Name _____ Date _____ Class _____

CONNECTION TO ENGINEERING

Wave Energy

Transverse waves are generated by the force of the wind acting on the surface of the ocean. As the wind blows, it transfers part of its energy to the waves. Some engineers are designing alternative methods to convert this energy into useful energy. The ocean wave energy conversion (OWEC) devices convert the energy in ocean waves to mechanical energy that can be used to power an electrical generator.

The Oscillating Water Column

An oscillating water column (OWC) device uses a vertical cylinder that is open at both ends. The bottom end of the column is submerged in water. As the crest (high point) of a wave passes, the column of water rises. The rising water pushes the column of air above the water column. The force is transmitted through the air column causing a propeller on top of the column to rotate. As the trough of the wave passes, the water column falls, drawing air into the cylinder. Each crest causes the propeller to rotate. The propeller can be attached to an electric generator that can convert the kinetic energy of the propeller into electricity.

The Heaving Buoy

A second OWEC device is the heaving buoy, which is anchored to the seabed. The main parts are a buoy (float) and a hydraulic piston. The top of the buoy is attached to the piston by a movable "arm." As waves pass, they bounce the buoy up and down. As the buoy bounces, the arm lifts and lowers, pushing the piston back and forth. The motion of the piston is then converted to rotary movements to generate electricity.

Your Turn to Think

1. What kind of waves are generated on the surface of water?
2. In an oscillating water column (OWC) device, what is attached to the propeller?
3. In the heaving buoy converter, what causes the piston to move up and down?