NAME _TEACHER ANSWER KEY_____

Episode 2: Superheroes of the Caribbean Reef

Key Terms from the broadcast

During today's broadcast, we explored three incredible coastal ecosystems. Scientists use specific vocabulary to describe how they work. How well were you listening?

Match each keyword with its correct definition.

Key Term	Definition
Mangrove	**A.** type of tropical tree or shrub that grows (in brackish or salt water) in thick clusters and send out prop roots
Coral polyp	**B.** carbon dioxide that is absorbed from the atmosphere and stored in ocean ecosystems
Sediment	**C.** solid materials such as particles of soil, sand, or other material that can move across land or through water through erosion and settle in a new place
Blue carbon	**D.** a grass-like flowering plant that lives in marine environments
Seagrass	**E.** a tiny animal related to sea anemones and jellies that builds the hard structures of coral reefs

The journey from Ridge to Reef

When rain falls on land, it travels all the way to the sea, passing through important ecosystems along the way.

Complete the flow diagram by filling in the missing words from the word bank below.

seagrass meadows | coral reef | mangroves | sediment | filtered

Rain falls on land

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Water flows across the ground, picking up **sediment,** nutrients, and pollution.

↓

Water enters the **mangroves** → roots trap sediment → water is cleaned

↓

Water flows through **seagrass meadows** → feeding ground & carbon store

↓

Clean, **filtered** water reaches the **coral reef**

Answer the questions below.

1. In the broadcast, the host poured muddy water through a sponge. What did the sponge represent?

The sponge represented the mangrove roots, which trap sediment before it reaches the reef.

2. What would happen to the coral reef if all the mangroves were removed?

All the sediment and nutrients would flow straight onto the reef, blocking sunlight and encouraging algae to grow, which could smother the coral.

Mangroves as filters

Mangroves are coastal trees that grow right on the edge of the land and sea. They have special adaptations that allow them to survive in saltwater and play a vital role in protecting our reefs.

Fill in the table by describing the role of each mangrove feature.

Mangrove feature	What function does each of these do?
Above-water roots (pneumatophores)	Allow the tree to breathe in waterlogged, salty conditions where most trees would die
Tangled root network	Acts like a giant net by slowing water down and trapping sediment and nutrients so they don't reach the reef
Protected root habitat	Provides a safe nursery for juvenile fish, young sharks, and other animals, allowing them to shelter from predators on the open reef

In the broadcast, the diver described mangroves as a 'nursery.' What did they mean by this? Why is it important?

Young fish and other animals hide in the tangled roots to stay safe from predators while they grow. Without this nursery, fewer fish would survive to adulthood and reach the reef.

Seagrass meadows as underwater highways

Seagrass might look like seaweed, but it is actually a flowering plant (an angiosperm) with true roots, stems, and leaves. It plays multiple important roles in our ocean.

Seagrass does THREE important things. Use words from the broadcast to explain these roles.

1. Habitat and food *(the highway)*	2. Anchoring the seafloor *(the foundation)*	3. Storing carbon *(the carbon sink)*
Provides feeding grounds for green sea turtles, conch, and juvenile fish; shelter for creatures moving from mangroves to the reef	Rhizomes (underground stems) hold the seafloor together, preventing sand from washing away in storms and strong currents	Captures CO2 and stores it deep in the mud under its roots, locked away for hundreds of years, helping fight climate change

Why is seagrass considered different from seaweed? Tick ALL that apply.

✓	Seagrass has real roots, stems, and leaves
	Seagrass is found only in tropical oceans
✓	Seagrass is a flowering plant (angiosperm)
✓	Seagrass stores carbon dioxide in the mud beneath its roots

Coral reefs: the final destination

At the end of the Ridge to Reef journey, we reach the coral reef. Corals are not rocks or plants. They are animals!

Use the words in the word bank below to complete the paragraph about coral reefs.

polyps | calcium carbonate | algae | sunlight | architects | limestone

Coral reefs are built by thousands of tiny animals called polyps. Each one is like a tiny mouth surrounded by stinging tentacles. They take calcium carbonate directly from the seawater and use it to build hard limestone structures, making them the primary architects of the Cayman Islands.

For corals to survive, they need the water to be crystal clear so that **sunlight** can reach them. If too many nutrients wash off the land, they act like fertiliser and cause **algae** to grow out of control. This can smother the coral and stop it from building.

Team Algae vs Team Coral!

In the broadcast, the host asked: 'In a fight for sunlight, who wins if the water is full of nutrients?' Circle your answer below, then explain why.

TEAM ALGAE	TEAM CORAL
✓ WINNER (if water has too many nutrients)	

Explain why: _____

Algae grows much faster than coral. If there are too many nutrients in the water (from land run-off), algae grows out of control and smothers the coral, blocking its sunlight and stopping it from building.

CCMI's Blue Carbon Project

CCMI scientists have been studying how these ecosystems work together through the Blue Carbon Offset and Biodiversity Programme. Our 2025 findings made a surprising discovery!

Answer the questions about CCMI's research.

1. What is 'Blue Carbon' and why does it matter?

Blue carbon is carbon stored in ocean and coastal ecosystems. It matters because capturing CO_2 from the water (and atmosphere) helps slow climate change.

2. CCMI found that the seagrass in Little Cayman can withstand temperatures up to _____ °C before it struggles to photosynthesise. What word used describes the ability to withstand high temperatures.

Temperature: 35°C Vocabulary word: thermotolerant

3. What was the most exciting discovery from the 2025 study? Complete the sentence:

When coral reefs are restored near seagrass meadows, the coral acts like a speed bump for the water. This slows currents so that more sediment gets trapped in the seagrass roots, storing even more carbon underground.

If you could only save one habitat to fight climate change, which would you pick? Circle one, then explain your thinking.

MANGROVES	SEAGRASS	CORAL REEF
This is a trick question! The answer from the research is that you cannot pick just one! They are all interconnected and stronger together. Accept any reasoned answer, but prompt students to think about how the ecosystems help each other.		

Investigating the 'Ridge to Reef' connection

CCMI scientists monitored two reef sites near Little Cayman. They recorded the health of the connected coastal ecosystems and the recovery of coral cover over time.

Study the data table and answer the questions below.

Feature	Site A	Site B
Mangroves present nearby?	Yes	No
Seagrass meadow present?	Yes	No
Water clarity (Score 1–5, where 5 = clearest)	4	2
Coral cover 2024	14%	12%
Coral cover 2025	21%	13%
What is the percentage increase in coral cover?	**50%**	**8%**

How to calculate percentage increase:

Step 1: Find the increase (new value minus old value).
Step 2: Divide by the starting value.
Step 3: Multiply by 100.
Example Site A: 21 - 14 = 7 → 7 ÷ 14 = 0.5 → 0.5 x 100 = 50%

1. Which site recovered more strongly? Why do you think this is?

Site A recovered more strongly (50% vs 8% increase). This is because Site A had mangroves and seagrass nearby, which filtered the water and kept it clear. Clear water allows sunlight to reach the coral, which needs light energy to build its limestone structures.

2. How does having mangroves nearby affect the water quality at the reef?

Mangroves trap sediment and nutrients before they reach the reef. This keeps the water clearer, which means the coral gets more sunlight and algae does not grow out of control.

3. CCMI's 2025 research showed that restoring coral near seagrass makes the seagrass store MORE carbon. Explain how this works in your own words.

The restored coral acts like a speed bump, slowing the water current. Slower water drops more sediment, which gets trapped in the seagrass roots. This extra sediment means even more carbon gets buried under the seafloor, so restoring the reef enhances the seagrass's ability to fight climate change.

What can YOU do to help?

We were reminded that the Ridge to Reef connection means what we do on land affects the reef. Here are some actions that help, but some are WRONG!

Tick the actions that HELP protect the Ridge to Reef system. Put an 'X' next to actions that HARM it.

✓	Avoid anchoring boats in seagrass meadows
✗	Remove mangroves to build a new dock
✓	Reduce your carbon footprint to slow sea-level rise
✗	Pour chemicals or waste water directly onto the ground near the coast
✓	Choose sustainable seafood to reduce pressure on reef fish populations
✓	Support reef restoration projects like CCMI's Blue Carbon programme
✗	Use excessive fertiliser on gardens near the coast

Your pledge:

Write ONE thing you will do differently after watching this broadcast to help protect the Ridge to Reef system.

I will _____

Stronger together!

Let's see your creative skills! Draw the full journey from 'Ridge to Reef' in the box below. Include all the steps that messy rainwater has to go through in order to keep the water of the reefs crystal clear for corals to be able to survive and grow, including:

- The start of the water cycle as rainwater
- The journey water takes across land to sea
- Coastal mangroves
- Seagrass meadows
- And finally, coral reefs.

Label the role(s) of each ecosystem.

This is an opportunity to tie the whole lesson together in a fun, creative way. The answer is open ended, and there are a range of acceptable ways to draw this. There should be a clear understanding of the interconnected nature of all the ecosystems discussed in the live broadcast, and how each ecosystem plays an important role. Demonstrate an understanding of the following:

- That mangroves filter sediment and nutrients from land run-off
- That seagrass meadows act as a feeding ground, carbon store, and habitat for marine life
- That healthy coral reefs protect our coastlines from storm surges