Water Wise Youth
Education Program
Kindergarten-High School
Curriculum Guide

The University of Arizona
Cochise County Cooperative Extension

Water

Wise Youth Curriculum Guide 2017-2018

Water lessons available to Cochise County classroom teachers by
The University of Arizona Cooperative Extension
(520) 458-8278 ext. 2150
http://cals.arizona.edu/cochise/waterwise/youthprogram.html

Water Education Program Overview

The Water Wise Youth Program curriculum has five focus areas:

- **Water Basics** (the water cycle, where water is found, amounts of water in different places on the planet);
- **Aquifers and Watersheds** (how water moves through the ground, where is it stored, and how is it removed);
- **Conservation** (practical ways to save our water resource);
- **Water Quality** (where does our household water come from and where does it go after we've used it; how do we keep it clean; health impacts from unclean water).
- **Special Activities** (After-school programs, guest readings, and special school events such as STEM Days, Family Science Night, Earth Day etc…)

The goals of the Water Wise Youth water education program are to help students develop a deeper conceptual understanding of water and to encourage a personal connection to water as a limited resource. All activities are taught by experienced conservation educators through the University of Arizona Cooperative Extension and are offered free of charge**. Please note:** There are Middle School and High School components for many of the classes listed below and several other higher grade options are available. Please contact Rebecca Dailous (520) 458-8278 ext. 2150 to discuss additional opportunities.

How to Schedule Classroom Lessons

1. Please read through the lesson descriptions to determine which class(es) meet your needs. Classes can be modified or combined to meet specific educational goals. Each class is adapted for specific grade levels to meet Arizona State Academic Standards. Arizona State Standards can be found at: http://www.azed.gov/standards-practices. A copy of relevant Arizona State Standards will be provided to teachers for each class delivered upon request.

2. We encourage you to choose one to four classes you would like taught to your students. The topic categories enable you to choose classes that emphasize one or several areas of interest. There is a time (duration) listed for each activity. ***This timeframe can be flexible.***

3. Several of the classes can be modified or combined to create a specialized experience. Please contact Rebecca Dailous (520) 458-8278 ext. 2150 or rebecca.dailous@arizona.edu ***several weeks*** in advance if you would like a class tailored to your specific classroom needs.

Class Listing 2017-2018

The following icons in the curriculum guide are used to show the focus area for each lesson.

 Water Basics

 Aquifers and Watersheds

 Conservation

 Water Quality

Water Basics

Learn the Water Cycle (Grades K – 3)

Duration: 45-60 minutes

Students construct a water cycle poster and practice using water cycle vocabulary words. They also learn and sing the "Water Cycle Song".

Subject areas: Earth Science, Music
Learning styles: Visual, Kinesthetic (placement of objects), Auditory (discussion/song)
Special classroom request(s): Whiteboard or wall where a poster can be placed

Incredible Journey (Grades 3 - 8)

Duration: 45-60 Minutes

This class teaches the water cycle to older students in a fun and informative way. Students become a water drop and journey around the earth and through living things by tossing a cube which tells them where on earth they go next. They collect colored beads at every location they visit and move through the earth as a gas, liquid or solid. They use the beads to make a bookmark which provides details of their trek. Students discuss their journey, make inferences and draw conclusions about where most of the water on earth is located and how living creatures use water.

Subject: Earth Science (the water cycle)
Learning styles: Primarily Kinesthetic & Visual, some Auditory (discussion)
Skills: Analyzing (identifying components & relationships); Interpreting (relating); if modified Organizing information (mapping)
Modifications: This class can be combined with other classes as a "mini-water festival".
Special classroom request(s): large indoor or outdoor space.

Globe Toss (Grades K – 5)

Duration: 30 minutes for grades K – 2; 20 minutes for grades 3 – 5

Students gain an understanding of the distribution of water on Earth and the limited amount of water available for human use through a tossing an air filled globe and discussion of basic water cycle principles.

Subjects: Earth Science, Geography, Math (fractions or percentages)
Learning styles: Primarily Kinesthetic & Visual, some Auditory (lecture)
Skills: Analyzing (identifying relationships); Interpreting (relating);
Special classroom request(s): Space for students to stand beside their desks
Note: For older grades this exercise is usually combined with the "Drop in the Bucket" class.

Drop in the Bucket (Grades K – 5) ***Can be modified with mathematical calculations for Middle School.**

Duration: 45 Minutes

Students may know the earth is covered with water but may not realize that only a very small amount is available for human consumption. Through a visual demonstration, students learn that water is a very limited resource which helps them appreciate the need to use water wisely.

Subjects: Earth Science, Math (fractions/percentages)
Learning styles: Auditory (lecture), Visual (observation)
Skills: Gathering information (observing, listening); Organizing; Interpreting (drawing conclusions)
Special classroom request(s): None
Note: For older grades this class is usually combined with the "Globe Toss" class.

The Thunderstorm (Grades K – 5)

Duration: 45-60 Minutes

This class has both a lecture component and a fun activity! The lesson teaches students how to stay safe during thunderstorms which often occur during our monsoon season. They learn the difference between thunderstorm "watches" and "warnings"; the 30/30 rule and other precautions to take if they are inside or caught outside as a storm approaches. For the activity, students simulate the sounds of a thunderstorm through physical gestures which are recorded and played back. If time allows, the class can be broken into teams and the teams can compete with each other to see which group sounds the most like a real thunderstorm.

Subjects: Earth Science (meteorology); Music
Learning styles: Auditory (lecture), Kinesthetic (body movements) & Visual
Skills: Gathering information (listening); Applying (designing, composing)
Special classroom request(s): Space for students to stand beside their desks

Aquabodies (Grades 2 – 5)

Duration: 45-60 Minutes

Students learn how much of their bodies are composed of water, where water is found within their bodies and the function of water in their bodies. Demonstrations with fresh and dried fruit are used to illustrate the concept that all living things are comprised of water.

Students work in teams to trace their body on a piece of butcher paper. They divide their drawing into 10 sections. Lower grades color six of the sections to get a visual representation of how much water is in their body. Older grades also trace their bodies and then calculate the weight of water in their own body. Additional options for older grades include learning the percentage of water in eight different organs; learning where those organs are located in the body and what their functions are. (A second class or longer time period is recommended for this option.)

Subjects: Life Science, Art, Math (older grades)
Learning styles: Kinesthetic (hand/eye coordination), Auditory (lecture), Visual (observation)
Skills: Gathering information (calculating); Organizing (estimating, categorizing); Analyzing (comparing, identifying patterns)
Special classroom request(s): Space for students to lie down and trace their body. A table for the fruit demonstration. Locations around the room to display "organ cards" – if that option is chosen.

The Life Box (Grades K – 4)

Duration: 30-45 minutes

Students identify the four essential factors necessary for life: Soil, Sunlight, Air, and Water. They learn how living things use these four factors and how they work together as a system.

Subjects: Earth Science
Learning styles: Primarily Kinesthetic & Visual, some Auditory (lecture)
Skills: Analyzing (identifying relationships); Interpreting (relating)

Aquifers and Watersheds

Seeing Watersheds (Grades 3 – 8)

Duration: 45-60 mins

Students learn what a watershed is and get to see and feel their watershed on a topographical map. Students will participate in a "hands on" demonstration on how water drains in a watershed and complete a coloring worksheet to further grasp the concept. Students will also learn about how communities impact their watersheds with the placement of farms, industrial sites, landfills, toxic waste sites, etc. How can all these locations be effected by the natural processes within a watershed? How can these activity sites impact their health and safety? Students learn vocabulary terms related to watersheds, identify key geographic features, predict drainage patterns, and analyze and discuss natural and human environmental impacts.

Subjects: Earth Science (water movement), History/Anthropology, Art
Learning styles: Kinesthetic & Visual, some Auditory (discussion)
Skills: Analyzing (comparing); Interpreting (identifying cause & effect); Applying (planning, problem solving, developing and implementing action plans)
Special classroom request(s): None. (A sink or convenient water source is helpful)

Get the Groundwater Picture (Grades 4 - 6)

Duration: 45 minutes (basic class) – 1 hour plus for expanded version ***(often combined with the Ground Water Flow Model)***

Students learn about basic groundwater principles. They are asked to predict the behavior of water as it moves through substrates (soil) and then make observations on the rates (time) which water moves through various soils such as gravel, sand and clay. Basic concepts discussed include watersheds, aquifers, porosity and permeability. Other concepts may be expanded upon based upon grade level, classroom participation and inquiry. Students may be asked to role play soil particle interactions.

Subjects: Earth Science (hydrogeology), Math
Learning styles: Visual, Auditory (lecture); some Kinesthetic
Skills: Analyzing (identifying patterns); Interpreting (inferring, translating); Organizing information
Special classroom request(s): None (A sink or convenient water source is helpful)

Groundwater Flow Model (Grades 4 – to adult)

Duration: 45 minutes – 1 hour ***(often combined with other activities for specialized classes)***

Students interact with a simulated model of an underground aquifer. They pump water from the aquifer to investigate how water moves underground and observe the effects of groundwater pumping. A practical discussion of how increased development, changes in water use, and environmental conditions (drought) can all impact how water moves through the environment and ultimately impact our water resources. If time allows or if a second (higher level) class is requested, students will "contaminate" the model, observe and discuss the results.

Subjects: Earth Science (hydrogeology)
Learning styles: Visual, Auditory (lecture); some Kinesthetic
Skills: Analyzing (identifying patterns); Interpreting (inferring, translating); Planning
Special classroom request(s): Table to display model. (A sink or convenient water source is preferred but not necessary)
Modifications: This class can be combined with other classes as a "mini-water festival".
NOTE: The model takes at least 20 minutes to clean between uses. Back to back classes are not recommended because of the required cleaning times. Two models can be used to illustrate different ground water processes and issues.

Conservation

Everyone Comes to the Water Hole (Grades K – 2)

Duration: 30 minutes- story time

Students participate in the story, *The Water Hole*, by Graeme Base by becoming animals in the story. They experience the feel of a "water hole" that is being depleted as the animals drink all the water. Students make connections to our natural earth cycles, like the monsoon season in Arizona, and discuss how the animals adapt to changes in the environment. If time allows, a secondary role play activity is performed which demonstrates how our own personal use of water can affect everyone.

Subjects: Earth Science (natural cycles), Reading (comprehension, listening skills, vocabulary)
Learning styles: Auditory (story telling); Visual, Kinesthetic
Special classroom request(s): Students usually sit on the floor around a large cloth "water hole". For role play, a table or desk for water jug and cups is needed.

A Heavy Load to Carry (Grades 3 - 8)

Duration: 45-60 minutes

Students form teams and compete to move water from one point to another as a way to understand the energy and time required to physically transport water by hand. They learn that one-third of the world doesn't have easy access to water and often it is the responsibility of children in developing countries to walk long distances to collect water for their family's daily needs. Parallels are made to early settlers in America. Students gain an appreciation of how easy it is for us to have access to water through modern technology. Principals of conservation are discussed.

Subjects: Earth Science, History, Anthropology
Learning styles: Kinesthetic (transporting water), Auditory (lecture/discussion), Visual (pictures)
Skills: Gathering information (observing, listening); Interpreting (drawing conclusions)
Special classroom request(s): Outdoor access to water. Outdoor area where a water hauling course can be set up. Note: This class can be combined with other classes as a "mini-water festival".

Water Zig-Zag Race (Grades 3 - 8)

Duration: 45-60 minutes

Students enjoy teaming up to create a race course using passive rainwater harvesting principals *(slow it down, spread it out, soak it in)* and then compete against each other's landscape designs. The winning team's water moves the *slowest* through their designed landscape course.

Subjects: Earth Science (passive water harvesting, erosion), Building & design
Learning Styles: Primarily Kinesthetic & Visual, some Auditory (lecture)

Skills: Analyzing (comparing); Interpreting (identifying cause & effect); Applying (planning, problem solving, developing and implementing action plans)
Special classroom request(s): Level surfaces (such as tables or desks) with sufficient space for students to observe the race. (A sink or convenient water source is helpful)

Water Web of Life (Grades 3 – 6)

Duration: 45-60 minutes

Students learn the roles of different organisms in a riparian habitat and create connections between them. Often a string is used to create a "food web" to demonstrate the interdependence between living things. Situational exercises are included to observe what happens to the entire "web" if one organism is removed. This interactive demonstration of interdependence among living things challenges students to consider their own conservation habits. Food chain concepts (producers, consumers, decomposers) are also discussed.

Subjects: Earth Science, Biological science
Learning Styles: Primarily Kinesthetic & Visual, some Auditory (lecture)
Skills: Analyzing (comparing); Interpreting (identifying cause & effect)
Special classroom request(s): Space for students to stand in a circle. Activity can be performed indoors or outdoors.

Water History Trunk (Grades 3 – 8)

Duration: 45-60 minutes

This is a type of "living history" class. The instructor takes on the role of an Arizona pioneer and discusses the challenges of having sufficient access to water for their needs over a span of time. Students examine "old-fashioned" items for procuring and using water (dowsing rods, hand held laundry agitator, canvas water bag, windmill, ice tongs, etc.), and discuss their functions and connection with water conservation measures. Students gain an understanding that previous generations used far less water than we do today, discuss reasons that this is the case, and recommend conservation measures. If time allows, students can experiment with "dowsing" for water.

Subjects: Earth Science, History
Learning Styles: Auditory (lecture/discussion); Visual (observation); Kinesthetic (experimentation)
Special classroom request(s): Table for the historical artifacts.
Modifications: Class can be modified using a PowerPoint presentation in place or with the "living history" component.
Note: This class can be combined with other classes as a "mini-water festival".

Water Quality

One in a Million (Grades 5-8; up to Grade 12 with modifications)

Duration: 45-60 minutes

Students learn the concept that "dilution is not the solution to pollution". They use food coloring to simulate diluting a "toxic substance" down to "parts per million" which is the concentration of pollutants water suppliers are required to test for to ensure our water is safe to drink. Students view Water Quality (Consumer Confidence) Reports for their own city or town. They learn why preventing pollution is preferable to trying to clean contaminated water. Special responsibilities for students living in rural areas with private wells are also discussed.

Subjects: Earth Science (water quality), Math (dilution/proportions)
Learning Styles: Auditory (lecture/discussion); Visual (observation); Kinesthetic (experimentation)
Skills: Gathering information (observing, listening); Analyzing (identifying relationships) Interpreting (drawing conclusions)
Special classroom request(s): None. (A sink or convenient water source is helpful)
Note: May be combined with Ground Water Flow model for specialized class.

Poison Pump (Grades 4-8; up to Grade 12 with modifications)

Duration: 45-60 Minutes

Through a series of clues, students solve a mystery to discover the source of an epidemic which is based upon a real-life historical event in London in the 1800's. They learn about the importance of a clean water supply. If time allows or special request is made, the Ground Water Flow model can be used to show how polluted water can impact water wells or other water bodies.

Subjects: Earth Science (hydrogeology), History, Life Science (infectious disease)
Learning Styles: Auditory (discussion/team work); Visual (mapping); some Kinesthetic
Special classroom request(s): Classroom locations for six teams.
Note: May be combined with Ground Water Flow model for specialized class.

A-Maze-ing Water (Grades K-8)

Duration: 45 Minutes

Students will learn the basics of storm water management and how human actions affect water quality. They will be shown illustrations of pollutants and will have discussions on how they can relate to the pollutants and what they can do to prevent them from contaminating future storm water. They will also learn about storm pipes and water treatment plants. They will finish the lesson with a maze worksheet or activity

Subjects: Earth Science (water quality)
Learning Styles: Auditory (lecture/discussion), Visual (maze); some Kinesthetic
Skills: Interpreting (identifying cause & effect)
Special classroom request(s): None.

Special Requests

The *Water Wise Youth* Program can provide additional lessons, for example:

Adventures in Density (Grades 6-8; up to Grade 12 with modifications)

Subject(s): Density, 3 States of Matter (solid, liquid, gas) Duration: 45-60 Minutes

In this interactive lesson, students get a basic understanding of density by demonstrating how heat and salinity affect water density by doing lab experiments using materials like boiled eggs, salt, and ice cubes. They will also be able to relate the compactness of water molecules to water density in its 3 different states: solid, liquid, and gas.

Raining Cats and Dogs (Grades 4-8)

Subject(s): Language Arts, Figurative Speech, Proverbs/Sayings Duration: 45-60 Minutes

Students broaden their understanding of regional and cultural perspectives and practices related to water by studying water-related proverbs. The examination of such proverbs makes clear the central role that water plays in all human society. There is a Water Sayings card activity included with this lesson where students match sayings with illustrations and scenarios.

Guest Reading

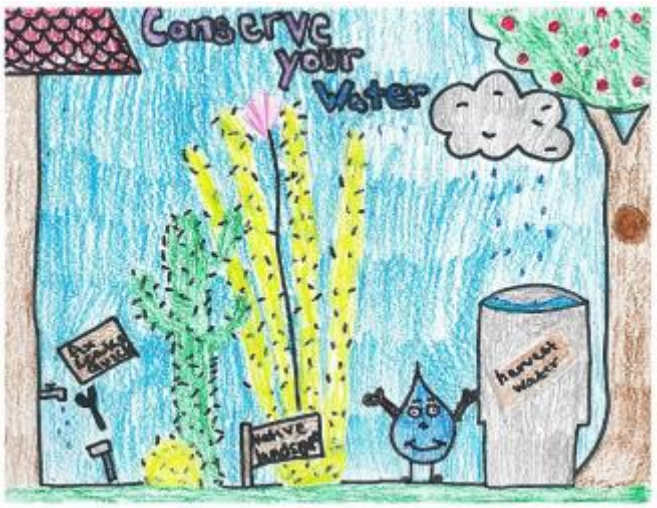
The *Water Wise Youth* Program can also provide you with a Guest Reader!

If you are having a special activity in the school or class that requires guest readers, a Water Wise instructor would be happy to come and read at your school or classroom with several engaging water-related books at different reading levels. (Grades pre-K-6)

Special Activities

Special Activities include:

- Annual WAM! Water Awareness Month Poster Contest (February to April)
- WAM! - Student Exhibition Projects
- Mini "Water-Festivals" (require assistance from classroom teachers)
- School Related Water Audits
- STEM Day events
- Earth Day programs
- Family Science Night
- After-school programs (Kid's WORLD, Boys & Girls Club; Girl Scouts; Youth Commission; etc.)
- Field Trips (San Pedro River; Brown Canyon Ranch, Palominas Recharge Project; Environmental Operations Plant; Waste Water Treatment Plants)



WWY Educator Request Form 2017-2018

Name _____ Date _____

School _____ Grade Level _____

Check best way to contact you: Email ☐ School Phone ☐ Cell Phone ☐

Contact Information: _____

1. Select your classes of interest. Check the box in front of each requested class and return to Rebecca via email or snail mail. ***(NOTE: For High School or Upper Middle School classes, please contact Rebecca to discuss your needs prior to completing this form.)***

Water Basics		*Aquifers and Watersheds*		*Conservation*		*Water Quality*	
☐	Learn the Water Cycle (K-2)	☐	Seeing Watersheds (3-8)	☐	Everyone Comes to the Waterhole (K-2)	☐	One in a Million (5-12)
☐	Globe Toss (K-5)	☐	Get the Groundwater Picture (4-6)	☐	Heavy Load to Carry (3-8)	☐	Poison Pump (4-12)
☐	Drop in the Bucket (K-5)	☐	Groundwater Flow Model (4- adult)	☐	Water Zigzag Race (3-8)	☐	A-Maze-ing Water (K-8)
☐	The Thunderstorm (K-5)	☐		☐	Web of Life (3-6)	*Special Requests/Activities*	
☐	Incredible Journey (3-8)	☐		☐	Water History Trunk (3-8)	☐	Adventures in Density (6-12)
☐	Aquabodies (2-5)	☐		☐		☐	Raining Cats and Dogs (3-5)
☐	The Life Box (K-3)	☐		☐		☐	Book Reading (PreK-6)
☐		☐		☐		☐	Other/Activity

2. List your first choice date(s) and/or any special requests:

_____ _____

_____ _____

If you have questions or would like additional information about the Water Wise Youth Program, please contact Rebecca Dailous at 520-458-8278 ext. 2150 or send an email to rebecca.dailous@arizona.edu