CORAL REEFS and 3D MODELS

Modules 3 and 10

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CORAL REEFS and 3D MODE

- Content of the modules:
  - Information Chapters
  - Educational Games
  - Exercises
  - Learn more

- Structure of the modules
  - Material for students
  - Material for teachers
Coral reefs

- Identity card of Coral reefs
- Importance of Coral reefs
- Coral reefs under attack
- Coral Bleaching
- Remote sensing for coral reef mapping

3D Modules

- Introduction
- Some basic principles
- 3D-Applications
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How do corals grow into reefs?

Fringing reefs

- Fringing reefs are relatively young. They can develop in shallow waters along the edges of islands, peninsulas, and continents (an example is the Great Barrier Reef in Australia).

- With time, however, the barrier platform of the fringing reef may become elevated and form a shelf, upon which shallows and slightly deeper parts can develop into a barrier reef.

- Fringing reefs can also transform into barrier reefs as they move away from the shore.

Barrier reefs


Fringing reefs generally form platforms a short distance from shore and are therefore near the shore. Barrier reefs are similar to fringing reefs as they border the shoreline, however, they are usually much wider distances from the land and are deep and often channeled and separated from shallow water.

Patch reefs

Patch reefs are isolated reef platforms of various shapes and sizes.

Exercise 2 - Teachers' instructions

Chapter 1: Identity card of a coral reef

A close look at the reef

Objectives

Students can point out and give some information on the different parts of the reef.

Materials

- Download the worksheet: A close look at the reef (230 KB, PDF)
- Directions

Time needed

One class period

Procedure

Try to fill in the image and answer the questions by using the explanations in the game.

Answers

1. The image below is a representation of a coral reef. Compare the image to identify every part of the reef...
Identity Card of Coral reefs:
- What are they?
- Global distribution of coral reefs
- What do corals need?
- How do corals grow into reefs?
- From fringing reefs to atolls
- A closer look at the reef
Coral reefs

- Importance of coral reefs
  - Ecological treasure
  - Socio-economic value
  - Corals are the “canaries” of the seas
Coral reefs under attack
- Damage by storms,
- Coastal development
- Tourism
- Marine pollution
- Destructive fishing
- Global Change
Coral bleaching

- What is coral bleaching?
- When does coral bleaching occur?
Remote sensing for coral reef mapping

- Why use remote sensing for coral reef research?
- The advantage of satellite measurements
- How to distinguish healthy from bleached corals
- How deep is the sea?
- Distinguishing the different parts of a reef
- What’s on the sea floor?
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3D Models

- Introduction
  - What is meant by 3D?
  - Why mapping in 3D?
  - History of 3D
Some basic principles
- Perspective projection
- Relief displacement
- Parallax
- Stereovision
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3D Models

- 3D-applications
  - Introduction to applications
  - DEM
  - Orthophoto
  - Drape
  - Anaglyph
  - Fly over
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3D Models
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3D Models
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- Educational games

A closer look at the reef

Studies of coral reefs show that most of the reefs have a similar structure where different parts can be distinguished.

This game helps you identify the different parts of a coral reef.

Coral reefs under attack!

Coral reefs become more and more stressed by several influences. These influences can be natural as well as human.

The following interactive image will show you the main threats to coral reefs.
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- **Exercises:**
  - as online worksheet
  - + downloadable PDF
- Learn more
- References
- Links
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Teacher’s Corner

Worksheets, exercises and case-studies for use in the classroom

Chapter 1: Identity card of a coral reef
- Exercise 1 - Global distribution - What do corals need?
  Go to the online worksheet.
  Download the worksheet (rtf) for use in class.
  Check out the teachers' instructions and answers.
- Exercise 2 - A closer look at the reef
  Go to the online worksheet.
  Download the worksheet (rtf) for use in class.
  Check out the teachers' instructions and answers.

Chapter 2: Importance of coral reefs
- Exercise 3 - ...

Chapter 3: Coral reefs under attack
- Exercise 4 - ...

Chapter 4: Coral bleaching
- Exercise 5 - Sea Surface Temperature and coral bleaching
  Go to the online worksheet.
  Download the worksheet (rtf) for use in class.
  Check out the teachers' instructions and answers.

Chapter 5: Remote sensing for coral reef mapping
- Case study - What's on the sea floor?
  Check out the case study of a bottom-type classification near Jebel Ali in the southern Arabian Gulf.
- Exercise 6 - Mapping the risks
  Go to the online worksheet.
  Download the worksheet (rtf) for use in class.
  Check out the teachers' instructions and answers.
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Thank you for your attention......and questions?