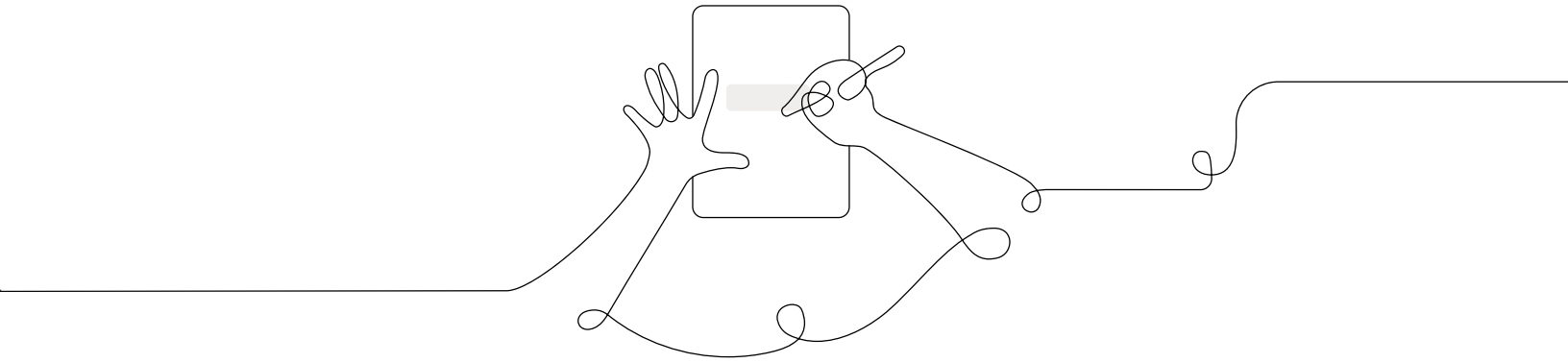
AmplifyScience

Participant Notebook

TK, Wondering About Puddles
Unit Internalization for Hybrid Learning



Unit Resources guide

Unit resources	
Unit overview	Brief description of the what, the why, and the how of the unit. It also gives an overview of the structure of the unit.
Instructional resources	Includes references, flexible implementation, description of routines, assessment opportunities, and supports.
Getting Ready to Teach	Snapshot of all the things you will need to prepare ahead of time that will save you time once you get going.
Materials and Prep	What materials you need and what is provided, as well as what you need to prepare before the start of the unit.
Preparation at a Glance	What you need to get ready broken down by activity as well as how long you can expect it to take.
Lesson-level resources	
Lesson Overview	Brief description of what the activity will cover, the how and the why
Materials and Prep	Detailed instructions on how to prepare for this specific activity.
Activity Notes	The what, the why, and the how, including all steps you will go through and recommended teacher talk.
Teacher support	Instructional suggestions including extension opportunities and home connections
Flexible Implementation	Notes on how to structure the activities in the classroom
Model set ups	Set-ups for investigation materials, shared writing and shared drawings
Formative assessments	How to perform the assessment and what to look for in student performance, one per exploration

Unit Overview

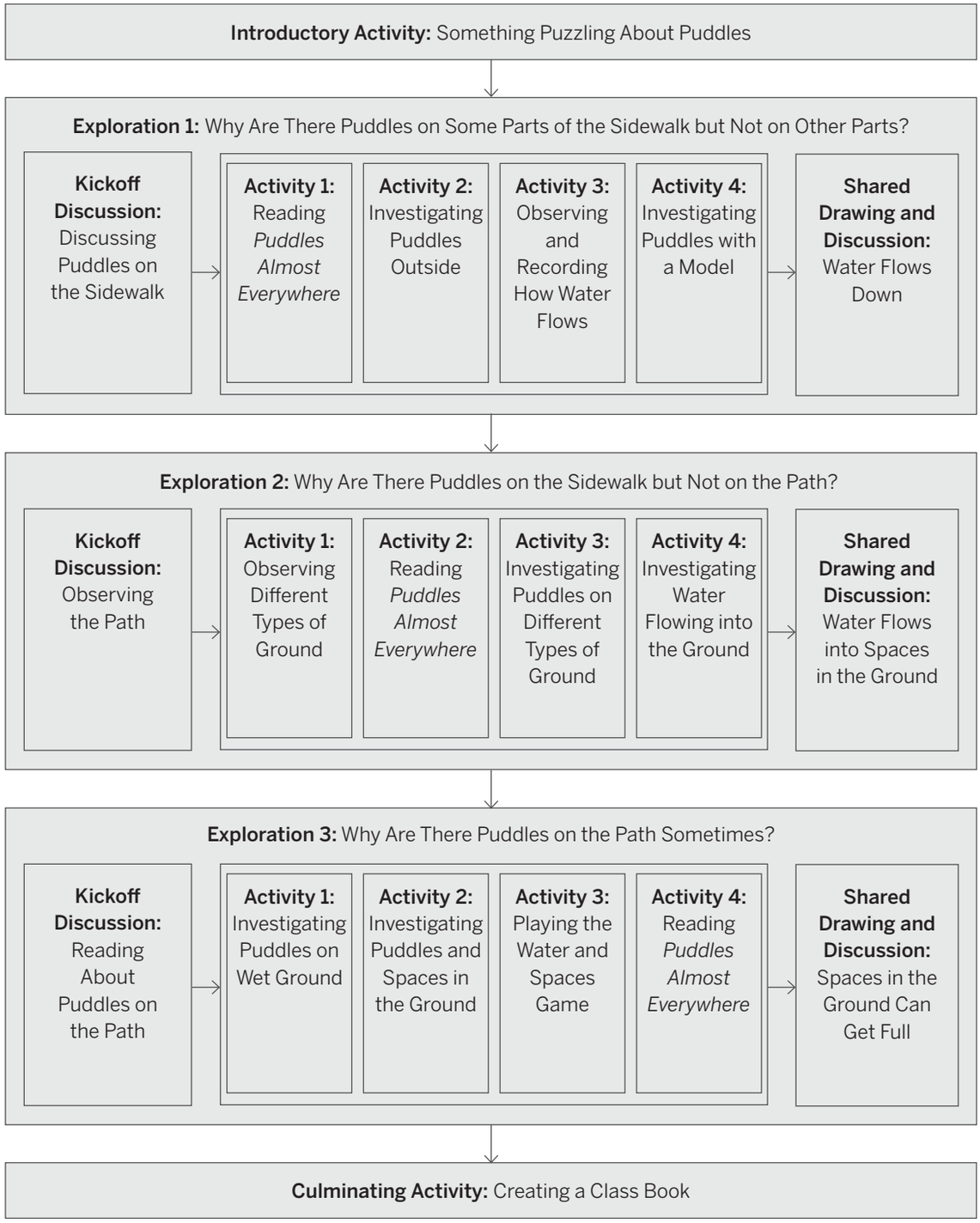
In the *Earth Science: Wondering About Puddles* unit, students investigate the phenomenon of puddles existing in some places but not in other places along a girl's walk to school. Students are challenged to solve the mystery of where and why puddles do and do not form. First, students figure out that water flows down as far as it can go, so puddles are likely to form at the bottom of slopes. Next, students investigate how certain types of ground can have puddles, while other types of ground do not have puddles. They figure out that some types of ground, such as gravel, have spaces for water to flow down into, which initially keeps puddles from forming. Meanwhile, other types of ground, such as pavement, do not have spaces for water to flow down into, so puddles form. Later in the unit, students figure out that more rain can cause water to fill the spaces in types of ground such as gravel, causing puddles to form in places in which they initially had not formed. In the course of solving these puddle mysteries, students are introduced to core ideas in Earth science and physical science, including types of earth materials and properties of materials, as well as the interaction of water and earth materials. The unit also includes an emphasis on planning and carrying out investigations, sharing ideas as scientists, and generating questions after learning new ideas. Students gather evidence for these ideas from a variety of sources: a book, pictures and illustrations, models, and indoor and outdoor hands-on investigations. Students share their developing ideas through discussion, drawing, and writing. Through the activities, students are exposed to the crosscutting concepts of *Cause and Effect* and *Scale, Proportion, and Quantity*. The context of puddles along a walk to school provides a familiar and puzzling starting point to inspire students' investigations both inside and outside the classroom.

Structure of the Unit

Each unit in the Amplify Science Transitional Kindergarten (TK) curriculum begins with an Introductory Activity that introduces a phenomenon. The Introductory Activity is followed by a series of three Explorations—each Exploration is comprised of a Kickoff Discussion, four activities, and a Shared Drawing and Discussion—in which students investigate to collect evidence that will help them construct an understanding of the phenomenon. Each unit ends with a Culminating Activity that consolidates students' understanding. See the unit diagram on the next page for a visual representation of the flow of instructional activities.

Depending on your class schedule and configuration, each unit can be implemented in a variety of instructional formats. (For additional information about how to personalize a unit for your class, see Flexible Implementation in the Instructional Resources section on page 6.) Each instructional activity is designed to span approximately 15 minutes. Depending on the implementation options you choose, teaching the entire unit will take approximately 4–6 weeks.

Earth Science: Wondering About Puddles



Guided Unit Internalization Planner

Part 1: Unit-level internalization

Unit title:

What is the phenomenon students are investigating in your unit?	
Exploration Questions:	Student challenge:
What science ideas do students need to figure out in order to explain the phenomenon?	
What evidence sources do students enage with across the unit?	

Part 2: Exploration-level internalization

Exploration 1 Question:	
What do students learn in Exploration 1?	What is the purpose of Exploration 1?

Exploration Note Catcher

Unit Name:

Flexible Implementation Structure:

FOCUS AREAS	Introductory Activity	Exploration #1	Exploration #2	Exploration #3	Culminating Activity
Science Question					
What will students learn? (objectives)					
Key Vocabulary					
Multiple Modalities (Do, Talk, Read, Write, Visualize)					
Assessments and/or Differentiation Opportunities					
Other Noticings					

Introductory Activity Overview

This Introductory Activity introduces students to the *Earth Science: Wondering About Puddles* unit and sets the stage for the Explorations to follow. The teacher reads aloud the first few pages of *Puddles Almost Everywhere*, which begins the story of a young girl who works like a scientist as she observes puddles on her walk to school. On her walk, the girl wonders why there are puddles in some places but not in other places. Students are introduced to their role as scientists and reflect on their own experience with puddles. They also share their initial ideas about why there are puddles in some places but not in other places. The purpose of this Introductory Activity is to introduce students to the unit phenomenon and to their role as scientists in order to motivate their learning throughout the unit.

Students learn

- Scientists wonder about things and try to figure out more about them.

Vocabulary

- observe
- scientist

Exploration 1 Overview

In this Exploration, students investigate Science Question 1: *Why are there puddles on some parts of the sidewalk but not on other parts?* Exploration 1 begins with the Kickoff Discussion in which students are introduced to Science Question 1 and share their initial ideas in response to this question. Four activities help students gather evidence about why puddles form in some places but not in other places. In Activity 1, students examine different puddles in a reference section of *Puddles Almost Everywhere* and on the Puddle Cards. In Activity 2, students plan and conduct an outdoor investigation of water on pavement. In Activity 3, students observe demonstrations of water flowing and pooling when it cannot flow down any farther, and then they record observations in their Science Notebooks. In Activity 4, students create and pour water over models of the ground and then observe and discuss where puddles form in their models. Exploration 1 ends with the Shared Drawing and Discussion in which the class summarizes and applies what they have learned. The purpose of Exploration 1 is for students to use science practices and ideas about cause and effect to figure out that a puddle can form at the bottom of a slope because water flows down as far as it can go.

Students learn

- Water flows down as far as it can go.
- A puddle can form at the bottom of a slope.
- Scientists ask questions and gather evidence to answer their questions.
- Scientists plan before they investigate.
- Scientists draw, write, and talk to share ideas.

Activities at a Glance

Kickoff Discussion: Discussing Puddles on the Sidewalk
The teacher introduces Science Question 1: *Why are there puddles on some parts of the sidewalk but not on other parts?* to motivate the activities students engage in throughout Exploration 1.

Activity 1: Reading *Puddles Almost Everywhere*
The teacher leads a Read-Aloud from the reference section of *Puddles Almost Everywhere*. Students observe and discuss the puddles in the book and on the Puddle Cards to build background knowledge about puddles, and they gather initial evidence about why there are puddles in some places but not in other places.

Activity 2: Investigating Puddles Outside
Students plan and conduct an outdoor investigation of water on pavement to gather evidence about why puddles form on some parts of pavement but not on other parts.

Activity 3: Observing and Recording How Water Flows
Students observe three demonstrations of flowing water to gather evidence that water flows down as far as it can go and pools when it cannot go down any farther. Students record observations in their Science Notebooks to express their developing understanding of this idea.

Activity 4: Investigating Puddles with a Model
Students create models of the ground and pour water over them. They then observe and discuss where puddles form in their models in order to gather evidence and make sense of how puddles form at the bottom of slopes.

Shared Drawing and Discussion: Water Flows Down
The class participates in a shared drawing and an accompanying discussion to consolidate and apply their understanding of Science Idea 1: *Water flows down as far as it can go*.

Vocabulary

- evidence
- flow
- investigate
- observe
- scientist
- slope

Materials and Preparation

Materials

For the Class

- *Puddles Almost Everywhere*
- Science Question 1: *Why are there puddles on some parts of the sidewalk but not on other parts?*
- 4 vocabulary cards: *evidence*, *flow*, *investigate*, *slope*
- Puddle Cards (16 cards)
- Language Frame Cards: Set 1 (5 cards)
- Science Notebook Cover copymaster
- Science Notebook Page copymaster
- 2–4 sentence strips*
- 3 sheets of chart paper*
- 2 sheets of white paper (8.5" x 11")*
- 2 large bowls (1 transparent, 1 non-transparent)*
- 1 tray or baking sheet (at least 1" deep and wider than the diameter of the large non-transparent bowl)*
- 1 tray, cafeteria style
- 1 rectangular container (at least 2" deep)*
- 1 pitcher*
- 1 book or wooden block (approximately 2" thick)*
- yarn*
- waxed paper*
- water*
- 1 pushpin*
- colored markers or crayons*
- marker, black*
- paper cutter or scissors*
- stapler*
- masking tape*
- pocket chart or whiteboard with magnets*
- optional: Visual Directions Cards (8 cards)

For Each Pair of Students

- 2 trays*
- 1 cup, paper, 4 oz. (for rain cup)*
- 2 cups, paper or plastic, 4 oz., with water*
- 2 cups, plastic, 6 oz., with water*
- 2 squares of waxed paper*
- 2 pieces of yarn (approximately 50 cm each)*
- 2 sticky notes (3" x 3" each)*

For Each Student

- 1 set of crayons*
- 1 assembled Science Notebook

*teacher provided

Preparation

1. **Optional: Plan for flexible implementation.** If you would like to use the flexible implementation option,

refer to the teacher reference on pages 36–37 (Suggestions for Flexible Implementation: Exploration 1) to determine any adjustments you may need to make for planning and instruction. Activities 1, 3, and 4 can be implemented flexibly to incorporate a science center with an adult-led introduction and wrap-up. Activity 2 requires adult facilitation.

Note: Throughout the unit, there are several activities that involve students using water and rain cups to investigate puddles. If you choose the flexible implementation option for these activities, you might consider inviting an adult volunteer to help supervise.

- **Visual Directions Cards:** Determine whether or not the Visual Directions Cards will be helpful if you choose to take advantage of the flexible implementation. This optional card set is provided as a Class Resource, located after the activities in Exploration 1. Make a copy of the card set (8 cards) and cut apart each card.

2. **Locate the following print materials:**
   - Science Question 1: *Why are there puddles on some parts of the sidewalk but not on other parts?*
   - vocabulary cards: *evidence*, *flow*, *investigate*, *slope*
   - Puddle Cards (16 cards)

3. **Prepare Science Idea 1 (Shared Drawing and Discussion).** On one or two sentence strips, write "Water flows down as far as it can go." You will post this during the Shared Drawing and Discussion activity.

4. **Prepare Language Frame 1 and accompanying card set (Activity 4, Shared Drawing and Discussion).**
   - **Language Frame 1.** On one or two sentence strips, write "This place _____ a puddle because water flowed _____."
   - **Language Frame Cards: Set 1.** This card set is provided as a Class Resource, located after the activities in Exploration 1. Make a copy of the card set (5 cards) and cut apart each card.

5. **Arrange the language frame and cards in a pocket chart or on a whiteboard (Activity 4, Shared Drawing and Discussion).** Refer to the teacher reference on page 38 (Language Frame 1) to see what the setup with the sentence strip(s) and cards will look like.
   - Place the language frame in a pocket chart or attach it to a whiteboard with magnets.
   - Place the cards beneath the language frame. Make sure the cards are turned over so they are not revealed to students until you discuss them in Activity 4.

6. **Prepare subset of Puddle Cards (Activity 1).** In this Exploration, students will only observe Puddle Cards with pictures of puddles on ground that is impermeable—puddles on pavement and rock. Gather Puddle Cards 1–12 for students to use in Activity 1. Students will observe the other Puddle Cards in Exploration 3, once they have been introduced to the phenomenon of puddles forming on permeable types of ground (e.g., wood chips, gravel, sand, soil).

7. **Review *Puddles Almost Everywhere* (Kickoff Discussion, Activity 1, Shared Drawing and Discussion).** Review pages 4–12. Preview pages 24–37.

8. **Prepare for the outdoor investigation (Activity 2).** In Activity 2, you will take students outside to conduct an investigation of water on pavement. You will need to prepare for this investigation beforehand.
   - **Locate an outdoor pavement area.** Choose an outdoor area with paved ground where you can safely take students (e.g., a section of the playground). Determine the boundaries of the pavement area that you will use for the outdoor investigation.
   - **Prepare cups of water.** Prepare one cup of water for each student by filling a 6 oz. cup about three-fourths full with water. You may choose to fill the cups indoors and bring them outside on a tray. Or, if you have access to an outdoor water source, you may choose to bring the empty cups outside and fill them there.
   - **Prepare yarn circles.** For each student, cut one piece of yarn measuring approximately 50 cm. Tie the ends together to make a circle. Attach a sticky note by folding it in half over the yarn and pressing the sticky parts of the note together. (Students will write their initials on the sticky notes so they can identify and reuse their yarn circles throughout the unit.)
   - **Create a plan for managing the investigation.** Determine any guidelines you will implement for the investigation. For example:
     - Students need to keep water off themselves and others.
     - Students need to leave enough space between themselves and others so as not to interfere with one another's investigations.
     - Students need to stay within the physical boundaries identified for the investigation.

Note: Students will plan and conduct another outdoor investigation in Exploration 2. Set aside the yarn circles for reuse in Exploration 2 after you collect them at the end of

Activity 2. If you would like to reuse the 6 oz. cups from this Exploration's investigation, set them aside for reuse after you collect them as well.

9. **Prepare the Flowing Water Demonstrations (Activity 3).** Refer to the teacher reference on page 39 (Flowing Water Demonstrations) to see what each of the demonstration setups will look like. Identify a location for the demonstrations where all students will be able to easily observe them.
   - Prop up one end of the rectangular container (at least 2" deep) on the book or wooden block.
   - Place the large transparent bowl right side up.
   - Place the large non-transparent bowl upside down on the tray or baking sheet (at least 1" deep).
   - Fill a pitcher with water and place it nearby.

10. **Assemble Science Notebooks (Activity 3).** Throughout the unit, students will draw their ideas in Science Notebooks. You may collect notebooks after students compose each entry to review their work. You will need to assemble one Science Notebook for each student and one for yourself.
    - **Science Notebook cover.** Make enough copies of the Science Notebook Cover copymaster so each student will have a cover. Make one copy for yourself.
    - **Science Notebook pages.** Make 10 copies of the Science Notebook Page copymaster for each student. Make one set of pages for yourself.
    - **Combine cover and pages.** For each notebook, staple the cover and the 10 pages on the short left-hand side.

11. **Prepare materials for the Ground Model (Activity 4).** For each pair of students, stack two trays and then place one rain cup and two cups of water on the top tray. You will distribute one square of waxed paper to each student separately. Set aside one set of materials for yourself. Refer to the teacher reference (Ground Model) on page 40 to see what the model will look like.
    - **Prepare waxed paper.** Cut waxed paper into squares measuring approximately 6" x 6" each. Create a few additional squares to have on hand.
    - **Prepare rain cups.** To make a rain cup, use a pushpin to poke approximately 20 holes in the bottom of a 4 oz. paper cup. Test each rain cup to ensure that all the water will drip from the cup. If some water remains in the cup, enlarge the holes slightly.
    - **Prepare cups of water.** Fill each 4 oz. paper or plastic cup three-fourths full with water.
    - **Test the model.** Crumple a piece of waxed paper and then partially

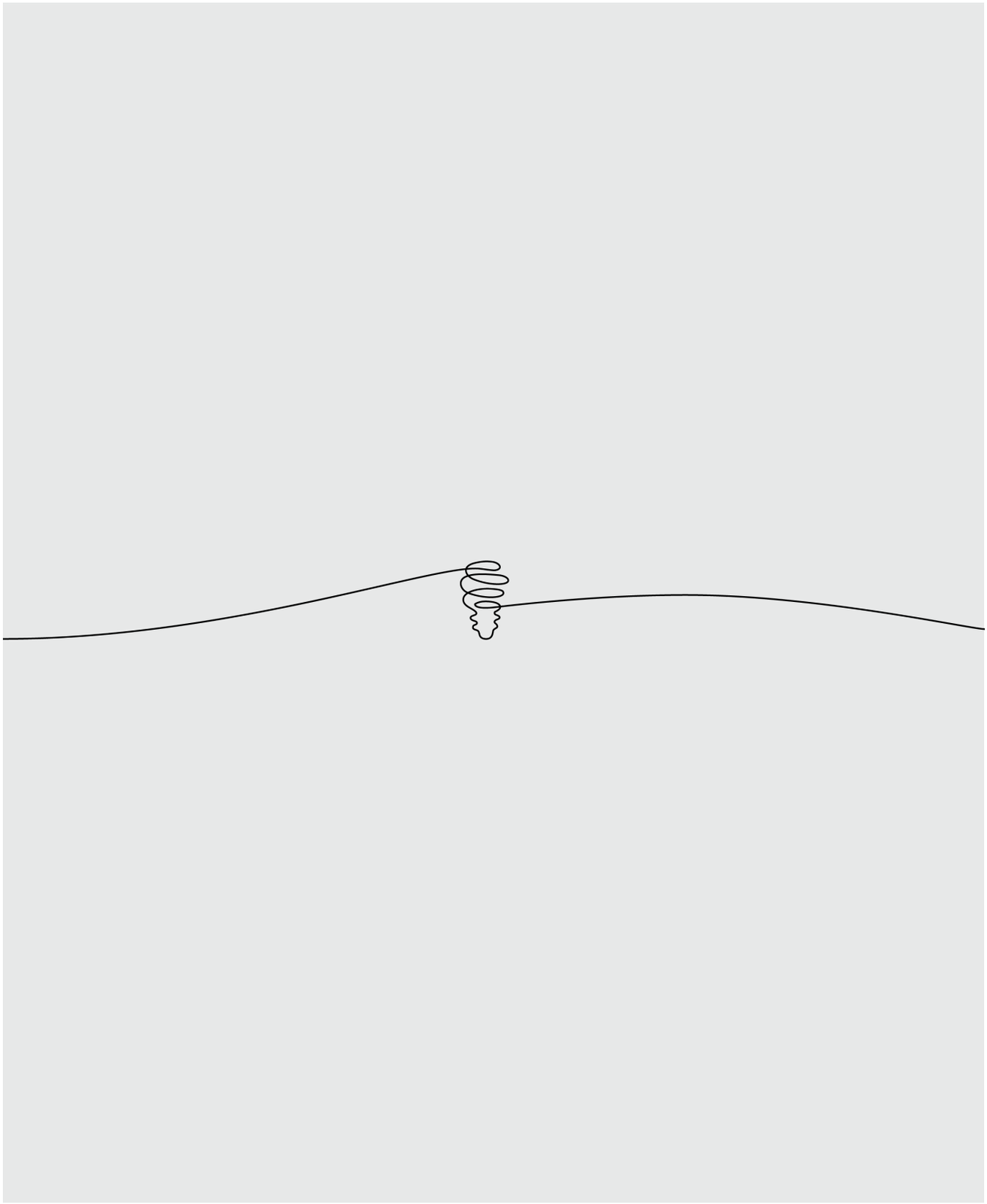
flatten it to represent the ground. Be sure there are enough folds/crinkles in the waxed paper to represent small slopes of the ground outside. Place the waxed paper on a tray. Hold a rain cup above the waxed paper and pour the water from the 4 oz. cup into the rain cup. As you pour the water, slowly move the rain cup around, above the waxed paper, so water drips on all areas of the waxed paper. Observe how the water flows down the slopes and forms puddles.

Note: At the end of Activity 4, collect and set aside the rain cups and the 4 oz. paper or plastic cups for water to reuse in Exploration 2. You may need to replace some of the rain cups if they get destroyed.

12. **Preview shared drawing and writing (Shared Drawing and Discussion).** Throughout the unit, you will add to a shared drawing on two sheets of chart paper, taped together. You will write sentences on separate sheets of white paper (8.5" x 11") that explain the drawing and attach these to the chart paper. Using colored markers or crayons, you will write, with student input, during the Shared Drawing and Discussion activity at the end of each Exploration. Refer to the teacher reference on pages 42–43 (Shared Drawing and Writing: Exploration 1) to see what the shared drawing and shared writing will look like at the end of Exploration 1. Tape together the two sheets of chart paper and post them on the wall.

13. **Prepare Questions About Puddles chart (Shared Drawing and Discussion).** At the top of a sheet of chart paper, write "Questions About Puddles." At the end of this Exploration, you will record students' questions on this chart.

14. **Have on hand the following materials:**
    - **Kickoff Discussion:** *Puddles Almost Everywhere*, Science Question 1, vocabulary card: *evidence*, masking tape
    - **Activity 1:** *Puddles Almost Everywhere*, Puddle Cards 1–12
    - **Activity 2:** vocabulary card: *investigate*, masking tape, yarn circles, crayons, 6 oz. cups of water
    - **Activity 3:** vocabulary card: *flow*, masking tape, setups for Flowing Water Demonstrations, pitcher of water, Science Notebooks, crayons
    - **Activity 4:** vocabulary card: *slope*, masking tape, squares of waxed paper, trays with prepared materials for Ground Models
    - **Shared Drawing and Discussion:** prepared Science Idea 1, masking tape, *Puddles Almost Everywhere*, colored markers or crayons, sheets of white paper (8.5" x 11"), Questions About Puddles chart



Teacher References

Suggestions for Flexible Implementation: Exploration 1

Activities 1, 3, and 4 can be implemented flexibly to incorporate a science center with an adult-led introduction and wrap-up. Activity 2 requires adult facilitation. Activity 4 does not require adult facilitation, but it involves students using water and rain cups to investigate puddles. Due to the nature of the materials, you might consider inviting an adult volunteer to supervise at the Activity 4 center. Refer to the following suggestions about how to modify these activities to incorporate a science center into Exploration 1.

Activity 1: Reading *Puddles Almost Everywhere*

- **Introduction:** Follow Steps 1–7 to read aloud from the reference section of *Puddles Almost Everywhere* and to introduce the Puddle Cards. When demonstrating the activity, set expectations for observing multiple Puddle Cards.
- **Science center (Steps 8–9):** Students work at the center to observe and discuss Puddle Cards with a partner. Optional: Have students draw a puddle they remember seeing or choose their favorite puddle card to draw.
- **Wrap-up:** Once all students have completed the center activity, gather the class together and follow Steps 10–11 to synthesize student learning.
- **Materials adjustments:** If you choose to have students complete the optional drawing, provide them with paper and crayons.
- **Visual Directions Cards:** *observe, share*, optional: *draw and write*

Activity 2: Investigating Puddles Outside

- This activity requires adult facilitation. Follow all steps as written.

Activity 3: Observing and Recording How Water Flows

- **Introduction:** Follow Steps 1–8 to conduct the Flowing Water Demonstrations and introduce the Science Notebook and drawing task.
- **Science center (Step 9):** Students work at the center to choose one of the demonstration setups and then record their observations in their Science Notebooks.
- **Wrap-up:** Once all students have completed the center activity, gather the class together and follow Step 10 to synthesize student learning.
- **Materials adjustments:** n/a
- **Visual Directions Cards:** *think, draw and write*

Activity 4: Investigating Puddles with a Model

- **Introduction**: Follow Steps 1–5 to introduce the Ground Model and explain the partner activity.
- **Science center (Steps 6–10):** Students work at the center with a partner to create their own Ground Models, predict where puddles will form in their models, and then take turns making rain on their partners' models.
- **Wrap-up:** Once all students have completed the center activity, gather the class together and follow Steps 11–17 to introduce and model Language Frame 1 and to provide students with opportunities to explain their models, using the language frame.
- **Materials adjustments:** n/a
- **Visual Directions Cards:** *make* (affix a crumpled and partially flattened piece of waxed paper to the card), *share*, *observe* (You may also want to take a photo or draw a picture of students making rain on their partners' models and post it on an additional *make* card as a visual cue for what students will do at the center.)

Language Frame 1

On one or two sentence strips, write the language frame shown below. Place the language frame in a pocket chart or attach it to a whiteboard with magnets. Place the cards in the pocket chart beneath the language frame as shown. Make sure the cards are turned over so they are not revealed to students until you discuss them in Activity 4.

This place _____ a puddle because water flowed _____ .

has

does not have

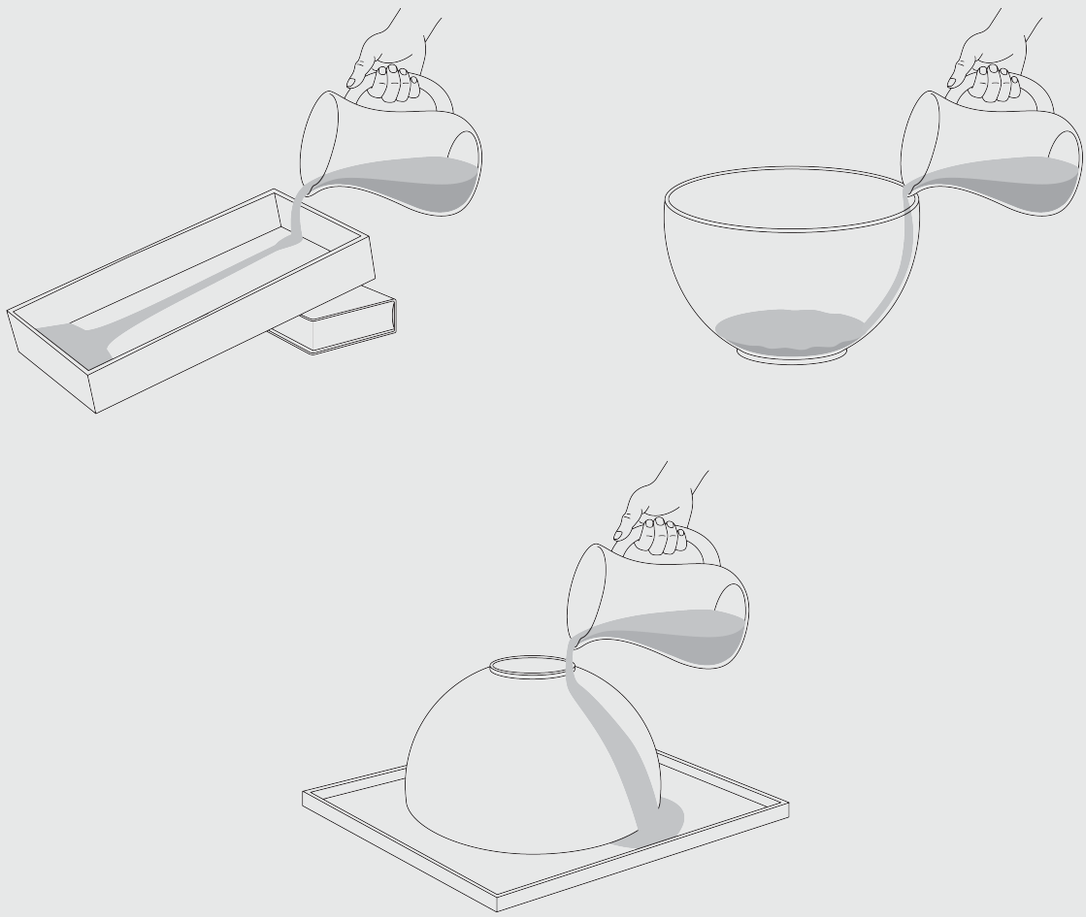
_____ to the bottom of the slope

_____ away from the top of the slope

_____ down the slope

Flowing Water Demonstrations

In Activity 3, you will conduct a demonstration with the three setups shown below—a slanted rectangular container propped up on one side on a book or wooden block, a large transparent bowl, and a large upside-down non-transparent bowl placed on a tray. You will pour water near the highest part of each setup so students can observe how water flows down as far as it can go and then pools when it cannot go down any farther.



Ground Model

In Activity 4, you will demonstrate how to make a model of the ground by crumpling a square of waxed paper and then partially flattening it out. You will make it rain over your Ground Model by dripping water from a rain cup. Students will then make their own Ground Models, make it rain over their models, and observe and discuss how and where water flows and forms puddles in their models. Below is an example of what the Ground Model will look like.

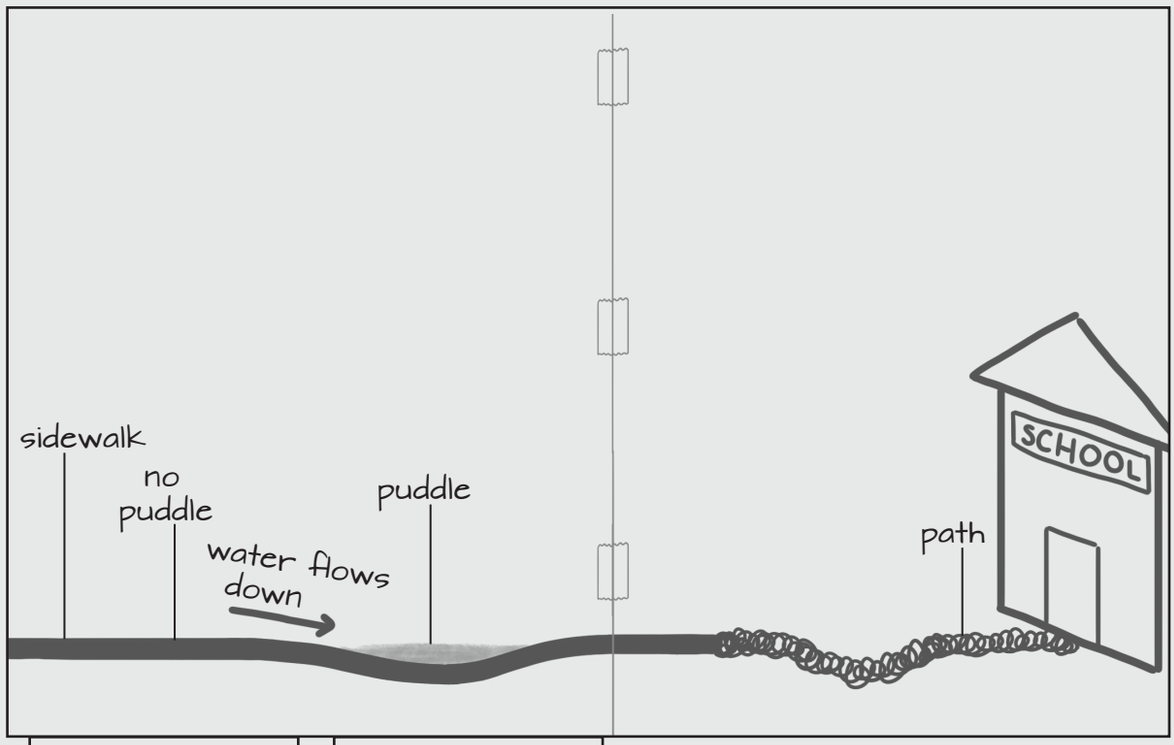
Teacher References continued on pages 42–43.

Shared Drawing and Writing: Exploration 1

Throughout the unit, you will add to a shared drawing. You will create the drawing on two side-by-side sheets of chart paper and write on sheets of white paper (8.5" x 11") that you will attach to the bottom of the drawing. You will draw and write, with student input, during the Shared Drawing and Discussion activity at the end of each Exploration. Keep the drawing relatively simple and leave room for additional details and labels, which you will add during Explorations 2 and 3. See the next page for an example of how the shared drawing and writing for Exploration 1 may look. Depending on students' ideas, the sentences may differ. Using colored markers or crayons, be sure to include the following:

- a sidewalk labeled "sidewalk" that slopes gently downward and then back upward.
- a gravel path labeled "path" to the right of the sidewalk, with a subtle dip in one place.
- a school to the right of the gravel path.
- a blue puddle at the lowest point in the sidewalk labeled "puddle."
- a blue arrow labeled "water flows down" that indicates water flowing along the sidewalk, down to the puddle.
- a part of the sidewalk that does not have a puddle labeled "no puddle."
- a sentence that explains why one part of the sidewalk has a puddle.
- a sentence that explains why another part of the sidewalk does not have a puddle.

Shared Drawing and Writing: Exploration 1 (cont.)



This place does not have a puddle because water flowed away from this part of the sidewalk.

This place has a puddle because water flowed down the sidewalk.

Kickoff Discussion: Discussing Puddles on the Sidewalk

What?

The class reviews what happened in the first section of *Puddles Almost Everywhere*. Students are introduced to Science Question 1 and discuss their initial ideas in response to this question.

Why?

Revisiting *Puddles Almost Everywhere* deepens students' connection to the unit phenomenon and encourages them to wonder more about puddles. Introducing and discussing Science Question 1 models how scientists approach a problem.

How?

1. **Display *Puddles Almost Everywhere*.** Invite students to share what they remember from reading the first section of the book in the Introductory Activity.
2. **Revisit pages 4–12.** Point out the pictures on these pages. Remind students that as the girl in the book walked to school, she observed puddles in some places but not in other places. After revisiting these pages, turn back to page 5 and read the first sentence aloud.

   The sidewalk has puddles in some places but not in other places.
3. **Introduce Science Question 1.**

   The girl in the book wonders about puddles on her walk to school. We are scientists, and when scientists wonder about things, they ask questions.

   Post Science Question 1 to the classroom wall and read it aloud.

   Why are there puddles on some parts of the sidewalk but not on other parts?
4. **Invite students to share their ideas about Science Question 1.** Provide the Shared Listening prompt and give students time to engage in the Shared Listening routine with partners.

   Take turns sharing why you think there are puddles on some parts of the sidewalk but not on other parts.
5. **Introduce *evidence*.**

   To help answer questions like this one, scientists gather evidence.

   Use the Vocabulary routine to introduce *evidence*: things you see, hear, or read that help you answer a question.
6. **Wrap up the activity.** Let students know that they will continue working as scientists to figure out an answer to the question.

Teacher Support

Instructional Suggestion

Science Practice: Gathering Evidence

The concept of evidence and the idea that scientists base their ideas on evidence is central to science. For young learners, it is important to reinforce this idea with concrete examples. Make sure your students know that they can find evidence to answer questions by making observations directly with their senses or by gathering information in books and other secondhand media. Consider talking students through a few examples of gathering evidence to answer questions. You could think aloud by saying, "I have a question: *Is it raining outside?* I could gather evidence with my senses to find out if it was raining. I could listen closely for the pitter-patter sound that rain makes. I could look outside and see if there were raindrops falling. Or, I could go outside and feel if it was raining." Think aloud by saying, "Here's another question: *Are all bananas yellow?* I could gather evidence by getting a bunch of bananas and looking closely to see if they were all yellow or if they were different colors. I could also read about bananas in a book to figure out if they are all yellow." Then, have students provide ideas for how to gather evidence for another question such as *What happens when you mix dirt with water?* In this unit, students will gather evidence from *Puddles Almost Everywhere*, hands-on investigations, pictures, and models.

Activity 1: Reading *Puddles Almost Everywhere*

What?

The teacher introduces the reference section of *Puddles Almost Everywhere* and reads aloud about different puddles. Students observe the puddles in the book and on the Puddle Cards and share their ideas about why there are puddles in some places but not in other places.

Why?

Observing puddles helps students build background knowledge about puddles and begin generating ideas about why puddles form in some places but not in other places. Gathering evidence from text also reflects how scientists obtain information from reference material.

How?

1. **Connect to students' prior knowledge about puddles.** Invite students to close their eyes.

   Think about a time you saw a puddle. Imagine the puddle you saw.

   What did the puddle look like? Where was the puddle?

   Have students share their memories of a puddle with a partner. Invite several volunteers to share their ideas with the class.

2. **Display *Puddles Almost Everywhere*.** Remind students that as the girl in the book walked to school, she saw puddles on some parts of the sidewalk but not on other parts. Explain that the class will read a new section of the book to help them figure out why.

3. **Open to the Contents page to introduce the reference section.**

   This page is the Contents. It lists the different parts of the book.

   - Point to the "Looking for Puddles" section and read the title aloud.

   We read this part of the book and learned about the puddles that the girl observed in some places but not in other places.

   - Point to the next few sections and read several of the titles aloud. Let students know that the "After the Rain" section continues the story about the girl observing puddles, and the other parts of the book have information about things that relate to the story.
   - Point to the "More About Puddles" section and read the title aloud.

- This part of the book might help us gather information about puddles and the places puddles can form.
- When we say a puddle can form in a place, we mean that water can gather to make a puddle in that place.

4. **Read aloud pages 20–23.** Pause after reading each page and invite students to share their observations of the pictures.
5. **Introduce the Puddle Cards.** Hold up a few Puddle Cards and let students know that they will observe pictures of puddles to gather evidence about where puddles form. Also let students know that several of the pictures on the cards are the same as the pictures they just saw in *Puddles Almost Everywhere*.
6. **Model observing a Puddle Card.** Hold up Puddle Card 1. Think aloud to model observing the puddles, noting that there are only puddles in some places in the picture and that they are all on one side of the sidewalk.
7. **Explain the procedure for observing Puddle Cards.**
   - Students will work in pairs to observe the puddles in the pictures.
   - Students should pay attention to where there are puddles in the pictures and where there are no puddles in the pictures.
   - Students should discuss their observations and ideas with their partners.
8. **Distribute Puddle Cards.** Distribute one or more Puddle Cards to each pair of students.
9. **Partners discuss pictures.** Once students have had a chance to discuss their Puddle Cards, have them trade cards with another pair. Do this a few times so each pair has a chance to discuss several of the pictures.
10. **Invite students to share observations.** Gather students together and have them bring the Puddle Cards with them. Then, invite volunteers to hold up their Puddle Cards and share their observations. Prompt students to share why they think there are or are not puddles in certain places in each picture. Accept all ideas.
11. **Wrap up the activity.** Collect the Puddle Cards. Let students know that they will continue to gather evidence for their ideas about puddles.

Teacher Support

Rationale

Pedagogical Goals: Observing Puddles

In this activity, students observe and discuss various puddles. These observations alone do not provide sufficient evidence for answering Science Question 1. However, the observations and accompanying discussion help students build background knowledge about puddles on different surfaces, which helps prepare them for the other activities in this Exploration as well as later Explorations. Providing students with these opportunities to observe puddles can be especially important if it has not rained in your area for quite awhile. To provide further experience with puddles, you can show your students additional pictures or videos of puddles. You may find a variety of pictures and videos on the Internet by using the following suggested search terms: "playground with puddles after rain," "puddles on the sidewalk," "road with puddles," "rain puddles." Look for pictures of places in which some areas have puddles, and other areas do not. Look for videos that show rain falling and collecting into puddles.

Instructional Suggestion

What One Teacher Did: Photographs of Puddles Near the School

One teacher prepared ahead of time to extend this activity by taking pictures of puddles in familiar areas at and around the school after it rained. Students then observed and discussed these pictures and made comparisons to the pictures of puddles in *Puddles Almost Everywhere* and on the Puddle Cards. After observing the pictures of puddles at and around the school, the teacher took students on a walk to observe the locations where the puddles had formed.

Activity 2: Investigating Puddles Outside

What?

Students plan and conduct an outdoor investigation in which they pour cups of water onto pavement and observe what happens to the water.

Why?

Students' observations of water on pavement provide evidence to help answer Science Question 1. This activity also introduces students to the science practice of investigation, with which they will engage throughout the unit.

How?

1. **Introduce the outdoor investigation.** Point to Science Question 1 on the classroom wall.

   Remember, we are working as scientists to answer the question *Why are there puddles on some parts of the sidewalk but not on other parts?*

   To help answer this question, we will go outside to investigate.

2. **Introduce *investigate*.** Use the Vocabulary routine to introduce *investigate*: to try to learn more about something.

3. **Relate the sidewalk in *Puddles Almost Everywhere* to the pavement outside.** Show students pictures of the sidewalk with puddles on pages 4–5 of *Puddles Almost Everywhere*.

   The pavement outside is like the sidewalk in the book.

   We can investigate puddles on the pavement outside to learn more about the puddles on the sidewalk in the book.

4. **Lead the class outside.** Bring the yarn circles and cups for the investigation with you.

5. **Introduce planning an investigation.**

   Before scientists investigate, they make a plan. They think about and then decide what will help them figure out an answer to their question.

   We need to make a plan for our investigation.

   We want to know why there are puddles on some parts of the sidewalk but not on other parts.

   We should use water to investigate places on the pavement where we think water will form puddles and places where we think water will not form puddles.

Remember that when we say a puddle can form in a place, we mean that water can gather to make a puddle in that place.

6. **Explain and model the steps of the investigation.**
   - **Partners choose two different places on the pavement.** Partners should choose one place where they think the water will form a puddle and another place where they think it will not form a puddle.
   - **Partners mark their places.** Partners will mark their places by setting down small circles of yarn with labels that indicate whose yarn circles are whose.
   - **Partners compare and discuss their two places.** Partners will observe their two places and discuss what is different about them and what they think will happen when they pour water on each place.
   - **Display two cups of water.** Let students know that each pair will get two cups of water to pour on the pavement.
   - **One partner pours water.** One partner will pick up the yarn circle in the place where they think the water will form a puddle and pour water there, and both partners will observe what happens.
   - **The other partner pours water.** The other partner will pick up the yarn circle in the place where they think the water will not form a puddle, and both partners will observe what happens.
7. **Introduce investigation guidelines.** Explain and model the guidelines you established for the investigation.
8. **Distribute yarn circles and crayons.** Distribute two circles of yarn and one set of crayons to each pair of students. Have pairs write their initials on the folded sticky notes attached to both yarn circles or mark them in some other way that will remind them which yarn circles are theirs.
9. **Partners plan investigations.** Invite students to walk around to choose where to pour water. Remind students to mark their chosen places with their yarn circles.
10. **Partners make observations and predictions.** Remind partners to discuss the following questions:

    What is different about your two places?

    What do you think will happen when you pour water on each place?

    Circulate to listen to partners' observations and predictions.
11. **Emphasize investigation purpose.** Remind students to carefully observe what happens when they pour water on the pavement. After students observe, they should discuss what happens to the water and how what happens is the same or different at their two places.

12. **Distribute one cup of water to each student.** Remind students that first one partner will pour water on one place, and then the other partner will pour water on the other place. Remind students to pick up their yarn circles before pouring the water.
13. **Partners pour water, observe, and discuss.** Circulate as students conduct investigations and ask what they notice and why they think the water does what it does.
14. **Gather students together to share observations.** Use the following questions to guide discussion:
    - *What happened to the water you poured on the pavement?*
    - *Did you observe what you thought would happen?*
    - *What was the same at your two places?*
    - *What was different at your two places?*
    - *Did you observe any puddles? Where?*

    Encourage students to explain why they think the water did what it did. Highlight observations about how the water moved—*away* from some places and *to* other places. If students observed puddles, guide them to notice how puddles formed when water moved *to* a place and stopped there.
15. **Discuss new ideas about Science Question 1.** Ask students to share any new ideas about why there are puddles on some parts of the sidewalk but not on other parts in *Puddles Almost Everywhere*.
16. **Return to the classroom and conclude the activity.** Collect the cups and yarn circles and lead students back to the classroom. Congratulate them on planning and conducting their first investigation. Let them know that scientists gather a lot of evidence to answer their questions, so the class will continue to investigate Science Question 1.

Teacher Support

Instructional Suggestion

What One Teacher Did: Emphasizing Where Puddles Form

One teacher emphasized where puddles form by repeating one pair's investigation. While pairs investigated, the teacher identified a place where a student poured water that flowed over the pavement and then formed a puddle. After students shared observations from their investigations, the teacher gathered the class in this place and poured another cup of water. Students observed closely as the water flowed over the pavement and formed a puddle. The class then discussed their ideas about why a puddle formed. This enabled all students to observe a puddle forming, even those who hadn't observed one forming in their own investigations. If none of your students observed puddles (e.g., if their water just flowed over the surface of the pavement, slowly seeping in until there was no more water to flow), it could be particularly useful to conduct this demonstration. Pour the water near a low point in the pavement to ensure that students will observe the water flowing to the low point and then stopping and making a puddle there.

Activity 3: Observing and Recording How Water Flows

What?

Students observe how water flows and where it pools when it is poured on sloped surfaces. Students are introduced to their Science Notebooks and use them to record how water flows.

Why?

Observing water flowing and pooling provides students with evidence that water flows down as far as it can go and then pools when it cannot go down any farther. Recording ideas in their Science Notebooks allows students to express their developing understanding of water flowing down.

How?

1. **Revisit Science Question 1.** Point to Science Question 1 on the classroom wall.

   We are working as scientists to answer the question *Why are there puddles on some parts of the sidewalk but not on other parts?*

2. **Introduce and set purpose for the Flowing Water Demonstrations.** Point to the demonstration setups. Explain that you will pour water on these materials, and students will observe what happens.

   By observing how water moves over these materials, we can gather evidence that helps us understand why there are puddles in some places but not in other places.

3. **Conduct the Flowing Water Demonstrations.** For each of the demonstration setups, do the following:
   - Point to the highest part of the setup and explain that this is where you will pour the water.
   - Ask students what they think will happen to the water when you pour it.
   - Encourage students to observe carefully as you slowly pour some water from the pitcher.
   - Invite students to share their observations.

4. **Introduce *flow*.**

   We just observed water flowing.

   Use the Vocabulary routine to introduce *flow*: to move smoothly, the way water moves downhill.

5. **Set purpose for repeating the demonstrations.**

   We are going to observe the water flowing again. This time, pay attention to *where* the water flows, *when* the water stops flowing, and *what happens* to the water when it stops flowing.

6. **Repeat the demonstrations.** Pour the water from each of the demonstration setups back into the pitcher. Then, repeat the demonstrations. Pause after pouring water over each setup to ask the following questions:

   Where did the water flow?

   [Down. Downhill. To the bottom of the tray/bowl/upside-down bowl.]

   Did the water ever flow uphill?

   [No.]

   When did the water stop flowing?

   [When it got to the bottom. When it couldn't go down anymore.]

   What happened to the water when it stopped flowing?

   [It gathered at the bottom of the tray/bowl.]

   After repeating all three demonstrations, ask students what was the same in all three. If they don't mention it, point out how the water always flowed down, stopped flowing at the bottom of the setup, and pooled where it stopped.

7. **Introduce the Science Notebook.**

   When scientists gather evidence to figure something out, they often draw and write their observations and ideas to remember them.

   Display a copy of the Science Notebook.

   As we work as scientists, we will draw our ideas in this notebook. You will each get your own notebook.

   You will draw your observations and ideas so you can remember them.

   Show students that all the pages are the same. Then, show students where they will write their names on the cover.

8. **Introduce drawing flowing water.** Turn to the first page of your sample Science Notebook and point out where students will draw. Explain that they should choose one of the demonstration setups to draw—the slanted tray, the bowl, or the upside-down bowl on the tray. First they should draw the setup, and then they should draw how water flowed over it and pooled at the bottom.

9. **Distribute materials and give students time to draw.** Distribute one Science Notebook and one set of crayons to each student. Have students write their names on the front cover of their notebooks and then record their observations.
10. **Wrap up the activity.**

    We observed that water always flowed down.

    When the water got to the bottom, it had nowhere else to go, so it gathered there. We can say that the water pooled at the bottom when it could not flow down anymore.

    We will come back to this idea as we think about why the girl in the book observed puddles on some parts of the sidewalk but not on other parts.

Teacher Support

Instructional Suggestion

Going Further: Adding Labels to Drawings

If you are teaching this unit late in the year or if students are ready to write, you might invite students to add labels to their drawings. They might add arrows to show which direction the water is moving and/or add the words *down*, *flow*, or *water*. This will give students an opportunity to practice writing at a moment when they are likely to be engaged and motivated to express their ideas. You could highlight how writing is a part of scientists' work. There are benefits to this even for students who are just starting to learn to write; it's fine if the words that students write are spelled incorrectly or just include the beginning and/or ending sounds.

Instructional Suggestion

What One Teacher Did: Providing Materials for Students to Explore

One teacher led the demonstration with the slanted tray and then, instead of demonstrating with the bowls, provided materials for students to explore. The teacher distributed trays with small bowls, cups of water, and droppers. Students first practiced sucking water from the cup into the dropper and releasing it back into the cup. Then they explored what happened to water when they released drops of water over the bowls. The teacher encouraged students to try releasing drops of water over the bowls when the bowls were right-side up and when the bowls were upside down. The teacher asked students where the water flowed when it stopped flowing and what happened when it stopped flowing.

Another teacher set up exploration stations outside. Students poured cups of water onto the materials at each station and observed what happened to the water. The teacher set up the following stations:

- **Pool-noodle ramps:** The teacher created ramps out of pool noodles by cutting the noodles in half, lengthwise, and propping them up by attaching one end to a table and placing the other end in a bucket. Students poured water at the top of the ramps.
- **Funnels and tubes:** The teacher attached plastic funnels to one end of clear plastic tubes and placed the other end of the tubes in a bucket. Students held up the funnels and poured water into them.
- **Bowls and rain cups:** The teacher collected an assortment of large bowls and placed rain cups (created for Activity 4) near the bowls. Students held the rain cups over the bowls and poured water into the rain cups.

The teacher circulated while students explored and asked them where the water flowed, when it stopped flowing, and what happened when it stopped flowing.

Activity 4: Investigating Puddles with a Model

What?

Students create and pour water over their Ground Models. They predict where puddles will form in their models and then observe where puddles form. They use a language frame to explain their observations.

Why?

This activity provides evidence that water flows down as far as it can go and forms puddles when it cannot flow down any farther. Using a language frame to explain observations gives students a structured opportunity to share ideas the way scientists do.

How?

1. **Set purpose.** Remind students that they are trying to figure out why there are puddles on some parts of the sidewalk but not on other parts in *Puddles Almost Everywhere*. Let them know that they are going to use a model to gather more evidence to answer this question.

   Scientists make models to show their ideas. A model is similar to the real thing but not exactly the same.

2. **Introduce the Ground Model.** Display a piece of waxed paper.

   We can use this waxed paper to make a model of the ground. The waxed paper will be similar to the real ground outside, but not the same.

   Crumple the waxed paper and then partially flatten it. Be sure there are enough folds or crinkles in the paper to represent small slopes of ground.

   The real ground is not totally flat. It is higher in some places and lower in other places. Our model is similar to the real ground in this way.

   Place the waxed paper on a tray.

3. **Introduce *slope*.** Use the Vocabulary routine to introduce *slope*: ground that is slanted so one part is higher than another part.
   - Point to a few slopes in the Ground Model and then invite volunteers to point to a few more slopes in the model.
   - If needed, revisit page 7 of *Puddles Almost Everywhere* to reinforce the meaning of *slope*.

4. **Introduce and demonstrate how to use a rain cup.** Let students know that you will make it rain over your Ground Model.
   - Hold a rain cup above the waxed paper.
   - Pour water from the 4 oz. cup into the rain cup, a little bit at a time.
   - As you pour the water, slowly move the rain cup around so the water drips on all areas of the waxed paper.

   Keep your Ground Model displayed so you can refer to it in Steps 13 and 14 to point out where puddles formed and did not form.
5. **Explain partner work.**
   - Each student will use a square of waxed paper to make a Ground Model.
   - Students will predict where water will form puddles in their models when they make it rain on them.
   - One student will make it rain on their partner's model while the other student observes what happens. Then, they will switch roles.
   - Partners will discuss where water formed puddles and why they think water formed puddles in those places.

   💬 Observing how water flows and forms puddles in our models will give us more evidence for where water forms puddles and why puddles form in those places.

   💬 Remember that when we say a puddle can form in a place, we mean that water can gather to make a puddle in that place.
6. **Distribute one piece of waxed paper to each student.**
7. **Students make Ground Models.** Have students crumple their pieces of waxed paper and then partially flatten them. Provide assistance as needed.
8. **Students predict where puddles will form.**

   💬 Where do you think the biggest puddles will form in your model?

   💬 Why do you think big puddles will form there?

   Have students share their predictions and reasoning with their partners.
9. **Distribute remaining materials.** Distribute two trays, one rain cup, and two 4 oz. cups of water to each pair of students. Have students place their models on the trays.
10. **Students take turns making rain on their partners' models.** Provide assistance as needed. Remind students to observe closely as it rains on their own models and to discuss what they observe with their partners.

11. **Gather students together.** Ask students to leave their materials at their workstations.
12. **Introduce Language Frame 1.**

    Scientists share their ideas with other scientists. We can use these words to help us talk about and share what we observed about puddles in our models.

    Point to the language frame and read it aloud.

    This place _____ a puddle because water flowed _____.
13. **Model using the language frame to explain why a puddle formed in one place.** Point to a place on your Ground Model where a big puddle formed.

    This place *has* a puddle.

    Place the *has* card in the first blank in the language frame. Then, point to the model and think aloud about where the water flowed. For example:

    I can see that the puddle is at the bottom of a slope. The water flowed to the bottom of the slope to form the puddle.

    Place the *to the bottom of the slope* card in the second blank of the language frame. Read the completed language frame aloud. Then, invite students to repeat the sentence with you as you point to the words of the language frame.

    This place has a puddle because water flowed to the bottom of the slope.

    Remove the cards from the language frame.
14. **Model using the language frame to explain why a puddle did not form in one place.** Point to a place on your Ground Model where a puddle did not form (e.g., a high point, the top of a slope).

    This place *does not have* a puddle.

    Place the *does not have* card in the first blank in the language frame. Then, point to the model and think aloud about where the water flowed. For example:

    I can see that there is a slope coming down from this place. The water flowed down the slope, away from the top of the slope, so this place does not have a puddle.

    Place the *away from the top of the slope* card in the second blank of the language frame. Read the completed language frame aloud. Then, invite students to repeat the sentence with you as you point to the words of the language frame.

    This place does not have a puddle because water flowed away from the top of the slope.

    Remove the cards from the language frame. Let students know that they can use this language frame when they discuss their observations of puddles in their models. Point

out and read aloud the *down the slope* card and let students know that they could also use these words to describe how the water flowed and why a place does or does not have a puddle.

15. **Students explain places in their models with and without puddles.** Have partners return to their models and take turns pointing to places with and without puddles. Remind students to use the language frame to explain why those places do or do not have puddles.
16. **Formative Assessment Opportunity.** As students discuss their models, listen to their reasoning for why places do or do not have puddles. Students who are developing an understanding of Science Idea 1—*Water flows down as far as it can go.*—will point to puddles in the lowest areas of their models and explain how water flows down to those places.
17. **Synthesize ideas.**

    We gathered evidence from our models that water flows down a slope and can form a puddle when it gets to the bottom of a slope.

Teacher Support

Instructional Suggestion

Going Further: Thinking More About Models

This activity engages students in the science and engineering practice of *Developing and Using Models*. Students' use of this and other models throughout the unit is authentic to one of the ways scientists use models—to gather evidence. The Ground Model, like all scientific models, is similar to the thing it represents in important ways and different in many other ways. While explicit instruction on modeling is beyond the scope of this unit, there are opportunities for deeper discussion around modeling. For example, consider having students discuss the ways the ground in this model is similar to and different from the real ground on the sidewalk by their school. Thinking about how models represent scientific ideas in this basic and concrete way prepares students to engage with more complex and abstract models in later grades.

Instructional Suggestion

Providing More Experience: Using the Language Frame to Explain Pictures

To provide students with more opportunities to use the language frame, have them explain the places in pictures that have and do not have puddles. Using the pictures on pages 20–23 of *Puddles Almost Everywhere* and/or Puddle Cards 1–12, you could have students use the language frame to explain why certain places in each picture have puddles, and other places do not. You could do this as a whole class or have students work in pairs.

Shared Drawing and Discussion: Water Flows Down

What?

The class discusses why there are puddles on some parts of the sidewalk but not on other parts. They then represent their ideas in a shared drawing. Students use the language frame to describe the shared drawing in an oral and written explanation.

Why?

Participating in the shared drawing and accompanying discussion helps students apply their understanding that water flows down as far as it can go. This collaborative activity also reinforces students' understanding that scientists draw, write, and talk to share their ideas.

How?

1. **Review the activities in Exploration 1.**

   We have been working as scientists to gather evidence to help answer this question: *Why are there puddles on some parts of the sidewalk but not on other parts?*

   Remember that evidence is things you see, hear, or read that help you answer a question.

   Invite students to share some of the ways they have gathered evidence to help answer this question.

2. **Students share ideas about Science Question 1.** As needed, use artifacts from the activities in Exploration 1 (e.g., *Puddles Almost Everywhere*, the setups from the Flowing Water Demonstrations, your Ground Model) to lead the class to the idea that water flows down as far as it can go.

3. **Introduce the Science Ideas section of the classroom wall.**

   As we learn new science ideas, I will post them here on the wall.

4. **Introduce Science Idea 1.** Hold up Science Idea 1 and read it aloud.

   Water flows down as far as it can go.

   Remind students that they have gathered evidence from many activities to figure out this idea. Post Science Idea 1 on the classroom wall.

5. **Display page 5 of *Puddles Almost Everywhere*.** Point to parts of the sidewalk where there are puddles and parts where there aren't any puddles.

   We have figured out that there are puddles on some parts of the sidewalk but not on other parts because water flows down as far as it can go.

When the water cannot go down any farther, it can form a puddle.

6. **Introduce the shared drawing.**

We know that scientists share their ideas by talking and listening to one another. Scientists also draw and write to share what they learn and to remember their ideas.

Each time we learn something new about puddles, we will draw and write what we have figured out.

As we draw what we have learned, we will think about the ideas together. You will help me decide what to draw.

Today, we will draw to explain what we have figured out about why there are puddles on some parts of the sidewalk but not on other parts.

7. **Lead shared drawing.**

In *Puddles Almost Everywhere*, the girl walked on a sidewalk and then on a path on her way to school.

On the chart paper posted on the wall, use a marker or crayon to draw a sidewalk that slopes gently down toward a low point and then gently back up. The sidewalk should lead to a gravel path that has a dip in one place and leads to a school. Draw the slopes in the sidewalk and path without bringing students' attention to them.

Where should we draw a puddle in this picture?

[At the bottom of the slope in the sidewalk.]

Elicit students' ideas and then use a blue marker or crayon to draw a puddle on the sidewalk. If students suggest drawing a puddle where there is a dip in the path, remind them that there was not a puddle on the path in the book.

How did the water get to the puddle?

[It flowed down the sidewalk. It flowed down the slope.]

Elicit students' ideas and then use a blue marker or crayon to draw an arrow to indicate water flowing along the sidewalk and down to the puddle.

8. **Add labels to the shared drawing.**

Scientists often add words to their drawings to help make their ideas clear. We can add words to our drawing, too.

- Write "sidewalk" and "path" on the drawing with a line coming from each label. Point to and say each word. Explain that these words help make it clear what the drawing shows.
- Ask students the following questions:

Where could we write the word *puddle*?

[Near the puddle.]

Where could we write the words *no puddle*?

[Higher up on the sidewalk.]

Where could we write the words *water flows down*?

[Next to the arrow.]

- Based on students' responses, write "puddle," "no puddle," and "water flows down" on the shared drawing. Point to and say each word or phrase after you add it to the drawing.

9. **Revisit the language frame.**

   We just drew our ideas about how water formed puddles on some parts of the sidewalk but not on other parts. Scientists draw, write, and talk to share their ideas.

   Point to the language frame.

   We used these words to share our ideas about where we observed puddles in our Ground Models.

   Now we can use these words to help us talk about and write our ideas about why there are puddles on some parts of the sidewalk but not on other parts.

10. **Lead shared writing about a place where a puddle formed.** Point to the puddle in the drawing and then to the language frame as you guide the class in constructing a sentence. Place the *has* card in the first blank in the language frame and read the first part of the sentence aloud.

    This place has a puddle because water flowed _____.

    Invite volunteers to share ideas for how to complete the sentence. Synthesize students' ideas and write the completed sentence (e.g., "This place has a puddle because water flowed down the sidewalk.") on a sheet of white paper (8.5" x 11") and post it near the puddle on the shared drawing. Read the completed sentence aloud and invite students to read it with you. Remove the *has* card from the language frame.

11. **Lead shared writing about a place where a puddle did not form.** Point to a place near the top of the sidewalk slope in the drawing and then to the language frame as you guide the class in constructing a second sentence. Place the *does not have* card in the first blank in the language frame and read the first part of the sentence aloud.

    This place does not have a puddle because water flowed _____.

Invite volunteers to share ideas for how to complete the sentence. Synthesize students' ideas and write the completed sentence (e.g., "This place does not have a puddle because water flowed away from this part of the sidewalk.") on another sheet of of white paper (8.5" x 11") and post it near the top of the sidewalk slope on the shared drawing. Read the completed sentence aloud and invite students to read it with you.

12. **Post the Questions About Puddles chart and record students' questions.** Post the chart to the classroom wall.

    When scientists answer one question, that often leads them to ask more questions.

    Think about what we have learned about puddles so far. Based on what we have learned, what new questions do you have about puddles?

    Record students' questions on the chart. If students share statements rather than questions, you may record these as well. However, consider recording them in a separate column from the questions so you can point out the difference between questions and statements.

13. **Conclude the Exploration.** Let students know that they will continue working as scientists to investigate puddles.

Teacher Support

Background

Science Practices: Diagrams with Labels and Captions

A primary goal of this curriculum is to deepen students' experience with several genres and components of science writing. Diagrams play an important role in many genres of science writing. The written labels and captions that accompany diagrams help clarify the ideas represented. When students learn how to write labels and captions for the shared drawing, they learn important habits of effective writing as well as particular elements of science diagrams. In this unit, students learn about diagrams and associated labels and captions through the shared drawing and shared writing activities. In later grades, students will document their ideas by creating diagrams with increased independence.

Rationale

Pedagogical Goals: Recording Questions to Prepare for a Class Book

As students work on a class book in the Culminating Activity, they will revisit the idea of asking questions based on what they have learned. Each student will create a page to share something they wonder about puddles. In each Exploration, you will support students in asking questions to record on the Questions About Puddles chart. The cumulative record of students' questions will be useful when it is time to work on the class book.

has

Earth Science: Wondering About Puddles—Language Frame Cards: Set 1—Exploration 1

does not have

Earth Science: Wondering About Puddles—Language Frame Cards: Set 1—Exploration 1

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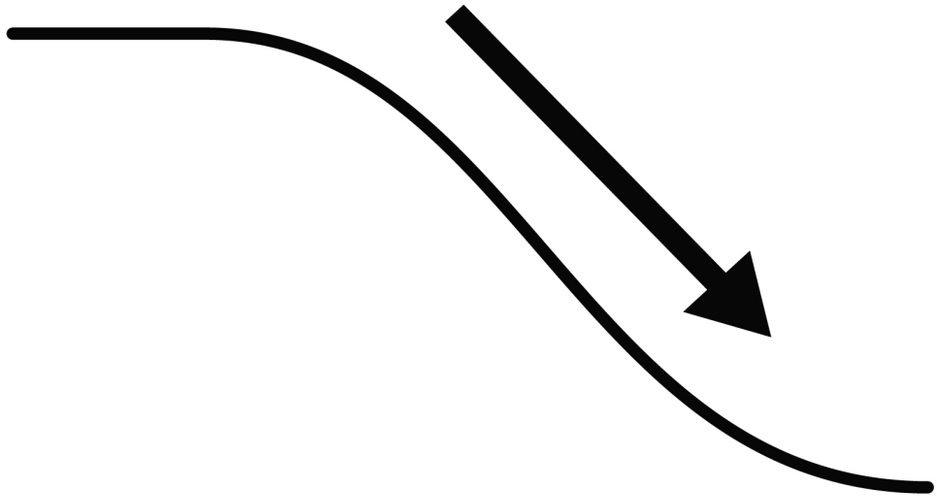
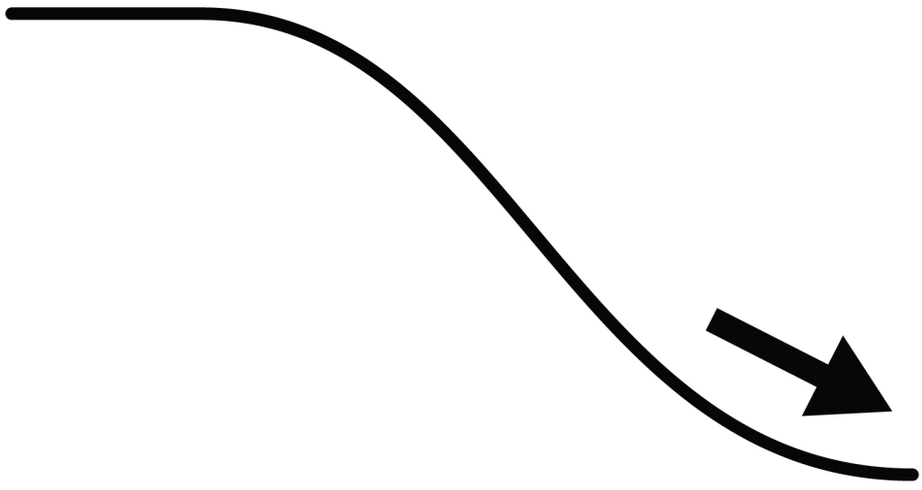


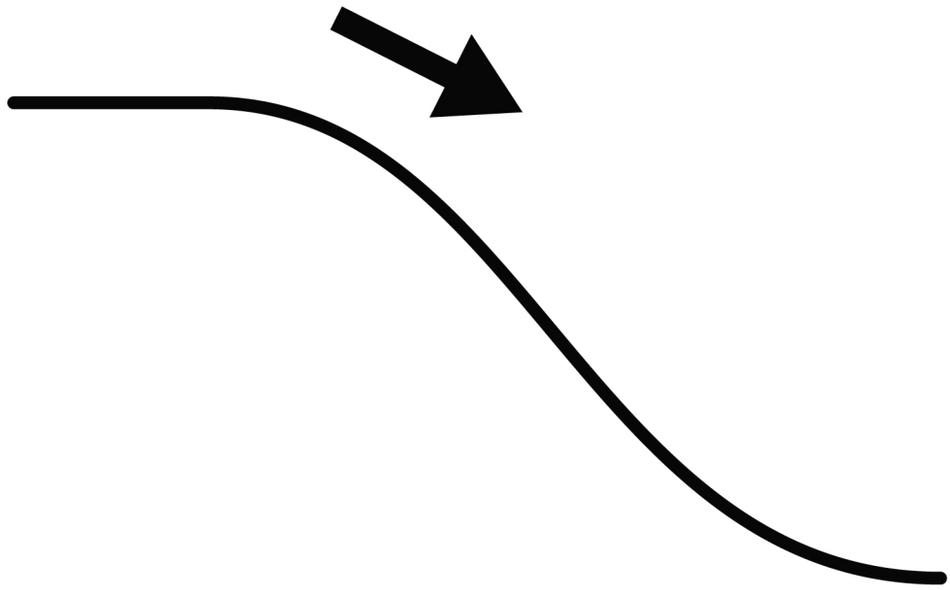
down the slope

Earth Science: Wondering About Puddles—Language Frame Cards: Set 1—Exploration 1



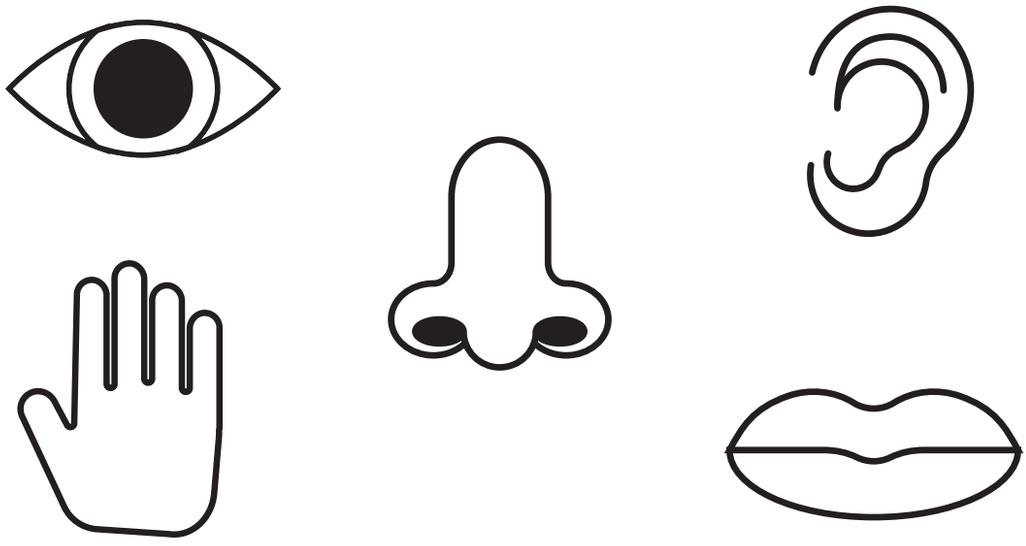
to the bottom of the slope

Earth Science: Wondering About Puddles—Language Frame Cards: Set 1—Exploration 1



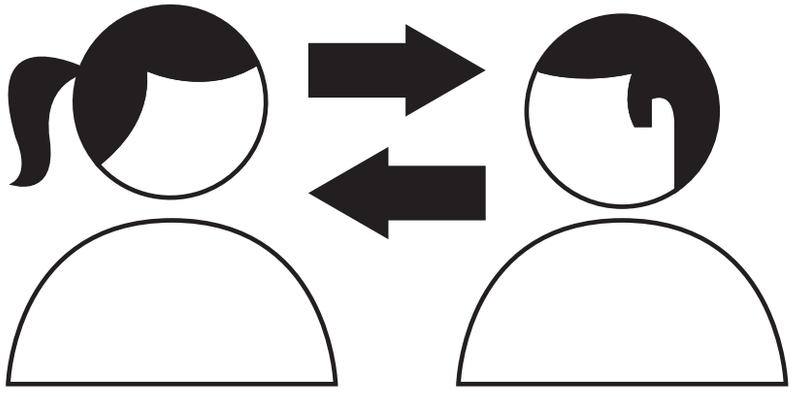
away from the top of the slope

Earth Science: Wondering About Puddles—Language Frame Cards: Set 1—Exploration 1



observe

Earth Science: Wondering About Puddles—Visual Directions Cards



share

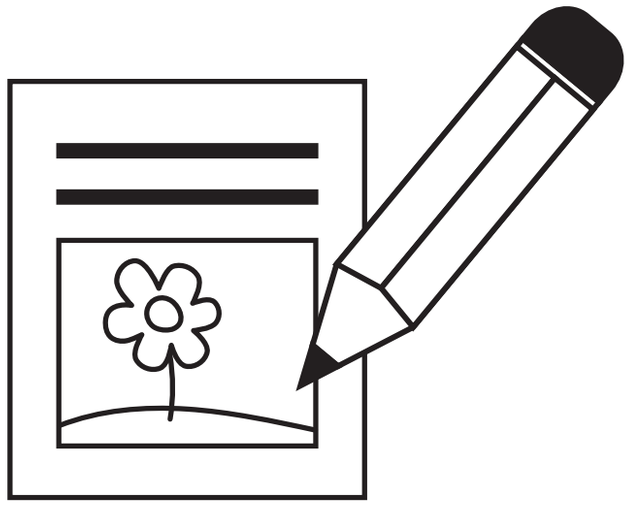
Earth Science: Wondering About Puddles—Visual Directions Cards

listen

Earth Science: Wondering About Puddles—Visual Directions Cards

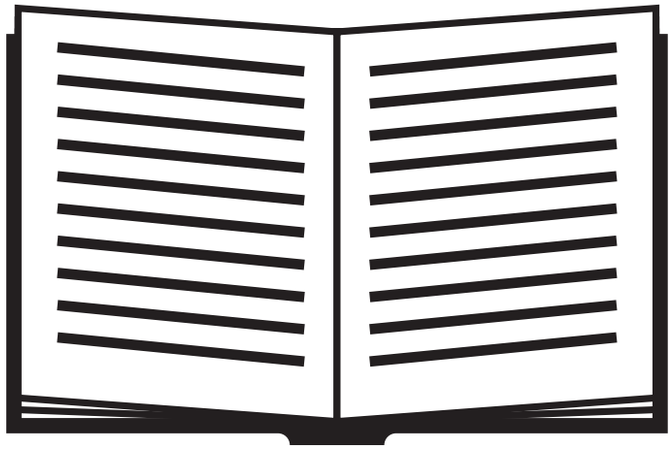
make

Earth Science: Wondering About Puddles—Visual Directions Cards



draw and write

Earth Science: Wondering About Puddles—Visual Directions Cards



read

Earth Science: Wondering About Puddles—Visual Directions Cards

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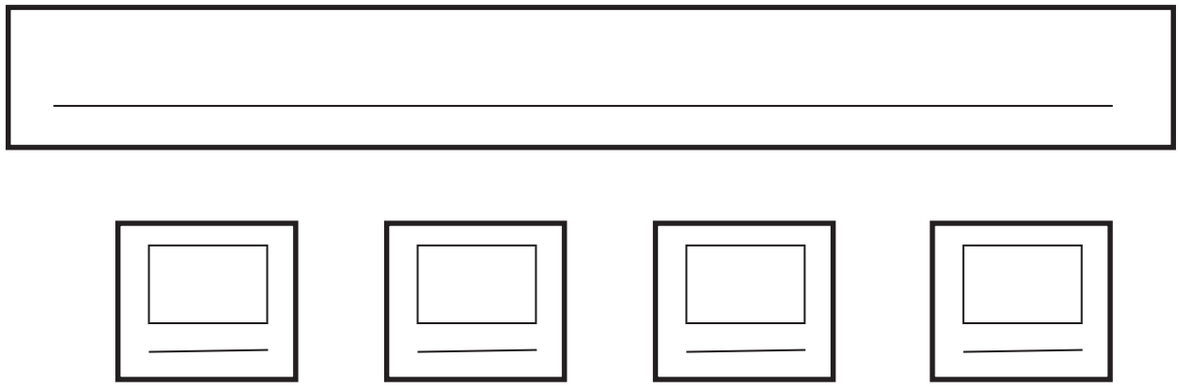
think

Earth Science: Wondering About Puddles—Visual Directions Cards



explain

Earth Science: Wondering About Puddles—Visual Directions Cards

_____ 's

Science Notebook

Name: _____ Date: _____

Hybrid Learning: Amplify Science TK

Questions to consider:

- What adaptations will you make for hybrid learning?
- What materials will you need to teach the lessons?
- What materials will your students need to engage in the lessons?
- Will you make interdisciplinary connections? If so what/how?
- How will you engage families?

Part 3: Amplify Science TK, Hybrid Learning Pacing and Planning Tool

Directions: Use your class schedule to complete the first row of the table. Then follow the directions to map your week in the bottom row.

Day 1	Day 2	Day 3	Day 4	Day 5
Minutes for science: Instructional format: ❏ Asynchronous ❏ Synchronous	Minutes for science: Instructional format: ❏ Asynchronous ❏ Synchronous	Minutes for science: Instructional format: ❏ Asynchronous ❏ Synchronous	Minutes for science: Instructional format: ❏ Asynchronous ❏ Synchronous	Minutes for science: Instructional format: ❏ Asynchronous ❏ Synchronous
Use your Teachers Guide to familiarize yourself with upcoming lessons. Refer to Suggestions for Synchronous Time on the next page to consider the best format for different parts of the lesson(s). Then, map your week in the row below.				

Lesson: ❏ Students work independently ❏ Teach live lesson ❏ Preview ❏ Review Notes:	Lesson: ❏ Students work independently ❏ Teach live lesson ❏ Preview ❏ Review Notes:	Lesson: ❏ Students work independently ❏ Teach live lesson ❏ Preview ❏ Review Notes:	Lesson: ❏ Students work independently ❏ Teach live lesson ❏ Preview ❏ Review Notes:	Lesson: ❏ Students work independently ❏ Teach live lesson ❏ Preview ❏ Review Notes:
Use this row to make notes about student work, including what students will work on, timing, how they will submit work, and how you will respond or provide feedback. This is also a good place to begin thinking about family projects.				

Suggestions for Synchronous Time

Online or in-person class
● Discussions ● Hands-on investigations (option for teacher demo) ● Interactive read-alouds ● Shared Writing ● Co-constructed class charts ● Preview: Go over what students will experience/do in upcoming asynchronous lessons/family activities so they are prepared. ● Review: Revisit activities from previous asynchronous lessons/family activities to help students make sense of them.

Preparing to Teach

Directions: Begin looking through your teacher guide to prepare your first lesson

Things to consider

Lesson purpose

- What is the purpose of the lesson?
- How do the activities in this lesson fit together to support students in achieving this purpose?

Preparing

- What materials do you need to gather?
- What materials do you need to prepare?
- What grouping structures (flexible implementation) will you utilize for the activities?
- Are there activities you need to practice before showing students?
- Are there space considerations to think about (e.g., outside observation, stations, whole-group floor space)?
- Are there documents you need to review?

Timing

- How will teaching this lesson fit into your class schedule?
- How will you pace these activities over the course of your week? Month? quarter?

Teaching the Lesson

- Are there specific steps you have questions about?
- What challenges might you encounter in teaching this lesson, and how might you address these challenges?

Supports and challenges

- What might be challenging for your students?
- What additional supports can you plan for individual students?

Suggestions for synchronous time

The following are some ideas for making the most of synchronous time with your students. As a general rule, the best way to use your synchronous time is to provide students opportunities to talk to one another, or to observe or visualize things they could not do independently.

Online synchronous time	Notes
Online discussions: It's worthwhile to establish norms and routines for online discussions in science to ensure equity of voice, turn-taking, etc. **Digital tool demonstrations:** You can share your screen and demonstrate, or invite your students to share their screen and think-aloud as they use a Simulation or other digital tool. **Interactive read-alouds**: Screen share a digital book or article, and pause to ask questions and invite discussion as you would in the classroom. **Shared Writing:** This is a great opportunity for a collaborative document that all your students can contribute to. **Co-constructed class charts:** You can create digital charts, or create physical charts in your home with student input.	

Adapting Amplify Science for Hybrid Learning

Student talk options

- Talk to someone in their household about their ideas.
- Talk to a stuffed animal or pet about their ideas.
- Call a friend or classmate and discuss their ideas.
- Talk in breakout groups in a video class meeting.

Student drawing/writing options

- Draw, have family members/friends take dictation &/or write in a designated science notebook. Photograph drawing/writing and submit digitally.
- Complete prompts in another format. (Teachers can convert prompts so they are completed in an online survey or an editable document that students can submit digitally like SeeSaw, ClassDoJo, &/or Schoology).
- Submit audio or video responses digitally (text, email, SeeSaw, ClassDojo, &/or Schoology), rather than submitting a written response.
- Share a response orally with a family member or friend with no submission required.

Student reading options

- Engage students in read alouds during synchronous in-person or synchronous remote lessons.
- Watch a video of the unit big book read aloud using a digital device (phone, tablet, or computer).
    - **The Noisy Tree**
    - **How Engineers Make Buildings**
    - **Puddles Almost Everywhere**
    - Unit related literature, especially non-fiction, read alouds - **TK Unit 3:"Wondering About Puddles" Unit Video ReadAlouds & Songs**

Hands-on activity/project options

- Do the activity/project with simple materials students are likely to have at home. OR send home baggies of materials for students to use. Have students share projects online &/or in-person, &/or via photo/video and post in class gallery
- Demonstrate hands-on activities with student input during synchronous in-person or synchronous remote lessons.

Classroom wall options

The classroom wall provides an important reference for students to track and reflect on their developing understanding of the unit's anchor phenomenon and content. When in the classroom, students can engage with the classroom wall in the usual way. When remote/asynchronous these suggestions will enhance the student experience:

- Create a personal science/engineering wall for students. This would include all of the unit questions, vocabulary words and potentially language frames. You could then have students:
    - Highlight or color in each question or word as it is introduced.
    - Cut out each question or word to post on a large sheet of paper or the refrigerator at home.
    - Illustrate each word that is introduced to create a picture glossary.
    - Have students practice weekly language frames with family members &/or friends
- If you are meeting with your class remotely, you could create a virtual Science/Engineering Wall on a slide.

Notes