

GROW YOUR PALS PROGRAM GUIDE



THE NATIONAL FFA MENTORING PROGRAM

Sponsored by



LESSON 1.33

Make It Rain

Unit:
**MATHEMATICAL
APPLICATIONS**

PRECEPTS

- J. Mental Growth
- J5. Commit to life-long learning



Lesson Type:
Small Group

NATIONAL STANDARDS

- ESS.03.03.01.a. Describe the world's water supplies and discuss the many uses of water.
- NL-ENG.K-12.4 – Communication Skills
- NL-ENG.K-12.5 – Communication Strategies
- NL-ENG.K-12.6 – Applying Knowledge
- NSS-G.K-12.3 – Physical Systems

STUDENT LEARNING OBJECTIVES

As a result of this lesson, the student will ...

- Describe the *water cycle*.
- Distinguish between *evaporation, condensation, precipitation* and *collection*.
- Demonstrate the *water cycle* using a *condensation* model.





TIME

Instruction time for this lesson: **50 minutes.**



RESOURCES

<http://www.kidzone.ws/water/index.html>

Robertson, R. (2005) Stop Faking It! – Air, Water, and Weather. NSTA Press: Arlington, VA.

National FFA Organization. (2003). LifeKnowledge Precepts and Signs of Success.



TOOLS, EQUIPMENT AND SUPPLIES

- ✓ Bag of cotton balls
- ✓ Glass bottle - one per student
- ✓ Paper clips - four per student
- ✓ Funnel that fits into the bottle - one per student
- ✓ Small plastic bag
- ✓ Water and ice cubes
- ✓ A saucepan or beakers
- ✓ A stove or hot plate
- ✓ A freezer or bucket filled with ice and water.
- ✓ Lab aprons
- ✓ Lab goggles
- ✓ Hot beaker tongs
- ✓ PALS1.33.SG.TM.A- one color copy
- ✓ PALS1.33.SG.ASSESS.A- one per student

KEY TERMS



The following terms are presented in this lesson and appear in ***bold italics***:

Water cycle

Evaporation

Condensation

Precipitation

Collection



CONTENT OUTLINE

I. Four stages of the *water cycle*

A. *Evaporation*

1. When the sun heats up water in rivers, lakes or the ocean and turns it into vapor or steam.
2. The water leaves the ground and moves into the air.

B. *Condensation*

1. Water vapor in the air gets cold and changes back to liquid, forming clouds.

C. *Precipitation*

1. What occurs when so much water has condensed that the air can't hold it anymore? The clouds get heavy and it begins to rain.

D. *Collection*

1. When water falls back to the earth as *precipitation*, it may fall back into the oceans, lakes or rivers.
2. It may end up on land where it both soaks into the earth and becomes groundwater or run into the rivers, lakes and oceans.

INTEREST APPROACH

Bring the students around a table and have cotton balls and a pan filled with water where everyone can reach it.



Hello everyone. How many of you like clouds? What about rain? Why is rain important to us?

Students respond.



That is exactly right. Rain helps water our crops, keep the dust down, cool off a hot summer day and help animals find a place to drink water. Where does rain come from?

Students respond.



Those are right. Rain comes from the sky and from clouds. Lucky for you, I have captured some clouds right here in this bag (*show bag of cotton balls*), and we are going to make it rain!

First, everyone must take some of the cloud.

Hand out two cotton balls to each of the students.



These are clouds, and we can't have rain without clouds. Everyone hold your clouds over the water. We'll say this pan is the ocean or a river. Are your clouds heavy or light?

Students respond.



Right, they aren't very heavy at all. That is because these clouds don't have water in them yet. Do clouds always have lots of water in them?

Students respond.



They don't actually. Not all clouds rain. They have to first absorb water from the earth. Let's all give our clouds some water. Dip your clouds into this pan or "the ocean" to absorb water.

Have all the students put their cotton balls into the water or "ocean."



What is happening to your clouds? That is right – they are absorbing water. Real clouds do this too. Water moves from the ground and into the clouds. Isn't that cool? Now pick up your clouds again. Do they weigh the same?

Students respond.



No, they are heavier. That is because they are now filled with water. What is happening as you hold the clouds above the ocean?

Students respond.



That is right! It is raining. When the clouds are filled with enough water, it begins to rain. Where does the water from the clouds go?

Students respond.



Exactly. Back to the ocean or the ground.

This is exactly what happens on earth when it rains. Water is sucked up from the earth, fills up the clouds, and then when enough water has built up, it rains the water back to the earth. How many of you had water today? How old is that water?

Let the students respond. They could have all kinds of answers. Lead them through questioning that water is very old because it is a cycle.



The water you drank today is as old as the earth. Water never really goes away. Instead it is always moving from the ground, to the clouds and back to the ground. It is called the **water cycle**. Today we are going to make it rain right here inside and learn what exactly makes rain.

SUMMARY OF CONTENT AND TEACHING STRATEGIES

OBJECTIVE 1. | Describe the *water cycle*.

OBJECTIVE 2. | Distinguish between *evaporation, condensation, precipitation* and *collection*.



Where is water found on the earth, even when it isn't raining?

Elicit student responses.



Exactly. Water is found in rivers, oceans, in our houses, in swimming pools and even hidden underground. Water is all around us. Water that is collected on the ground is the beginning of the cycle. Let's look at our picture of the **water cycle**.

*Use a color copy of PALS1.33.SG.TM.A to show students the **water cycle**.*



Where is water collected on this picture?

Have students point to the ocean.



Right. In this picture, it is collected in the ocean.

How does the water get up to the clouds?

Allow students to guess.



Let me give you a hint. This arrow is showing the water going into the air and above it is the sun. What would the sun do to the water?

Students respond.



Right. The sun heats up the water, which causes it to move into the sky. It goes from being a liquid to a vapor. We call water moving to the air **evaporation**. Point to where **evaporation** is occurring on the picture?

*Have students show **evaporation** on the cycle worksheet PALS1.33.SG.TM.A.*



Great. As the air moves up into the sky it starts getting cold again. What do you think happens after the water vapor moves into the sky? Look at the picture for a hint.

Guide the kids to the cloud.



Exactly it turns into clouds. When the water cools back down, it starts to become small water droplets again forming clouds. This process is called **condensation**. Say it with me.

CONDENSATION



As clouds form, more and more water fills up the cloud like our cotton balls. What eventually happens?

Let students share.



Yes! It begins to rain. Just like our cotton balls that became too full of water, clouds get full of water and then the water drops, which is rain. This is called **precipitation**. Who will show me **precipitation** on our picture?

Have a student point toward the rain on PALS1.33.SG.TM.A.



You got it! One more.
What happens to the rain when it falls?

Have students respond.



It collects in ponds, lakes, rivers, streams, oceans and underground. Where is that happening in our picture?

Have students point.



You all know your **water cycle**! Now let's see if we can remember them!

Fred Astaire e-Moment®

*The Fred Astaire e-Moment® expands students' bodily – kinesthetic intelligence. In this e-Moment, the students will create a dance move for each of the main parts of the **water cycle** taught above. You lead them through creating a dance for each of the **water cycle** stages. Then you say one of the stages and they must begin their dance for that key term.*



We are all going to do some rain dancing! You will create a dance for each of the stages of the **water cycle**. I'll show you one first. For example, this is my dance for **precipitation**.

*Demonstrate a dance for **precipitation**.*



OK, it is your turn. Everyone do a dance for **precipitation**.

Join in while helping them create a dance for this element. Continue this for each stage.



That was a great first dance move. Let's keep going. Show me a dance move for **evaporation**.

Students dance. Coach to make sure they are demonstrating the content.



Very cool. What about **condensation** – water forming into clouds.

Students create dance move.



Finally, **collection** or when rain falls onto the earth and then begins to run toward lakes, streams, oceans and underwater aquifers.

Students complete dance move.



You are all fantastic dancers. Let's have a group concert. When I say a stage of the **water cycle**, you must begin your dance for that stage.

Evaporation! *Check for the correct dance move.*

Condensation! *Check for the correct dance move.*

Precipitation! *Check for the correct dance move.*

Collection! *Check for the correct dance move.*



That was a lot of fun because your dances were so good! Now that we know the **water cycle**, let's make our own rain right here in this building!

OBJECTIVE 3. | Demonstrate the water cycle using a condensation model.



For this activity, students should wear goggles and a lab apron to avoid any hazards posed by the hot water. Also, do not allow students to sit down while working with hot liquids as they might fall into their lap resulting in burns.

*At this point, you should have the funnels out of the freezer, but they **MUST BE COLD**. You can also keep them in an ice water bath to keep them cold. You can boil the water on a stove or you can borrow a hot plate from the science department, along with a beaker and set of tongs.*

Have all the materials for each student in the middle of the table. You can either work on one model together as a group or allow each student to create his or her own model.



In the middle of the table are all of the materials to make it rain inside the school. We are going to work together so make sure you follow me. We are going to be working with some very hot water, so it is important that you listen carefully and do not touch the glass or water.

First, everyone will place paper clips around the bottle so air can get in. It takes lots of air for clouds and rain to form.

Help students place clips on their bottles.



Next, I am going to pour hot water into your bottles. In the real world what makes the water hot?

Students respond.



Right, the sun warms the water up.

Pour water into the bottles. Move students away from the table in case the water splashes or misses the bottle. Remind them not to touch the bottle or water.



Now we have to make the air above the hot water cold like it really is outside. To do this, we will put a funnel in the jar, and then put a bag of ice in the funnel. This will make the air around the funnel cold, just like outside.

Help each student place the funnel and ice.



Who will explain what is happening right now?

Allow students to explain what is going on. You will need to assist them in identifying each of the steps of the **water cycle**. Let the students watch as the water condenses and begins to precipitate on the funnel. Eventually the water will begin to fall and collect – **precipitation**.



Wow! Now you can tell your parents and friends you made it rain in class today! You just created the **water cycle** in a jar. That is what is happening outside all the time. If the clouds get full enough of water, then it will rain. The **water cycle** is really important to keep plants and animals alive. Water never goes away; it just is constantly moving because of **evaporation**, **condensation**, **precipitation** and **collection**.



Now that we know so much about the **water cycle**, let's have some story telling fun.



REVIEW / SUMMARY

Dickens e-Moment®:

The Dickens e-Moment® taps into students' linguistic, intrapersonal and interpersonal intelligences. Students will use PALS1.33.SG.TM.A as a reference as they create and tell a short story about a raindrop's life.



How many of you like cool stories? Great. Each of us is going to create a story where a raindrop goes through the whole **water cycle**. I will give you an example.

Give an example of a short story of a raindrop.



Now it is your turn. Who will go first?

At this age level, you may have to coach each student as they create a story of a raindrop moving through the **water cycle**. Have them name their raindrop and create a story. Use this as a chance to check for understanding and to reinforce concepts they may have missed.



We could sell those stories! Now as you walk outside you can look at the air, the clouds, water and rain in a whole new way.



APPLICATION

One-on-One Idea

*When working with one student, instead of using PALS1.33.SG.TM.A, allow the student to draw the entire **water cycle** him or herself. Then continue with the rain-making activity. For a more intense study of the **water cycle**, students could create a landscape and demonstrate the **precipitation** falling on the landscape to watch how water moves and collects.*



Large Group Idea

*In order to adapt this lesson to a large group, post a large image of the stages of the **water cycle** in the four corners of the room. Put students into four large groups and assign each group an adult as well as a stage of the **water cycle**. Each adult should help teach their group about the stage they were assigned and the group then must create a dance move for that stage. Once they are done, they will share their dance and information with the group. Once all have shared, they actually put the **water cycle** into motion. The adults will not move. However, the student groups will then rotate to the four corners learning about each stage.*



PALS1.33.SG.ASSESS.A | EVALUATION ANSWER KEY

1. Collection
2. Precipitation
3. Evaporation
4. Condensation

PALS1.33.SG.ASSESS.A

Name: _____

Draw a line from the picture to the correct stage of the **water cycle**.

1. Crop out picture of the ocean in PALS1.33.SG.TM.A and place it here.



Precipitation

2. Crop out picture of the rain in PALS1.33.SG.TM.A and place it here.



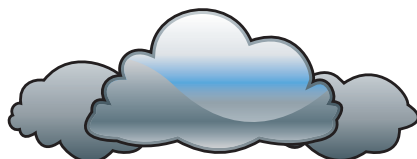
Condensation

3. Crop out picture of the sun and arrow in PALS1.33.SG.TM.A and place it here.



Collection

4. Crop out picture of the cloud in PALS1.33.SG.TM.A and place it here.



Evaporation

PALS1.33.SG.TM.A

A - Evaporation
B - Condensation
C - Precipitation
D - Collection

