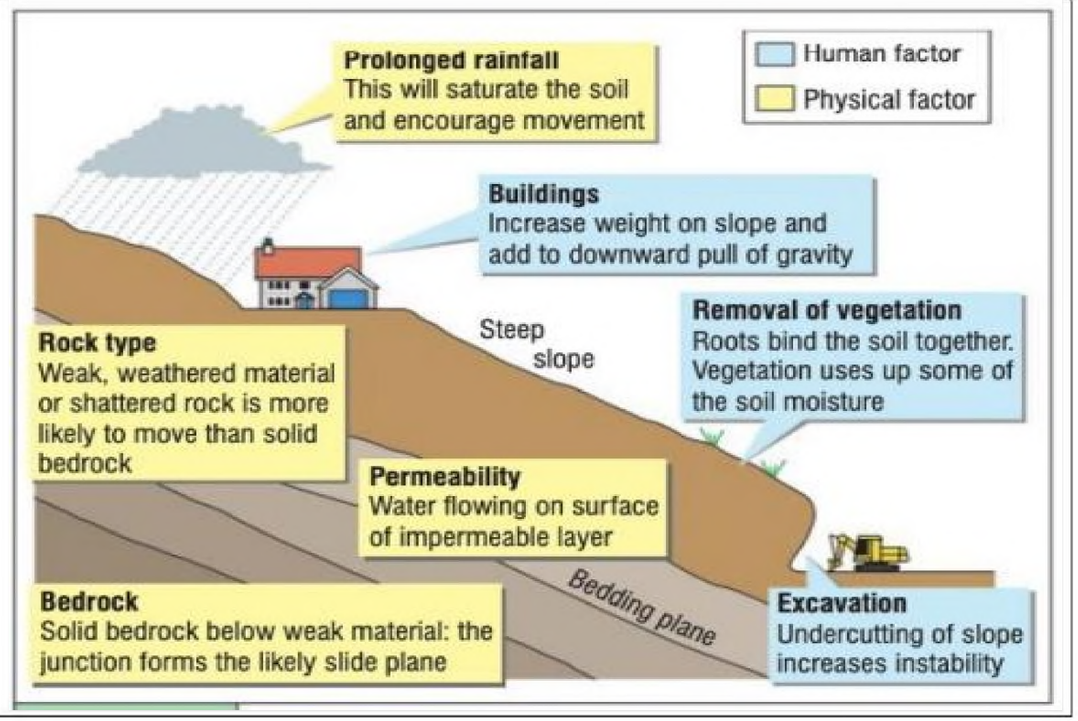


C.

Mass wasting

Effects of Soil Creep





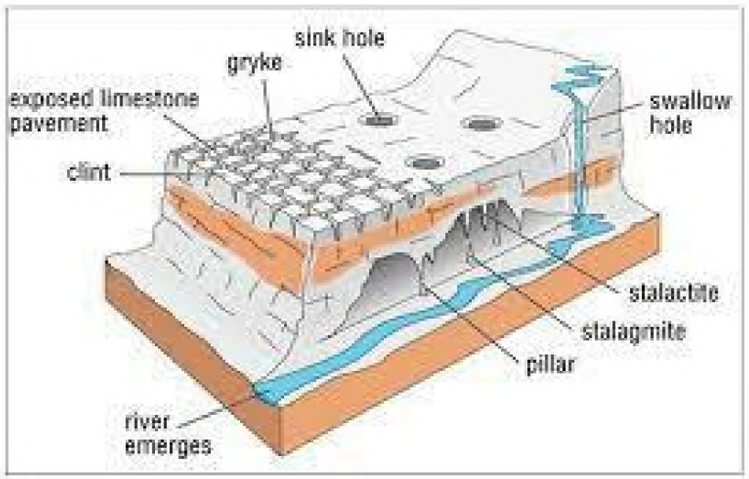
D. Limestone Environment

Surface features

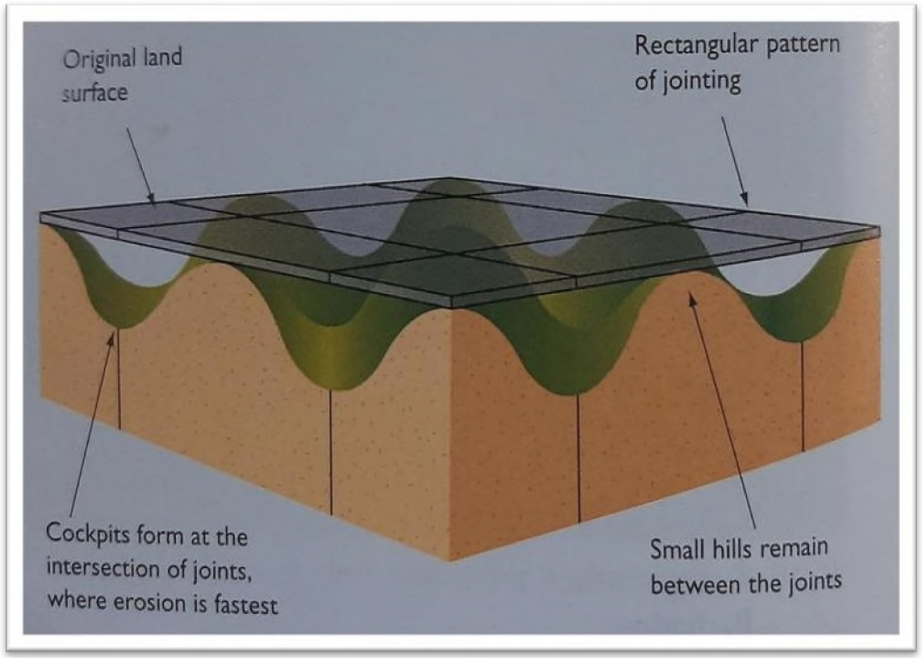
Swallow holes- an enlarged joint down which water plunges as it flows off an impermeable rock onto limestone.

Clinks and grikes- joints are often enlarged by weathering to form deep cracks called grykes. The blocks of rock between the grykes are called clints.

Surface depressions or dolines- are formed by extensive chemical weathering or the collapse of limestone. These can be up to 30m in diameter.



Cockpits- are a landscape pitted with smooth-sided, soil-covered depressions and cone-like hills. These can be up to 160m high in Jamacia with a base at up to 300 m above sea level. They develop mainly as a result of the solution.



E. The Coastal System

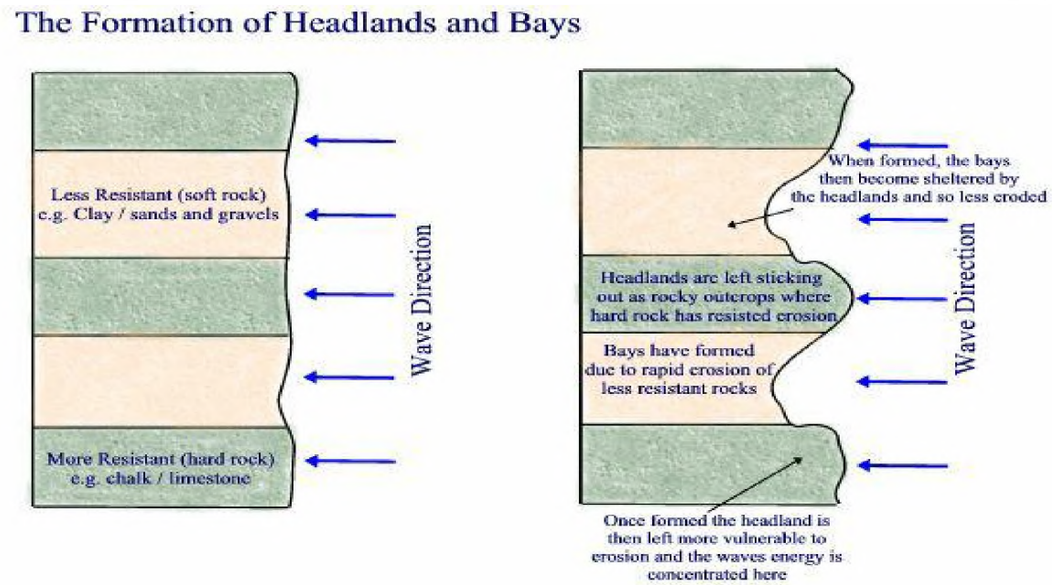
Headlands and Bays

Headlands – a section of rocky coastline that protrudes into the sea.

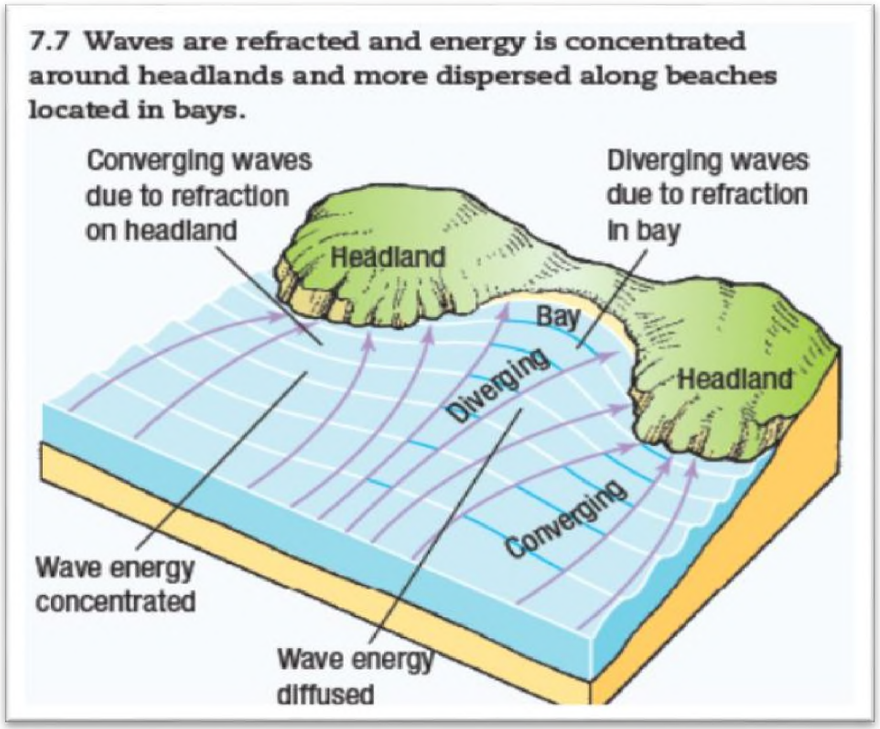
Bays- a pronounced indentation in the coastline usually found between two headlands.

Formation of Headlands and Bays:

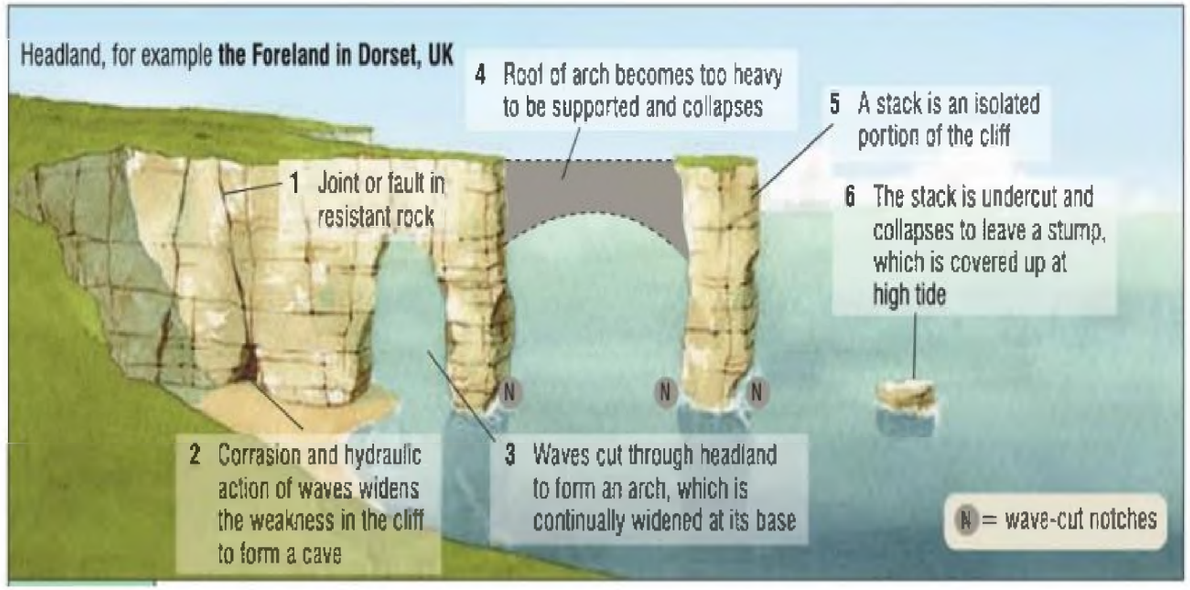
In some places, there are alternating bands of softer and harder rock along the coastline. As waves attack and erode the coastline, areas with softer rock will be eroded faster than areas with more resistant rock. Over time, the bands of softer rock will be worn back forming **bays**. A bay is an inlet along the shoreline of a body of water. The bands of more resistant rock will be left jutting out into the sea as **headlands**.



Wave refraction and the formation of Headlands and Bays



Formation of cave, arch and stack



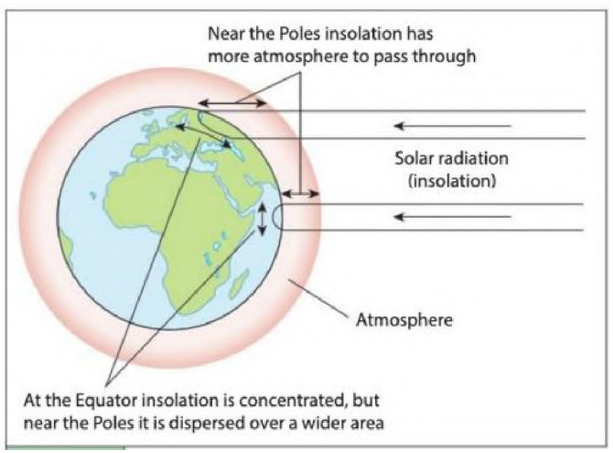
F. Weather and Climate

Latitude: At the equator, the sun is directly overhead for much of the year. This results in a high intensity of insolation leading to high temperatures. In contrast at the poles, the sun is lower in the sky. This causes the radiation from the sun to be spread out over a larger surface area and therefore the temperatures are lower.

Radiation from the sun has to pass through a greater thickness of the atmosphere at the poles compared with the equator. This accentuates the temperature differences.

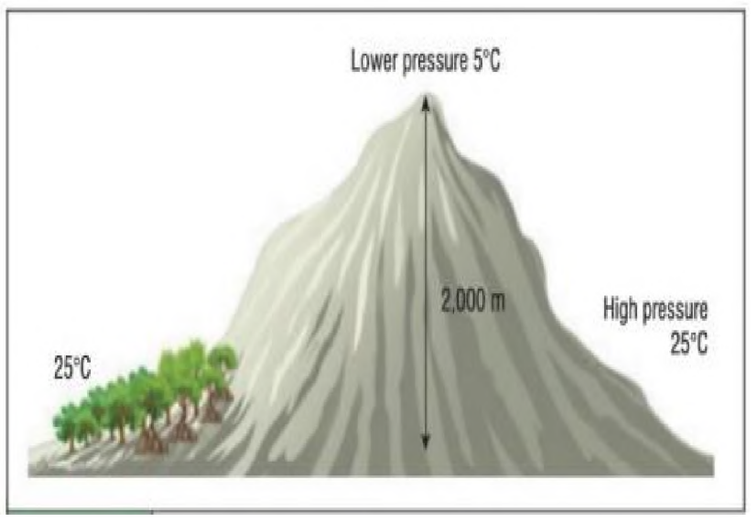
The higher temperature at the equator results in rising air, the formation of clouds and periods of heavy rain. This accounts for the equatorial climate being warm and wet.

The effects of latitude



Altitude: Altitude has a marked effect on the temperature of an area. Generally speaking, temperature decreases with height in the lower atmosphere. Therefore, areas at high elevations would tend to experience lower temperatures than nearby areas at much lower elevations. In the lower atmosphere, temperature decreases at a rate of about 6.5 degrees Celsius per kilometre. The rate at which temperature decreases with height is called the environmental lapse rate.

The drop in temperature is due in part to the fact that atmospheric pressure decreases with height. Because of the lower pressure at high elevations, the air is thinner (the molecules of air are farther apart). This makes the air less capable of absorbing or retaining heat.



Relief: In Geography, the term relief may be defined as "the variations in elevation and slope of an area of the Earth's surface". When we speak of an area as being flat, gently sloping or mountainous, we are speaking of the relief of that area. When we speak of the elevation (height above sea level) of an area, we are also speaking of relief. The relief of an area can have a significant effect on the climate of that area.

Effect of Relief on Wind

Wind speed is affected by altitude. Near the Earth's surface, winds are slowed due to friction. At higher elevations, wind speeds tend to be considerably higher. The windward slopes of mountains (the side facing the prevailing wind) will generally experience higher wind speeds than nearby lowland areas. Wind speeds are not as high on the leeward side.

Effect of Relief on Rainfall

Relief can influence the amount of precipitation an area receives. When air is forced to rise over a mountain range, it cools and the moisture within it condenses. Clouds form and produce rain. This type of rainfall is called **orographic rainfall** or **relief rainfall**. It rains mostly on the windward slopes. As the air moves over the mountain range and starts to descend, it warms. As a result, rainfall is usually low on the leeward side of the mountain range and the area is said to be in a **rain shadow**. The video below explains the process in greater detail.

Prevailing Winds: A prevailing wind is a surface wind that blows predominantly from one direction. The prevailing wind in an area can impact weather and climate. In the

Distance from the sea (continentality): This is of particular importance in those places which are well away from the equator, and which therefore have well-developed summer and winter seasons. During the summer the sea warms up less rapidly than land and places near to the sea tend to be cooled by it. During the winter, the sea cools down less rapidly than the land and places near the sea tend to be warmed by it. As a result, far inland places tend to have greater extremes of temperature than places which are near the coast.

Note. The Caribbean is relatively close to the Equator, temperatures at sea level are high throughout the year hence the sea tends to have a cooling effect at all times of the year.

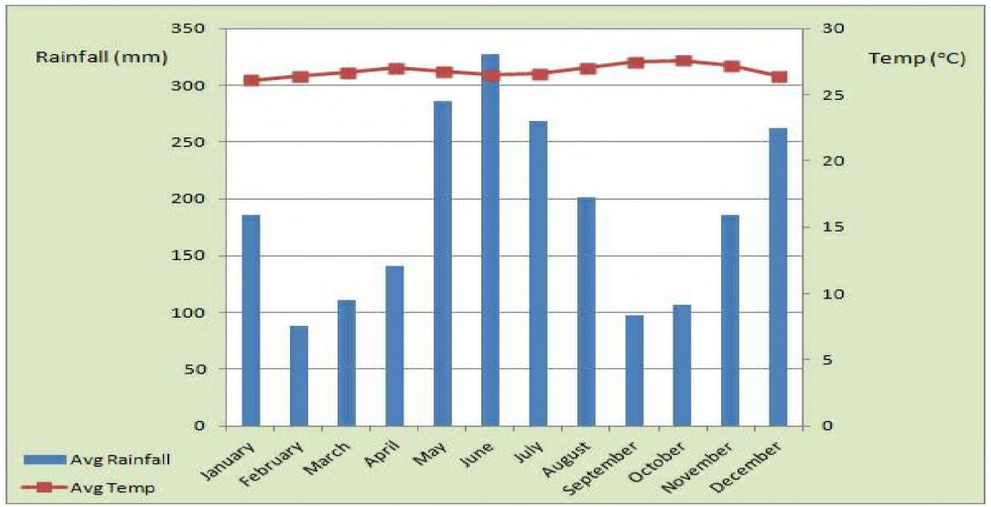
Winds: Winds are important in transferring moisture and heat. The dominant wind direction is called the prevailing wind. The Caribbean is mostly affected by prevailing winds from the northeast – the trade winds.

Land and sea breezes: These occur in coastal areas. They occur because the land and the sea heat up and cool down at different rates.

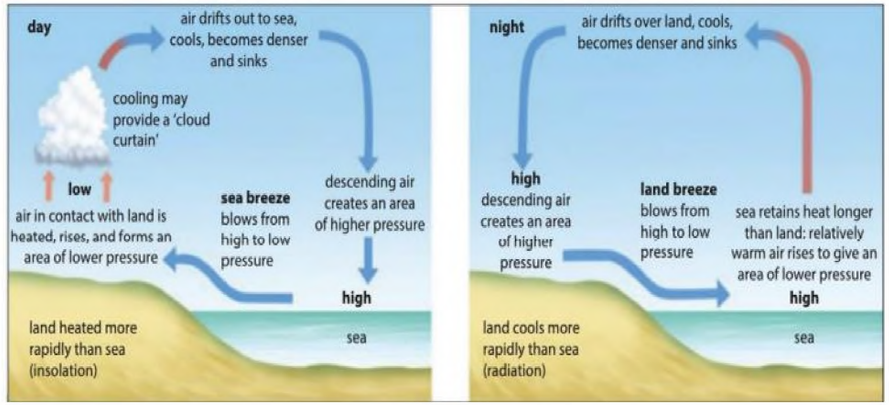
Sea breezes occur during the day. During the day, the land heats up faster than the sea. Air over the land heats up and rises, creating an area of lower pressure over the land. Cooler denser air from over the sea flows to the land to replace it.

At night, the land cools faster than the sea. The air over the land cools and sinks, creating higher pressure over the land. This cooler denser air flows from the land to the sea. This is called a *land breeze.*

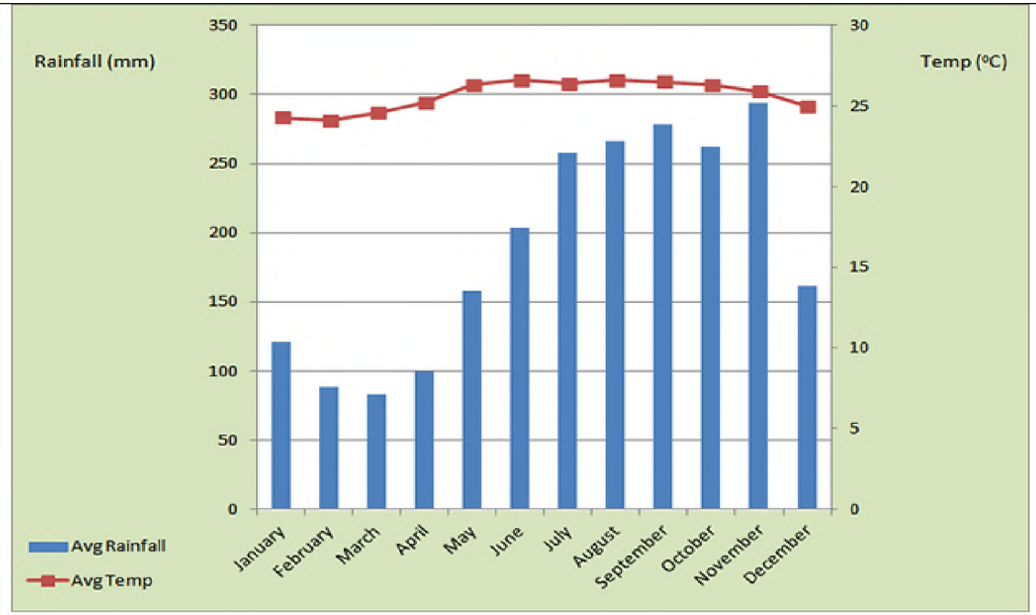
Caribbean, the northeast trade wind is the prevailing wind. It blows from the Atlantic bringing moisture and causing relief rainfall as it rises over mountains.



Characteristics of Equatorial Climates



Characteristics of Tropical Marine Climates



G. Consequences of climate change

Consequences of climate change

Rising sea level: As the average temperature of the Earth rises polar ice in the Arctic and Antarctic melts. Glaciers and ice sheets in places such as Greenland, North America and Europe are also melting. This water ends up in our oceans causing a rise in sea level. As sea level rises, low-lying areas near the coast are threatened.

More frequent extreme weather events: In the past forty years or so, extreme weather events such as droughts, heat waves and storms have been occurring more frequently.

Measures to reduce the effects of climate change in the Caribbean and the UK.

Caribbean	UK
Strengthen education institutional capacities and include climate change and health in all levels of national educational curricula.	**Legislation:** The UK passed the Climate Change Act in 2008. This Act originally aimed to reduce carbon emissions in the UK by 80% by 2050. It was amended in 2019 and now the goal is to achieve **net zero carbon emissions** by 2050
Carbon trading	**Making homes more energy efficient:** The UK's Energy Company Obligation Scheme

Global warming is believed to be responsible for this. Scientists predict that extreme weather events will become more frequent and more intense as the Earth warms up.

Changing rainfall patterns: Experts believe that rainfall patterns may change significantly. Some areas, such as the subtropics, may receive less rainfall and experience more frequent droughts. Other areas, such as the higher latitudes, may receive more rainfall. In some areas it is expected that heavy rainfall will be more frequent, increasing the likelihood of floods.

Impact on plants and wildlife: As world temperatures have increased, some plants and animals (including parasites and disease-causing organisms) are now inhabiting regions which were once too cold for them to survive. They may pose a threat to the native species in these areas. Also, some organisms may find it difficult to adapt to the changing climate and may become extinct. Polar bears, for example, are having difficulties coping with the effects of rising temperatures in the Arctic.

Consequences of Climate Change in the Caribbean and the UK

Caribbean	UK
Rising sea levels could flood low-level islands such as the Bahamas and the Cayman Islands.	**More frequent heatwaves:** As global temperatures increase; the UK can expect to experience more frequent heatwaves during the summer. Heat waves can pose serious risks to life and health.
Increased rates of coastal erosion of beaches and coastal ecosystems. This in turn could have a negative impact on tourism.	**More frequent flooding:** Rising temperatures are expected to cause more frequent heavy rainfall in the UK during winter. Winter storms are expected to occur longer and more frequent.

If a country or organisation within a country has cut its carbon emissions to a level that is below its target, it has 'spare' carbon credits. These carbon credits can then be traded (carbon trading) with a country or organisation that has not been able to cut its emissions. Overall, a balance is maintained through international cooperation and trade. Tree-planting programmes can also be used to 'buy' carbon credits. Trees absorb carbon dioxide and therefore remove it from the atmosphere.	requires large energy companies to improve the energy efficiency of homes. Homes are made more energy efficient by installing insulation and upgrading inefficient heating systems. This reduces the amount of energy needed to heat homes.
Renewable energy in the Caribbean To reduce carbon emissions, several countries in the Caribbean have introduced renewable energy projects: -Jamaica — supported by the Netherlands, Wigton wind farm has 23 wind turbines and already meets Jamaica's -Barbados — there are over 32,000 solar water heaters on the roofs of houses, businesses, and	**Vehicle Tax:** The yearly tax rate on vehicles is based on the carbon dioxide emissions of the vehicle. The tax for very fuel-efficient vehicles is relatively low. Higher taxes are paid for less fuel-efficient vehicles. No tax is paid for electric vehicles. This is meant to encourage people to drive vehicles that produce less pollution.

The warming of tropical seas can cause harmful bleaching of corals. 300 km of Belize's barrier reef was bleached, and it could die.	**Drought:** Summers in the UK are becoming drier. Summer rainfall has been decreasing. This will likely cause more frequent droughts and water shortages in the future.
Sea-level rise could flood low-lying coastal areas, e.g., the Gulf of Mexico and parts of threatening the fishing industry and tourism.	**Sea level rise:** Rising sea levels pose a greater risk of coastal flooding and coastal erosion. In Norfolk, houses have been destroyed by coastal erosion. Coastal railway lines have been damaged in places such as Cornwall and Devon. Experts believe that some coastal settlements, such as the village of Fairbourne, may have to be relocated.
Tropical diseases could spread more widely which could threaten human health	Warming will increase electricity demand, e.g. for air conditioning
More intense hurricane **ACTIVITY** may prove very costly to the Caribbean.	**Increased risk of wildfires:** Rising temperatures have resulted in an increase in the number of wildfires experienced in the UK. The country experienced a total of less than one hundred wildfires from 2011 to 2017.
Erratic rainfall could affect crop yields, water supply and irrigation, leading to poverty and migration.	**Effects on wildlife:** Rising temperatures are likely to cause disruptions in many of the UK's ecosystems which could threaten many species of animals and plants. For instance, hotter and drier summers may cause some grasslands to dry up. Many species of birds and insects are adapted to cooler climates and would struggle as temperatures rise. Ecosystems such as coastal wetlands may be damaged or destroyed as the sea level rises.

hotels. They save around US$6.5 million in fuel that would otherwise have been imported. -Barbados is considering the use of offshore wind turbines to generate electricity. -St Lucia, Dominica and Grenada — these countries are seeking to become the world's first noncarbon-fueled economies by developing wind, wave and solar power to meet all their energy needs. -Nevis, St Lucia and Dominica — here there are opportunities for exploiting geothermal energy.	
Helping people and nature adapt to the impacts of climate change. We empower local resource users to protect, sustainably manage, and restore natural climate solutions, like mangroves, coral reefs, seagrass beds, and soils, that reduce peoples' vulnerability to climate change's impacts.	**Increasing production of renewable energy:** The UK government has provided support for renewable energy to move away from burning fossil fuels. In 2020, 42% of the UK's electricity was generated from renewable sources such as wind and solar. There are currently 11,000 wind turbines onshore and offshore. They generate almost a quarter of the electricity supply in the UK. The photo below shows an offshore wind farm in the UK. Over 1 million homes in the UK have photovoltaic systems installed. Solar panels

	Rising sea temperatures will also affect marine ecosystems. Fish and other marine animals adapted to cooler temperatures may be driven away along with seabirds and other animals which feed on them. In addition, more frequent floods, droughts and wildfires would directly impact wildlife as well.

	generate electricity which can be used in the home. Any additional electricity which is generated goes into the power grid and the homeowner receives payment for it.
	Nuclear power: nuclear power plants produce electricity without emitting greenhouse gases like carbon dioxide. Nuclear power currently generates about 15% of the UK's electricity. The UK currently has 9 nuclear power plants, most of which will be retired by 2030. The UK hopes to generate about 25% of its electricity with nuclear power by 2050. Construction of a new nuclear power plant began in Somerset in 2018 and is still ongoing. There are plans to build more nuclear power plants in the future.

H. Tropical Rainforest Biome

Adaptations in the Rainforest ***Epiphytes*** are plants that live on the surface of other plants, especially trunks and branches. They grow on trees to take advantage of the sunlight in the canopy. Most are orchids, bromeliads, ferns, and Philodendron relatives. ***Bromeliads*** are found mostly in the Americas. Some grow in the ground, like pineapple, but most species grow on the branches of trees. Their leaves form a vase or tank that holds water. The tanks support a thriving ecosystem of bacteria, mosquito and dragonfly larvae, tadpoles, birds, salamanders and frogs. ***Nepenthe.*** Pitcher plant vines have leaves that form a pitcher, complete with a lid. Sweet or foul-smelling nectar in the pitcher attracts insects, especially ants and flies, that lose their grip on the slick sides and fall into the liquid. Downward-pointing hairs inside the pitcher prevent the insects' escape. The insects are digested by the plants and provide nutrients. Pitcher plants are not epiphytes, but climbers rooted in the soil.	**Consequences of deforestation in the Caribbean** **Positive:** Sustainable Management: Tropical rainforests can be managed in the following ways to reduce deforestation: - Logging and replanting - selective logging of mature trees ensures that the rainforest canopy is preserved. This method allows the forest to recover because the younger trees gain more space and sunlight to grow. Planned and controlled logging ensures that for every tree logged another is planted. - Education - Promoting the value and benefits of biodiversity associated with tropical rainforests. -Ecotourism - this encourages sustainable tourism that creates jobs for local people whilst ensuring that the money generated is used to protect and conserve the tropical rainforest for future generations to enjoy. -International agreements - agreements to protect tropical rainforests have been made between different countries through debt-for-nature swaps. This is when a country which is owed money by another country cancels part of the debt if an agreement is made by the debtor country to ensure the conservation of its tropical rainforests.

I. **Constituents of Soil:**

II. ***Mineral:*** **The largest component of soil is the mineral portion, which makes up approximately 45% to 49% of the volume.**

III. ***Water*****: This is the second basic component of soil. Water can make up approximately 2% to 50% of the soil volume. Water is important for transporting nutrients to growing plants and soil organisms and for facilitating both biological and chemical decomposition.**

IV. ***Organic matter*****: This is the next basic component that is found in soils at levels of approximately 1% to 5%. Organic matter is derived from dead plants and animals and as such has a high capacity to hold onto and/or provide the essential elements and water for plant growth.**

V. ***Gases*****: Air is the next basic component of soil. Because air can occupy the same spaces as water, it can make up approximately 2% to 50% of the soil volume.**

VI. ***Microorganisms:*** **These are the final basic element of soils, and they are found in the soil in very high numbers but make up much less than 1% of the soil volume. A common estimate is that one bottle-cap full of topsoil may hold more than 20,000 microbial organisms.**

Factors influencing the formation of latosols.

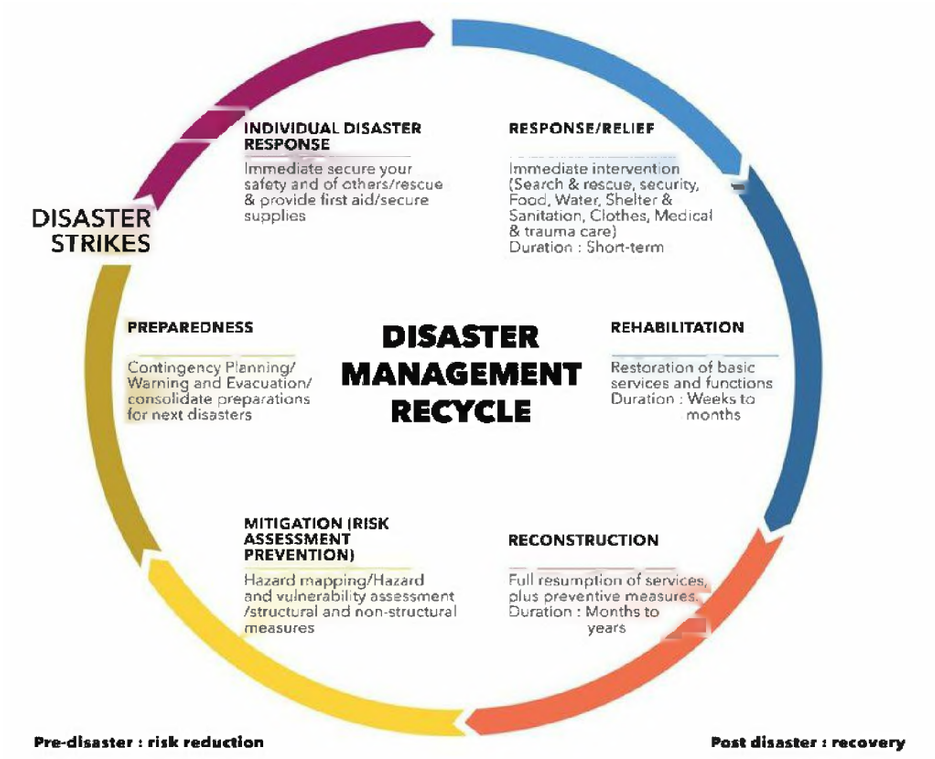
Climate: Because of their location in the tropics and equatorial regions of the earth, latosols form in very hot, wet conditions. High rainfall, high humidity and high temperatures cause deep chemical weathering and rapid leaching of minerals down through this soil. Average rainfall is up to 2,000 mm. Humidity is constantly high (88%) and the average temperature is 27°C. Because of the high temperatures and the permeability of the soil, heat and moisture reach great depths and rot the parent material into deep soil. As a result, latosol soils are very deep.

Living organisms: The hot, damp conditions on the forest floor are perfect for fungi and bacteria to thrive and cause the rapid decomposition of dead plant material. This rapid humification provides plentiful nutrients that are easily absorbed by plant roots. However, as these nutrients are in high demand from the rainforest's many fast-growing plants, they do not remain in the soil for long and stay close to the surface of the soil. This cycling of nutrients is called the nutrient cycle and in latosols, it is very short – a few days in some cases.

Laterisation: Laterisation is the dominant process in forming latosols. Laterisation is a combination of deep leaching and chemical weathering by carbonation, oxidation and hydrolysis. Leaching and chemical weathering in the high temperatures of the tropics combine to dissolve all minerals except iron and aluminium oxides. These minerals give the soil its distinctive red/orange colour.

Vegetation: The latosol is completely reliant on the rainforest to maintain fertility, as all nutrients leach away quickly when the forest is felled, and the layer of humus is no longer

	being replaced. The soil generally contains a thin but very fertile layer of humus dropped from the forest above. Latosols have a low humus content. This is due to the rapid breakdown of organic material by the many bacteria which thrive in the hot and wet conditions of this region and the equally rapid uptake of the humus by plants. Any humus formed is quickly absorbed by plants. ***Water in soil:*** The high rainfall throughout the year results in chemical weathering taking place throughout the year. The oxidation of iron compounds gives the soil its characteristic reddish-brown colour. Also, the heavy rainfall causes a downward movement of water in the soil. The water dissolves the soluble minerals by the process of leaching. These minerals are deposited at lower layers in the soil, a process called illuviation.


DISASTER STRIKES
INDIVIDUAL DISASTER RESPONSE
Immediate secure your safety and of others/rescue & provide first aid/secure supplies
RESPONSE/RELIEF
Immediate intervention (Search & rescue, security, Food, Water, Shelter & Sanitation, Clothes, Medical & trauma care)
Duration : Short-term
REHABILITATION
Restoration of basic services and functions
Duration : Weeks to months
RECONSTRUCTION
Full resumption of services, plus preventive measures.
Duration : Months to years
MITIGATION (RISK ASSESSMENT PREVENTION)
Hazard mapping/Hazard and vulnerability assessment /structural and non-structural measures
PREPAREDNESS
Contingency Planning/ Warning and Evacuation/ consolidate preparations for next disasters
DISASTER MANAGEMENT RECYCLE
Pre-disaster : risk reduction
Post disaster : recovery