TVA Science Kids:
Lesson Guide for TVA Virtual WWM Lab

37 minutes total

VIDEO ONE: What is TVA? (5 minutes)

What you will learn:

- What is a watershed?
- The ways TVA creates electricity using renewable and non-renewable resources.
    - Hydroelectric dams
    - Fossil fuel power plants
    - Nuclear power plants
    - Solar power plants
    - Wind farms
- How electricity travels
- TVA manages the Tennessee River for flood control, navigation, and recreation.

Discussion/Journal questions:

- What do you power with electricity?
- What is the difference between renewable and non-renewable resources?
- Why does part of the Tennessee River flow north into Kentucky?
- What do you like to do on the water?

Vocabulary:

- Watershed- an area of land where all the water on the surface drains to one central body of water
- Renewable resource- a resource that can be used repeatedly and never run out because it is naturally replaced

External resources:

- www.currentsofchange.net/
    - Social Studies/History lessons of the Great Depression, New Deal, & TVA.

VIDEO TWO: What is Aquatic Life? (3 minutes)

What you will learn:

- What is an environmental scientist?
- What is aquatic life?
- Step one of the science and engineering process.
    - Ask the question: Will this water source support aquatic life?
- How to make a visual observation

Discussion/Journal questions:

- What 4 things does aquatic life need to survive?
- What visual observations do you see for your water source?
- Will the water source support aquatic life?

Vocabulary:

- Aquatic life- any plant, animal, or insect that uses water as a home for at least part of its life cycle
- Visual observation- data gathered by researchers of what they can see with their eyes

External resources:

- www.stemexplore.org/
    - Cabinet of Curiosities explores STEM career paths.

VIDEO THREE: How to Start an Experiment (6 minutes)

What you will learn:

- Science and Engineering Process
    - Plan and Carry Out Investigations
- How to fill out a data sheet like a scientist
    - Why it's important
    - Date
    - Location
- Using degrees Fahrenheit and Celsius
- What units of measurement to use
    - PPM- parts per million
    - JTU- Jackson Turbidity Unit
- How to check your equipment
    - It's important to make sure everything is there and works

Discussion/Journal questions:

- How does a thermometer work?
- Why do scientists use Celsius?
- Why are units of measurement important?

Vocabulary:

- Data sheet- document where we record information on the subject we are studying
- Parameter- characteristic or feature that can be measured
- Measurement-description of what we are studying
    - unit of measurement- standard used for reference and comparison
- Beaker- piece of science equipment used to hold fluids and chemicals
- Secchi Disk- black and white disk, used to measure transparency or turbidity of water
- Test tube- cylindrical container that holds a small amount of a substance used for laboratory tests and experiments
- Vial- small vessel or bottle that usually holds liquids
- Thermometer- used to measure the amount of heat in an object or substance

VIDEO FOUR: Water Temperature Test (4 minutes)

What you will learn:

- How water temperature affects aquatic life
- Why is water temperature important to aquatic life?
- How to properly take the temperature of water
- Organisms migrate to conditions that better suit them
- Predator/Prey relationships

Discussion/Journal questions:

- Examples of why is water temperature important to aquatic life?

Vocabulary:

- Adaptation- the evolutionary process where an organism becomes better suited to its habitat; process that takes place over several generations

VIDEO FIVE: Dissolved Oxygen Test (5 minutes)
What you will learn:
- What is dissolved oxygen?
- How oxygen is infused into water?
- Why is dissolved oxygen important to aquatic life?
- Steps for the D.O. test

Discussion/Journal questions:
- How do fish breathe?
- Examples of why is dissolved oxygen important to aquatic life?
- Examples of a chemical reaction?

Vocabulary:
- Chemical reaction- the process where a set of substances undergo a chemical change to form a different substance

VIDEO SIX: pH Test (3 minutes)
What you will learn:
- pH scale
- How the pH or acidity in the water affects aquatic life
    - Range of 6.5-9.0 is best for most aquatic life
- Steps for the pH test

Discussion/Journal questions:
- Examples of how pH affects the water quality and aquatic life?

VIDEO SEVEN: Turbidity Test (3 minutes)
What we will learn:
- What is turbidity?
- Why is turbidity important to aquatic life?
    - Animals need to see to find food or avoid predators
    - Plants need sunlight for photosynthesis
- Steps for turbidity test

Discussion/Journal questions:
- Examples of why turbidity is important to aquatic life?
- What are 2 possible causes for increased turbidity?

Vocabulary:
- Turbidity- the measure of waters transparency or clarity
- Photosynthesis- the process by which plants use sunlight to make their food

VIDEO EIGHT A: Analyze and Interpret Results (5 minutes)
What you will learn:
- Record your data
- What does your data mean
- Answer the question: Will your local water source support aquatic life?
    - Give evidence to support your answer

Discussion/Journal questions:
- Why will your local water source support aquatic life?

External resources:

- www.monitorwater.org/
    - See test results from all over the world.

VIDEO EIGHT B: Human Impact (3 minutes)

What you will learn

- Distribution of water on Earth
    - Almost 75% of Earth is water
    - 97% Saltwater, 2% Ice, 1% Freshwater
- Importance of protecting freshwater resources
    - 1% we have to share with all aquatic life, worldwide

Discussion/Journal questions:

- Ways we can protect water?
- Ways we can conserve water?