

# Down the Drain

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## Teacher's Guide

**Grade Level:** PS-5  
**Subject Areas:** Science (Kansas)  
Science (Missouri)

### Objectives and Goals

- Science objectives
  - Students will learn about the water cycle
  - Students will learn about watersheds
- Life Skill objectives
  - Students will learn to analyze problems and apply solutions
  - Students will learn that working together will often help to solve problems.

### Required Materials and Equipment

- Teacher reference sheets
  - Water Cycle Diagram from the United States Geological Service
  - Articles on Ocean Garbage Patches
    - North Atlantic Garbage Patch
    - Indian Ocean Garbage Patch
    - Great Pacific Garbage Patch
  - Water Distribution from the United States Geological Service
  - Watersheds of the Kansas City Region
  - Watersheds and Drainage Basins from United States Geological Survey
  - Kansas Specific
    - Watersheds in Kansas from Emporia State University
    - Map of Kansas Watersheds from Wikipedia Commons
    - Watersheds of Kansas from KS Water Plan Atlas
    - Johnson County and Its Place in Kansas Watersheds from the Kansas River Science Curriculum
    - Kansas Stream Tm Training
  - Missouri Specific
    - Missouri Stream Activity Guide
    - Missouri Stream Team Activity Documents
    - Missouri Stream Team Activity Documents

- Student Sheets from StoneLion Puppet Theatre
  - Storm Sewers are not trash cans
  - Clean up after your pet
  - Karma Coloring Sheet
  - Create a Habitat Craft
  - Drain Maze Activity

### **Anticipatory Set**

- Discuss the water cycle
- Discuss watersheds and drainage basins
- Discuss the effect of pollution
  - Runoff from agriculture, industry and urban impermeable surfaces
  - Direct pollution from humans (examples include putting trash into the storm runoff system, depositing animal feces into the drainage system)
- Ask students what could be done to help. Possibilities include
  - Smaller, more concentrated development
  - Changes in farming styles (less slash and burn)
  - Proper disposal of waste products
  - Encouraging rain gardens
- Ask students what they can do. Even little things help! Possibilities include
  - Recycling
  - Making sure that nothing 'nasty' goes down storm drains so pollution is lessened
  - Using less water
    - Showers vs baths
    - Turning the faucet off while brushing teeth
- Explore how to work in a group to achieve a goal

### **Direct Instruction**

- Definition of the water cycle
- Definition of watershed
- Using the description of the watershed, discuss the watersheds of Missouri and/or Kansas and how they fit into the continental watershed system.

### **Guided Practice**

- Create an aquatic habitat using the habitat craft sheets from StoneLion Puppet Theatre
- Work on the Drain maze sheets from StoneLion Puppet Theatre

Watch performance of ***Down the Drain***

# Standards Fulfilled

## Missouri Science Standards Fulfilled

### Kindergarten – Grade Level Expectations

IN: 1-A-K-a: Pose questions about objects, materials, organisms, and events in the environment

### Grade 1 – Grade Level Expectations

ES: 3-A-1-a: Observe and describe ways water, both as a solid and liquid, is used in everyday activities at different times of the year (e.g., bathe, drink, make ice cubes, build snowmen, cook, and swim)

IN: 1-A-1-a: Pose questions about objects, materials, organisms, and events in the environment

ST: 3-A-1-a: Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of individuals solving everyday problems or learning through discovery)

### Grade 2 – Grade Level Expectations

IN: 1-A-2-a: Pose questions about objects, materials, organisms and events in the environment

ST: 3-A-2-b: Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member

### Grade 3 – Grade Level Expectations

ES: 1-C-3-a: Identify liquid water can be changed into a gas (vapor) in the air

ES: 1-C-3-b: Identify that clouds and fog are composed of tiny droplets of water

ES: 3-E-3-a: Describe clouds and precipitation as forms of water

IN: 1-A-2-a: Pose questions about objects, materials, organisms and events in the environment

LO: 1-A-3-a: Describe the basic needs of most plants (i.e. air, water, light, nutrients, temperature)

ST: 3-A-2-b: Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member

### Grade 4 – Grade Level Expectations

ES: 2-A-4-b: Identify the major landforms/bodies of water on Earth

ES: 3-A-4-b: propose ways to solve simple environmental problems (e.g. recycling, composting, and ways to decrease soil erosion) that result from human activity

EC: 1-D-4-a: Identify examples in Missouri where human activity has had a beneficial or harmful effect on other organism (e.g. feeding birds, littering vx. Picking up trash,

hunting/conservation of species, paving/restoring green spaces

### **Grade 5 – Grade Level Expectations**

- ES: 2-E-5-a: Describe and trace the path of water as it cycles through the hydrosphere, geosphere, and atmosphere (i.e., the water cycle: evaporation, condensation, precipitation, surface run-off/groundwater flow)
- ES: 2-E-5-b: Identify the different forms water can take (e.g., snow, rain, sleet, fog, clouds, dew) as it moves through the water cycle
- ES: 3-A-5-b: Describe how human needs and activities (e.g., irrigation damming of rivers, waste management, sources of drinking water) have affected the quantity and quality of major bodies of fresh water
- ES: 3-A-5-c: Propose solutions to problems related to water quality and availability that result from human activity
- LO: 1-E-5-b: Distinguish between plants (which use sunlight to make their own food) and animals (which must consume energy-rich food) q

## **Kansas Science Standards Fulfilled**

### **Kindergarten Standards**

- K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

### **Grade 1 Standards**

- K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

### **Grade 2 Standards**

- K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

### **Grade 3 Standards**

3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

**Grade 4 Standards**

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

**Grade 5 Standards**

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

5-ESS2-2. Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.  
eruptions, earthquakes) change Earth's surface