

# Problem Solvers Activity SE 5: Weather Discovery

## CHILDREN ARE LEARNING...<sup>1</sup>

### Science Content:

- Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time.
- Weather emerges in patterns over time (here, focused on the pattern of a rainstorm).
- Humans can prepare for weather.

## CHILDREN ARE DOING...

### Science Practices:

- Ask questions
- Make and share observations

## TEACHER'S NOTE:

This unit focuses on weather, specifically the pattern or cycle of a storm. Scientists define weather as the "mix of events that happen each day in our atmosphere" (UCAR, no date) including changes in "temperature, atmospheric pressure, wind, humidity, precipitation, and cloud cover" (National Geographic Society, no date). For the purposes of teaching a preschool (2 ½ to 4 years) age group, we define weather as the outside temperature, wind, precipitation, and clouds present at a particular place at a particular moment in time.

For more information, check out these resources:

UCAR Center for Science Education: <https://scied.ucar.edu/learning-zone/how-weather-works/weather>

National Geographic Society: <https://education.nationalgeographic.org/resource/resource-library-weather/>

## MATERIALS NEEDED:

- 14 index cards
- 3 trays
- 3 clear plastic cups or jars
- 3 clean sponges (5 if you want to repeat the experiment)
- 3 child-safe, small bowls
- 3 water droppers (can substitute spoons if needed)
- Optional: Blue food coloring or liquid watercolor

### Handout 1: Weather and Preparation Cards

### Handout 2: Rainstorm Pattern

### Optional: Handout 3: Weather Report

<sup>1</sup> Adapted from the Next Generation Science Standards (kindergarten): <https://www.nextgenscience.org/>

## PREPARATION:

- **For the EXPAND activity:**
  - Make the cards for the weather forecasting game by cutting the images from **Handout 1** and taping/gluing to index cards.
  - If the technology is available, find a short clip to share with children of a weather report for your area showing symbols indicating the upcoming weather. Alternatively, use the image from (optional) **Handout 3**.
- **For the EXPLORE activity:**
  - Make the rainstorm cycle cards by cutting the images from **Handout 2** and taping/gluing to index cards. If you have access to a copier, you can also magnify these images so each is the size of a full page and omit the index cards.
  - Prepare three trays of materials for the rainstorm experiment. On each tray, place a clear plastic cup/jar, clean sponge, a water dropper, and small child-safe bowl (filled halfway with water).
  - OPTIONAL: Dye the water blue using a few drops of food coloring or liquid watercolor. Keep aside until needed.

## Activity Instructions

### ENGAGE

Gather a small group of 4 children in a circle on the floor. (Note: Groups of 6 children work well if you are teaching 4-year-olds. Adjust materials as needed.)

**ASK:** Today we are going to be Problem Solvers and think about the weather together. I'd like to hear what you all know about the weather – what can you tell me?

**EXPLAIN:** Invite the children to share their experiences with and knowledge about the weather. Additional discussion questions, if needed, are below:

- What are some different kinds of weather? What kinds of weather have you seen?
- Is the weather always the same or does it change?
- What is the weather outside today? How do you know?
- What is your favorite weather?
- How do your grown-ups find out what the weather will be?
- What can we do to prepare for the weather? What if it is going to be rainy, what should I do to get ready? Or very cold? Or very hot?

**SUMMARIZE:** Summarize children's reflections—and if they have been mentioned, be sure to emphasize elements like: temperature, wind, precipitation (rain, snow, hail, hurricanes, etc.), and cloud cover.

**EXPLAIN:** Today we are going to learn more about the weather. We'll also explore where rain comes from!

## EXPAND

**EXPLAIN:** You helped to explain what weather is. Now we know that weather is what's happening outside, like:

- The temperature, how hot or cold it is outside;
- If it's windy outside;
- Whether it's rainy or snowy; and
- Whether it's cloudy or not.

**ASK:** Sometimes your grown-ups will check the weather before they go out. Why does it help us to know what the weather will be? *(Help children make the connection between the weather and what we need to do in order to prepare: for example, by dressing appropriately or bringing items like umbrellas with us.)*

**EXPLAIN:**

- To find out what the weather will be, we need to check the *weather forecast*. A forecast is when we find out what might happen in the future.
- A weather forecast tells us what the weather might be later in the day, or tomorrow, or even next week!
- We can find weather forecasts on television, in the newspaper, and on websites on our phone or on computers.
- People who study and share weather forecasts are called *meteorologists*. Do you think you would like to be a meteorologist? Tell me why you feel that way.

**SHOW:** If you have the technology available, show children a brief excerpt of a weather report from a news station in your area. Point out the symbols (sun, snow, cloud, lightning, wind) that meteorologists use. Explain that meteorologists show a map of your community and then use the symbols to tell people what weather is coming to their town or city. Alternatively, you can share the weather report from **Handout 3** to spark this discussion.

**TRY IT:** Today we'll play a game where we are meteorologists. We will pick a card with a weather forecast on it and tell the class what it is. Then we have to match the card with how we prepare for that weather. Let's try one together.

**DEMONSTRATE:** Place the "weather" cards face-up on one side of the table. Place the "preparation" cards on the other side of the table. Choose the "sun" card as a demonstration.

**ASK:** I chose sun as my weather forecast. Let's look at our preparation cards. How can we prepare for being in the sun? *(Let children suggest a matching card. When you make the match to the card showing sunglasses, sunblock, and a sunhat, point out that these items help us prepare for a sunny day by protecting our skin from the sun.)*

**TRY IT:** Play the game as a group, each time asking a child to first select a weather forecast card. Ask them, "What is today's forecast?" Then encourage the group to talk about which preparation card shows items that would help people prepare for that forecast.

**SUPPORT:** Support children's conceptual learning by using the strategies below.

- Children may not immediately make the connection between a Weather card and its matching Preparation card. You can help by asking questions like, "If it's a big storm with thunder and lightning, where can we go to be safe in a shelter?"

### TEACHER'S TIP:

Some of these weather types may be new to children so this is an opportunity to introduce new vocabulary and concepts. Each card offers a simple definition of the weather type.

- Help children see the connection between the weather forecast and choosing clothing to prepare: "When there's rain in the forecast, there are clothes we can wear to keep us dry. There's also a special tool we can use to keep us dry. Does anyone see these items?"
- You can center children's life experiences in this activity by asking questions: "When there is thunder and lightning, should we stay outside or should we find shelter indoors?"
- Be aware that some children may have had traumatic or frightening experiences as a result of severe weather (hurricanes, floods, tornados, etc.). Be sensitive to their fears and if children are disturbed by images (for example, of the thunderstorm) allow them to take a break. You may want to share their distress with family members/caregivers and share ideas for supporting them if the family is interested.

**SUMMARIZE:** Use the points below:

- We learned that weather is the combination of temperature, wind, clouds, and rain or snow that is happening outside.
- We learned that weather forecasts tell us about what weather might be coming. We can find weather forecasts in the newspaper, on our phones, and on television. People who deliver weather forecasts are called meteorologists.
- Weather forecasts help us prepare for the weather by wearing the right clothing or having the right tools with us.

## EXPLORE

**PREPARE:** Have the three trays of rain materials close by.

**ASK:** When we played our game about preparing for weather, we talked about what to wear in the rain. Let's talk about that again. Does anyone remember what rain is? Can you share your thoughts with me?

**EXPLAIN:** A *droplet* is a teeny, tiny drop of water. In a cloud, water droplets come together and become bigger and bigger. When the drops get too heavy for the cloud to hold, the water falls down to the earth as rain. That's when we have a rainstorm.

**ASK:** Ask questions to help children think about the pattern of a storm.

- Does anyone know what it looks like outside before it starts to rain?
- When it's raining, what does the sky look like? What does rain feel like?
- What does it look like outside after the rain is done?

**EXPLAIN:**

- There is a sequence to a rainstorm. A sequence is a set of events that happen in a certain order. Let's talk about what we see before, during, and after a storm. You can tell me if you have ever seen these events happen in our community!
- Let's start with a sunny day. The weather is warm and clear. (*Show first sunny image from **Handout 2.***)
- Then, slowly: the clouds roll in and get thicker. The clouds are also moving lower in the sky and closer to earth. The sky gets darker. Sometimes it gets windy. The birds may stop singing. Some people even say they can smell rain coming—can you? (*Show cloudy image.*)
- Next, the rain starts to fall. It can be light rain or heavy rain. Sometimes there is thunder and lightning. (*Show stormy image.*)
- Last, when the storm is over, the clouds eventually float away and the sun comes out. Sometimes there is even a rainbow! (*Show final sunny image.*)

**TRY IT:** Mix the images up. Ask children to help you put the images back in order. Invite children to re-tell the sequence of the rainstorm.

**TRANSITION:** Now, we're going to create some rain in our classroom with a science experiment.

**EXPLORE:**

- Place children in pairs.
- Give each pair a tray of materials and keep a demonstration tray for yourself.
- Instruct children to place the sponge covering the top of their jar or cup: "We will pretend the sponge is our cloud."
- Ask children to take turns dripping water droplets into the "cloud" (sponge). Explain that when their "cloud" gets too full of water droplets, it will start to "rain" into the cup. Have children continue dripping water until some starts to drip through the sponge into the cup.
- Ask children to observe closely for when it starts to rain and raise their hand when they see it happen. Notice with children how, when the "cloud" (sponge) got too full of water, some water started to "rain" (drip into the cup).
- Reinforce the learning: When clouds get too full of water droplets, the water falls out of the cloud as rain—just like when our sponges got too full of water, it dripped into our cup.
- If time allows, let children repeat the experiment, with a new sponge. Refill water as needed.

**SUMMARIZE:**

- Today, we learned that weather is the combination of temperature, wind, rain, and clouds happening outside.
- Meteorologists provide a weather forecast. A weather forecast tells us what weather to expect. Weather forecasts help us prepare for weather that is coming soon.
- There is a sequence to rainstorms that we can observe and predict. First, the clouds come and the sky gets dark. Then it rains. When the rain is over, we can see the sun again.
- Rain happens when water droplets come together in a cloud. When the water droplets become too heavy in the cloud, they fall down to earth as rain.

**REFLECT**

To close the activity, use reflective questions - like those below - to prompt children's thinking about engineering and design plans.

- What did you learn about weather today?
- Tell me about one thing you can do to prepare for weather.
- What do you know about rainstorms? Do you like the rain? Why/why not?
- What did you discover about rain?
- What do you think is your favorite weather? Why?
- What is something you'll tell your grown-ups about the weather after our learning today?

**SUMMARIZE:** Today we learned about weather forecasting and the sequence of a rainstorm. We were Problem Solvers and did an experiment where we created our own rain!

## Individualizing the Activity

### Make it more challenging:

- In the **EXPAND** activity: Make an additional set of the card game and let children play in pairs. Observe to ensure they understand the images depicted on the weather/preparation cards. Listen to make sure each group is making the connection between forecast and preparation cards and answer any questions about images depicted on the cards.
- In the **EXPLORE** activity: Make a set of the rainstorm images for each child so they can order the cards independently as you talk.
- In the **EXPLORE** activity: See if children can count how many drops of water it takes until the “cloud” starts to rain. You can also give pairs a piece of paper and a marker so that they can keep a tally to track the number of drops.

### Make it less challenging:

- Simplify the **EXPAND** activity by removing the “storm” card.
- In the **EXPLORE** activity, omit discussing the sequence of a rainstorm.
- In the **EXPLORE** activity, do the rain experiment as a group, giving each child a chance to drip water on the sponge.

## MAKING CONNECTIONS ACROSS THE DAY:

- Create a weather center that children can explore during free play. Include the preparation/weather cards; the rainstorm pattern cards; and materials to create rain.
- Make the “weather forecast” part of your daily routine. Select a different child each day to step outside and with their help, make note of temperature, wind, rain, and clouds. Print weather symbols so that children can choose and display the day’s weather. If you’d like, let the selected child use a toy microphone (or paper towel tube with pom-pom glued to the top) while they share the forecast with the class.
- Frame daily routines as part of preparing for the weather. For example, if your program applies sunblock before outdoor play in the summer, make the connection to weather preparations. The same goes for the routine of raincoats/boots or snowsuits, boots, hats, and mittens.
- If your program experiences a storm one day, try to point out the sequence to prepare children. Point out how the clouds are changing and the sky is becoming darker. Notice the first drops of rain on the pavement outside. Cheer when the sun returns. Framing storms as a predictable sequence can reduce children’s fear or distress.

## Song: *Grand Old Time*

**Materials Needed:** space to move in the room or outside

Model the movements suggested in the song; encourage children to do what you do!

### Verse 1

Put on your raincoat; put on your hat.

(Pretend to put on rain gear)

Put on your boots, and that'll be that!

We'll splash in the puddles while it's raining outside and

(Pretend to splash with feet)

As long as it rains we'll have a grand old time...

(Smile and open arms)

we'll have a grand old time!

Open your umbrella spin and it around

(Pretend to open an umbrella

Watch those raindrops come falling down!

and look around)

Splish splash in the puddles

(Pretend to splash with feet)

Catch it on your tongue

(Hold out your tongue)

Splat with your hands

(Pat the floor with hands)

Squish squish through the mud...now

(Pretend to knead gooey mud)

### Verse 2

Put on some sunscreen; put on a hat

(Rub face like putting on sunscreen)

Put on your sneakers, and that'll be that!

(Pretend to put on a hat and sneakers)

We'll play in the sun and enjoy the soft breeze.

(Sway side to side)

And as long as there's sun, we'll have a grand old time...

(smile and open arms)

we'll have a grand old time!

Spin around and soak in the rays

(Spin around with arms open)

There's nothing like a warm sunny day.

Jump like the frogs

(Jump up and down)

Buzz like the bees

(Make a buzzing noise)

Sing like the birds

(Hands to lips; move hand away as if song is coming out)

Sway like the trees

(Sway arms side to side)

And as long as there's sun, we'll have a grand old time...

(Smile and open arms)

When we're together, in any weather,

(Point to others and smile)

we'll have a grand old time!

## Making Literacy Connections

Share the following book with children as an opportunity to deepen their understanding of engineering and design.

**Suggested Book:** *When the Storm Comes* by Linda Ashman

### AS YOU READ:

- On the first two-page spread, there is a *weathervane* spinning in the wind. Can children find it? Do they know what this is? (A weathervane is a tool that is placed on the roof of a house or barn. The wind catches the weathervane and spins it around until it's pointing to show the direction the wind is coming from.)

- On the second spread, we begin to see how animals and people are each preparing for the storm in their own way. Do children know if their family prepares for a storm doing these things (checking news, getting food, finding a cozy place)?
- On the third spread, ask children if they see any clues in the picture that a rainstorm is on the way. (Make the connection to the sequence of a storm and perhaps have the images from the **EXPLORE** activity handy.)
- On the fourth spread, point out to children the ways that different animals stay safe in a storm. What animal would they like to be in this picture?
- On the fifth spread, ask children why they think the waves are so rough? (Often this is because it gets windy in a storm and as wind blows over calm water, it starts to ruffle the surface and cause rougher waves.)
- On the seventh spread, ask children why they think the fisherman is tying his boat to the dock during the storm.
- On the eighth spread—the peak of the storm—ask children how they think the children in the houses are feeling? Do the children in the story like rainstorms? What makes them think that? Do the children in the classroom like rainstorms? Why or why not?
- On the tenth spread, why do children think the family is using a candle instead of turning on the lights in the house?
- On the eleventh spread, ask children what clues in the picture tell us the storm is over.

## BUILD ON THE BOOK: MAKING RAINSTORM SOUNDS

Materials: Just the children!

Sit in a circle and explain that you will tell the story of a storm and each time, you'll make a sound. Then the next person will make that sound, and the next, until everyone in the circle has a turn. Alternatively, you can demonstrate the sound and the group can imitate you all together—whichever approach works better for your class.

- First, it's sunny and the birds are singing. (Sound: Tweet Tweet!)
- Next, the wind and clouds come in. (Sound: Blow and make a *whoosing* sound)
- Then, the first few raindrops start to fall. (Sound: Pat your thighs gently/softly)
- Next, the rain gets even heavier! (Sound: Pat your thighs harder/louder—if you'd like, turn off the lights in the classroom and turn on a flashlight)
- Now the rain is pouring down! (Sound: Clap your hands)
- And the thunder and lightning begins! (Sound: Stomp your feet on the floor)
- But wait—what's happening now? The rain is getting lighter. (Sound: Pat your thighs more softly)
- And now the rain is just sprinkles. (Sound: Tap your fingers on the floor—turn the lights back on in the classroom)
- The wind goes away. (Sound: A soft blow)
- And the birds are back! (Sound: Tweet Tweet!)

## Handout 1: Weather and Preparation Cards

### SUN

In the summer, sun feels warm on our skin. But too much sun can burn our skin.



### SUNGLASSES, HAT, AND SUNBLOCK

We can protect our bodies from the sun.



### RAIN

Rain is water falling from the sky.  
Rain helps plants grow.



### UMBRELLA, BOOTS, AND RAINCOAT

We can use tools and clothing to keep ourselves dry.



## SNOW

Snow is falling ice crystals from the clouds. When snow melts, it helps fill our rivers.



## SNOW BOOTS AND SHOVEL

We can use tools and clothing to prepare for the snow.



## STORM

A storm is when there is wind, rain, and sometimes thunder and lightning.



## SHELTER

During a storm, we can prepare by finding safe shelter, like a house, and stay inside.



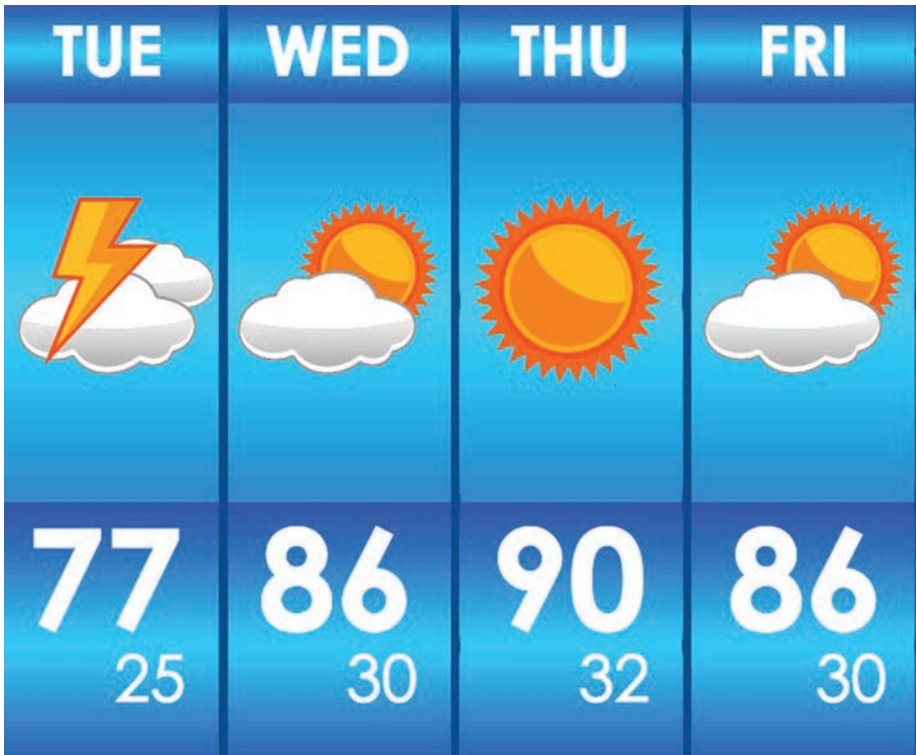
## Handout 2: Rainstorm Pattern

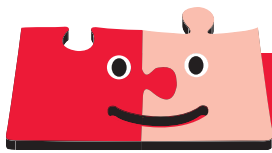
**NOTE TO TEACHERS: THE SEQUENCE OF IMAGES IS NOTED BELOW.**

1. Sun
2. Gray sky and clouds
3. Dark clouds and rain
4. Sun with rainbow



Handout 3: Optional Weather Report





### What Is the Weather?

This week, children learned that weather is the combination of temperature (hot or cold), wind, clouds, and rain that is happening at any moment in time. They also learned that weather often happens in a pattern—like the clouds coming in before a storm, the rain falling down, and then the sun returning once more. You can help children learn about the weather at home by trying the activities below.

- **Notice and talk about the weather together:** Go outside with your child and look at the sky to notice the weather. Talk about what you see and feel. Is it warm or cold? Is it cloudy or clear? Is it windy? Is it raining? You can share new vocabulary like *foggy*, *humid*, *storm*, and more.
- **Help your child think about preparing for the weather.** Explain what the weather forecast is that day and ask your child what they think they should wear to prepare. For example, if it's going to be hot and sunny, would they wear a heavy jacket or a t-shirt? If it's going to snow, would they wear a bathing suit or warm boots?
- **Discover how much rain is falling.** The next time it rains, ask your child if they want to collect rain drops. Put a wide-mouth plastic cup or jar outside just as it's starting to rain. (If you think it might blow over, let your child drop a few stones into the bottom of the bottle.) When the rain is done, have your child bring the cup inside to see how much rain has fallen. Afterward, they can use this water for plants inside or outside.





## Solo para familias

### ¿Qué es el tiempo?

Esta semana, los niños aprendieron que el tiempo es la combinación de temperatura (calor o frío), viento, nubes y lluvia que se produce en un momento dado. También aprendieron que el tiempo suele seguir un patrón, como las nubes que se acercan antes de una tormenta, la lluvia que cae y el sol que regresa. Puede ayudar a que a los niños aprendan en casa sobre el tiempo con las actividades que se indican a continuación.

- **Observen y hablen juntos del tiempo:** Salga de la casa con su hijo y miren al cielo para observar el tiempo que hace. Hablen de lo que ven y sienten. ¿Hace frío o calor? ¿Está nublado o despejado? ¿Hace viento? ¿Está lloviendo? Puede utilizar vocabulario nuevo, como niebla, humedad, tormenta, etc.
- **Ayude a su hijo a pensar en cómo prepararse para el tiempo.** Explíquelo qué tiempo va a hacer ese día y pregúntele qué ropa cree que debería llevar para prepararse. Por ejemplo, si va a hacer sol y calor, ¿se pondría una chaqueta gruesa o una camiseta? Si va a nevar, ¿se pondría un traje de baño o botas de invierno?
- **Descubra cuánta lluvia está cayendo.** La próxima vez que llueva, pregúntele a su hijo si quiere recoger gotas de lluvia. Ponga afuera un vaso o frasco de plástico de boca ancha justo cuando empiece a llover. (Si cree que el viento puede tumbarlo, pídale a su hijo que deje caer unas cuantas piedras en el fondo del frasco). Cuando termine de llover, haga que su hijo lleve el vaso adentro de la casa para calcular cuánta lluvia cayó. Después, pueden utilizar esta agua para regar las plantas adentro o afuera.

