

# Why is the Ocean Important?

Chapter 10 Lesson 1

ByDesign Science, Level 5  
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# Resources from the Ocean



- ◆ Natural resources are materials that occur naturally that humans use.
- ◆ The ocean contains natural resources such as water, wildlife, and minerals.
- ◆ The ocean provides ways to transport people or goods as well as recreation.

# Resources from the Ocean

- ◆ During the twentieth century, people began using oil and natural gas pumped from below the ocean floor.
- ◆ Today people are harnessing the power of the ocean's tides and waves to produce electricity.
- ◆ People continue to explore the oceans for new resources that can be used to make life on Earth better.



# Resources from the Ocean

## Renewable Resources



- ♦ Many people rely on the ocean's resources for food or to make a living.
- ♦ There are two types of resources found in the ocean – renewable and nonrenewable resources
- ♦ A **renewable resource** is one that nature can recreate relatively quickly so it will always be available if used properly.

# Resources from the Ocean

## Renewable Resources

- ◆ Fish can be a renewable resource if they are allowed to reproduce.
- ◆ However, if fishermen catch too many of one species of fish, then that species might not be able to reproduce quickly enough to maintain its population.
- ◆ For this reason, many government agencies that manage fisheries set limits on how many fish of one species can be harvested.



# Resources from the Ocean

## Renewable Resources



- ◆ A fishery is an area where fish and other sea food, such as shrimp, crab, and shellfish can be caught and harvested for commercial purposes.
- ◆ The word *fishery* can also refer to a fishing occupation or a business in the fishing industry.
- ◆ Some fishermen catch fish or harvest marine animals in shallow waters.
- ◆ Others use huge nets or long lines to catch fish in the open ocean.

# Resources from the Ocean

## Renewable Resources

- ◆ Seaweed is another important renewable ocean resource.
- ◆ Many people eat seaweed as a main part of their diet.
- ◆ Seaweed extract is used to thicken foods such as ice cream.



# Resources from the Ocean

## Renewable Resources



- ◆ In addition to harvesting fish and seaweed, people also harvest salt from the ocean.
- ◆ Most of the salt in the ocean comes from the land.
- ◆ As rainwater falls on land it dissolves minerals from the land.
- ◆ As rainwater falls on land it dissolves minerals in the rocks and soils.



# Resources from the Ocean

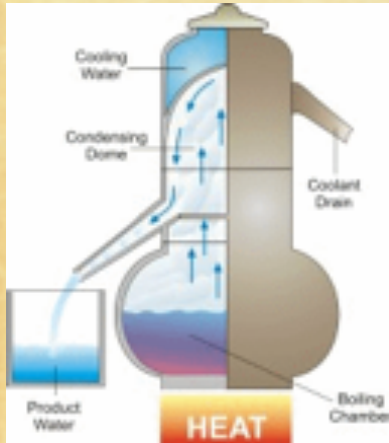
## Renewable Resources

- ◆ These minerals, which are mainly salts, are carried by the water into streams and rivers which carry them to the ocean where they are deposited.
- ◆ To harvest salt from the ocean, saltwater is collected and evaporated.
- ◆ When the water evaporates, crystals of sea salt are left behind.



# Resources from the Ocean

## Renewable Resources



- ◆ Another essential for your body is water.
- ◆ You already know that you can only drink freshwater.
- ◆ Freshwater is typically found in lakes, rivers, and aquifers.
- ◆ However, many places on Earth have more saltwater than freshwater.
- ◆ The ocean can be a source of freshwater.
- ◆ A process called **desalination** removes salt from ocean water.

# Resources from the Ocean

## Renewable Resources

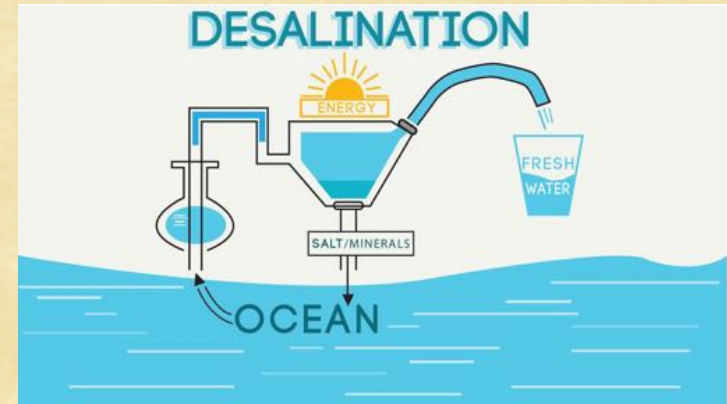


- ◆ Desalinating large amounts of water takes place in a desalination plant.
- ◆ In desalination plants, saltwater is collected from the ocean and treated with chemicals.
- ◆ Then the water is filtered and goes through a process called reverse osmosis.

# Resources from the Ocean

## Renewable Resources

- ◆ In reverse osmosis, the water is passed through a membrane with very tiny holes in it.
- ◆ Water molecules can pass through the membrane, but salt molecules cannot.
- ◆ The process can be very expensive, but some populations of people rely on it for their freshwater supply.



# How Seawater Desalination Works



# Resources from the Ocean

## Nonrenewable Resources



- ◆ Other resources humans use from the ocean are nonrenewable resources.
- ◆ These resources occur naturally, but supplies are limited, or they are used faster than nature can replenish them.

# Resources from the Ocean

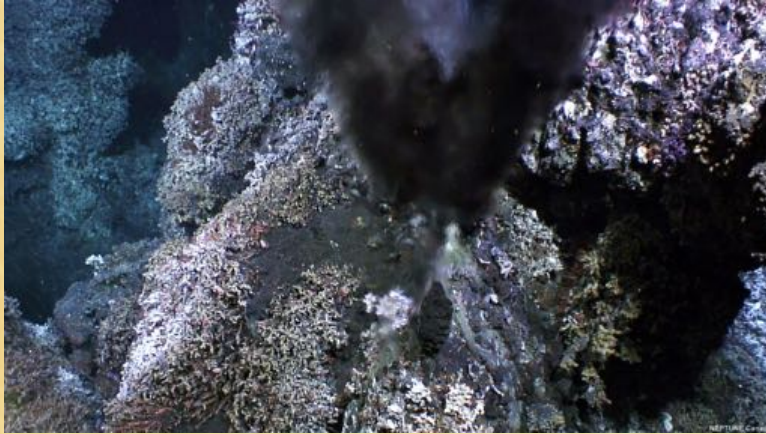
## Nonrenewable Resources

- ◆ Two widely used resources from the ocean are oil and natural gas.
- ◆ People use oil and natural gas as fuels and to manufacture numerous products.
- ◆ To meet society's demand for these resources, companies drill beneath the ocean floor and pump out the oil and gas.
- ◆ Earth cannot replenish the supply of oil and natural gas as fast as humans use them.



# Resources from the Ocean

## Nonrenewable Resources

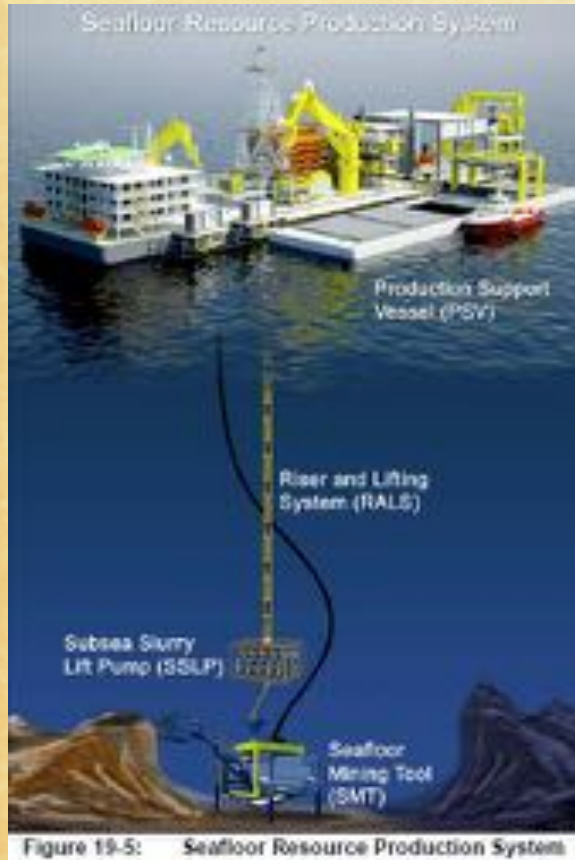


- ◆ In addition to oil, natural gas, and salt, there are many other minerals found in the ocean, including potassium, magnesium, zinc, titanium, and diamonds.
- ◆ These minerals are found near hydrothermal vents.



# Resources from the Ocean

## Nonrenewable Resources



- ♦ Scientists are developing methods for mining other useful minerals, including copper, gold, silver, and zinc.
- ♦ To mine these rocks, remote-controlled machines cut and collect rocks from underwater formations.

# Resources from the Ocean

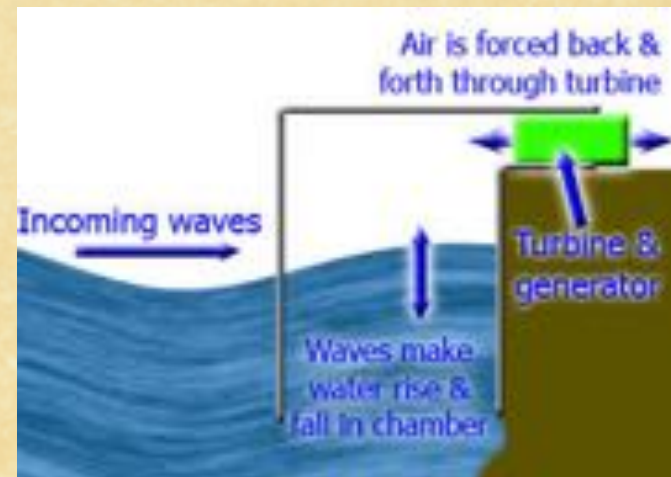
## Nonrenewable Resources



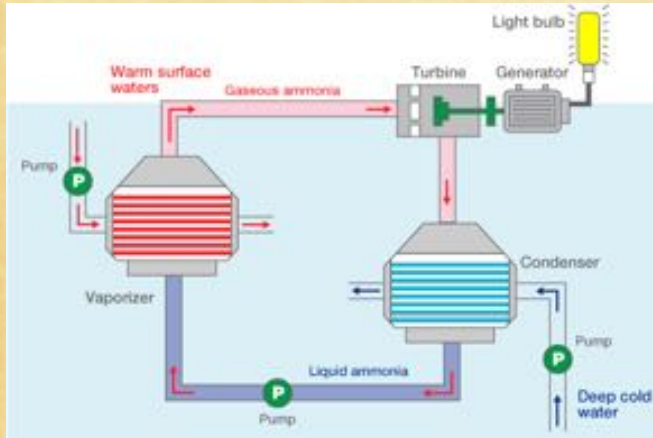
- ◆ We need to protect natural resources and use them wisely.
- ◆ Nonrenewable resources could eventually be used up.
- ◆ Even the renewable resources God gave us can be lost if they are not cared for properly.

# Energy from the Ocean

- ◆ Have you ever been to the beach and been knocked over by a wave?
- ◆ Waves contain an enormous amount of energy.
- ◆ Wave energy is electricity that is generated by the movement of ocean waves.
- ◆ There are three ways this can be done:



# Energy from the Ocean



- ◆ The First Way:
- ◆ Generators on or near the shore contain turbines that are turned as ocean waves reach the shore.
- ◆ The turbine generates electricity that is sent through wires to power homes and businesses.

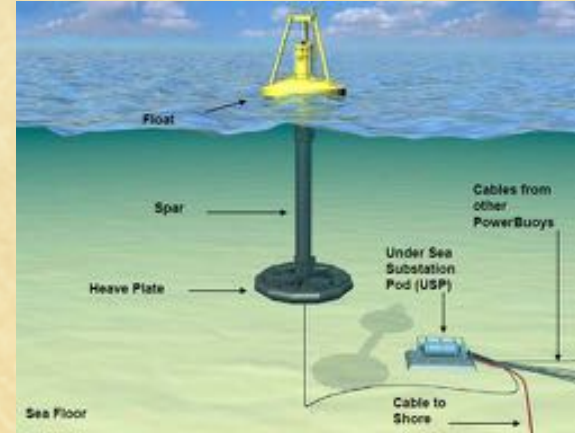
# Energy from the Ocean

- ◆ The second way:
- ◆ Dam-like structures in the water catch the ocean water and hold it, then use the pressure from the incoming waves to turn a turbine.
- ◆ The electricity generated is then relayed to shore.

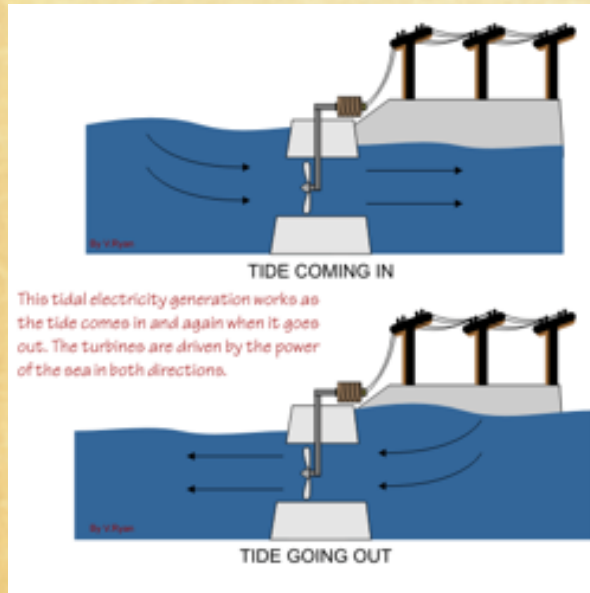


# Energy from the Ocean

- ◆ The third way:
- ◆ Special buoys anchored to the ocean floor contain generators.
- ◆ The top of the buoy moves up and down with the movement of the ocean waves.
- ◆ In turn, this moves a cylinder in the generator up and down, which generates electricity.



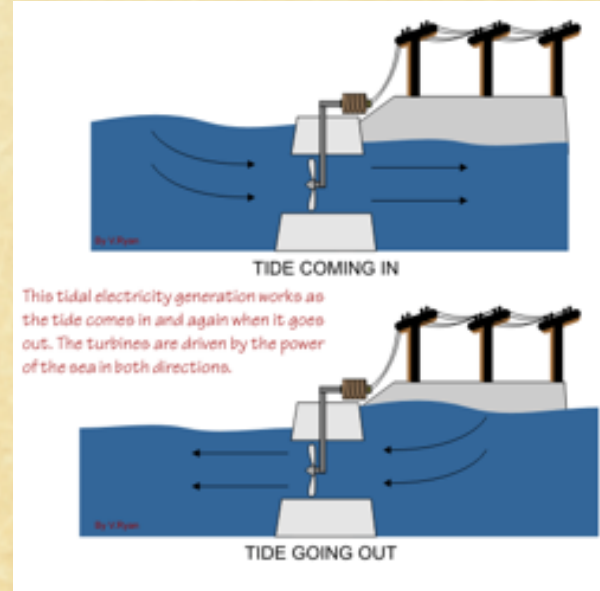
# Energy from the Ocean



- ◆ Some of the best locations in North America for wave energy technology include the northern coasts of Canada and the northwestern coasts of the United States.
- ◆ In places where there is a large tidal range, the tide's powerful movements can be harnessed to produce electricity.

# Energy from the Ocean

- ◆ Tidal power works best where the tides move through a bay or between tall cliffs that create a narrow funnel.
- ◆ When the water flows in and out with the tides, it turns a turbine on the sea floor.
- ◆ The turbine generates electricity.





# Energy from the Ocean

- ◆ Another way engineers have used the ocean as a source of renewable energy is by constructing offshore wind farms.
- ◆ A wind farm is a group of wind turbines.
- ◆ The wind over the ocean can be very strong for long periods of time.
- ◆ By constructing wind turbines in the ocean, scientists can use these strong winds to generate electricity.



# Wave Energy

