

**Source:** This activity is adapted from Coral Reefs: A Gallery Program produced at the National Aquarium in Baltimore, Maryland. Used with permission.

## 21\*. WHERE DO CORAL REEFS GROW?

### Introduction

The term “reef” refers to a hard structure that rises above the ocean floor. Sometimes reefs are large rocks; the Exxon Valdez hit a rock reef. Coral reefs consist of calcium carbonate ( $\text{CaCO}_3$ ) deposited as skeletons by animals related to anemones and jellyfish called stony or reef-building corals. In addition to corals, coralline algae also produce calcium carbonate. These rock-like red algae live on dead coral. They cement the branches and mounds of coral skeletons into a solid structure. Anytime there is a hard surface for plants and animals to attach to, ocean creatures are abundant. Think of pier pilings or the bottoms of boats that become covered with seaweed and marine animals. In addition, swimming animals like fish come to reefs for both food and shelter. Humans take advantage of this when they make artificial reefs from ships, old cars or cement-filled tires. Coral reefs are exciting places to visit. They have some of the greatest numbers of different kinds of organisms living in the world’s oceans; they are very diverse.

### Where Do Coral Reefs Grow?

The coral animals that build the reef by depositing layer upon layer of calcium carbonate skeleton have very specific requirements. Reef-building corals need warm water. They tolerate  $18^\circ$  to  $29^\circ$  C, but  $24^\circ$  C is optimum. The sun shines most directly year round on areas near the equator. It warms tropical oceans all year. This means coral reefs usually occur in tropical waters.

1. Use the map on the following page (or your own world map) to locate the area between the Tropic of Cancer and Capricorn. Do coral reefs grow everywhere in the tropics? List two tropical countries lacking coral reefs.

Winds along the equator blow from east to west, pushing water across the ocean. Coriolis forces caused by the spinning of the Earth and the continents’ location across the path of wind driven water, create circular currents in the oceans. They move clockwise in the northern hemisphere and counter-clockwise in the southern.

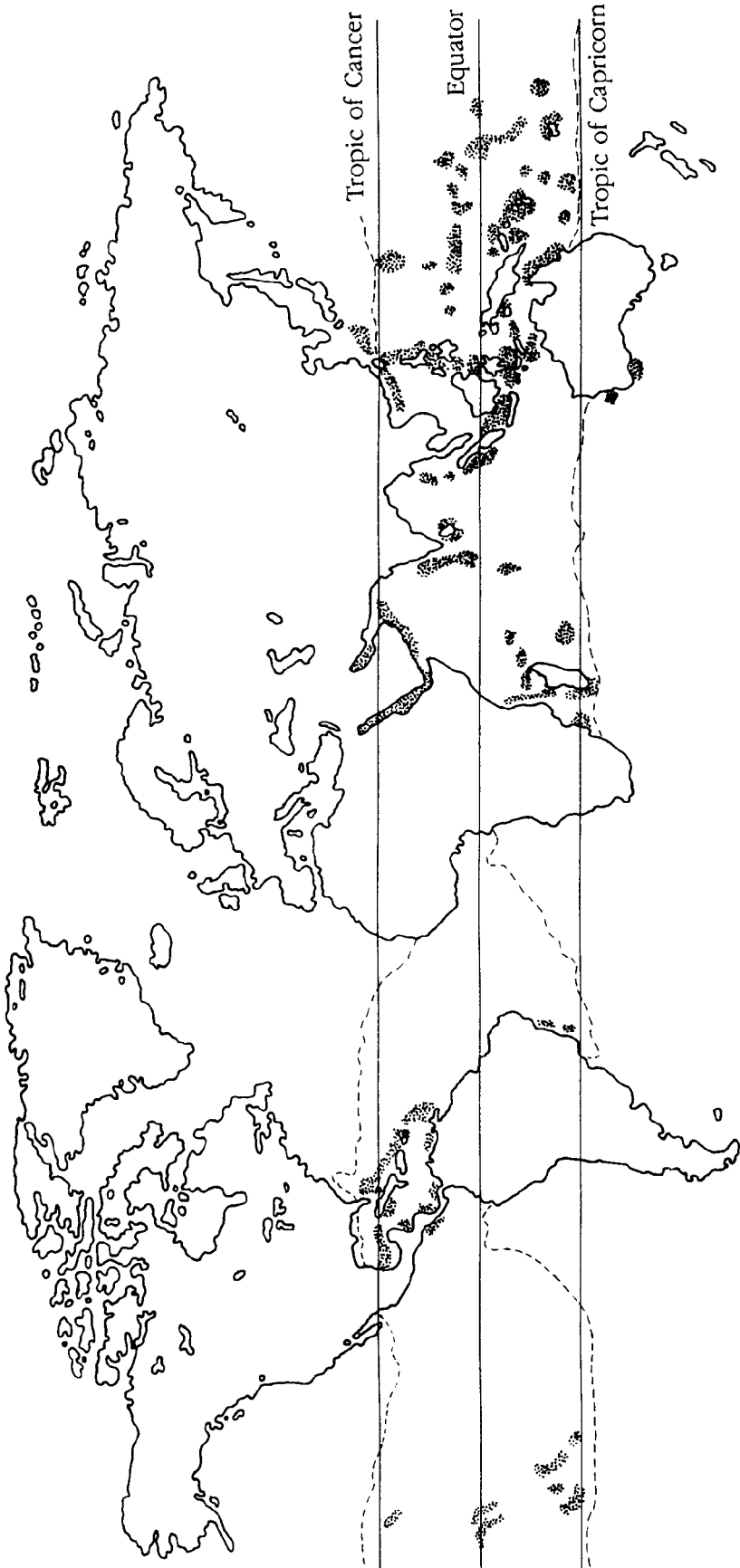
2. Draw arrows showing these currents on the map.

Water warms as it moves westward along the equator. It cools as it passes across the northern and southern parts of the oceans.

3. Which coasts have the warm water? Cold? Write a general hypothesis that explains coral reef distribution based on water temperature.

Reef-building corals require ocean-strength salt water (35 ppt with a range of tolerance from 25-40 ppt). Fresh water kills them. In addition to temperature and salinity, reef-building corals have a strange need for animals: they require light! Anything that blocks light kills corals. They do not grow in water with sediment or dirt (turbid water) nor do they grow in deep water where the water itself absorbs the light.

4. Look at a world map. Name a place that should have coral reefs if temperature were the only criterion. Account for this lack of reefs based on light and salinity. Hint: think geography of the adjacent land.



■ Coral Reefs

--- Restricted 70° isotherm (winter)

**Correlation to National Standards from McREL ( <http://www.mcrel.org> ) :**

Life Sciences

6. Understands relationships among organisms and their physical environment

Geography

1. Understands the characteristics and uses of maps, globes, and other geographic tools and technologies
3. Understands the characteristics and uses of spatial organization of Earth's surface
8. Understands the characteristics of ecosystems on Earth's surface