Marine Science: Coral Reef Ecosystems

Initial Knowledge Assessment (15 minutes)

Before we dive deep into coral reefs, let's explore what you already know!

1. Draw and label the basic structure of a coral polyp in the space below:

2. What do you think makes coral reefs so important to ocean ecosystems?

3. List three marine species you think depend on coral reefs:

Coral Reef Detective Challenge (25 minutes)

Group Investigation:

Using the provided data cards, work in groups to analyze different aspects of coral reef health.

Environmental Factor	Current Reading	Healthy Range	Impact Analysis
Water Temperature		23-29°C	
pH Level		8.1-8.4	
Light Penetration		70-90%	

Coral Reef Food Web Analysis (20 minutes)

Create a detailed food web showing the relationships between coral reef organisms:

Available Organisms:

- Coral Polyps
- Zooplankton
- Parrotfish
- Reef Sharks
- Sea Turtles
- Algae
- Clownfish
- Sea Anemones

[Draw your food web here. Use arrows to show energy flow between organisms]

Coral Bleaching Investigation (30 minutes)

Analyze the process of coral bleaching and its environmental impacts.

Part 1: Understanding the Process

Complete the following sequence diagram explaining coral bleaching:

Step 1: Healthy Coral	Step 2: Environmental Stress	Step 3: Zooxanthellae Loss	Step 4: Bleached Coral

Part 2: Impact Analysis

1. What environmental factors trigger coral bleaching?

2. How does bleaching affect the coral reef ecosystem?

3. Propose three solutions to prevent coral bleaching:

Conservation Action Plan (20 minutes)

Design a Local Conservation Initiative:

1. Identify the main threats to coral reefs in your region:

2. Develop a community awareness campaign:

3. Create a timeline for implementation:

[Draw your timeline here]

Coral Reef Biodiversity Survey (45 minutes)

Conduct a detailed analysis of coral reef zones and their inhabitants.

Reef Zones Identification

Zone	Characteristics	Common Species	Adaptations
Reef Flat			
Reef Crest			
Fore Reef			

Species Identification Challenge

Fish Species #1:

Identifying Features:

- Body Shape: _____
- Color Pattern: _____
- Feeding Behavior: _____

Invertebrate Species #1:

Identifying Features:

- Body Structure: _____
- Habitat: _____
- Defense Mechanism: _____

Symbiotic Relationships Study (30 minutes)

Document Three Types of Symbiosis

Mutualism

Example Pair: Clownfish and Sea Anemone

Benefits to Species 1:

Benefits to Species 2:

Commensalism

Find and describe an example:

Parasitism

Find and describe an example:

Reef Chemistry Laboratory (40 minutes)

Ocean Acidification Experiment

Materials Needed:

- Calcium carbonate shells
- Vinegar solution

- pH meter
- Safety goggles
- Recording equipment

Time (minutes)	pH Reading	Shell Observations
0		
5		
10		

Climate Change Impact Assessment (35 minutes)

Global Warming Effects on Coral Reefs

Analyze the Following Graph:

[Temperature vs. Coral Coverage Graph]

1. What is the correlation between temperature rise and coral coverage?

2. Predict future trends based on current data:

3. Suggest mitigation strategies:

Great Barrier Reef Case Study

Research and document recent changes:

Year	Observed Changes	Recovery Efforts
2016		
2018		
2020		

Final Assessment and Reflection (30 minutes)

Comprehensive Review

Create a concept map connecting the following terms:

- Coral Polyps
- Symbiosis
- Ocean Acidification
- Climate Change
- Biodiversity
- Conservation
- Ecosystem Services
- Human Impact

[Draw your concept map here]

Personal Reflection

1. What was the most surprising thing you learned about coral reefs?

2. How has your understanding of marine conservation changed?

3. What actions will you take to help protect coral reefs?

Extension Activities

- Design a coral reef conservation poster campaign
- Create a digital presentation about local reef ecosystems
- Write a research paper on artificial reef technologies
- Develop a coral reef monitoring program proposal

Project Planning Template:

1. Project Choice: _____
2. Timeline: _____
3. Resources Needed: _____
4. Expected Outcomes: _____

Assessment & Reflection (15 minutes)

Personal Learning Reflection

1. What was the most surprising thing you learned about coral reefs today?

2. How has your understanding of marine ecosystems changed?

3. What further questions do you have about coral reef conservation?

Extended Learning Activity

Choose one of the following projects to complete at home:

- Create a 3D model of a coral reef ecosystem
- Design a poster campaign for coral reef conservation
- Write a creative story from the perspective of a coral polyp

Due date: _____