

Virtual - 4 H2O Curriculum Guide

Modified from Original 4-H2O Curriculum

Date Published: 10/16/20

Authors: Caroline Blake and Ashley Eaton

Lesson 1:

The Water Cycle

Guiding Questions	What is a watershed? What is the water cycle?
Time	45 minutes
Student Learning Objectives	<ul style="list-style-type: none">• Students will learn about the Lake Champlain watershed.• Students will understand the process of the water cycle.
Lesson Outline	<ol style="list-style-type: none">1. Introduction (10 min)2. Learn about Lake Champlain watershed (10 min)3. Watch Water Cycle video (7 min) https://www.youtube.com/watch?v=al-do-HGuIk4. Read: <i>The Water Cycle at Work</i> (10 min)5. Closing (5-7 min)
Materials	<ul style="list-style-type: none">✓ Computer, internet connection✓ PowerPoint slides include:<ul style="list-style-type: none">o Lake Champlain Basin Postero Milk Gallon Photoo Football Field Photoo Link to Water Cycle youtube video✓ PDF of Book: <i>The Water Cycle at Work</i>

IMPORTANT: You will need to ask the classroom teacher to set up a meeting in Zoom, Google Hangouts, Microsoft Teams or whatever online learning platform the school uses and ask that s/he shares the link with the TRY team and all participating students. If this is an issue, then please reach out to Lauren.Traister@uvm.edu to help set this up.



Preparation Time:

STEP 1: Review and practice the lesson with the whole teaching team before arriving to teach. Review background information and glossary with specific terms for this lesson.

Note: Words in *italics* in the lesson plan are designed as a “script” to help you prepare what to say. Try to use your own words, when possible. It will seem more authentic. Whereas, **bold and underlined** are materials that should be used in the lesson.

STEP 2: Log-in to the online meeting room at least 15 minutes before you are scheduled to teach your lessons to make sure technology is working and to get ready for your students.

Note: Open up the following information **before** the students arrive - **powerpoint**, the **Water Cycle Youtube video**, and the **PDF of The Water Cycle at Work**.



Teaching Time:

Slide 1: Introduction

Share your screen and begin by introducing yourself, UVM Extension, and the TRY program. Let the students know that you will be working with them 3 times to teach them about watershed science. Share a little bit about yourself and why you are interested in watershed science (e.g., you love kayaking and swimming and value protecting Vermont waterways).

Hi Everyone, my name is ... We are teen teachers who are part of a UVM Extension 4-H program called TRY for the Environment that teaches younger students, like you, about the environment. Our group is focusing on water quality. UVM Extension takes the research happening at the University of Vermont and makes it available to communities throughout the state.

Explain: *As a class, we will be exploring water and aquatic ecosystems over the next 3 classes.*

Aquatic = relating to water

Slide 2: Zoomland guidelines

Only use this slide if you are teaching students while they are learning at home (otherwise you can delete it). Read these notes at the bottom of the powerpoint.

- Turn your microphone off unless talking
- Share ideas & questions in the Chat Box
- Mark “Raise Your Hand” if you would like to speak
- Be kind & respectful
- Make sure you do not create any distractions (e.g., do not make silly faces, make sure nothing is happening in your background,



- etc.)
- Be involved, contribute, participate fully

Slide 3: Meet Students

Have each student introduce themselves and answer **what is their favorite water activity?**

Unshare your screen.

Call on individual students or let them raise their hands to answer.

Teaching Tip: Put the question in the chat box if students are learning from home so students can see it after you stop sharing your screen.

Slide 4: Guiding Questions

Reshare your screen.

Read the guiding questions to your students: **What is a watershed? What is the water cycle?** They don't need to answer these questions yet. Just let them know that these questions are what we are going to learn about today. Explain that today's lesson will include watching a video about the water cycle and then reading a book.

Slide 5: Define Watershed

Say: *Let us first start with what is a watershed? Imagine that a watershed is like a giant bathtub, where the drain is the river, lake, or stream. All of the land that drains into the river, lake or stream makes up the watershed. The edge of a watershed can be defined by a ridge of land that separates waters flowing to different rivers, basins, or seas.*



Let us think about what happens to a drop of water that falls on the top of the mountain in this example. Use your mouse to point to the mountain on Slide 5.

Say: *When it rains, say on the top of the mountain, the water droplets flow downhill. The water that flows down the mountain will flow into a stream, a river and maybe even into another body of water, eventually reaching the ocean.*

Slide 6: Lake Champlain Basin Poster

Explain: *The same thing happens here in Vermont. The Lake Champlain watershed (or basin) includes any area of land/water between the Adirondacks in New York, Green Mountains here in Vermont, and a portion of Quebec in Canada (reference picture on left in powerpoint).*

That means that when it rains, say on the top of Mount Mansfield, the water droplets flow downhill. The water that flows down the mountain will flow into a stream, a river and maybe even into another body of water such as Lake Champlain. Once in the lake, it then flows North to the Richelieu (rish-eh-loo) River, and then to the St. Lawrence River, which flows to the ocean through Canada.

Action: Using the photo on the right in the powerpoint, use your mouse to trace approximately where the school is located to Lake Champlain via major rivers.

Looking at the **Lake Champlain Basin** (point to photo on the right)

Ask: *Is there more land (white space) or water (blue for rivers and lakes) on the map?*

Unshare after asking the question (or ask students to put their answer in the chat box if they are in a virtual setting)



Answer: There is a lot more land! **Note:** Emphasize that we have to make wise choices in caring for the land as things that are put on the land will eventually make their way to the streams that drain into the lake.

Slide 7: Fun Facts

Reshare screen

- The largest lake in Vermont is Lake Champlain
- It is 120 miles long
- 12 miles wide at its widest point (just north of Burlington)
- It can reach depths of 400 ft, near where the Charlotte Ferry crosses the lake
- 20 million gallons of water are pumped out of Lake Champlain each day for drinking water. (Encourage students to visualize this by showing them the **milk gallon photo** and the **football field photo**.
 - **Explain:** *What if this entire football field was covered in milk cartons filled with water? That's how much water we take out of Lake Champlain each day for drinking water!*

Slide 8: Water Cycle

Say: *Now that we have covered what a watershed is, we are going to explore how water moves through the hydrologic cycle.*

Unshare screen.

Ask: *Raise your hand if you have ever heard of the hydrologic cycle? Anyone want to take a guess on what it means?*

Reshare screen



Teaching Tips!

- Help students break apart “hydrologic”

Ask them what comes out of a fire hydrant? **Water!**

Hydro means water

-logic means the science of

Explain: The hydrologic cycle is the scientific way of saying the water cycle. The water cycle is how water moves and changes form over time as it moves across and within the Earth and through its atmosphere.

Say we are going to explore the water cycle a bit more carefully – asking ourselves what story can water tell? Our goal is to understand how we use water every day and to think like scientists to ensure the water we drink, and use for cooking, washing, and for playing in, remains healthy and clean!

Unshare powerpoint screen.

Next Step: Watch Video

Share video in full screen.

Go to tab with video. Watch *The Water Cycle*

<https://www.youtube.com/watch?v=al-do-HGuIk>. **Teaching Tip:** Make sure to pause & close out of the video afterwards to prevent any further videos playing.



Next Step: Video review

Stay unshared.

Ask: *Who can tell me “stages” or “phases” of the water cycle?*

Answer: precipitation, condensation, evaporation, collection.
Encourage them to use the scientific names (e.g., precipitation instead of rain).

Ask: *During the water cycle is there ever “new” water?*

Answer: No, there is the same amount of water on the planet as when the dinosaurs roamed – it simply changes form as it moves through the hydrologic cycle.

Next Step: Introduce The Water Cycle at Work

Say: *Let’s review what we’ve learned about the water cycle by reading this book. This story will help us understand places water is found in our everyday lives and where it moves all around us. It is called **The Water Cycle at Work**.*

Switch to the PDF of *The Water Cycle at Work*.

Begin reading the book.

Note: Remember to read slowly and clearly.

Book Review (close out of the PDF).

Say: *As a class, let us think about the things we do every day and how they impact water quality and quantity and also think about how we can be better stewards; someone who takes care of water.*

Let’s go back to our two guiding questions from this lesson.



Next Step: Lesson Review

Stay unshared.

Read out loud the two guiding questions from the beginning of this lesson. Pick a student to answer each.

1. What is a watershed?
2. What is the water cycle?

Next Step: Student Questions

Once students have answered the questions. Thank them for working with you today to learn about the Lake Champlain watershed and the water cycle. Close by telling the students that the next lesson will be about *Water Use and Conservation*.

Last Step: Questions

Ask: *Does anyone have any questions about what we just taught?*

Check the clock - say goodbye to students and disconnect from the web platform. After the lesson, check in with the teacher via email about the next lesson including timing, any props, or help with technology. Start preparing with your teammates for Lesson 2.



Important Vocabulary for Teen Teachers

Glossary

Aquatic	Relating to water.
Cloud	They form when water vapor in the air condenses to form millions of tiny liquid water droplets or ice crystals. They can only form when dust particles and cool air are present.
Condensation	The process where water vapor changes from a gas to liquid water.
Cool Air	Cool air is necessary for condensation to occur in the atmosphere and clouds to form.
Evaporation	The process where liquid water changes to a gas as water vapor.
Evapotranspiration	When plants release water through pores in their leaves back into the atmosphere.
Groundwater	All the water that is found in the ground under the Earth's surface.
Infiltration	Water going down into the ground
Precipitation	Any form of water that falls from clouds and reaches the Earth's surface. Precipitation includes rain, snow, sleet, hail, and other forms.
Surface Runoff	Water that cannot be absorbed into the ground and so flows across the surface (because the ground is too dense or is already filled with water).
Water Cycle	The movement of water between the atmosphere and Earth. It includes: Evaporation, Condensation, Precipitation, Surface Runoff, Transpiration, groundwater and Infiltration.
Water Vapor	Water in the gaseous state.



Lesson 2:

Exploring Water Use and Conservation

Guiding Questions	<p>What is our impact as humans on water quantity?</p> <p>What activities use water?</p> <p>How much water do we use on average each day?</p>
Time	45 min
Student Learning Objectives	<ul style="list-style-type: none"> • Students will understand the amount of water their daily activities use.
Lesson Outline	<ol style="list-style-type: none"> 1. Introduction & Review (7 min) 2. Daily Water Use Review Card (15 min) 3. Water Conservation Match Up (15 min) 4. Closing (7 min)
Materials	<ul style="list-style-type: none"> ✓ Computer, internet connection ✓ <u>Water Use Chart PDF</u> ✓ PowerPoint slides include: <ul style="list-style-type: none"> o <u>Template Water Use Card</u> o <u>Sample Water Use Card</u> o <u>Water Use Conservation Practice Cards</u> ✓ Students need <ul style="list-style-type: none"> o <u>A blank piece of paper (or index card)</u> o <u>Something to write with (pen/pencil/marker)</u> o <u>Calculator</u> (optional)

IMPORTANT: You will need to ask the classroom teacher to set up a meeting in Zoom, Google Hangouts, Microsoft Teams or whatever online learning platform the school uses and that s/he shares the link with the TRY team and all participating students. If this is an issue, then please reach out to Lauren.Traister@uvm.edu to help set this up.



Preparation Time:

STEP 1: This activity requires students to have props (**A blank piece of paper or index card, writing utensil and calculator** if they have one). Please communicate with classroom teachers ahead of time.

STEP 2: Review and practice the lesson with the whole teaching team before arriving to teach. Review background information and glossary with specific terms for this lesson.

STEP 3: Log-in to the online meeting room at least 15 minutes before you are scheduled to teach your lessons to make sure technology is working and to get ready for your students.

Note: Open up the following information **before** the students arrive - **powerpoint** and **Water Use Chart PDF**.

Teaching Time:

Slide 1: Introduction

Share your powerpoint screen and begin by reintroducing yourself.

Say: *Hi, I am (fill in name). I am excited to be joining you all again! Today we are going to focus on how much water we use for daily activities such as brushing our teeth and showering. We will be thinking about how our daily actions impact water quantity.*

Explain:

Quantity = how much

Quality = how good or bad



Our goal today is to find out how much water we use individually and as a class. You may be surprised at how much water we use just in our daily lives. This is important to understand because there is only so much water on this Earth. Water is continually being circulated and is essential for the survival of all life on this planet! That includes humans, plants and animals! Remember, there is no new water. What we have is what we have. So we need to know how much we use and start to think about ways we can use less.

Slide 2: Zoomland guidelines

Only use this slide if you are teaching students while they are learning at home (otherwise you can delete it). Read these notes at the bottom of the powerpoint.

- Turn your microphone off unless talking
- Share ideas & questions in the Chat Box
- Mark “Raise Your Hand” if you would like to speak
- Be kind & respectful
- Make sure you do not create any distractions (e.g., do not make silly faces, make sure nothing is happening in your background, etc.)
- Be involved, contribute, participate fully

Next: Review

Unshare screen.

Say: *Before we begin can someone tell me what we learned about the last time we were here?*

Answer: what is a watershed & the different stages of the water cycle



Do a quick comprehension check by asking these two questions.

Ask: *What are the stages of the water cycle?*

Answer: condensation, evaporation, precipitation, transpiration, runoff, groundwater.

Ask: *What does precipitation mean?*

Answer: Any form of water that falls from clouds and reaches the Earth's surface. Precipitation includes rain, snow, sleet, hail, and other forms.

Slide 3: Guiding Questions

Reshare screen.

Today's lesson will include 3 guiding questions-

1. What is our impact as humans on water quantity?
2. What activities use water?
3. How much water do we use on average each day?

Reminder: Students don't need to answer these questions yet. Just let them know that these questions are what we are going to learn about today.

Slide 4: Ways We Use water

Ask: *What are some ways that we use water everyday?* **Hint:** have students think about ways they use water in the morning, afternoon and evening?

Unshare your screen.



Let the students brainstorm a couple of ideas. Then, reshare your screen and click your mouse to reveal common answers.

Example: Ways We Use Water – Each Day	
Morning	<i>Shower Breakfast Brush teeth</i>
Afternoon	<i>Wash hands Lunchroom Bathroom Water fountain Classroom activities</i>
Evening	<i>Bath/Shower Dinner Wash Dishes Laundry</i>

Say: *You all just did a great job listing the **ways** we use water every day. Now we will take this one step further to think about **how** much water we use on average in a single day.*

Slide 5 & 6: Water Use Activity - Let's Draw

Instruct students to:

1. Take out a **writing utensil** and **paper** (any sized paper will do but index card is best)
2. Pick a water use activity from the list that was generated (example: shower) and write it at the top of their paper. Encourage students to select different answers.
3. Then, **explain** to students that they will be following the **Template Water Use Card** on slide 5
 - a. Walk them through the template (steps 1, 2 and 3)
 - b. Instruct them to leave #4 blank



4. Move to **slide 6** and show an example of final product **Sample Water Use Card**
5. After showing them the **Sample Water Use Card**. Give students 5 minutes to complete (if student finishes early then have them pick another water use activity)

Students share artwork:

Unshare screen to allow students to show artwork.

Ask: *who would like to share their card and their guesses?*
(Call on a couple of students but keep your eye on the clock)

After a couple of students have shared their artwork

Say: *Instead of guessing how many gallons of water our water activities used, let us find out how much they ACTUALLY use*

Water Use Chart PDF:

Open up **Water Use Chart PDF**. Make sure it is full screen (might be tough for students to read since it is not the best quality photo).

Explain: This chart shows how many gallons of water are directly or indirectly used for certain water use activities. **Hint:** Read the two bullet points in the top right corner of this document to explain to students what a direct and indirect use of water might be (this can be confusing). Pick one example to read outloud.

Have students find their activity using the chart. Then, have them write the ACTUAL amount their activity uses on the **index card or piece of their water use card** they created just a couple of minutes ago.



Task: Have students circle the actual number at the bottom of their Water Use drawing and compare to their guessed amount.

Exit out of PDF

Ask: *Take a look at this chart. By a show of hands, how many of you were surprised by the amount of water your activity uses? If time allows then let a couple of students share.*

Slide 7-9: Give an example such as flushing the toilet

Reshare powerpoint

Say *let's do some math to figure out how many gallons of water are used for a certain activity over the course of a day. Grab your calculator if you have one. If not, then just follow along.*

- a. 1 flush = 6 gallons of water
- b. Example: Estimate that 1 student flushes toilet 3x a day
 - i. Math: 1 student x 3 daily restroom breaks x 6 gallons = ?
Answer: 1 student uses roughly 18 gallons in one day to flush a toilet three times
- c. Let's say there are approximately 20 students in one classroom
 - i. Math: 20 students x 18 gallons of water use per day to flush toilets = ?
Answer: 360 gallons of water used by a 20 person class in one day to flush toilets
- d. Let's think bigger: ~ 331 million people in USA in 2020
 - i. Math: 331,000,000 people x 18 gallons = ?
Answer: Americans use roughly 5,958,000,000 gallons of water each day if they flush the toilet 3 times!!!
- e. What about the whole world! 7.6 billion (2018)



Next: Debrief

Unshare screen & Ask

- *Does that seem like a lot of water? It does to me!*
- *This was just an example for one water use activity (flushing the toilet).*
- *Think about other water use activities you do every day!*

Say: *Now that we have learned about how much water certain activities use. Let us think bigger. **On average each person uses between 100-2,800 gallons of water each day!***

Say: *Do you think we could reduce the amount of water we use? I think we can. In our next activity we are going to look at ways to conserve (to save) the amount of water we use.*

Next: Define Conservation

Ask: *Who has heard of the word conservation by show of hands?*

Conservation definition: the care and protection of these resources so that they can persist for future generations.

Say: *Water conservation is also very important because like we have previously learned, there is no “new” water on Earth. What is here is what we have.*

Slide 10: Water Conservation Match Game Instructions

Reshare screen.



Read Game Instructions:

- A. There are 28 total cards (14 pictures & 14 water conservation tips)
- B. Each picture has a matching water conservation tip
- C. The object of this game is to have students “match” the picture cards and the conservation tips (labeled A, B or C).
- D. **Say-***I want you to write down your answers for each slide because we are going to ask that everyone participate.*

Slides 11-15: Matching game slides

For each Powerpoint slide, read aloud both sets of cards. Give 1-2 minutes for students to think. Then, call on students (or have them put answers in the chat box) to guess which letter/conservation tip matches each picture.

Click your mouse to reveal the answer.

Once they are all correctly matched, then go to the next slide and start again until all cards are matched correctly.

Next: Activity Debrief

Unshare screen.

When all of the matches have been made, let students share any additional conservation practices they might want to add to the discussion.

Ask: *Do you think you might be able to make changes like these at home? If yes, which ones will you do?*



Next: Lesson Review & Closing

Repeat the 3 guiding questions (one at a time) for this lesson to see what students have learned. Have different students answer each question.

1. What is our impact as humans on water quantity?
2. What activities use water?
3. How much water do we use on average each day?

Say: *Thank you for your hard work today! I hope you all enjoyed learning about the ways we use water and, more importantly, the ways we can conserve water! Since we now know water is used in many ways it is going to be important that we begin to think about this in our everyday lives. Please share these water conservation practices with your families!*

Next lesson we will learn how to further Protect Our Waterways.

Next: Student Questions

Ask: *Does anyone have any questions about the lesson?*

Important Background Vocabulary for Teen Teachers	
Glossary	
Conservation	the care and protection of these resources so that they can persist for future generations.
Quality	How good or bad
Quantity	How much



Lesson 3:

Stewardship-Conserving and Protecting Our Waterways

Guiding Question	What are specific ways we can help protect our waterways?
Student Learning Objectives	<ul style="list-style-type: none"> ● Students will consider how they can be stewards of a watershed. ● Students will be able to list specific best management practices for keeping the water in their everyday lives clean and healthy. ● Students will generate ways of sharing their watershed knowledge.
Lesson Length	45 min
Lesson Outline	<ol style="list-style-type: none"> 1. Introduction (2-3 min) 2. Read Save Our Stream! (10 min) 3. Sum of the Parts Activity (20 min) 4. Droplets of Change (5 min) 5. Closing and Assessment (5 min)
Materials	<ul style="list-style-type: none"> ✓ Computer, internet connection ✓ PowerPoint slides ✓ <u>Save Our Stream! PDF</u> ✓ <u>Students:</u> <ul style="list-style-type: none"> ○ <u>1 to 2 pieces of white paper, 8.5 x 11</u> ○ <u>Writing utensils (pens/marker/ etc)</u> ✓ <u>Teens:</u> <ul style="list-style-type: none"> ○ <u>Beads</u> ○ <u>Clear cup/glass/jar</u> ○ <u>Calculator</u> ✓ <u>TRY Participant Assessments</u>



IMPORTANT: You will need to ask the classroom teacher to set up a meeting in Zoom, Google Hangouts, Microsoft Teams or whatever online learning platform the school uses and that s/he shares the link with the TRY team and all participating students. If this is an issue, then please reach out to Lauren.Traister@uvm.edu to help set this up.

Preparation Time:

STEP 1: This activity requires students to have props (**2 pieces of paper, writing utensil and calculator** if they have one). It also requires ONE teen teacher to have props ahead of time as well (**beads or beans, Clear cup/glass/jar, calculator**). Please communicate with classroom teachers ahead of time.

STEP 2: Review and practice the lesson with the whole teaching team before arriving to teach. Review background information and glossary with specific terms for this lesson. This activity requires teen teachers to have props (see materials section above). Please communicate with other teen teachers ahead of time.

STEP 3: Log-in to the online meeting room at least 15 minutes before you are scheduled to teach your lessons to make sure technology is working and to get ready for your students.

Note: Open up the following information **before** the students arrive - **powerpoint** and the **PDF of Save Our Stream!** Gather the props you need as well.



Teaching Time:

Slide 1: Introduction

Share your screen and begin by introducing yourself. Let your students know that today is your last class with them.

Slide 2: Zoomland guidelines

Only use this slide if you are teaching students while they are learning at home (otherwise you can delete it). Read these notes at the bottom of the powerpoint.

- Turn your microphone off unless talking
- Share ideas & questions in the Chat Box
- Mark “Raise Your Hand” if you would like to speak
- Be kind & respectful
- Make sure you do not create any distractions (e.g., do not make silly faces, make sure nothing is happening in your background, etc.)
- Be involved, contribute, participate fully

Next: Review

Unshare screen.

Review what you have covered over the last few class periods. Use the two comprehension check questions below to encourage students to share what they learned (not just what they did!).

Ask: *What are some stages of the water cycle?*



Answer: condensation, evaporation, precipitation, transpiration, runoff, groundwater, collection

Ask: *What's one way you can save water in your home?*

Answer: Don't flush the toilet every time you go. "If it's yellow, let it mellow." Turn the water off when brushing teeth. Keep a jug of water in the refrigerator if you want cold water.

Slide 3: Guiding Question

Reshare screen.

Read the guiding questions to your students: **What are specific ways we can help protect our waterways?** They don't need to answer these questions yet. Just let them know that these questions are what we are going to learn about today. Explain that today's lesson will include reading a book, completing an activity to learn about water pollution, and how to make changes at home to better our waterways.

Slide 4: Introduce Water Stewardship

Explain: *Today we will put together all of the pieces we have learned about water and water health, and we will think about specific ways we can conserve and protect our local waterways. We want you to help your community keep rivers, streams and lakes healthy! This is called stewardship.*



Slide 5: Prep for story

Say: *To start we are going to read the **Book: Save Our Stream!** (PDF) to get our minds thinking about ways we can protect water.*

We want to think about the following questions:

- *How can I conserve water?*
- *How can I keep water clean (so we can drink and play safely)?*
- *How do I know if the water might be clean or not?*
- *How can we **SHARE** what we have learned with our community at school?*

Next: This is when you unshare your Powerpoint and share the PDF of **Save Our Stream!** Read the story .

Teaching Tips!

- Read **slowly** and clearly. Read the notes along with the story.

Next: Story Wrap Up

Unshare PDF.

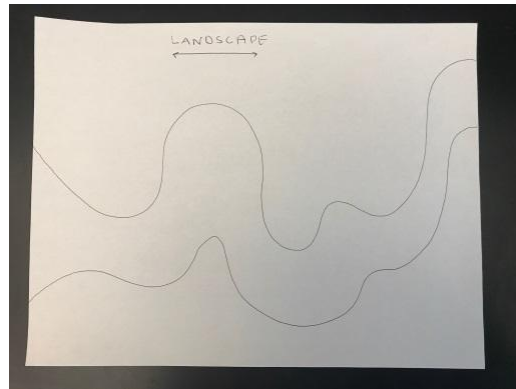
After the story, ask: *How does the story connect with the two other lessons we've had with water? What's one new thing from the book that you learned? Are there activities in the book you might share with your family?*

Slide 6: Sum of the Parts Instructions

Reshare powerpoint



1. **Tell** the students they are going to create a river on a piece of paper and to please follow you step by step.
2. Have students gather an **8.5x11 piece of paper** and have them get a writing utensil (markers/crayons/pencil/pen etc.)
3. Have the students turn the paper so that it is landscape while instructing the students to create a river across their page – the river needs to start and end on the ends of the page. Show them the **example river** like below.



4. Have the students **draw an arrow** indicating which direction the water is flowing

Next: Assign students a number

Unshare screen.

Assign students numbers (1 to... however many students are in class) and have them write the number in the top, right section of their paper so they do not forget. Go slowly to make sure people remember their numbers



Slide 7: Sum of the Parts Activity continued...

Reshare screen.

Show chart. Inform students of the items they are *required* to put on their “section of river.” Also, let them know there are *optional* items. Read through item by item and let student’s ask any questions

<i>Required</i>	<i>Optional</i>
<ul style="list-style-type: none">• <i>River</i>• <i>1 House</i>• <i>1 Farm</i>• <i>Road</i>• <i>Wastewater Treatment Facility OR Factory</i>	<ul style="list-style-type: none">• <i>Park (put circle around whole park area)</i>• <i>Forest (put circle around whole forest area)</i>• <i>Individual animals</i>• <i>Individual plants and trees</i>

Keep sharing screen and give students 5-7 minutes to draw/color/label.

Slide 8: Sum of the Parts Activity Point Value

1. **Say and click mouse:** *Now we are going to explore what you might have on your landscape (one box should appear and then disappear).*
2. **Say and click mouse to reveal a textbox with +/- numbers:** *What you might not know is that each of the items you listed can either help or harm our waterways. We are going to “calculate” the amount of pollution your property added to the river or cleaned up the river.*



Required	Optional
<ul style="list-style-type: none"> • River • 1 House (+1 bead) • 1 Farm (+2 beads) • Road (+1 bead) • Wastewater Treatment Facility OR Factory (+2 beads) 	<ul style="list-style-type: none"> • Park (-2 beads) • Forest (-1 bead) • Individual animals (+2 beads) • Individual plants and trees (-1 bead)

3. **Say** *We are going to go item by item. You can keep track of “points” on the side of your paper, on the backside or on another piece of paper.*
4. **Click the mouse** to reveal each of these point values. Go slowly so students can follow along and add up their points. **Teaching tip** - maybe have them put thumbs up when they have finished counting each item.
- Houses (each house +1 bead)
 - Farms (each farm +2 beads)
 - Roads (each road +1 bead)
 - Wastewater treatment facility (each wastewater treatment facility +2 beads)
 - Factory (each factory +2 beads)
 - Park (each park -2 beads)
 - Forest (each forest area -1 bead)
 - Individual animals (each animal +2 beads)
 - Individual plants and trees (each individual plant and tree -1 bead)

Unshare screen

Next: “Passing the Beads” Explanation

Ask students to add and subtract **ALL** of their points and **circle** the total so they don’t forget. If you need help, just ask.



1. **Say:** *Each point will be represented by a bead (or pollutant).*
2. **Say:** *Now, each of you were given a number at the beginning of this activity. Each number is one section of the river. They all connect to form one LARGE river that moves from an upstream location (1) to a downstream location (last student number).*

Next: *Beads will be added or subtracted into a cup by one of our teen teachers as we move from river section to river section.*

For Example: *Number 1 will “virtually pass” their **bead**(s) to Number 2, Number 2 will “virtually pass” everything to Number 3 and so on until the last student is “virtually holding” all the **beads** in the **cup**.*

Assign one teen teacher to keep track of the total bead count. That teen teacher will add (or take away) the correct number of **beads** as each student gives their answer. Put the **beads** into the **jar** and make sure it is visible on the computer screen.

Assign another teen teacher to use a **calculator** to count the numbers coming in (aka the total number of beads) in the jar so they can verbally keep track and tell the students as the activity moves downstream.



Action item: Begin activity and move from Student Number 1 to Number 2 ... until last student. Each student should say the number they were assigned AND the number of beads they acquired.

Sum of All Parts Wrap Up

Once you reach the final student, ask the following questions.

- *How did those students toward the middle or at the end of the river feel as they looked at the number of beads in the cup they received?*
- *Could a student downstream be affected by the actions of a student upstream?*
- *Could upstream users alter the water quality for those downstream?*
- *What might indicate whether the water is healthy or not?*

Next: Reflection

Say: *Now that we have learned how upstream neighbors might affect those that are downstream, maybe we can go back to our idea from the beginning of this lesson about what it means to be a watershed steward. Let us review what we have learned so far in these past couple of lessons and think of ways to make change. Let's have fun and be creative!*

Next: Celebrating Water through Action

Reshare powerpoint (**slide 9**) to show example - *water droplet of change*.



Ask: Students to get a **blank piece of paper** (or flip over your river section paper) and **writing utensil**. Then have them draw a **BIG** water droplet with enough room inside the water droplet to answer 1 of 3 questions.

Say: Inside of the water droplet, answer **ONE** of these three questions.

Read questions out loud.

1. What is one fact about water or water quality that I have learned?
2. What is one action or practice I can adopt to protect waterways and prevent pollution?
3. What is one question I still have about water?

Give students 5 minutes to work on these (keep screen up so they can continue to see the questions).

Say: If you finish early you can sit quietly or answer another question.

Unshare screen.

Ask if anyone wants to share. Maybe call on 2-3 students depending on time.

Explain: A droplet of change is each of us doing one small thing that hopefully will result with your family or community making big changes – or a river of change! An example might be the student who suggested we no longer use plastic straws as they aren't recyclable and they end up in the landfill. This student was able to get some fast-food restaurants to stop



using plastic straws. Now the shops no longer have straws or they have paper straws that can be recycled.

Next: Revisit guiding questions

Ask: *What are specific ways we can help protect our waterways?*

Next: TRY Participant Assessment

Time for the TRY Participant Assessment. Read each statement and ask the students to give thumbs up or down. Count and write the number on the TRY Tally Sheet. **Tip:** Make sure to read SLOWLY and say each statement more than once.

Next: Closing Words

Say: *Thank you for your hard work today! I have had fun working with all of you! We have learned so much about water and how to help conserve and protect the waterways we live near. I hope we can all be good water stewards every day, every action counts!*

Close with answering any questions the students might have.



	Important Background Information for Teen Teachers Solutions / Best Management Practices for Non-Point Pollution
Source	Best Management Practice
Roads and Streets	<ul style="list-style-type: none"> ● dispose of paints, solvents, and gas cans at approved waste sites, not in storm drains or street gutters ● fix your car and truck if you have oil or fuel leaks
Agriculture	<ul style="list-style-type: none"> ● read and follow labels before using chemicals, fertilizers and pesticides ● fence areas where cows might damage the stream banks or add manure to the stream
Logging	<ul style="list-style-type: none"> ● prevent dirt from reaching streams and lakes by building terraces ● leave plants and trees as a grassy zone in areas by streams
Construction	<ul style="list-style-type: none"> ● put up a plastic sheet to control dug up soil from getting into streams or eroding hillsides ● plant ground cover to reduce erosion
Residential	<ul style="list-style-type: none"> ● only use fertilizers when a soil test reveals it needs it ● wash cars on the lawn ● cut lawn no shorter than 3” in height, cut not more than 1/3 of the length of the grass blades in any one cutting and leave the clippings on the lawn



Virtual 4-H₂O Program – Standards

Lesson 1: The Water Cycle

Grade 3-4

[Science and Engineering Practices](#)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.

- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1)

[Disciplinary Core Ideas](#)

ESS2.C: The Roles of Water in Earth’s Surface Processes

- Nearly all of Earth’s available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2)

[Crosscutting Concepts](#)

[Systems and System Models](#)

- A system can be described in terms of its components and their interactions. (5-ESS2-1),(5-ESS3-1)

Lesson 2: Exploring Water Use and Conservation

Grade 3-4

[Science and Engineering Practices](#)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.

- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1)

[Disciplinary Core Ideas](#)

ESS2.C: The Roles of Water in Earth’s Surface Processes

- Nearly all of Earth’s available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2)

[Crosscutting Concepts](#)

[Systems and System Models](#)



- A system can be described in terms of its components and their interactions. (5-ESS2-1),(5-ESS3-1)

Lesson 3: Stewardship- Conserving and Protecting our Waterways

Grade 3-4

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

- Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. (K-ESS3-3)

Disciplinary Core Ideas

ESS2.C: The Roles of Water in Earth’s Surface Processes

- Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form.

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people. *(secondary to K-ESS3-3)*

Crosscutting Concepts

Patterns

- Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1)

Cause and Effect

- Events have causes that generate observable patterns. (K-ESS3-3)

Systems and System Models

- Systems in the natural and designed world have parts that work together. (K-ESS2-2),(K-ESS3-1)

