
CORAL BLEACHING

ACTIVITIES TO PERFORM WITH YOUR STUDENTS

AGE LEVEL: 15-18 YEARS OLD

EDUCATIONAL BOOKLET AROUND THE EDUCATIONAL VIDEO CLIP: "CORAL BLEACHING EXPLAINED"
IN COLLABORATION WITH DR TULLIO ROSSI,
MARINE BIOLOGIST AND SCIENCE COMMUNICATOR



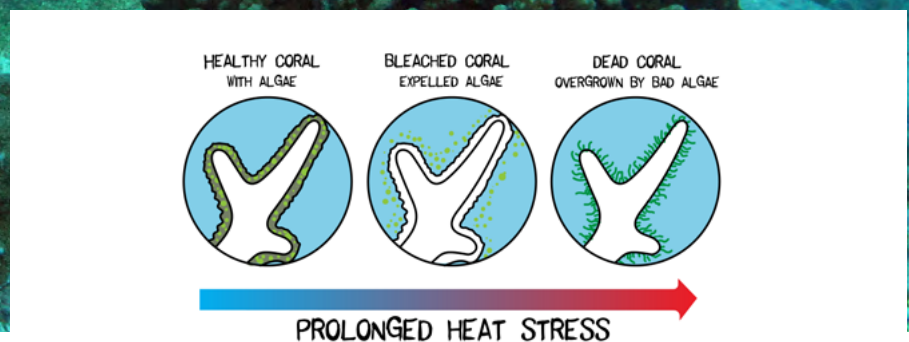
tara
PACIFIC



CORAL BLEACHING

ACTIVITIES TO PERFORM WITH YOUR STUDENTS AROUND THE EDUCATIONAL VIDEO CLIP: CORAL BLEACHING EXPLAINED
https://youtu.be/UyEw_Rl8mqM

While coral reefs cover less than 0.2% of the sea floor, they are host to almost 30% of marine biodiversity. Their good health is therefore vital to the diversity of the species they shelter, and for humanity. True indicators of the Ocean's health, a large part of coral reefs has been disappearing in recent years.



LEARNING OBJECTIVES

The main goals of this documentation are for students to:

- Enrich their knowledge of the Ocean, including information on coral
- Better understand the fragility of this ecosystem and the impact of climate change
- Become aware of the role they can play in addressing this issue

You will find activities to conduct on various scientific topics, particularly in Earth and life sciences through the study of coral biodiversity, symbiotic relationships and global warming, or in chemistry by investigating the formation of calcareous layers or acidification.

SUGGESTED CLASSROOM ACTIVITIES

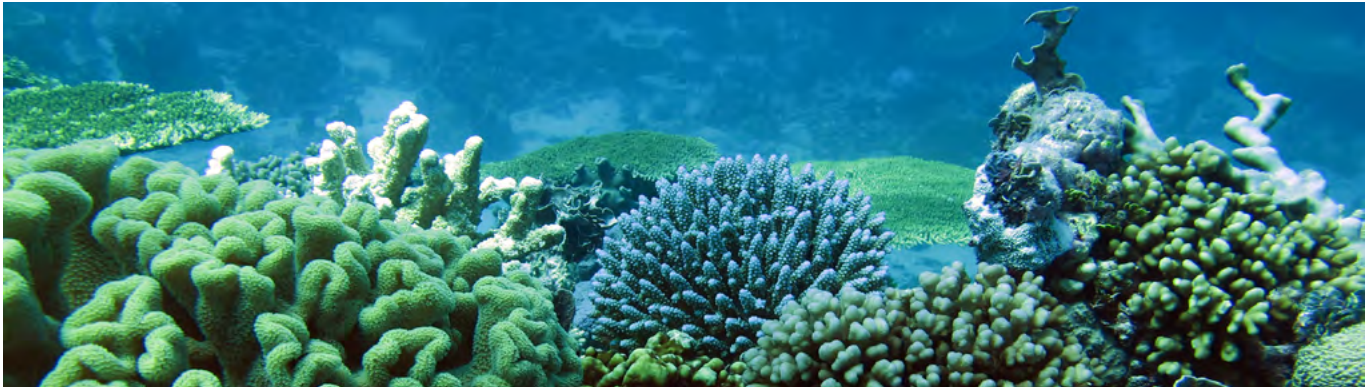
GENERAL COMPREHENSION

Students are invited to **take the quiz** below, in groups or individually, to test their overall understanding of the video clip. A crossword puzzle will help them assimilate the associated key words. Games can be played at the beginning and/or end of session.

Answers to quiz: 1c, 2b, 3b, 4c, 5c, 6c, 7b, 8a, 9b, 10a, 11b, 12a

Answers to crossword puzzle: 1-bleaching, 2-warming, 3-reef, 4-photovoltaic, 5-nutrients, 6-symbiosis, 7-El Niño, 8-alga, 9-acidification, 10-coral, 11-calcareous

CORAL AND ITS ENVIRONMENT



Discovering coral reefs

Students can **conduct online searches** to find locations of coral reefs around the world.

Discovering the organism

Corals have a calcareous skeleton that grows with age. You can brainstorm in the classroom about other marine organisms with a calcareous skeleton or shell (Foraminifera, seashells, gastropods, crustaceans, etc.) and find examples of similar growth, such as tree rings, speleothems, etc.

Understanding the relationship between algae and coral

Algae and coral need each other to survive. Such an association is called "symbiosis". Invite students to create a diagram or chart explaining the principle of symbiosis between these 2 organisms. What other examples of symbiosis do they know? (human intestine and bacteria, acacia and ants, plants and fungi, etc.)

The class can be divided into small groups to work on different examples of symbiosis. Each group will then show their results to their peers in the form of **presentations** or small plays. Your students are encouraged to use visual art to represent the main characters in their shows.

UPHEAVALS OF THE OCEAN

Increasingly warm

In class, a **simple scientific experiment can be conducted** to understand the greenhouse effect, using Experiment no.1 attached at the end of this file; and supplement it with online searches on the implications of climate change.

Students can also research the El Niño phenomenon and its consequences around the world.

Increasingly polluted

In class, invite your students to reflect on what contaminates the oceans, and why this is a problem.

You can access articles, photographs and videos of the TARA MEDITERRANEAN mission on the Tara Expeditions website, and **view an animation on dissemination of plastics in the Mediterranean Sea:**

www.oceans.taraexpeditions.org/rp/la-dissemination-des-plastiques-en-mediterranee/

You can organize or participate with your class in a beach-cleaning campaign.

Increasingly acidic

Engage your students in a discussion on the definition of acid and base.

Conduct simple experiments to understand how carbon dioxide makes seawater more acidic, and what the consequences are using Experiment no. 2, "Carbon dioxide and ocean acidification", attached at the end of this file.

Coral reefs in danger!

Taking inspiration from the video clip and additional online documentation, **draw and annotate coral's stages of development** when exposed to high water temperatures for a long time.

Invite your students to **give a presentation on the TARA PACIFIC expedition**. They can also find out about the first scientific explorations of the Ocean and discover who Captain Cook was.





A ROLE TO PLAY

How to reduce our own impact?

Together with your students, brainstorm on how to reduce greenhouse gas emissions in different contexts: at home, during leisure activities, when traveling, at school, etc.

They can **make a short video** about their actions and what they intend to do. Classes can also be divided into small groups to prepare presentations on pollution sources: meat industry / transportation / energy, etc.

Inform your family and friends

With your students, you can **create different types of communication** to share what they have learned with their entourage. This may include writing a short text, individually or in groups, an “advocacy for coral” to explain the issues concerning coral reefs and what each of us can do to help. You can even make a short animated film similar to the video clip “Coral Bleaching Explained”, with your own illustrations and words.

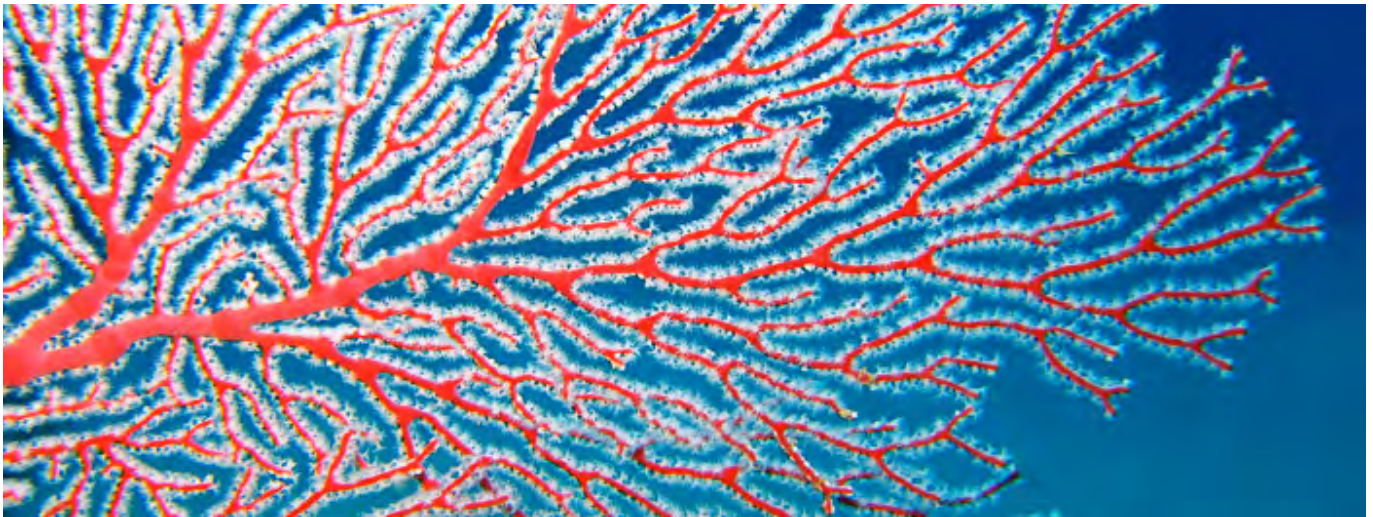
DISPLAY THE ACHIEVEMENTS OF YOUR STUDENTS AND YOUR PROJECTS!

Share **your students’ drawings, texts and videos**.

We will publish them on the Tara Expeditions website. Do not hesitate to send them to us specifying who the artists are!

Show the projects you have coordinated on coral so that other teachers can be inspired.

Contact us:
education@taraexpeditions.org



QUIZZ

1: CORAL IS...

- a- A motionless animal
- b- A colorful stone
- c- An animal that is also a plant and a mineral

2: HOW DO WE KNOW IF A CORAL IS YOUNG OR OLD?

- a- It becomes greyish as it grows old, like men
- b- It grows with age, like the rings of a tree
- c- It becomes more fragile and brittle

3: ALGAE AND CORAL LIVE IN SYMBIOSIS. WHAT DOES THIS MEAN?

- a- They help each other from time to time
- b- They help each other and wouldn't be able to live without the help of the other one
- c- They compete with each other

4: WHERE DOES CORAL GET ITS ENERGY?

- a- Directly from sunlight
- b- From surrounding food
- c- From the sugar produced by algae using solar energy

5: HOW LONG DO CORALS LIVE?

- a- Several decades
- b- A few months
- c- Several hundred years

6 - WHAT CHANGES ARE AFFECTING THE OCEAN?

- a- It is getting more polluted, warmer and less acidic
- b- It is getting cleaner, warmer and more acidic
- c- It is getting more polluted, warmer and more acidic

7: WHAT IS THE MAIN CAUSE OF OCEAN WARMING?

- a- More intense sun activity
- b- Emissions of greenhouse gases into the atmosphere
- c- Increased underwater volcanic activity

8: WHAT IS THE NAME OF THE PHENOMENON RESPONSIBLE FOR WARMING THE SURFACE OF THE PACIFIC OCEAN?

- a- El Niño
- b- La Niña
- c- El Pacífico

9: HOW DOES CORAL REACT WHEN SEAWATER GETS TOO HOT?

- a- It sweats a lot
- b- It expels the symbiotic algae
- c- It dies

10: WHAT HAPPENS WHEN A CORAL CEASES TO HOST ALGAE?

- a- It turns white and risks dying from starvation
- b- It sets up a new symbiosis with another living organism
- c- It dies immediately

11: WHAT DO SCIENTISTS ANTICIPATE IN THE FUTURE?

- a- Ocean temperature is going to stabilize
- b- Ocean warming will continue and peak temperatures will become more and more frequent
- c- Ocean temperature is going to gradually decrease

12: WHAT INDUSTRY PRODUCES THE MOST GREENHOUSE GASES?

- a- The meat industry is more polluting than the transportation industry
- b- The meat industry is less polluting than the transportation industry
- c- The meat industry is as polluting as the transportation industry

EXPERIMENT: GREENHOUSE EFFECT

1. QUESTION

What is a greenhouse effect?

To answer this question, the Planet Sciences Association & ADEME propose the following experiment:

2. MATERIAL

- 1 transparent bowl
- 1 thermometer
- 2 glasses
- water

3. PROCEDURE

- 1- Fill the 2 glasses with the same amount of water
- 2- Place the glasses outside in the sun, and cover one of the glasses with the transparent bowl
- 3- After 60 minutes, measure the temperature of the water in the 2 glasses. Which glass contains the warmest water?

4. FURTHER INFORMATION

The transparent bowl acts like a greenhouse, allowing light rays to pass through and retaining the heat. Different gases in the earth's atmosphere play the same role: not only do they protect us but they also retain the sun's heat. Without these gases, the Earth's surface temperature would be -180C ! However, for several years, the quantity of atmospheric greenhouse gases has increased leading to climate disruptions. It is interesting to find out which gases have greenhouse effects and where they come from.

This experiment was provided by the Planet Sciences Association

SOURCE :

Fondation Tara Expéditions, Planète Sciences et l'ADEME
www.oceans.taraexpeditions.org/rp/effet-de-serre/

