

## Wonders of the Water Cycle Training Materials

*The following is the series of Water Cycle activities used by the Idaho Botanical Garden in Boise, Idaho, using the music of the Banana Slug String Band. Thanks to the Garden staff for sharing this resource!*

Materials:

**A couple of days beforehand**, put a plastic bag around some leaves on a living plant and tie it on.

water cycle poster

CD player

Banana Slug String Band CD (SINGING IN OUR GARDEN or SLUGS AT SEA) set on the “Water Cycle Boogie” song\*\*

1 inflated balloon

**On patio**, or other level surface-

Six pie pans, 2 gallons of dilute white paint, 4 colors of food coloring, six baby food jars with soapy water, 1 q-tip per jar, 1 inflated balloon, a bucket, and big plastic tub of rinse water, sponge and dish towel.

Arrive early to set up props, put on apron, and get enough stickers for one class of students. Decide who will do what after the introduction.

### **Introduction – 10 minutes**

*Seat all classes, each group sitting together, for the introduction.* Today we will be talking about weather and the water cycle. We’ll do some things all together and then divide into groups. I will lead one group and \_\_\_\_\_ will lead the other.

Why do you think that gardeners need to know understand weather? Please raise your hand if you can tell me one of the reasons. *(Possible answers are: So that they know when to plant, plants do better if planted on a cloudy day, seeds need to be kept wet after they are planted so that rainy days are helpful, some plants need to be planted after freezing weather is over, so they know when to cover up plants so that they don’t freeze, so they know when would be a good day to work outdoors.)*

To understand what makes the weather you need to understand the water cycle.

*Hold up water cycle poster.* Down here is liquid water, the kind of water you drink. Let’s pretend this is a lake. What is this up here? (The Sun) What temperature is it? (Hot) The sun shines down on the lake and warms the water. As the water warms up the molecules move faster and faster. Water molecules are the smallest bit of water you can have. Some of the water molecules move so quickly that they leap up into the air and go up, up, up into the sky. The water is now an invisible gas called water vapor. Water is all around you right now, in the air, but you cannot see it, because the water molecules are so small and so far apart. Liquid water turning into vapor is called **evaporation**. Everybody say “evaporation.”

Once they get up high, they cool down. They run into specks of dust, stick to the dust and form water droplets. Water vapor turning into liquid water is called **condensation**. Everybody say “condensation.” The droplets join together and make a cloud. Water sticks together because of something called hydrogen bonding. *Rub balloon against your hair and then have it stick to your hand.* Just like this balloon sticks to my hand, molecules of liquid water stick to each other. The cloud becomes so big and so heavy that it cannot hold the water any more and it falls to the ground, as rain or sleet or hail or snow. Water falling from the sky is called **precipitation**. Everybody say “precipitation.” The water runs downhill back into the lake. There it is warmed up again and this happens over and over and over again – that’s called the Water Cycle!

Now we are ready to do the water cycle boogie.

I am going to play this CD and you will get to dance to the chorus. I’ll show you what to do. The first part is evaporation; you will start down low and then stand up wiggling your fingers to show the water vapor rising into the air. We will sing, “Evapora-a-a-tion”. Let’s try that. *Demonstrate with them following along, do it two or three times.* Next we’ll form a cloud. The water vapor will turn back into liquid. Hold out your arms and make a circle with them over your head. We will sing, “Condensa-a-a-tion.” *Demonstrate.* Next it is going to rain. Hold your fingers over your head and wiggle them down to show rain. We will sing, “precipita-a-a-tion.” *Demonstrate.* Next the song goes, “The water cycle boogie goes round and round. The water cycle boogie goes up and down.” *Demonstrate.* We’ll stay down until the next chorus. Just keep watching me, and you’ll know what to do. At the very end we’ll stay standing up and go “around and round” again. *Demonstrate circling around poking your pointers into the air.*

*Play the CD and go through the song once.*

*Divide group into the individual classes, move your group to where you will do the phases of water game with your class.*

### **Phases of Water – 5 minutes**

*Each group needs enough room to play this game without being distracted by another group. Get them in a bunch in front of you.*

We are going to pretend that we are molecules of water. Remember that water molecules are the smallest bit of water that you can have. First we are going to be an ice cube. When water is frozen it is solid. The molecules are very close to each other, and have so little energy that they cannot move much; they just jiggle. You will stand right next to each other, with your arms at your sides, and just quiver slightly.

Then someone is going to take our ice cube out of the freezer and place it into a cup. We are going to warm up and melt, turning into liquid water. Now remember that liquid water molecules stick to each other like the balloon stuck to my hand. That was called hydrogen bonding. We are going to stick to each other when we are liquid water so we’ll need to hold hands. We will have enough energy to move around each other, but we need to stay stuck together by our hands. We’ll pretend that someone is pouring us from one cup into another.

Next we are going to be poured into a pot and heated. We are going to get more and more energy and move faster and faster. Finally, we will have so much energy that we will be ripped apart, our hydrogen bonds will break, and we will let go of each other's hands. We will pretend that we are flying into the air as water vapor. It's okay to walk around quickly but please do not run and do not bump into anyone else. We will then cool back into liquid water in a cup – remember to hold hands again- then be put back into a freezer and turn back into ice. Just listen to my instructions. *Have them all stand up and go through the game. Watch out for rowdy behavior.*

### **Breaking Hydrogen Bonds Demonstration – 10 minutes**

Divide children to sit around the six pans. Explain that you will put the paint into the pans, put four colors of food colors into the pan, and then they will take turns dropping drops of soapy water into the pan. The soap will break the water's hydrogen bond, causing the water molecules to move apart. Make the balloon stick to your hand and then move it away, mimicking water molecules moving apart. Tell them that as the water molecules move apart, the colors will swirl around in the pan. Demonstrate how to release the drop of soapy water over a color. After one child adds a drip, the jar should be handed to the next person in the group. Everyone will get several turns. Bumping the pan will mix the colors together, messing up the activity. Tell them **NOT TO TOUCH THE PANS** after the dilute white paint is poured into them.

Half fill each pan with the paint. Place 2-3 drops of each color in four quadrants of the pan. If possible, you can get a parent to help put the food coloring into the pans. Pass out the jars with the soapy water and Q-tips. Let them start. Walk around, observing results, helping where needed.

At the end of the activity, dump the paint into the bucket and quickly rinse the pans (or assign this to a parent), as you have the kids reorganize themselves into a line.

### **Walk Through the Garden – 30 minutes**

Make sure that the children are in a line. Let them know your rules for walking through the garden. The most important one is that they should not pick up or touch anything without your permission. Explain that they will be looking at plants, which play an important role in the water cycle. Walk them through the grounds letting them smell and touch plants. Where appropriate make references to the water cycle. For example, water evaporates from the ponds. When you get to the plastic bag over the leaves, explain how plants draw water from the ground from their roots and release it from the leaves, into the air as water vapor. The plastic bag caught the water vapor, and it condensed back into the liquid water you can see.

**Ideas for the Walk** - The following are some suggested things you address during the walk as they present themselves. Mix and match. You might have them look for flowers in all the different colors of the rainbow, plus two colors that are not in the rainbow. (The following is based on the Idaho Botanical Garden; your school or camp may need to adapt these ideas to fit your garden or habitat.)

#### Meditation Garden/Forest

Play guessing game with mint. Smell the plant, guess what it is called.

Rhubarb - green leaf top is poisonous, red leaf base is edible- usually cooked with sugar

Violets- flowers put into salads, leaves cooked like spinach with lemon juice and butter  
Play listening game: Children hold up one fist and close eyes. They are to listen for bird song. Every time they hear a song they should hold up a finger. You should peek and tell them to open their eyes when most people are holding up five fingers. Ask them if they see any birds. Most will not. Tell them that the birds have a hard time seeing each other too; that's one reason why they sing.

Pond – point out that water evaporates here and comes back here as rain or from the “creek.” Children may carefully kneel by the edge of the pond and observe closely, looking for snails, fish, water striders, water lilies, algae, duck weed, tadpoles in May. You may wish to pull out some filamentous algae for them to examine.

**If you told them to look for flower colors be sure to ask them about that sometime during the walk. Rainbow colors- red, orange, yellow, green, blue, purple. Flower colors not in the rainbow – white & pink.**

## **Conclusion**

Thank them for joining you in the Water Cycle.

Today you learned about what plants need to live, learned about plant parts and saw many plants. I think you are ready to be plants. We will be trees.

What do most plants start out as? (A seed) Everyone please spread out a little and crouch down in a seed shape. A seed is a baby plant in a box with its lunch. Inside the seed with you baby trees is enough food to help you grow until your leaves can make your food. We have the right soil, temperature and enough water to sprout, so everyone stand up with your arms at your sides, and your feet together.

One of the first things to come out of the seed is the roots. Spread out your legs. Wiggle your toes within your shoes and pretend you are sucking up water and minerals from the soil. Slurp, slurp, slurp.

Now we need some branches. Put both arms into the air but keep your hands balled up into fists. We have used up all the food we had with us in the seed so we'll need to make our own. What plant part do we use to make food? Leaves! Unfold your fingers and wave them in the air. Now we are filling up with food. You won't need to eat (lunch, snack, dinner) today, because you are filling up with food right now. Everyone make eating noises. Yum, yum, yum, yum.

Oh, look! Here comes a thunderstorm. The wind is blowing our branches back and forth. It has big, black thunder clouds. Lightning will hit one of your branches and make it fall off. When I count to three, make a loud noise – kaboom– and drop one of your arms. 1,2,3... kaboom. You, however, are strong trees and can grow another limb. (Put arm back up.)

Water moves through plants from the ground into the plant and then is released back into the air through the leaves. You bend you knees, make a slurping sound, stand up mimicking throwing water

into the air and say “Ptooeey” about five times with accompanying gestures, Slurp, Ptooeey, Slurp Ptooeey....

Trees are not really happy or sad but we are going to pretend to be a happy tree because birds are making nests in us and squirrels are running around in our branches. When I count to three, say, “Hip, hip hooray!” 1,2,3, ... “Hip, Hip Hooray!”

Oh, no.! Now we have another problem. Bark beetles are moving into us, trying to eat the wood underneath our bark. We are going to pretend that we are ticklish trees and the bugs are rather itchy. (Pretend to scratch.) But look! Here comes a woodpecker to eat those insects, but it’s making us shake and it makes holes to get those bugs. (Tap head with fist and vibrate) Oh good, it flew away.

We are now a grown up tree, and we are ready to make some seeds. Can our babies grow way up high in the air on our branches? No! We have to drop them to the ground. (Make dropping motions with your fingers. Say “Drop, Drop, Drop, Drop. Bye Kids, have a good life!”)

Oh, no! Here comes a family of beaver. Beaver have big, long, sharp front teeth. They are going to cut us down, eat our bark, and use our trunks to build their dam. Here they come; they are going to chew through our trunks. Chomp, chomp, chomp, chomp. Now they have cut through half our trunk! Lift up one leg. When I count to three, yell “Timber” and fall over, being careful not to hit your fellow trees. Branches up high, one leg up! Chomp, chomp, chomp, chomp. 1,2,3... “timber” (Fall over and lie on the ground.) The beaver ate out bark but there are so many trees here that they cannot use us all. Most of us will just lie here on the forest floor. Earthworms will eat our dead leaves, termites will eat our wood, carpenter ants will move in, and mushrooms will grow on us. We are going to rot and go into the ground. Remember the seeds you dropped? They are going to sprout. Everyone stick up an arm as a new tree sprouts. Look, there is a brand new forest! Terrific, give yourselves a hand, you were great trees. (Applaud)

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### **Banana Slug String Band**

CDs can be purchased (or downloaded) from the following:

Website: [www.BananaSlugStringBand.com](http://www.BananaSlugStringBand.com)

Toll-free Phone: 888-32-SLUGS (888-327-5847)

Email: [slugs@BananaSlugStringBand.com](mailto:slugs@BananaSlugStringBand.com)

The Banana Slugs encourage use of their music for educational purposes. All songs are copyrighted, however. Please ask permission before recording (audio or video) any songs and be sure to credit the band (including the website) in any video or written materials. Thank you!

### **Idaho Botanical Garden**

Website: [www.idahobotanicalgarden.org](http://www.idahobotanicalgarden.org)

Phone: 1.877.527.8233