Exploring The Water Cycle

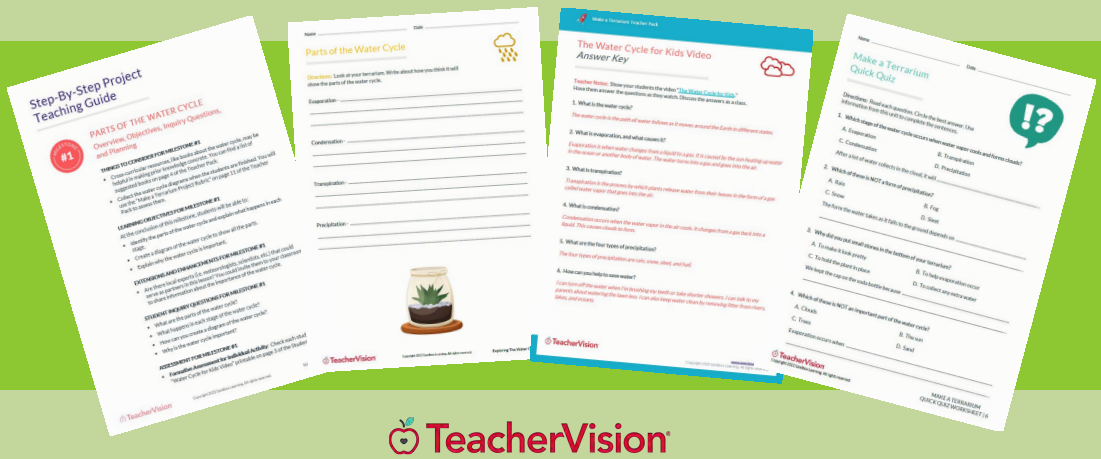
Make a Terrarium

Science Project-Based Learning Grade 3

Learn About the Water Cycle

Make Your Own Terrarium

Write a Story, Comic Strip, and Skit



TeacherVision

Lesson Plan:
Make a Terrarium

ABOUT THIS PROJECT-BASED LESSON

This project-based learning unit is designed to teach and reinforce the concepts in a Grade 3 Science unit on the Water Cycle and can be used in conjunction with existing curriculum materials.

The project is divided into 5 Milestones; each Milestone includes a self-contained student project activity. Done in sequence, the Milestones connect to enable students to produce a comprehensive capstone activity.

The minimum suggested duration for completing this project is 5 class periods. However, it is completely flexible and can be lengthened or shortened as necessary, based on available class time and interest level.

HOW TO USE THIS TEACHING GUIDE

Each Milestone for this project-based learning unit includes detailed daily activities presented in step-by-step order, with teaching notes, instructional guidance, and page references to resources and materials included in the Teacher Pack and Student Pack.

Daily activities are organized for you as follows:

- **Prepare (Bell-ringer/opener activity)**

  Use these short opening activities at the beginning of class.

- **Present (Lecture/model)**

  Use this portion of the lesson to deliver new subject material and project information, and to model any instructions or activity required for Produce or Participate elements.

- **Produce (Student project work)**

  Use this portion of the lesson to allow students to work independently or in small groups on activities and other project elements.

- **Participate (Student/group share)**

  Use this portion of the lesson to allow students to share out any project, research, or presentation materials.

- **Practice (Homework/assessment/independent)**

  Use this optional portion of the lesson, if desired, to give students homework activities.

Step-By-Step Project Teaching Guide

PARTS OF THE WATER CYCLE

Overview, Objectives, Inquiry Questions, and Planning

THINGS TO CONSIDER FOR MILESTONE #1

- Cross-curricular resources, like books about the water cycle, may be helpful in making prior knowledge concrete. You can find a list of suggested books on page 4 of the Teacher Pack.
- Collect the water cycle diagrams when the students are finished. You will use the "Make a Terrarium Project Rubric" on page 11 of the Teacher Pack to assess them.

LEARNING OBJECTIVES FOR MILESTONE #1

At the conclusion of this milestone, students will be able to:

- Identify the parts of the water cycle and explain what happens in each stage.
- Create a diagram of the water cycle to show all the parts.
- Explain why the water cycle is important.

EXTENSIONS AND ENHANCEMENTS FOR MILESTONE #1

- Are there local experts (i.e. meteorologists, scientists, etc.) that could serve as partners in this lesson? You could invite them to your classroom to share information about the importance of the water cycle.

STUDENT INQUIRY QUESTIONS FOR MILESTONE #1

- What are the parts of the water cycle?
- What happens in each stage of the water cycle?
- How can you create a diagram of the water cycle?
- Why is the water cycle important?

ASSESSMENT FOR MILESTONE #1

- **Formative Assessment for Individual Activity:** Check each student's "Water Cycle for Kids Video" printable on page 3 of the Student Pack.

You can use the "Water Cycle for Kids Video Answer Key" on page 5 of the Teacher Pack to check their answers.

- **Formative Assessment for Group Activity:** Listen in as the students share their diagrams to see if they correctly drew the water cycle.
- **Summative Assessment:** Have the students complete the response printable on page 5 of the Student Pack for the Inquiry Question, "Why is the water cycle important?"

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Project Activities for Milestone #1: Parts of the Water Cycle

PREPARE (Bell-ringer/opener activity)

Have the students turn and talk about where water comes from. Call on students to share their answers. If no one mentions the water cycle, tell the students that we wouldn't have any water without it.

PRESENT (Lecture/model)

Tell the students that they're going to watch a video to review the parts of the water cycle. Give them the "Water Cycle for Kids Video" printable on page 3 of the Student Pack. Show them the "Water Cycle for Kids" video. Have them answer the questions. Use the "Water Cycle for Kids Video Answer Key" on page 5 of the Teacher Pack to discuss the answers.

Give the students the "Water Cycle Diagram Guidelines" on page 4 of the Student Pack. Go over the requirements with them. Tell them to use what they learned in the video to draw and label the parts of the water cycle.

PRODUCE (Student/group project work)

Give each student a piece of construction paper or copy paper. Have them follow the guidelines to create their water cycle diagrams. When they're done drawing the water cycle, they can add color.

PARTICIPATE (Student/group share, group activity)

Put the students into groups of 3 or 4. Have them share their water cycle diagrams and discuss how they are the same and different.

Formative Assessment: Listen in as the students share their diagrams to see if they correctly drew the water cycle.

PRACTICE (Homework/independent work/extensions)

Give each student the writing response template on page 5 of the Student Pack and ask them to write an answer to the inquiry question for this Milestone: "Why is the water cycle important?"

ASSESSMENT

Formative Assessment for Individual Activity: Check each student's "Water Cycle for Kids Video" printable on page 3 of the Student Pack. You can use the "Water Cycle for Kids Video Answer Key" on page 5 of the Teacher Pack to check their answers.

Formative Assessment for Group Activity: Listen in as the students share their diagrams to see if they correctly drew the water cycle.

Summative Assessment: Have the students complete the response printable on page 5 of the Student Pack for the Inquiry Question, "Why is the water cycle important?"

MAKING A TERRARIUM

Overview, Objectives, Inquiry Questions, and Planning

THINGS TO CONSIDER FOR MILESTONE #2

- Before you start Milestone #2, cut the bottom half off the 2-liter soda bottles. You should leave about 6 inches at the bottom of the soda bottle. You can find a complete list of the materials you will need to make the terrariums on page 3 of the Teacher Pack.
- Set aside a place in the classroom to keep the terrariums. It should be away from direct sunlight. On the first day or two, the terrariums may look cloudy, but by the third day, water droplets should start to form.

LEARNING OBJECTIVES FOR MILESTONE #2

At the conclusion of this milestone, students will be able to:

- Explain where they see the parts of the water cycle in their daily lives.
- Create a terrarium to demonstrate the water cycle by following written directions.
- Explain how they think their terrariums will exhibit each part of the water cycle.
- Describe what would happen if they took the cap off the soda bottle.

EXTENSIONS AND ENHANCEMENTS FOR MILESTONE #2

- Could you have your students watch the Water Cycle Study Jams video to review the parts of the water cycle? Then, have them take the test to check their understanding.

STUDENT INQUIRY QUESTIONS FOR MILESTONE #2

- Where do you see the parts of the water cycle in your daily life?
- How can you make a terrarium to show the parts of the water cycle?
- How will your terrarium show all the parts of the water cycle?
- What would happen if you took the cap off the soda bottle? Would you still be able to see the water cycle in your terrarium?

ASSESSMENT FOR MILESTONE #2

- **Formative Assessment for Individual Activity:** Check each student's "Parts of the Water Cycle" printable on page 7 of the Student Pack.
- **Formative Assessment for Group Activity:** Circulate as the students work, and discuss how the terrarium will demonstrate the water cycle.

- **Summative Assessment:** Have the students complete the response printable on page 8 of the Student Pack for the Inquiry Question, "What would happen if you took the cap off the soda bottle? Would you still be able to see the water cycle in your terrarium?"

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Project Activities for Milestone #2: Making a Terrarium

PREPARE (Bell-ringer/opener activity)

Have the students turn and talk about where they have seen parts of the water cycle in their daily lives. Allow the students to share their ideas, like condensation on the mirror after a shower, rain on a stormy day, or evaporation from a glass of water.

PRESENT (Lecture/model)

Tell the students that today they are going to create their very one water cycle in a bottle. Give the students the "Making a Terrarium" printable on page 6 of the Student Pack. Talk about the steps to creating a terrarium. You may want to go through the steps to make a sample terrarium to show them what it should look like.

PRODUCE (Student/group project work)

Have the students work with a partner and get the materials they need to make a terrarium. They should work together to follow the steps.

PARTICIPATE (Student/group share, group activity)

Give each student the "Parts of the Water Cycle" printable on page 7 of the Student Pack. Have them work with their partners to predict how the parts of the water cycle will be demonstrated by their terrariums.

Formative Assessment: Circulate as the students work, and discuss how the terrarium will demonstrate the water cycle.

PRACTICE (Homework/independent work/extensions)

Give each student the writing response template on page 8 of the Student Pack and ask them to write an answer to the inquiry question for this Milestone: "What would happen if you took the cap off the soda bottle? Would you still be able to see the water cycle in your terrarium?"

ASSESSMENT

Formative Assessment for Individual Activity: Check each student's "Parts of the Water Cycle" printable on page 7 of the Student Pack.

Formative Assessment for Group Activity: Circulate as the students work, and discuss how the terrarium will demonstrate the water cycle.

Summative Assessment: Have the students complete the response printable on page 8 of the Student Pack for the Inquiry Question, "What would happen if you took the cap off the soda bottle? Would you still be able to see the water cycle in your terrarium?"

WATER CYCLE STORY

Overview, Objectives, Inquiry Questions, and Planning

THINGS TO CONSIDER FOR MILESTONE #3

- You may want to make extra copies of the "Water Cycle Story" printable on page 10 of the Student Pack and the "Water Cycle Comic" printable on page 11 of the Student Pack. Each pair of students will probably need more than one page to complete their writing.

LEARNING OBJECTIVES FOR MILESTONE #3

At the conclusion of this milestone, students will be able to:

- Identify the parts of the water cycle as a raindrop travels through them.
- Brainstorm ideas for a water cycle story by explaining how a raindrop would feel and what it would see.
- Write a story or create a comic to describe a raindrop's adventures as it travels through the water cycle.
- Explain one good thing and one bad thing about being a water drop going through the water cycle.

EXTENSIONS AND ENHANCEMENTS FOR MILESTONE #3

- Could you have your students watch the "DIY Comic Strip" video to learn the steps to create a comic strip? They could follow the steps in the video to practice making a comic strip about something that happened in their life.

STUDENT INQUIRY QUESTIONS FOR MILESTONE #3

- How can a raindrop travel through the whole water cycle?
- What would a raindrop see, and how would it feel as it traveled through the water cycle?
- How can you write a story or create a comic strip to show a raindrop's water cycle adventures?
- What would be one good thing about being a water drop going through the water cycle? What would be one bad thing?"

ASSESSMENT FOR MILESTONE #3

- **Formative Assessment for Individual Activity:** Check each student's "Water Cycle Story Planning" printable on page 9 of the Student Pack.

- **Formative Assessment for Group Activity:** Have each pair of students share one exciting part of their water cycle story.
- **Summative Assessment:** Have the students complete the response printable on page 12 of the Student Pack for the Inquiry Question, "What would be one good thing about being a water drop going through the water cycle? What would be one bad thing?"
- **Summative Assessment:** Have the students complete the "Make a Terrarium Quick Quiz" on page 6 of the Teacher Pack. Use the "Make a Terrarium Quick Quiz Answer Key" on page 7 of the Teacher Pack to correct the assessments prior to starting Milestone #4?"

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Project Activities for Milestone #3: Water Cycle Story

PREPARE (Bell-ringer/opener activity)

Have the students play the ABCya water cycle game "Hydro-Logic." They will help a raindrop travel through the water cycle.

PRESENT (Lecture/model)

Read the book **Drop: An Adventure Through the Water Cycle**. As Drop goes through the different stages of the water cycle, stop and discuss what is happening with your students. Talk about what Drop sees and how he feels at each part of the story.

Tell the students that they are going to write their own water cycle stories. They are going to pretend they are a drop of water that is traveling through the water cycle.

PRODUCE (Student/group project work)

Give each student the "Water Cycle Story Planning" printable on page 9 of the Student Pack. Have them work independently to brainstorm ideas for their stories.

PARTICIPATE (Student/group share, group activity)

Have the students meet with their partners from Milestone #2. Have them share their ideas and decide what they want to include in their story. Tell them that they should each be a drop of water, and they are traveling through the water cycle together.

Give each pair a choice of the "Water Cycle Story" printable on page 10 of the Student Pack or the "Water Cycle Comic" printable on page 11 of the Student Pack. They can choose which format they would like to use to write about their water drop's adventures.

Formative Assessment: Have each pair of students share one exciting part of their water cycle story.

PRACTICE (Homework/independent work/extensions)

Give each student the writing response template on page 12 of the Student Pack and ask them to write an answer to the inquiry question for this Milestone: "What would be one good thing about being a water drop going through the water cycle? What would be one bad thing?"

ASSESSMENT

Formative Assessment for Individual Activity: Check each student's "Water Cycle Story Planning" printable on page 9 of the Student Pack.

Formative Assessment for Group Activity: Have each pair of students share one exciting part of their water cycle story.

Summative Assessment: Have the students complete the response printable on page 12 of the Student Pack for the Inquiry Question, "What would be one good thing about being a water drop going through the water cycle? What would be one bad thing?"

Summative Assessment: Have the students complete the "Make a Terrarium Quick Quiz" on page 6 of the Teacher Pack. Use the "Make a Terrarium Quick Quiz Answer Key" on page 7 of the Teacher Pack to correct the assessments prior to starting Milestone #4."

PLANNING A SKIT

Overview, Objectives, Inquiry Questions, and Planning

THINGS TO CONSIDER FOR MILESTONE #4

- You may want to have the pairs of students spread out around the classroom as they work on their skits. That way, they won't disturb other groups as they work.

LEARNING OBJECTIVES FOR MILESTONE #4

At the conclusion of this milestone, students will be able to:

- Discuss what actors do in a play.
- Create scenery and props for their water cycle skits.
- Practice their skits by using the dialogue from their stories or comics.
- Explain how they will make their skit interesting for the audience.

EXTENSIONS AND ENHANCEMENTS FOR MILESTONE #4

- Could you have your students record themselves as they practice their skits? Then, they can watch themselves to see how it looks and sounds before presenting it to the class.

STUDENT INQUIRY QUESTIONS FOR MILESTONE #4

- What do actors do when they are in a play?
- How can you create scenery and props for your water cycle skit?
- How can you use dialogue from your story or comic to practice your skit?
- How will you and your partner make your water cycle skit interesting for your audience?

ASSESSMENT FOR MILESTONE #4

- **Formative Assessment for Individual Activity:** Check each student's raindrop and scenery to make sure all the parts of the water cycle are included.
- **Formative Assessment for Group Activity:** Circulate as the students practice their skits and offer feedback.
- **Summative Assessment**: Have the students complete the response printable on page 14 of the Student Pack for the Inquiry Question, "How will you and your partner make your water cycle skit interesting for the audience?"

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Project Activities for Milestone #4: Planning a Skit

PREPARE (Bell-ringer/opener activity)

Have the students turn and talk about a play they were in or a play they watched. Have them discuss what the actors in a play have to do. Allow students to share their ideas.

PRESENT (Lecture/model)

Tell the students that they are going to turn their water cycle stories and comics into skits. Tell them that they will work with their partners to create scenery for their skits and then they should practice their lines.

PRODUCE (Student/group project work)

Give each pair of students the "Raindrop Patterns" printable on page 13 of the Student Pack. Have them use markers, crayons, or colored pencils to draw faces on their raindrop characters. Then, have them cut out the raindrops and glue them on popsicle sticks.

Give each pair a piece of poster board. Have them create the background for their skit. Tell them they should look at their story or comic strip to see which places the raindrop moves. They should include those places on their poster.

PARTICIPATE (Student/group share, group activity)

Have the students practice their skits. They should use the dialogue in their stories and comic strips to take their raindrops through the water cycle. They should also move their raindrops around the poster to show the different parts of the water cycle.

Formative Assessment: Circulate as the students practice their skits and offer feedback.

PRACTICE (Homework/independent work/extensions)

Give each student the writing response template on page 14 of the Student Pack and ask them to write an answer to the inquiry question for this Milestone: "How will you and your partner make your water cycle skit interesting for the audience?"

ASSESSMENT

Formative Assessment for Individual Activity: Check each student's raindrop and scenery to make sure all the parts of the water cycle are included.

Formative Assessment for Group Activity: Circulate as the students practice their skits and offer feedback.

Summative Assessment: Have the students complete the response printable on page 14 of the Student Pack for the Inquiry Question, "How will you and your partner make your water cycle skit interesting for the audience?"

PRESENTING WATER CYCLE SKITS

Overview, Objectives, Inquiry Questions, and Planning

THINGS TO CONSIDER FOR MILESTONE #5

- Prior to class, put the terrariums in different places around the classroom. Have the pairs of students start at their own terrarium to observe changes. Then, allow them to move to the different terrariums to see how they all show the parts of the water cycle.
- Collect the students' water cycle stories and comics so you can use the "Make a Terrarium Project Rubric" on page 11 of the Teacher Pack to assess their work.

LEARNING OBJECTIVES FOR MILESTONE #5

At the conclusion of this milestone, students will be able to:

- Identify changes in their terrariums and explain how they show the stages of the water cycle.
- Present their water cycle skits.
- Take notes about their favorite parts of the other skits.
- Explain the most interesting fact they learned about the water cycle.

EXTENSIONS AND ENHANCEMENTS FOR MILESTONE #5

- Could you invite other classes to watch your students' water cycle skits? This would help them learn about the water cycle, too.

STUDENT INQUIRY QUESTIONS FOR MILESTONE #5

- How has your terrarium changed since you made it?
- How does your terrarium show the stages of the water cycle?
- How can you and your partner present your skit to the class?
- What are your favorite things the raindrops do and see in the skits?
- What is the most interesting fact you learned about the water cycle?

ASSESSMENT FOR MILESTONE #5

- **Formative Assessment for Individual Activity:** Check each student's "Water Cycle Skit Observations" printable on page 15 of the Student Pack.
- **Summative Assessment:** Use the "Make a Terrarium Project Rubric" on page 11 of the Teacher Pack to assess the terrariums and skits.

- **Summative Assessment:** Have the students complete the response printable on page 16 of the Student Pack for the Inquiry Question, "What is the most interesting fact you learned about the water cycle?"
- **Summative Assessment:** Give the students the "Make a Terrarium Summative Assessment" on page 9 of the Teacher Pack. Use the "Make a Terrarium Summative Assessment Answer Key" on page 10 of the Teacher Pack to correct the assessments.

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Project Activities for Milestone #5: Presenting Water Cycle Skits

PREPARE (Bell-ringer/opener activity)

Have the students look at their terrariums to see how they've changed since Milestone #2. Allow them to move around the classroom to look at different terrariums and to discuss the parts of the water cycle they observe.

PRESENT (Lecture/model)

Tell the students they are going to present their skits today. Use the "Oral Presentation Mini Lesson" on page 8 of the Teacher Pack to review good speaking skills.

PRODUCE (Student/group project work)

Give each student the "Water Cycle Skit Observations" printable on page 15 of the Student Pack. Have each pair of students present their water cycle skit for the class. As the rest of the students are watching, they should take notes about the things the water drops saw and did during the different stages of the water cycle.

PARTICIPATE (Student/group share, group activity)

Allow the students to share their favorite parts of the skits by using the notes they took on the "Water Cycle Skit Observations" printable.

Summative Assessment: Use the "Make a Terrarium Project Rubric" on page 11 of the Teacher Pack to assess the terrariums and skits.

PRACTICE (Homework/independent work/extensions)

Give each student the writing response template on page 16 of the Student Pack and ask them to write an answer to the inquiry question for this Milestone: "What is the most interesting fact you learned about the water cycle?"

ASSESSMENT

Formative Assessment for Individual Activity: Check each student's "Water Cycle Skit Observations" printable on page 15 of the Student Pack.

Summative Assessment: Use the "Make a Terrarium Project Rubric" on page 11 of the Teacher Pack to assess the terrariums and skits.

Summative Assessment: Have the students complete the response printable on page 16 of the Student Pack for the Inquiry Question, "What is the most interesting fact you learned about the water cycle?"

Summative Assessment: Give the students the "Make a Terrarium Summative Assessment" on page 9 of the Teacher Pack. Use the "Make a Terrarium Summative Assessment Answer Key" on page 10 of the Teacher Pack to correct the assessments.