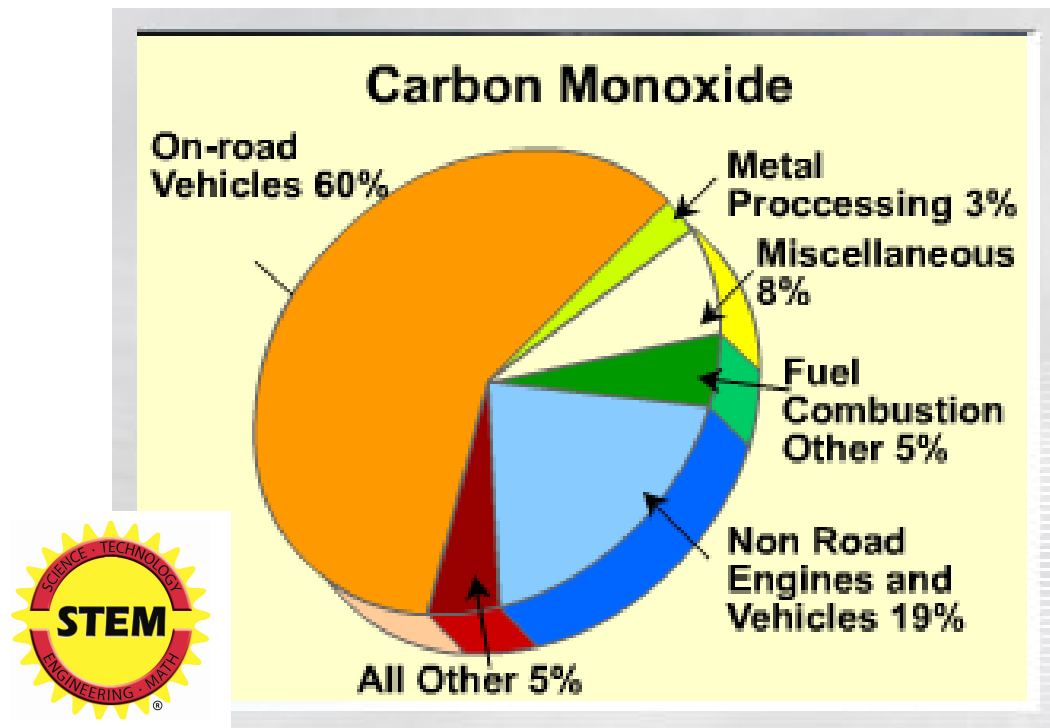


Environmental Engineering



LearnMate Delivered with Embedded Assessment

Curriculum Topics:

- **Intro to Environmental Engineering**
- **Intro to Environmental Pollution Control**
- **Intro to Water Supply Engineering**
- **Intro to Wastewater Management**
- **Intro to Transportation Engineering**



Introduction to Environmental Engineering

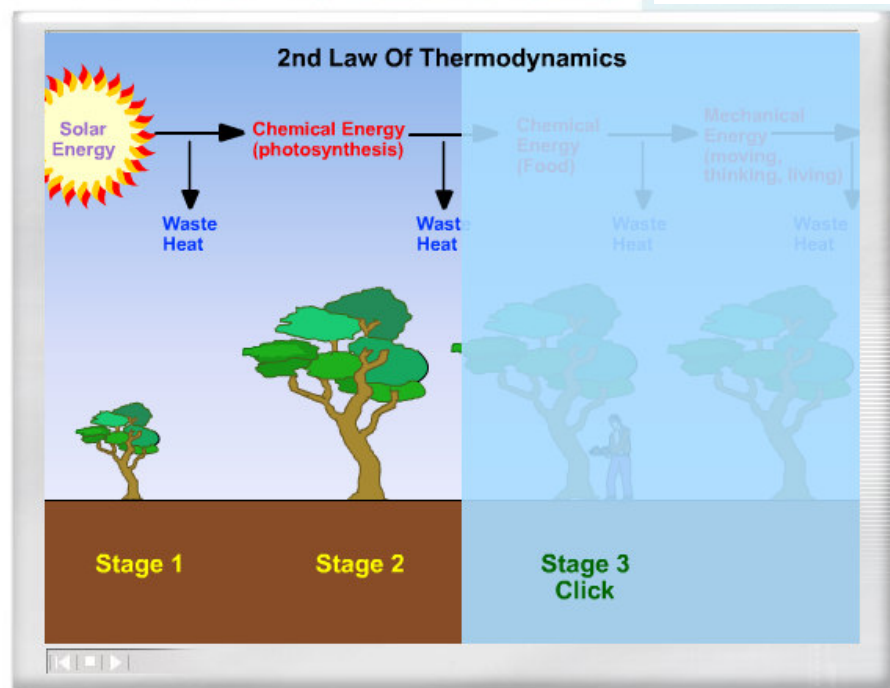
- Activity 1: Ecosystems and Ecology
- Activity 2: The Hydrosphere and Water Resources
- Activity 3: Water Quality and Supply
- Activity 4: Water Pollution
- Activity 5: Wastewater Management
- Activity 6: Fundamentals of Air Pollution
- Activity 7: Global Air Pollution
- Activity 8: Solid Waste Management
- Activity 9: Solid Waste Disposal
- Activity 10: Hazardous Waste Disposal
- Activity 11: Population and Economic Growth
- Activity 12: Energy Growth
- Activity 13: Environmental Impact Assessment
- Activity 14: Environmental Ethics
- Activity 15: Sustainable Development



Energy Flow in Ecosystems

Second Law of Thermodynamics

The second law of thermodynamics states there will always be some wasted heat. Meaning, there will always be a decrease in energy during the conversion process.



Introduction to Environmental Pollution

Activity 1: Introduction to Environmental Pollution

Activity 2: Introduction to Air Pollution and Classification

Activity 3: Meteorological Processes and Atmospheric Dispersion

Activity 4: Effects of Ambient Air Pollution

Activity 5: Reducing Air Pollution 1

Activity 6: Reducing Air Pollution 2

Activity 7: Noise and Indoor Air Pollution

Activity 8: Introduction to Water Pollution

Activity 9: Water Pollution

Activity 10: Marine Pollution

Activity 11: Water Quality and Treatment Standards

Activity 12: Wastewater Treatment Processes

Activity 13: Land Degradation

Activity 14: Land Pollution and Solid Waste Disposal

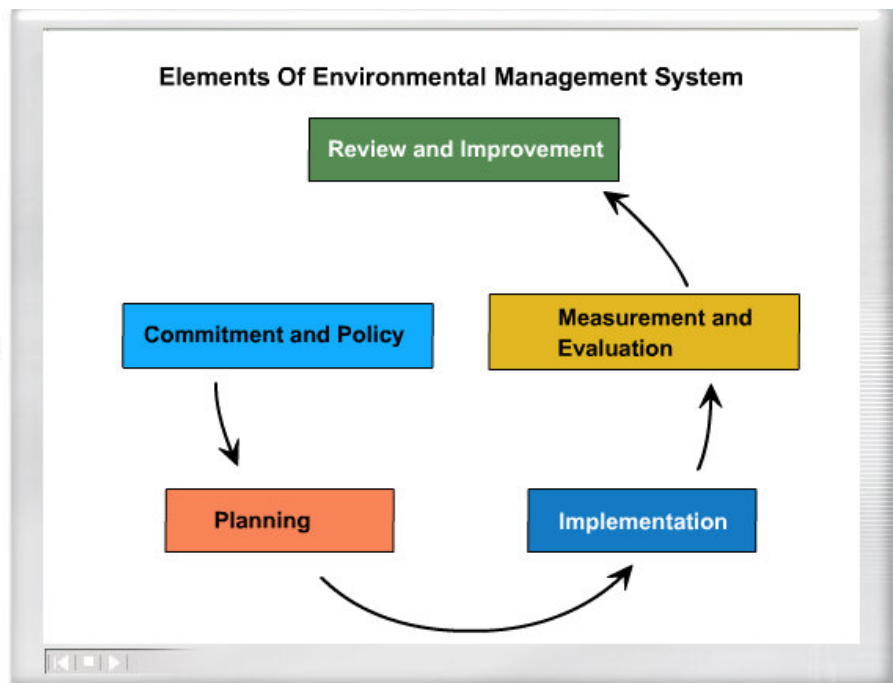
Activity 15: Pollution Legislation



What is Pollution Prevention?

Pollution Prevention Today

Today, prevention efforts are aimed not only at direct toxins. Efforts are continuously being made to reduce all pollution, from radioactive and other hazardous material, through agricultural and household chemicals, all the way to simple garbage. In addition, direct efforts are being made to use resources more efficiently and to recycle, treat water, and dispose of solid waste in a manner less damaging to the environment.



Introduction to Water Supply Engineering

Activity 1: Introduction

Activity 2: Water Sources

Activity 3: Water Quality and Treatment Standards

Activity 4: Water Pollution

Activity 5: Water Supply Systems

Activity 6: Water Intake

Activity 7: Water Treatment Overview

Activity 8: Coagulation and Flocculation

Activity 9: Filtration

Activity 10: Disinfection and Conditioning

Activity 11: Water Distribution Systems

Activity 12: Pipes

Activity 13: Joints and Valves

Activity 14: Pump Stations

Activity 15: Water Distribution in Buildings

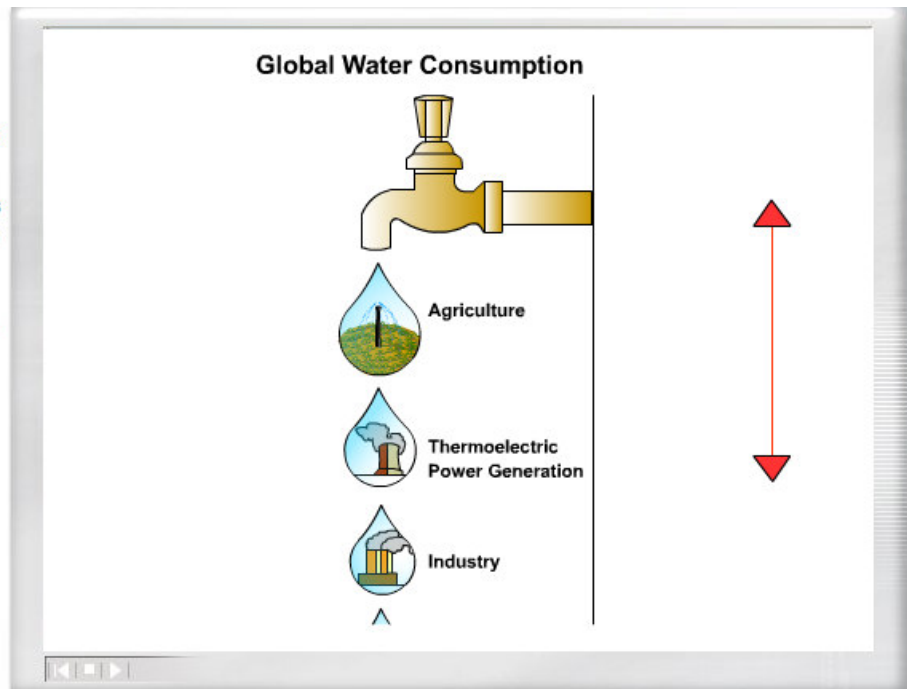


Water Supply Feasibility Studies

The Need for Water Supply Facilities

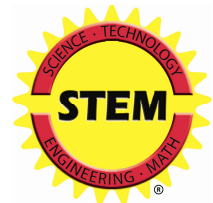
You have already learned that water is necessary for life on earth. As cities grow and the demand for water rises, water supply systems are developed to carry, treat and distribute water from natural sources like rivers and lakes, to consumers. These systems provide water for **domestic, industrial, commercial** and **municipal** use.

The first stage of developing a water supply facility is to conduct a feasibility study. The purpose of a feasibility study is to select the best location for the water supply facility. A number of factors are considered in the feasibility study.



Introduction to Wastewater Management

- Activity 1: Introduction
- Activity 2: Wastewater Characteristics
- Activity 3: Wastewater Treatment Processes
- Activity 4: Treatment Plant Planning and Design
- Project Estimates
- Activity 6: Pump Stations
- Activity 7: Preliminary Treatment
- Activity 8: Flow Measurement
- Activity 9: Primary Treatment
- Activity 10: Secondary Wastewater Treatment
- Activity 11: Disinfection
- Activity 12: Advanced Wastewater Treatment
- Activity 13: Effluent Disposal
- Activity 14: Sludge Management
- Activity 15: Natural Wastewater Treatment



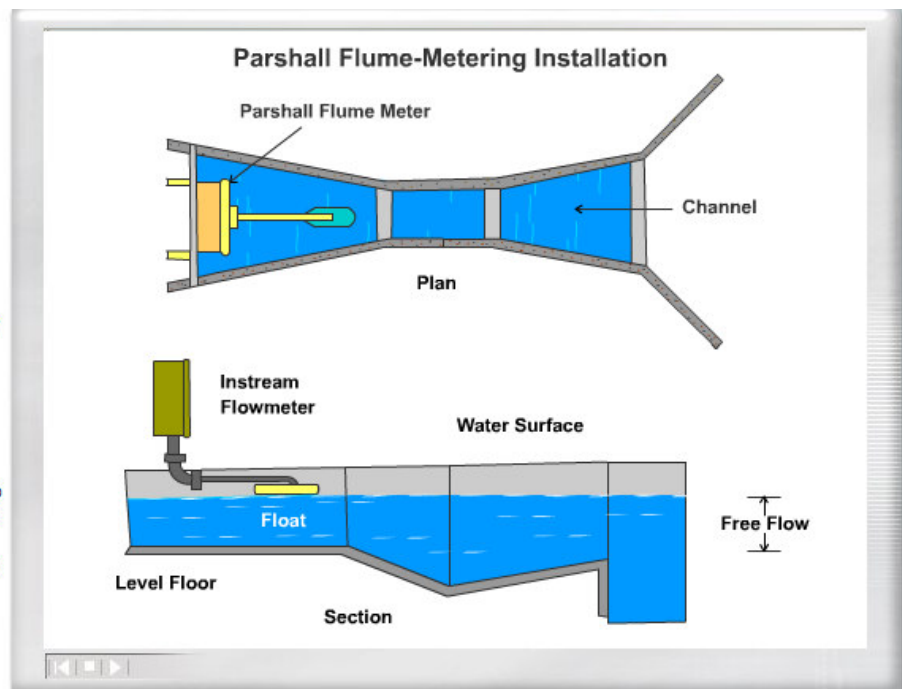
Open Channel Flow Measurement

Flumes

The most commonly used flumes in wastewater treatment systems include:

- **Parshall Flumes:** The most commonly used and widely known flume, used in sewers and to monitor influent and effluent flows at wastewater treatment plants. Parshall flumes are best used in rectangular channels.

Parshall flumes are constructed according to very strict dimensions so that the measurements they produce can be converted using predefined tables. Parshall flumes can therefore not easily be installed in existing channels.



Introduction to Transportation Engineering

Activity 1: Introduction to Transportation

Activity 2: Traffic Flow Models

Activity 3: Forecasting Travel Demand

Activity 4: Capacity and Level of Service Analysis

Activity 5: Transportation Planning

Activity 6: Transportation Impact Analysis

Activity 7: Transportation Engineering Software Applications

Activity 8: Land Transportation - Facility Design

Activity 9: Water Transportation - Facility Design

Activity 10: Air Transportation - Facility Design

Activity 11: Transportation System Management

Activity 12: Transportation Safety

Activity 13: Energy Issues in Transportation

Activity 14: Intelligent Transportation Systems

Activity 15: Emerging Transportation Systems



Maglev Trains

The Future

Germany plans to link Berlin and Hamburg in 2005. The success of this project will largely determine the fate of maglev trains in the future.

Also, some space agencies, such as NASA, are researching the use of maglev systems to launch spacecraft. In order to do so, the space agency would have to get a maglev-launched spacecraft up to escape velocity, a task which would otherwise require elaborate timing of magnetic pulses or a very fast, very powerful electric current.

Photo: [Wikipedia](#)

