Water, Water Everywhere Outline

**Lesson Objectives:**

* Students will learn what irrigation is and some of the positive and negative implications.
* Students will learn about sources of water commonly used for irrigation, such as groundwater which can be pumped from aquifers.

**Introduction of Activity:**

1. For centuries, man has had the need to move water from one place to another.
	1. Irrigation systems move water from one location to others where it may be needed for farming or other purposes.
	2. Irrigation is a system that artificially routes water to an area where it is not naturally present. More common applications are in providing water to remote or dry land for growing crops.
	3. Irrigation can route water to fields, help crops overcome drought, provide drinking water, and support waste removal.
2. How do engineers and others decide which use of water is the most important?
	1. For example, what if one farmer routed a river to serve his or her own crops and in doing so prevented his neighbors from receiving any river water?
	2. Or, if water was routed to a company that stood to make a great deal of money from a profitable manufacturing facility, but in order to provide enough water for their process, all water would be diverted from small local farms farmers who might lose their livelihood. What would be fair?
	3. Engineers are continually faced with ethical considerations when building structures, designing systems, and improving products.
3. Groundwater is the water that seeps into the earth and is stored in aquifers, which are areas of soil, sand, and rock that are capable of holding liquid.
	1. The water sits in between particles or in cracks.
	2. These saturated underground areas, which can be replenished by rain and snow, can be found close to the Earth’s surface or hundreds of feet underground.
	3. Nearly 50 percent of people living in the U.S. get their drinking water from groundwater, but its biggest use is irrigation.
	4. Threats to this underground source increase as population and development accelerate.
	5. Agricultural and urban runoff tainted with chemical pesticides and fertilizers seeps into groundwater sources.
	6. The over-pumping of groundwater is causing water tables to decrease across large areas of northern China, India, Pakistan, Iran, the Middle East, Mexico, and the western United States.
	7. The United States is the world’s third largest irrigator (after China and India).
	8. Ogallala Aquifer, which spans parts of eight states from southern South Dakota to northwest Texas, is steadily being depleted. The Ogallala provides 30 percent of the groundwater used for irrigation in the U.S., and as of 2005, a volume equivalent to two-thirds the water in Lake Erie had been depleted.