

## **GLOSSARY:**

**Biomass** - Plant material or garbage that can be converted into fuel.

**Estuary** - An arm of the sea at the mouth of a river.

**Generator** - A machine that converts mechanical energy into electrical energy.

**Geothermal** - Energy that comes from the heat of the earth.

**Headpond** - The collecting basin of a power plant that uses water to generate power.

**Hydroelectric** - Of or relating to the production of electricity by waterpower.

**Nuclear energy** - The energy released by a fission or fusion reaction.

**Renewable** - Energy from sources that cannot be used up.

**Transformer** - An electromagnetic device that can change the voltage and current.

**Turbine** - A rotary power-generating device driven by a moving fluid, such as water, steam, gas, or wind, that converts kinetic energy into mechanical energy.

# **Show Me Science**

## **The Wonders of Oceanography**

# **Power from the Ocean Tides**

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**K4599DVD**  
**Teachers Guide**

## **SYNOPSIS:**

Gravity from the moon creates ocean tides on earth that go out two times a day, every day of the year. This effect of the moon's gravity on the oceans can be harnessed and turned into power. In fact, people have been using the power of the tides to do work for centuries. This program explores how tidal power is generated and how it works. It illustrates how the tides are created, how watermills once used the tides to grind grain, and how modern power plants use turbines to turn this constant flow of water into electricity. It also discusses how tidal power plants can work without damming estuaries and rivers.

## **CURRICULUM UNITS:**

Astronomy  
Ecology  
Electricity  
Engineering  
Oceanography

## **CAREER OPPORTUNITIES:**

Astronomer  
Electrical engineer  
Marine biologist  
Oceanographer  
Structural engineer

## **PROGRAM OVERVIEW:**

Most of the energy in use today is generated from fossil fuels. Hydroelectric, biomass, and nuclear power plants currently supply about 15 percent of the nation's electricity. Solar, wind, and geothermal power are gaining use as alternative fuel sources. Moon power, power from the tides, is also being used in some areas. In this edition, we will look at the moon and the earth to see how the gravity of the moon affects our oceans. An animation shows the waters of the ocean "following" the moon, bulging outward and raising the water levels.

## **ISSUES & CRITICAL THINKING:**

1. After viewing the program: What are tides and what causes them? Why do the ocean's waters pull towards the moon? What are the negative environmental impacts of traditional tidal power plants?
2. Discuss why gravity is important. Then, have students write a story about living in a world without gravity.
3. Discuss how energy is generated at a tidal power plant.
4. Discuss how the sun affects the tides, creating Neap Tides and Spring Tides.

5. Have students research renewable sources of energy, such as solar, wind, geothermal and hydroelectric. Choose two of these sources and compare and contrast their pros and cons.
6. Create a chart depicting the differences.
7. What causes the ocean to bulge on the side of the earth opposite the moon?
8. Visit a power plant and see how electricity is generated.