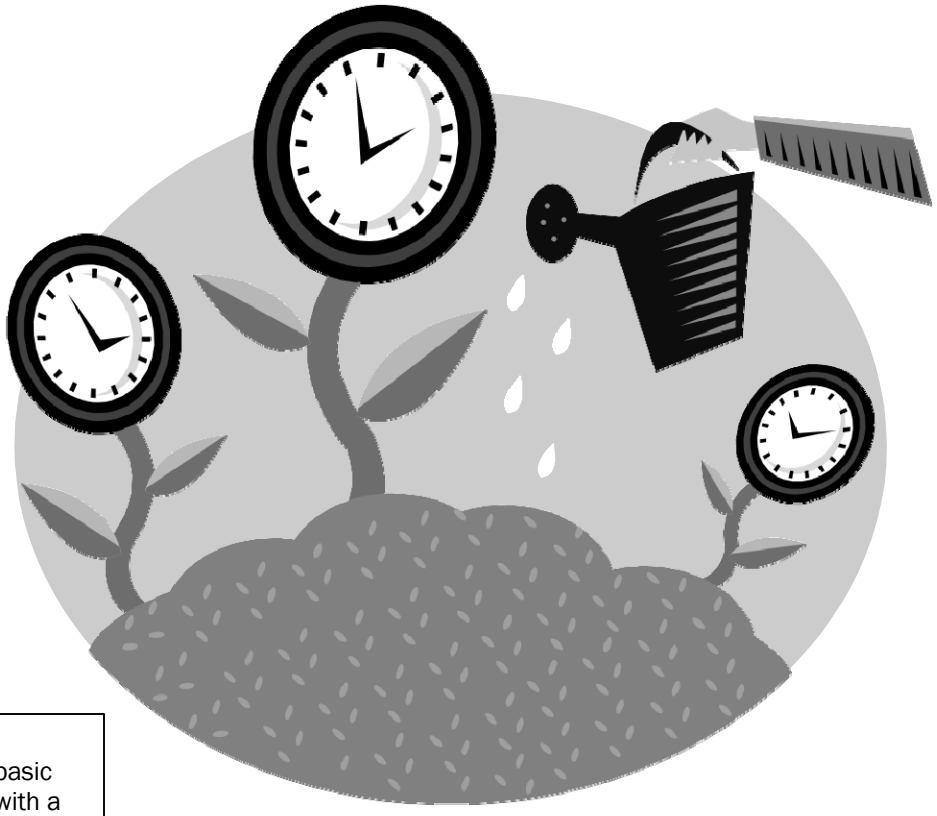
San Antonio Botanical Garden

Educational Curriculum Unit

Presented in partnership with the San Antonio Water System

Introduction to Plants and Water

Grades K – 3



Objectives:
K-3 students investigate basic growing needs of plants, with a focus on water and the water cycle.

San Antonio Botanical Garden
555 Funston, San Antonio, TX, 78209
www.sabot.org

How to use this Unit

Design This unit is designed to help you prepare your students for their visit to the San Antonio Botanical Garden (SABG) with pre-visit, visit, and post-visit activities.

Contents

Grade Level This unit is designed for use with children in grades K-3 and is linked with the Texas Essential Knowledge and Skills (TEKS) guidelines. This background information is provided as a supplement to your regular materials.

Pre-Visit to SABG You may find it helpful to visit SABG independently before bringing your classroom on the visit so that you are more familiar with the gardens.

Lesson Plan We recommend teaching the concepts covered in the summary and the vocabulary first, as part of your regular plant and water curriculum (**adjusted for your class level**). Then complete the pre-trip activities, **making age/attention appropriate revisions as you see fit**. It is best to finish the pre-visit activities within two days prior to the field trip so that students will see the relevance between their field trip and the classroom activities. We also recommend completing at least two post-visit activities within two days of the field trip to reinforce the visit experience.

Schedule Visit Every school group that comes to the SABG must be pre-scheduled. Please call as soon as you read this information in order to schedule your class visit (210-207-3255).

We are always looking for ways to make the garden work for you. Please contact our education department (210-207-3270) if you have additional suggestions, comments, or ideas on ways the SABG can help you and your classroom. *Also see the evaluation form at the end of this unit (page 19).*

Kindergarten TEKS*

***These are just some of the TEKS you will be addressing with this unit.**

Language Arts
110.2

K.1 Students learn to listen attentively and ask and respond to questions and retell stories;
The student engages actively in a variety of oral language experiences.

A: *determine the purposes for listening, such as to get information, to solve problems and to enjoy and appreciate*

C: *participate in rhymes, songs, conversations, and discussions*

K.3.C: The students ask and answer relevant questions and make contributions in small or large group discussions

.K.4: The student communicates clearly by putting thoughts and feelings into spoken words.

A: *learn the vocabulary of school such as numbers, shapes, colors, etc.*

K.8: The student develops an extensive vocabulary.

K.9C: The student can retell or act out the order of important events in stories.

K.14: The student develops the foundations of writing.

A: *write his/her own name and other important words*

K.16: The student uses writing as a tool for learning and research.

Mathematics
111.12

K.1: The student develops whole-number concepts and uses patterns to sort and explore number, data, and shape.

K.1: The student uses numbers to name quantities.

K.2: The student describes the order of events.

K.8: The student uses attributes to determine how objects are alike and different.

B: c*ompare two or more objects based on their attributes*

K.9: The student recognizes the characteristics of shapes.

C: *describe identify, and compare circles, triangles, and rectangles*

Science
112.2

112.2.1: Student work asking questions, gathering information, communicating findings, and making informed decisions.

112.2.2: The student identifies components of the natural world.

K.1: The student participates in the scientific process.

K.2: The student develops abilities necessary to do scientific inquiry in the field and classroom.

A: *ask questions about the organisms, objects, and events*

B: g*ather information using simple equipment and tools to extend the senses*

D: *construct reasonable explanations using information*

E: *communicate findings about simple investigations*

K.3: The student knows that information and critical thinking are used in making decisions.

K.4: The student uses age-appropriate tools and models to verify that organisms and objects and parts of organisms and objects can be observed, described, and measured.

K.5: The student knows that organisms, objects, and events have properties and patterns.

K.6: The student knows that systems have parts and are composed of organisms and objects.

B: r*ecord observations about parts of plants including leaves, roots, stems, and flowers*

D: *identify that when separated from the whole, may result in part of the whole not working*

K.7: The student knows that many types of change occur.

A: *observe, describe, and record changes in size, mass, color, position, time, sound, etc.*

D: *observe and record stages in the live cycle of organisms in their natural environment*

K.8: The student knows the difference between living organisms and non-living objects.

K.9: The student knows that living organisms have basic needs.

B: *give examples of how living organisms depend on each other*

K.10: The student knows that the natural world includes rocks, soil, and water.

Art
117.2

117.2.1: Students rely on their perceptions of the environment, developed through increasing visual awareness and sensitivity to surroundings, memory, imagination, and life experiences, as a source for creating artworks.

K.1: The student develops and organizes ideas from the environment.

A: *glean information from the environment using the five senses*

B: *identify colors, textures, forms, and subjects in the environment*

First Grade TEKS*

***These are just some of the TEKS you will be addressing with this unit.**

Language Arts

110.3

1.1: The student is introduced to new vocabulary through stories and informational books.

1.2: Students learn to listen attentively and ask and respond to questions and retell stories; The student engages actively in a variety of oral language experiences.

A: *determine the purposes for listening, such as to get information, to solve problems and to enjoy and appreciate*

B: *plan and conduct simple descriptive investigations*

C: *participate in rhymes, songs, conversations, and discussions*

D: *construct reasonable explanations and draw conclusions*

1.3: The student knows that information and critical thinking are used in making decisions

C: *ask and answer relevant questions and make contributions in small or large group discussions.*

1.4: The student communicates clearly by putting thoughts and feelings into spoken words.

A: *learn the vocabulary of school such as numbers, shapes, colors, etc.*

1.10: The student reads widely for different purposes in varied sources.

A: *identify and describe a variety of natural sources of water including streams, lakes, and oceans*

C: *identify how rocks, soil, and water are used and how they can be recycled.*

1.12: The student develops an extensive vocabulary

1.15: The student generates questions and conducts research about topics using information from a variety of sources including selections read aloud.

1.17: The student develops the foundations of writing.

1.23: The student uses writing as a tool for learning and research

Math

111.13

1.1: The student uses whole numbers to describe and compare quantities

1.3: The student recognizes and solves problems in addition and subtraction.

1.6: The student uses attributes to identify, compare, and contrast shapes and solids.

Science

112.3

112.3.2 Students identify basic needs of living things, explore ways that living things depend on each other.

112.2: Student will identify components of the natural world.

112.3.4: The student learns that a system is a collection of cycles, structures, and processes that interact.

1.1: The student conducts classroom and field investigations and participates in the scientific process .

1.2: The student develops abilities necessary to do scientific inquiry in the field and the classroom.

A: *ask questions about the organisms, objects, and events*

B: g*ather information using simple equipment and tools to extend the senses*

1.3: The student knows that information and critical thinking are used in making decisions.

1.4: The student uses age-appropriate tools and models to verify that organisms and objects and parts of organisms and objects can be observed, described, and measured.

1.5: The student knows that organisms, objects, and events have properties and patterns.

1.6: The student knows that systems have parts and are composed of organisms and objects.

B: r*ecord observations about parts of plants and animals*

1.7: The student knows that many types of change occur.

D: *observe and record stages in the live cycle of organisms in their natural environment*

1.8: The student knows the difference between living organisms and non-living objects.

1.9: The student knows that living organisms have basic needs.

1.10: The student knows that the natural world includes rocks, soil, and water.

Art

117.5

117.5.1: Students rely on their perceptions of the environment, developed through increasing visual awareness and sensitivity to surroundings, memory, imagination, and life experiences, as a source for creating artworks.

1.1: The student develops and organizes ideas from the environment.

A: *identify similarities, differences, and variations among subjects, using the senses*

B: *identify color, texture, form, line, and emphasis in nature and in the human-made environment.*

Second Grade TEKS*

***These are just some of the TEKS you will be addressing with this unit.**

Language Arts

110.4

110.4.2.1: The student listens attentively and engages in a variety of oral language experiences.

A: *determine the purposes for listening, such as to get information, to solve problems and to enjoy and appreciate*

C: *participate in rhymes, songs, conversations, and discussions*

2.3: C: The student will ask and answer relevant questions and make contributions in small or large group discussions.

2.4: The student communicates clearly by putting thoughts and feelings into spoken words.

2.12 : The student generates questions and conducts research-using information from various sources.

2.20: The student uses writing as a tool for learning and research.

Math

111.14

2.1: The student uses whole numbers to describe and compare quantities

2.3: The student adds and subtracts whole numbers to solve problems.

2.7: The student uses attributes to identify, compare, and contrast shapes and solids.

Science

112.4

112.4.1 Students conduct simple field investigations to develop skills of making measurements.

112.2: Student will identify components of the natural world.

112.3.4: The student learns that a system is a collection of cycles, structures, and processes that interact.

2.1: The student conducts classroom and field investigations and participates in the scientific process.

2.2: The student develops abilities necessary to do scientific inquiry in the field and the classroom.

A: *ask questions about the organisms, objects, and events*

B: *plan and conduct simple descriptive investigations*

C: *compare results of investigations with what students know about the world*

D: *gather information using simple equipment and tools to extend the senses*

F: *communicate explanations about investigations*

2.3: The student knows that information and critical thinking are used in making decisions.

2.4: The student uses age-appropriate tools and models to verify that organisms and objects and parts of organisms and objects can be observed, described, and measured.

2.5: The student knows that organisms, objects, and events have properties and patterns.

2.6: The student knows that systems have parts and are composed of organisms and objects.

B: *manipulate, predict, and identify parts that, when put together, can do things they cannot by themselves*

C: *observe and record the function of plant parts*

2.7: The student knows that many types of change occur.

2.8: The student distinguishes between living organisms and nonliving organisms.

2.9: The student knows that living organisms have basic needs.

A: *identify the external characteristics of different plants and animals that allow their needs to be met*

B: *Compare and give examples of the ways living organisms depend on each other and on their environments*

2.10: The student knows that the natural world includes rocks, soil, and water.

Art

117.8

117.8.1: Students rely on their perceptions of the environment, developed through increasing visual awareness and sensitivity to surroundings, memory, imagination, and life experiences, as a source for creating artworks.

2.1: The student develops and organizes ideas from the environment.

A: *identify variations in objects and subjects, using the senses*

B: *identify color, texture, form, line, and space and art principles such as emphasis, pattern, and rhythm*

Third Grade TEKS*

***These are just some of the TEKS you will be addressing with this unit.**

Language Arts
110.5

110.5.3.1: The student listens attentively and engages in a variety of oral language experiences.

A: *determine the purposes for listening, such as to get information, to solve problems and to enjoy and appreciate*

C: *participate in rhymes, songs, conversations, and discussions*

3.3: C: The student will ask and answer relevant questions and make contributions in small or large group discussions.

3.4: The student communicates clearly by putting thoughts and feelings into spoken words.

3.12: The student generates questions and conducts research-using information from various sources.

3.20: The student uses writing as a tool for learning and research.

Math
111.15

3.3: The student adds and subtracts whole numbers to solve problems.

3.11: The student selects and uses appropriate units and procedures to measure length and area.

Science
112.5

112.5.1 Students conduct simple field investigations to develop skills of making measurements.

112.5.2: Student will identify components of the natural world.

112.5.4: The student learns that a system is a collection of cycles, structures, and processes that interact.

3.1: The student conducts classroom and field investigations and participates in the scientific process.

3.2: The student develops abilities necessary to do scientific inquiry in the field and the classroom.

A: *plan and implement descriptive investigations*

B: *collect information by observing and measuring*

C: *analyze and interpret information to construct reasonable explanations*

3.3: The student knows that information and critical thinking are used in making decisions.

3.4: The student knows how to use a variety of tools and methods conduct science inquiry.

3.5: The student knows that systems exist in the world.

A: *observe and identify simple systems such as a sprouted seed*

3.8: The student knows that living organisms need food, water, light, air, a way to dispose of waster, and an environment in which to live.

A: *observe the habitats of organisms within an ecosystem*

D: *describe how living organisms modify their physical environment to meet their needs*

3.9: The student knows that species have different adaptations that help them survive and reproduce in their environment.

3.10: The student knows that many likenesses between offspring and parents are inherited from the parents.

A: *identify some of the inherited traits of plants*

3.11: The student knows that the natural world includes earth materials and objects in the sky.

Art
117.11

3.1: The student develops and organizes ideas from the environment.

B: *identify art elements such as color, texture, form, line, and space and art principles such as emphasis, pattern, rhythm, balance, proportion, and unity in artworks*

3.2: The student expresses ideas through original artworks, using a variety of media with appropriate skill.

A: *create artworks based on personal observations and experiences*

Summary for Teachers

Why Water?

When studying the life cycle of any living organism, the importance of water becomes clear. This unit introduces the life cycle of a plant as well as the water cycle. Emphasizing the importance of water is important in the missions of both the San Antonio Botanical Garden (SABG) and the San Antonio Water System. Water has long been an important resource in South Texas, and the SABG is home to the original Brackenridge Water Works, the first reservoir for a public water supply in San Antonio. SABG also houses a replica of an acequia, the original water delivery system that was installed when the area was under the rule of the Spanish crown. The SABG is part of the water story in South Texas!

Plant Life

Like humans who have organs designed to meet basic needs (hearts, lungs, skin), plants consist of systems of organs that allow them to survive. Roots provide support for plants and allow them to "drink" the nutrients and water that they need for healthy living. Leaves are a "factory" providing energy for the plant using the sun's energy, in a process called photosynthesis (this concept is not addressed in this unit but you may discuss with your class based on attention level). Stems are a link between the important roots and leaves of a plant. With the study of plant growth, it should be clear that there are some basic elements required for most plants to grow. One of the most important elements is water.

New Water?

There are no new sources of water on Earth. All the water on Earth moves in a never-ending natural cycle, so students are often surprised to find out that the water they get from their drinking fountain may have been a drink for a dinosaur. With large oceans, lakes, and rivers around, it is sometimes easy to forget that the sources of water on the earth are limited. This is why it's important to take care of water sources and conserve water in daily lives.

Water Cycle

The forms of water are always changing. Water moves from sky to earth and back to the sky again. This is called the water cycle. Water falls to earth as rain or snow. Some of the water soaks into the ground and is stored as groundwater. The rest flows into streams, lakes, rivers and oceans. The sun warms surface water and changes some of it into water vapor. This process is called evaporation. Plants give off water vapor too in a process called transpiration. The heated water vapor rises into the sky and forms clouds. When the vapor in the clouds condenses, it falls back to the earth as rain or snow. The water cycle has then come full circle and begins again.

Water Savers Vocabulary

Acequia An early system of water irrigation and delivery that was introduced to the South Texas area by early missionaries. They are often defined as "gravity flow irrigation ditches." A replica of an *acequia* is on the SABG site.

Condensation The change of water from a gas to a liquid (ex: water droplets on the outside of a cold soda can).

Evaporation Process in which the heat energy of the sun causes the water on the Earth's surface to change into a vapor (ex: dew disappearing from the grass).

Hypothesis A statement in science designed for further investigation.

Leaf The part of a plant that is the main area for photosythensis.

Precipitation Water droplets or ice particles condensed from atmospheric water vapor and are sufficiently massive to fall to the earth's surface (ex: snow, rain, sleet, or hail).

Root The usually underground portion of a plant that lacks buds, leaves, or nodes and serves as support, draws minerals and water from the surrounding soil, and sometimes stores food.

Stem The main stalk of a plant, connecting the roots to other parts of the plant.

Vapor A substance in the form of a gas having no fixed shape.

Water A resource needed by all living things in an ecosystem.

Water cycle The cycle of the earth's water supply from the atmosphere to the earth and back which includes precipitation, transpiration, evaporation, runoff, infiltration, and storage in water bodies and groundwater.

Water vapor The gaseous state of water (ex: steam rising from a boiling pan of water).

Pre-Visit Activity #1: How Do Plants Grow?

Objective

Using critical thinking and the scientific method, students learn that plants have basic needs in order to grow, including water.

Materials

- Clear plastic cups (3.5 oz) *–pre-punch holes in the bottom for drainage with push pins*
- Potting soil mix
- Aprons for students (*optional*--to protect the clothing from stains)
- Seeds or small plants *(plants may require a larger cup*)
- Masking Tape
- Black Marker
- Measurement tools (beakers and/or other consistent watering device)
- Worksheet #1: *Plants and Water Worksheet: How Does a Plant Grow?*

Directions

Step One

You should choose the appropriate level of plant study for your classroom. This experiment may be widened to include light levels, fertilizer levels, and/or soil types. We are beginning just with water and are not including a discussion of photosynthesis. You should feel free to expand upon this activity in your classroom.

Introduce your students to the life cycle of plants. Explain that plants are living things, just like humans and other animals. So, like all other living things, plants have specific ranges of temperature, light, air and nutrients that they must have to survive.

Step Two

Ask students to brainstorm about the requirements plants need to grow. Encourage them to come up with a list including: light, water, soil (not all plants), and nutrients.

Step Three

Encourage the students to think about how much of each item a plant needs. Ask the following questions:

Can a plant get too much light? What happens if a plant gets too much light?
What about water—how much water does a plant need? How often should a plant be watered?

Step Four

Move the students into pairs or groups to set up the test specimens. Using seeds or small sprouted plants (if using plants, make sure each group has something of a similar size), instruct the students to fill their plastic cups (with drainage holes) with

potting soil. Have the students plant the seed (1/3 of the way down, cover with soil) or plant (cover the roots with soil and make sure plant is standing up straight).

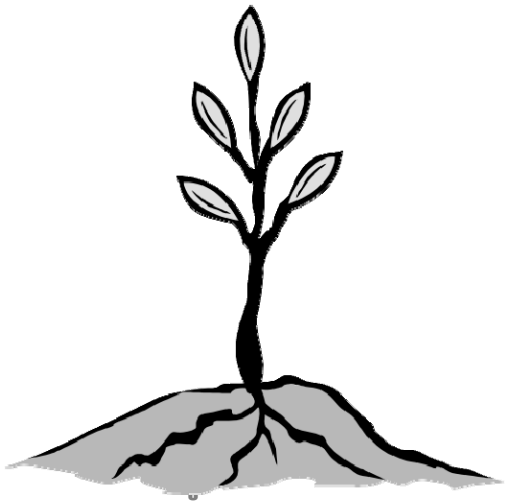
Step Five Using the masking tape and marker, label each cup with the team's name and number the cups (without repeating).

Step Six After the students have cleaned up their workspaces, ask them what they think they will need to do to help their seeds/plants grow into strong and large plants? Explain that as a class you will be conducting an experiment on how water affects the growth of plants. *Again, you should consider making this experiment more complicated by adjusting the test conditions.*

Step Seven Divide the plant cups into three groups:
1. No Water
2. Water *(use beakers to measure 60ml [1/4 C] or similar amount in another tool)*
3. Extra Water *(again, use what you have, but make sure this group gets 2x the water)*

Step Eight Every day have the students "take care" of their plants according to the group they are in. After they "water" the plants they should inspect their cup and make notes and/or drawings about any changes on their lab worksheet.

Step Nine After two weeks of studying the plants, have students discuss their conclusions about the impact of water on plant growth. Revisit the questions in step three.



Pre-Visit Activity #2: Learning the Water Cycle

Objective

Using critical thinking and the scientific method, students learn that there are limited water resources on the earth. Students will be able to recognize that the basic steps of the water cycle as well as define orally vapor and evaporation.

Materials

Simple Model (one per student)

- Copies of Worksheet 2A: *Plants and Water Worksheet: What is a Water Cycle?*
- Quart size Ziploc baggies
- Aprons for students (*optional*--to protect the clothing from stains)
- Clear plastic cups (3.5 oz)
- Masking Tape
- Black Marker
- *Optional: Worksheet 2B: Matching Water Terms and 2C: The Returning Raindrop*

Complex Model (one per student or one per class)

- 2-Liter plastic bottle (clear)
- 2 inches (5cm) of potting soil
- Small plants (moss is a good specimen)
- ½ inch (1.25 cm) of gravel
- Tape
- Copies of Worksheet 2A: *Water Savers Worksheet: What is a Water Cycle?*

Directions

Step One

Introduce your students to the water cycle and discuss the basic properties before beginning the activity. You may involve students by asking them questions like:

- *Where does your water come from? Can you have as much as you want?*
- *Where did the water that dinosaurs drank come from?*
- *Is the same water we drink used to water our yards?*
- *How do you use water every day? (encourage indirect answers like food preparation, farming, etc.)*

You should write their ideas on the board so that you can come back to these hypotheses after the activity is over.

Step Two

For this classroom activity, decide whether your students will do the simple water cycle model or create a more advanced terrarium model. Each model will allow students to observe how water evaporates, condenses, and accumulates again.

Simple Model Instructions

Step Three-A

Now that the students have begun to consider the properties of water, lead the students through the following steps:

1. Pass out a bag and a cup to each student.
2. Place approximately 2 ounces of water in the cup and mark the water line with a piece of tape of black marker.
3. Tape the cup to the inside of the bag to prevent spilling.
4. Close the bag and then tape it in a warm place, tilted on an angle so that the sides will slant down from the top allowing the droplets to slide down and collect in the bottom of the bag.

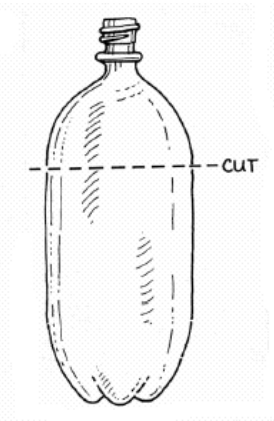
Step Four-A

Pass out Water Savers Worksheet 2A so that students may record what happens over a five day period.

- *Ask students what they think will happen to the water in the cup.*
- *Chart their responses on a piece of paper.*
- *On days 1, 2, 3, and 5 have students examine their bags and chart the results on their worksheets*

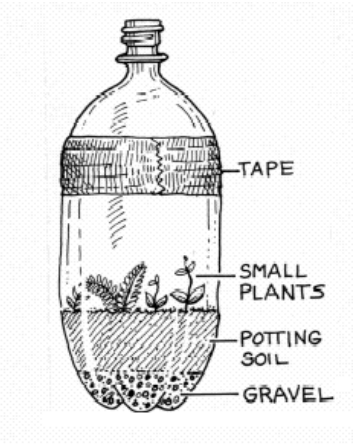
Complex Terrarium Model Instructions

Step Three-B



Prepare bottle(s) ahead of time (scissors easily and evenly cut the bottles)—see diagram.

1. Place 1/2 inch (1.25 cm) of gravel in the bottom of the bottle, for drainage.
2. Cover the gravel with about 2 inches (5 cm) of rich potting soil.
3. Plant the small plants or moss you have gathered.
4. Gently water the soil until moist.
5. Place the top back on the bottle and tape securely in place.
6. Place in a well-lit – but not too sunny – area. If all goes well, the plants will thrive and the water cycle can be observed all year.



Terrarium Concept Notes:

A terrarium is a simple and effective way for your class to watch the water cycle operating on a small scale. The plants take up moisture from the soil and release it through their leaves. The water molecules later condense on the inside of the plastic bottle and "rain" back to the soil. You never need to add water to the terrarium as long as it stays closed. This classroom water cycle works in miniature much the same way the water cycle works on a large scale for our planet. It is also a good introduction to the concept of ecological cycles. The students can present terrariums as gifts to their parents. You might ask parents to donate some small plant cuttings as well as other supplies needed. The terrariums are easily assembled, but be sure to cut the plastic bottles before starting the students on the assembly.

Step Four-B Using worksheet 2A, have students draw a representation of their terrarium on days 1, 2, 3, and 5. Note all changes and discuss the water droplets on the inside of the terrarium(s).

Step Five Ask your students how their experiment demonstrates the water cycle.

- *Where do the droplets come from?*
- *Where do the droplets go?*
- *How is the water cycle related to lakes, rivers, and other water sources?*

Step Six You may use worksheets 2b and 2c to follow-up with these concepts.

**Developed from SAWS education guides*

Pre-Visit Activity #3: Acting out the Water Cycle

Objective: Students will work creatively to use role-playing and demonstrate the steps of the water cycle. They will learn and be able to explain the concepts of evaporation, vapor, and the water cycle.

Materials:

- Chart paper (with narration of story and/or words for song, plus room for documenting answers)
- Markers

Directions

Step One Read the narration in step three to your class in the context of your water cycle discussion.

Step Two Divide the children into groups and place them in the role-playing positions:
1. Have a few children stand on a low table (with mats below the table). They will be "the raindrops."
2. Have a few children stand side by side holding hands. They will be "the river."
3. Have several children stand together in a group. They will be "the ocean." Of this group, choose a few children who will become vapor at the appropriate time.
4. Choose one child to be "the sun."

Step Three Read the narration slowly, allowing time and providing direction for role-playing.
Narration (to be read by the teacher)
"One day a gray cloud formed in the sky. Thunder could be heard."
(All children make thunder sound)
"Raindrops started to fall."
(One by one the children on the table "fall" to the floor.)
"The raindrops joined together to form a stream."
(These children hold hands and start walking slowly, winding around the room.)
"The stream flowed into a river."
("Stream children" join hands with "river children.")

"The river flowed into the ocean."

("River" joins hands with "ocean.")

"Some of the water got so warm it turned into vapor and rose into the air."

(Designated "vapor children" carefully climb onto the table.)

"The vapor got cold and joined together to form a cloud."

(Children on the table move close together.)

"Raindrops started to fall."

(One by one the children on the table "fall" to the floor.)

Step Four Ask students to tell you the steps of the water cycle. List their responses on chart paper.

Step Five Have the class sing the Water song. As the class sings "Water Goes Up and Down" let one student point to the corresponding step on the chart paper from step four.

Step Six Review the steps of the water cycle.

WATER GOES UP AND DOWN (Tune: The Farmer in the Dell)
Original song by Beth Corum

Water goes up and down
Water goes up and down
High Low is how it goes
Water goes up and down.
First it falls down
First it falls down
High Low is how it goes
First it falls down.
Then it makes a stream
When it makes a stream
High Low is how it goes
Then it makes a stream.
The stream joins a river
The stream joins a river
High Low is how it goes
The stream joins a river.
The river joins the ocean
The river joins the ocean
High Low is how it goes
The river joins the ocean.
The sun warms the water
The sun warms the water
High Low is how it goes
The sun warms the water.
The water turns to vapor
The water turns to vapor
High Low is how it goes
The water turns to vapor
The vapor forms a cloud
The vapor forms a cloud
High Low is how it goes
The vapor forms a cloud.
The rain falls again
The rain falls again
High Low is how it goes
The rain falls again.
Water goes up and down
Water goes up and down
High Low is how it goes
Water goes up and down.

Visit to the San Antonio Botanical Garden

Reminder **All visits must be prescheduled! See page one for more information.**

Time Required Your class should plan at least one-and-a half hours (90 minutes) for the tour of the garden. Groups are welcome to tour more than the "focus" gardens (the gardens addressed with this unit) during a visit; if you plan to tour some of the other gardens, obviously, include more time for your trip. The ninety-minute guideline allots for a self-guided tour these focus gardens: Water Saver garden, Fountain Plaza, Conservatory Fern Grotto, and the Japanese style-*Kumamoto En* Garden. Each of these areas features a water area for the students to study. *You may also include a walk through the Watersavers Lane to see different types of landscape designed to conserve water.*

Objectives With this garden visit students will: use their senses safely for outdoor and garden exploration and continue their study of water and plant growth. They will practice using their senses and see water in many forms.

Materials Please bring copies of the **Water Savers Journal** (printed double sided - one for each student) and instruct students to each carry a **pencil or pen**. You will also need a **hand towel** for this visit. Clipboards can also be useful, but are not required.

Before you Leave We recommend organizing your students into teams with a designated chaperone (you may break apart into small groups for the tour or go as one large group).

You may consider making nametags for your students and chaperones (this customizes the experience for the students and makes it easier for the chaperones).

Please review the objectives of the trip with students and chaperones, as well as the following rules:

- Students SHOULD: Have an enjoyable learning experience!
- Students should NOT: Run, Throw Rocks, Shout, Misbehave, Litter, Chase the Ducks, Get in the Fountains or Ponds, Walk through the Display Beds, Eat Snacks, and Collect Seeds, Flowers, or Plants.
- Students MUST be supervised in the restrooms and in the gift shop.

Please dress appropriately for the weather: *the program is designed to be outdoors.*

Food on site Although food is not normally allowed in the gardens, please contact the SABG Education Director if you would like to make arrangements for a snack (if your group is going to be at the garden for more than two hours). When arrangements are made, we recommend bringing edible flowers like raw cauliflower for a healthy and fun snack for the students that reinforces the connections between plants and humans.

At the Garden

Once you have checked in with garden staff, make sure each student has a copy of the water savers journal worksheet and a pencil.

Begin Tour
Fountain Plaza

Enter the gardens and proceed to the fountain plaza. When you arrive at the fountain plaza, ask the children to point out the water. Once they have identified the water, ask the students to sit next to the fountain (a safe distance away). They will be listening at this station so encourage them to listen quietly before they write and/or draw their answers on their journal worksheet.

Kumamoto En

From the fountain plaza, walk to the Kumamoto En Japanese-style garden. Visit the water feature in this area. Ask the students to stand still and see if they can feel any water on their skin. Prompt with questions about humidity and ask about wind. Then allow your students to touch the water in the pond. *Make sure that students just put fingers in the water, not anything more involved than that.* Then allow them to dry their hands using the hand towel.

Conservatory Water Fountain

From the Japanese Garden, walk back to the Lucille Halsell Conservatory. To get to the water fountain, you will walk through the Exhibit Room. As you walk through this area, prod the students to think about humidity again (the Exhibit Room has misters). The water fountain is located to your right as you step outside the Exhibit Room and into the Conservatory Courtyard. Allow students to form a line at the water fountain. Each student should prepare to think about how the water tastes. After students have all had a drink and completed their journal entry, proceed to the Fern Grotto room, located on the left side of the Conservatory as you face the courtyard.

Conservatory Fern Grotto

Once you reach the Fern Grotto station, walk students around the room and then ask students to use their nose and then respond on their worksheets once they're outside the humid room. They should feel/smell the humidity in the air produced by the misters.

Water Saver Garden

Tell students they are finished with this part of the activity and walk them to the Water Saver garden (above the conservatory). At this garden encourage students to recall their water and plant growth experiments. Explain that the plants in this garden do not need a lot of water to grow, which is good for the South Texas environment.

Allow students to walk around the garden and see if they can locate the plants on the journal worksheet. **Only 3 of the 4 plants should be found in the garden**. When you return to the classroom you can discuss why the impatiens is not featured in this garden (they require a lot of water to grow well).

Post-Visit Follow-Up

Objective Students will reinforce their learning about plant growth, water, and the water cycle, as well as enhancing critical thinking, visual arts, and creative writing skills.

Directions Use at least two of these follow-up activities with your classroom (we recommend the discussion as one of the items).

Review As a class, review the students' journal workbooks. Gather in a circle and/or small groups to talk about what they found at the gardens. Ask them why they think they found what they did (discuss which plants were in the water saver garden and why others were not there). Ask them to tell what their favorite part of the field trip was.

Write Using the descriptive words the students listed while at the Botanical Garden, have your students write a poem about water and its properties. Encourage them to be creative. You could also have students write a story about being a raindrop and traveling through the water cycle.

Create After discussing the fieldtrip as a class, have each student create a picture of his/her favorite memory of the trip. Either have students use traditional media first or just paint the scene/memory with water on a sidewalk on a sunny day to reinforce the ideas of evaporation.

Sing Sing another "water cycle song" to the tune of "Clementine" having students act out the motions: *Students form a circle, squatting. When they sing evaporation they should rise, slowly. For condensation they hold hands together, and for precipitation they squat down to original position.*
Lyrics: Evaporation, condensation, precipitation on my mind. This is the water cycle and it happens all the time (repeat).

Discuss Discuss with your students the ways that water supplies become polluted and the way water quality declines. Ask them what would happen if we did not worry about taking care of the water supply and discuss ways to help keep pollution from ruining the water supply.

Evaluate Use worksheets 2b and/or 2c to evaluate student learning of the water cycle.

Additional Resources

Teacher Books

GrowLab®: Activities for Growing Minds, National Gardening Association, 1999

The Water Sourcebook: A Series of Classroom Activities for Grades K-2, Produced for Georgia Water Wise Council," Education Research and In-service Center, University of North Alabama.

The Energy Sourcebook: Grades 3-5 Unit, Tennessee Valley Authority, 1990.

Student Books

Hackett, Jay K., *Science in Your World (Grade 3)*, Macmillan McGraw-Hill, NY, 1991.

The Story of Drinking Water, American Water Works Association, Denver, CO, 1984.

Water Fun, Los Angeles Department of Water and Power, Los Angeles, CA, 1984.

SAWS books for kids, including short story "*Sophie's Garden.*"
For information visit: http://www.saws.org/education/

Websites

National Garden Association
Visit the National Garden Association at www.garden.org, or their associated children's site, www.kidsgardening.org, for plenty of resources on using garden curriculum in your classroom.

San Antonio Water System
This site features numerous units and guides for teachers as well as information for families and children featuring all aspects of water education.
http://www.saws.org/education/

Feedback and Evaluation

Thank you for using the Water Saver Plants K-3 Guide!

Please take a few moments to give us your feedback so that we may improve our programs in the future.
Mail completed forms to: San Antonio Botanical Garden, attn: Education Director, 555 Funston, San Antonio, TX, 78209.

1. I used this curriculum guide with my_____class.
   a. Kindergarten
   b. First grade
   c. Second grade
   d. Third grade
   e. Fourth grade
   f. Fifth grade
   g. Other, *please explain:*

2. There are_____students in my average class.
   a. 5-15
   b. 16-25
   c. 26-35
   d. 36+

3. How useful did you find this guide?
   a. It was helpful; I used some of the suggestions.
   b. It was great, I found more than a few ways to use this in my classroom.
   c. It wasn't that good.

   Please explain your answer:

4. If you used any of the classroom suggestions in this guide, please tell us what your students thought of them.

5. I brought my students to the SABG as part of this trip.
   a. Yes, *we toured the gardens on* _____*please fill in date.*
   b. No, *please explain why not:*

6. Would you be willing to receive information about and consider participating on the SABG Teacher Advisory Board?
   a. No
   b. Yes, *please list your contact information:*

   Name:
   Email:
   Phone:
   Mailing Address:

7. Please share any specific suggestions or comments about this unit on the reverse of this page.