WATER CYCLE

MATERIALS

- 9 Incredible Journey dice
- 9 bead cups with lids
- 9 metal rings
- 9 numbered bead cups
- 9 station signs with carabiners
- 9 A Frames
- Chenille Stems looped at one end
- Set of "water location" cards

BEAD COLOR KEY

1. River: Baby blue
2. Lake: Royal blue
3. Cloud: White
4. Ocean: Turquoise
5. Groundwater: Orange
6. Plant: Green
7. Soil: Brown
8. Glacier: Glitter
9. Animal: Red

Learning Objectives:

Track the movement of water molecules through the Arizona water cycle.

BIG IDEAS

1. **Water is always moving and changing forms**
2. **All living organisms depend on water**

Activity Flow

1. Students start together on tarp, under the shade
    - Introduce yourself
    - Demonstrate attention grabber: **FREEZE!**
2. Water cycle process terms & movement activity
    - Emphasize **Big Idea 1** and **Earth's systems**
3. Provide instructions and distribute location cards
4. Lead water in Arizona discussion at game circle
    - **Big Idea 2:** All life depends on water
5. Demonstrate Incredible Journey game
    - Trade students their cards for chenille stems
6. 5 to 6 minutes of game then **FREEZE** to point out:
    - Water Cycle is more like a web than a circle
    - Water is always moving in many directions
7. Continue playing game
8. Return to tarp and help tie off bracelets/keychains
    - Students hold up bracelet to see differences
9. 1-2 student volunteers share parts of bracelet
    - Use Bead Color key to identify stops
    - Assist class in identifying and acting out how water moved in bracelet/keychain examples
10. Review the **Big Ideas** and prepare to transition

WATER CYCLE

Supporting Information:

Evaporation (Ee-vap-or-ay-shun): Liquid water, heated by the sun, turns into a gas/vapor and floats up into the air

Condensation (Con-den-say-shun): Water molecules in vapor form stick to bits of dust and then to each other, forming larger and larger clouds

Precipitation (Pre-sip-uh-tay-shun): When water droplets in a cloud get too heavy and fall from the sky to form rain, snow, hail, and sleet

Transpiration (Tran-spur-ay-shun): Plant roots absorb water, transport it up through their vascular system, due to heat from the sun, and leaves release it as water vapor

Percolation (Perc-oh-lay-shun): Water filters through earth materials, pulled by gravity down into the ground

Flow: Liquid moves and flows across the earth's surface and even underground, including run-off

Common Questions and Supporting Facts:

Animal Station: Yep, animals drink and pee! It is totally okay to confirm to the students that animals pee and water molecules are returned to the water cycle. Expect lots of giggles.

Glacier Station: We do not have glaciers in Arizona, but they are still an important component of watersheds, nonetheless! In Arizona, we do have snowpack. Snowpack is very important to Arizona's water resources and local water cycle. While very different from glaciers, snowpack can add to student's understanding of our local watersheds.

Set the Stage for Success:

- Model excitement with your expressions/animated hand motions and encourage engagement by asking open ended questions to get the students sharing their own ideas and thoughts.
- Go over the rules as a group and demonstrate "how to" roll the dice. Show what it looks like when you get a bead (once it's your turn in line and before rolling). Show the sides of the dice. Talk about what the "Stay" side means (Move to the back of the line at the same station, get another bead when you get to the front of the line again).
- **Set the Tone for Fun!** Interact with the kids as they travel through the system. Watch for frustrations at cloud & ocean. Respond with light-heartedness and see if they can explain why they might be stuck based on the real water cycle.
- Simulate a "natural event" to send them elsewhere if they are truly stuck or the line gets out of control.

BLACK = KEY INSTRUCTIONS **BLUE = WHAT YOU SAY** **ORANGE = ACTION BASED INSTRUCTION**

WATER CYCLE

WHAT YOU SAY AND DO

3 Minutes - What is the Water Cycle

- Students begin as a whole class sitting on the tarp under the shade structure.
- Introduce yourself and establish the attention grabber, **FREEZE!**
    - Feel free to ask students to get up and practice once or twice if you want, then ask:

What do you know about the **water cycle**?

Let **students respond**, hands raised to share, for 1 to 2 minutes

3 Minutes - Water Cycle Process Terms

- Make sure to **act out the motions multiple times** together, having **students repeat the terms** out loud
- You can playfully quiz the students once you've practiced together

Water is always moving and changing form! What are some of the **different ways water moves** through the water cycle? (Let students respond)
Let's **stand up** together, and **act out** how water moves.
We'll do it a couple times and see how many you can remember! You can **repeat the terms** along with me!

1. The sun heats surface water and turns it into a gas, which is called **EVAPORATION**:
   (**Wiggle fingers upwards** as you raise hands into air)
2. Water vapor cools and comes together, forming clouds which is called **CONDENSATION**:
   (Bring **raised hands together** above head)
3. Those clouds begin to get heavy, and liquid water falls to the ground as **PRECIPITATION**:
   (**Wiggle fingers down**, in a "raining" motion)
4. Plant roots absorb water and then release it from their leaves as vapor during **TRANSPIRATION:**
   (**Face and palms facing up** towards the sky, **fingers wiggling**)
5. Gravity pulls water down through the ground, which is called **PERCOLATION**:
   (**Lower hands towards ground and twist them back and forth**, jazz hands going down into ground)
6. Water moves above and below ground, which we call **FLOW**:
   (**Wave motions out to the side** with your hands and arms; feel free to **add a little dance rhythm** pizazz)

This is important knowledge! I want you to remember:

WATER IS ALWAYS MOVING AND CHANGING FORMS

WATER CYCLE

4 Minutes - Water Cycle Locations

Now that we know how water moves, can you **name some places where you find water** here on earth?
After taking responses, **share all 9 places** seen in Incredible Journey game and **discuss**:
I'm about to hand out cards to **represent some of those places**, and I want you to **think about living organisms that need water in that place.** Bonus points for **Arizona specific examples**!

First though**, what is a living organism?**(Let students respond) (*Plants, animals, people, insects, bacteria, fungi*)
If your card group is Plant or Animal, **can you think of specific types that live in Arizona?**

(**Hand out cards**) Now, we'd like you to **make a line behind the sign** that matches your card, and **think, pair, share** about the living organisms you think of. **I'll ask for some ideas from each group!**
Bring chenille stems over to circle as kids discuss in their groups.
Give students a few minutes to talk, then **from the center of the circle**, ask for **ideas from each** location
Great thinking! Now **before we go over the rules** of the next game, **repeat after me**:

ALL LIVING ORGANISMS DEPEND ON WATER

***Here are some ideas to help the groups who struggle*!**

Glacier→ *bacteria, ice worms* ***Animal***→ *Coyote,* ***Lake***→*Apache Trout ,* ***Plant***→ *Barrel cactus,* ***Ocean***→ *Orca whale*
Groundwater→*Bacteria,* ***River***→ *Gila Topminnow ,* ***Cloud***→ *fungi/bacteria ,* ***Soil***→ *Red Wiggler worms*

3 Minutes - Incredible Journey Instructions

- As **1 presenter explains** the game, the **other should** be rotating around to **trade cards for chenille stems**
  - Return all of the **cards back into the bag** and place back in bin
- If stems are not pre-looped, demonstrate while students tie their stems with you. Help as needed

Now it's **your turn** to become **a water molecule and begin** your own unique **Incredible Journey**!
Every student will go on their own path. Here is **how the game works**!
Demonstrate each step as you explain these rules:

1. **Make a line** behind the sign you are at now
2. When you get to the front you will **take a bead** to represent your stop and put it on your chenille stem
3. After taking your bead, **gently roll the die** like this (Demo a gentle roll, then **show the sides** of the die)
4. If you roll **"Stay"**, **go to the back** of the **same** line. Otherwise, **travel to the next place** you rolled!

WATER CYCLE

10-12 Minutes - Incredible Journey Game

- Set the Tone for Fun! **Interact** with the kids as they travel through the water cycle
- Watch for frustrations at cloud, ocean, and glacier
  - Respond with light-heartedness and ask, "*why might you be stuck, based on the real water cycle*?"
  - Shout out a "**natural event**" to send a line elsewhere (they can pick) if line gets too backed up

Natural events that may cause water movement:

Glaciers → avalanche or heat wave *Groundwater → earthquake*
Clouds → monsoon *Ocean → tsunami*

About halfway through the game (6-7 minutes), yell **"FREEZE!"** to have the students stop moving. Ask: Have you all been moving in the same path? (students respond) **Nope**! The water cycle is **more like a web** than a circle we often see in graphs –It's always **moving in different directions** to support living organisms.

We have **about 5 minutes left to play.** Everyone **hold up your bracelet**! (use your fingers to show **about 2 inches**) When you've got **about this much space** left, **have an adult or friend help you tie** your bracelet!

- As students fill up their bracelets, **help tie off ends** and send students to sit on the tarp in shade.
- When it's time to end the game, give **one last quick wrap up** warning as needed.
- Have students return to the tarp in the shade and ask adults to help tie off bracelets during Big Idea Review.

5 Minutes - Big Ideas Review

Raise your bracelet/keychain in the air and look at your neighbor's! **Are they all the same?** *(They are not)*
Would a volunteer like to **come up front** to share some of their journey?
Assist students in **identifying their stops** using the Bead Color Key

Using student's example bracelet, guide discussion and ask **students to act out water molecule movements**:
How does the water move from this place to that place? Let's **act that out** using our movements
Repeat a handful of examples together.

Review the **Big Ideas** and **Movements** all together ahead of transition

BIG IDEAS

WATER IS ALWAYS MOVING AND CHANGING FORMS
ALL LIVING ORGANISMS DEPEND ON WATER