



## Coral Reef Bleaching

**Summary:** Students learn about the biology of corals, who are members of the phylum Cnidaria. After learning the biology, students will learn why corals become bleached, which conditions produces less & more bleaching, and what they can do to help the problem.

### Background Information:

See attached PowerPoint presentation for Background Information.

**Grade Level:** High school

**Goal:** We need to watch and protect corals, as they are indicator species for how the rest of our planet is doing.

**Key Concepts:** ecology, symbiosis, global warming, conservation

**Objectives:** Upon completion of this lesson, students will:

- 1) Learn coral biology
- 2) Learn threats that face corals
- 3) Identify ways to protect and/or heal corals

**Teaching Location:** Classroom and Computer Lab (or access to internet)

**Lesson Time:**  
PowerPoint – 30 min.  
Coral bleaching simulator – 30 min.

**Subject Areas for Infusion:** Science

### Standards:

Science  
C.12.5, F.12.1, F.12.8

Environmental Education  
A.12.4, B.12.3, B.12.6

## Vocabulary

**Cnidarian:** a radially symmetrical invertebrate animal characterized by the possession of stinging cells called nematocysts

**Symbiosis:** two organisms that live together cooperatively

### Materials:

- Computer (1 for instructor)
- Data projector
- Computers with internet access (1 per pair of students)
- Paper
- Writing utensil

### Set-Up:

- Setup data projector and computer – make sure connections are secure
- Acquire computers or reserve computer lab (if necessary)
- Check website for address change
- Assign students to pairs

### Procedure:

Students will first learn about cnidarians through a PowerPoint presentation from the instructor. This will include coral biology and threats to corals that can lead to bleaching. Following the presentation, students will be put into groups of 2 to work together on coral bleaching simulator investigating coral status following specific threats.

#### Introduction – PowerPoint Presentation

Students will learn about cnidarians, coral biology, and threats to corals that can lead to bleaching.

#### Activity 1 – Lab: Coral Bleaching Simulator

1. Take students to computer lab.
2. Explain that once they arrive at the website, they will be responsible for running 5 different coral bleaching simulations.
3. Students can have 1 person who operates the computer and the other person will record the data, or they can switch often through the entire simulation.
4. On their sheets of paper, they must record the variables they chose, sketch the graph that was generated, and explain what they saw in their own words.
5. Each group must use 1 simulation and create a larger poster display using markers and/or colored pencils. The poster must have the same criteria in it as step 4.
6. Once finished, collect papers and posters from groups and return to the classroom for poster presentations and discussion.
7. In classroom, have each group explain their poster to the rest of the class.

#### Conclusion

Lead a discussion for students to develop ways in which they can help with the conservation efforts for coral reefs. Try to lead them to come up with similar ideas to these (provided by Reef Futures):

The ultimate solution to protect coral reefs would be to target the source of global climate change, i.e. reduction of greenhouse gas emissions through reduced fossil fuel burning and increasing reforestation. The extent and rate of such changes are governed by complex political and socio-economic drivers and are unpredictable. In the short-term, we must maintain coral reefs in the best possible condition. Reefs that are already stressed by environmental factors, such as poor water quality or overfishing, will be more vulnerable to changes in sea temperature. For human enterprises, such as tourism and fishing, surviving and thriving in the 21st Century means:

- working with scientists to determine the implications for different industries of projections of future environmental trends;
- implementing best practices to protect the biological diversity, productivity and ecosystem processes that underpin their industries; and
- working in the broader society to influence land-use, energy and population policies that may impact on their enterprises directly and through ecosystems.

### **Assessment**

Students will be assessed on the accuracy of their 5 simulations and on the accuracy and creativity of their poster. Cnidarians, coral bleaching, and threats to coral will be included in an end-of-the-unit test as well.

**Adaptations:** This lesson could be modified for middle school students by limiting the variables in the coral bleaching simulator to a select few? The lesson can be modified for students with special needs by having such students draw cnidarians to assess their learning and by having them control the coral bleaching simulator while their lab partner records the information.

### **References:**

Coral Bleaching      <http://www.uvi.edu/coral.reefer/bleach.htm>

Reef Futures          [www.reeffutures.org](http://www.reeffutures.org)