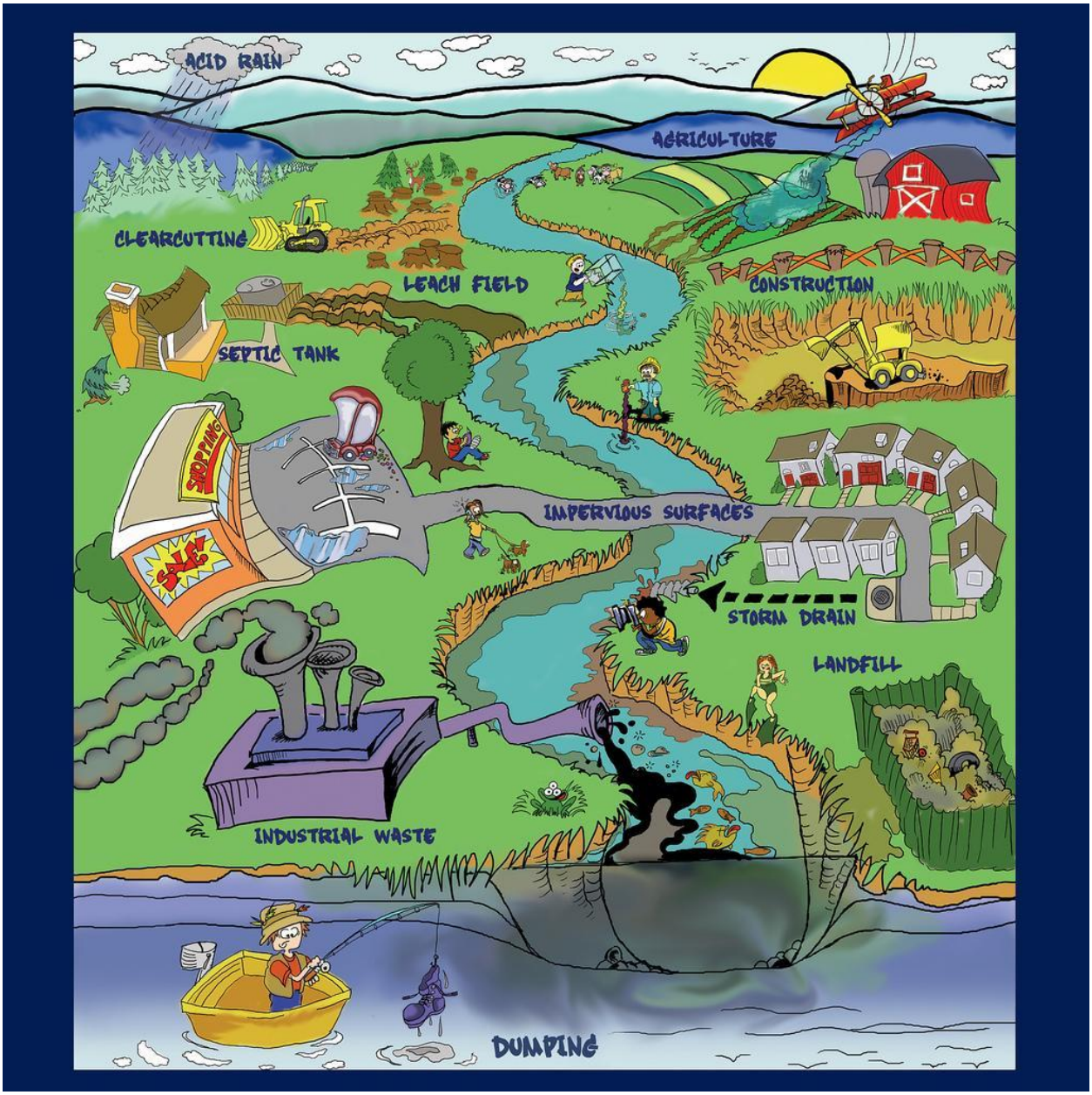
Watershed Wonders Summer Camp 2016

Grand Rapids Public Museum



Content:

- Introduction
- Objective Overview
- Pre-Evaluation Materials
    - Ages 6-8
    - Ages 9-11
    - Ages 12-14
- Camp Program
    - Day 1--*What's a Watershed*
        - Student objectives
        - Schedule for day
        - Materials
    - Day 2--*How do I Sample Water in my Watershed?*
        - Student objectives
        - Schedule for day
        - Materials
    - Day 3--*What's in a Watershed?*
        - Student objectives
        - Schedule for day
        - Materials
    - Day 4--*What's my part?*
        - Student objectives
        - Schedule for day
        - Materials
- Post Evaluation Materials
    - Ages 6-8
    - Ages 9-11
    - 12-14
- Appendix:
    - Examples of student work

Executive Summary

The Grand Rapids Public Museum (GRPM) hosted summer camps based on Great Lakes Stewardship principals and watershed curriculum in summer of 2016. Three levels of camp were provided for campers 6-8, 9-11 and 12-14 years old respectively. GRPM partnered with Dean Transportation, West Michigan Environmental Action Council and Grand Valley State University to provide the experiences. Camps were four days in length and followed an inquiry based process scaffolding on what is a watershed, what lives in the watershed and what affects those organisms and how stewardship can affect the watershed. The overarching theme was scientific observation and inquiry skills.

Learning Objective Overview:

- Campers will be able to explain what a watershed is and identify their own watershed
- Campers will be able to describe typical watershed structure and how watersheds work
- Campers will be able to make detailed sensory observations
- Campers will collect, analyze, and compare water samples
- Campers will be able to describe what lives in their watershed (with an emphasis on Lake Sturgeon)
- Campers will be able to explain various ways to improve the health of their watershed

Pre Evaluation Materials

Pre-Evaluation for Ages 6-8:
This age group was evaluated with both a question box and a word wall assessment. The question box was intended to gauge watershed-related conceptual knowledge, and the word wall aimed to poll student attitudes and ideas toward science and scientists.

Question Box Assessment

For the youngest age group, the assessment was designed to minimize any test anxiety that the children may have and to ensure that writing/reading skills did not impede us from gathering knowledge on watershed concepts. Campers were given a different color poker chip for each question, and when the instructor read the question aloud to them, they put their chips in the corresponding slot of a cardboard question box.

Instructors read the following directions to campers:

> *In this activity, we will be answering a few questions about watersheds.*
>
> *You need* one *poker chip of each color:* (color 1, color 2, color 3, color 4).
>
> *This is my question box. It has holes marked A, B, C, and D. I will read you a question, and give you some possible answers, A, B, C, and D. I will tell you what color chip to use. If you think the answer is A, put that chip in the hole marked A. If you think the answer is B, put your chip in the hole marked B. And so on.*
>
> *You should answer the way YOU think, and now worry about what anyone else might think. I will bring the box around to you, so stay where you are and let the box come to you.*
>
> *Do you have questions for me about how we do this?*

The questions read aloud were:

1. I will give you four answers, A, B, C, and D. Listen to them, then decide which one you think is a description of a *watershed*.
    a. A watershed is a particularly larege and long river.
    b. A watershed is all of the land area that drains water to a lake or river.
    c. A watershed is a government building where water is managed.
    d. A watershed is a king of waterfall.
2. I will give you four answers, A, B, C, and D. Listen to them, then decide which one you think describes when the water in a river or stream has a lot of pollution.
    a. There are many different kinds of tiny bugs.
    b. There are many tiny bugs, but they are mostly all the same kinds of bugs.
    c. There are hardly any tiny bugs.
    d. Something else.
3. I will give four answers again. What is a lake sturgeon?
    a. An invasive plant species.
    b. A native fish species.

c. A threatened crayfish species.
d. A kind of tiny bug in the lake.

4. What is the most common cause of pollution of streams, rivers, and oceans?
    a. Garbage trucks that pick up your trash are dumping it in the waters.
    b. When it rains, it washes spills and fertilizers from homes and farms into the water.
    c. People are leaving trash on the beaches.
    d. Factories are dumping chemicals into the water.

Word Wall Assessment

Instructors read the following directions to campers:

In this activity, we will think about scientists and the words that we think describe a scientist.

Think about your idea of a scientist. Now think of three words that you think describe a scientist. They can be any words that come to your mind when you think about a scientist. They should not be a sentence, like "A scientist has an interesting job." they should be single words that describe.

Let's try an example. If I thought to myself, "A scientist has an interesting job," what word might I choose to write down as my one describing word? Discuss with students until they identify the word "interesting."

You should answer the way YOU think, and not worry about what anyone else might think.

Do you have questions for me about how we do this?

OK, everyone get a marker and some sticky notes. You will write 3 words on the sticky note, then stick them to this sheet of white paper. If you can't think of 3, write as many as you can. If you can think of MORE than 3, write your best three words.

Pre-Evaluation for Ages 9-11

With this age group, pre-evaluations were given out traditionally with paper and pencil. Students were instructed to work independently and ask their instructor if they had a question.

1. How much would you say you know about watersheds, water sampling, and the Grand River? (Circle one number)

Very much		*Some*		*A Little or None*
5	4	3	2	1

2. Which word BEST describes your feelings about studying science? (Choose only ONE)

Fun	Challenging	Hard	Boring

3. List THREE things you think of when you hear the word scientist.

   1. _____
   2. _____
   3. _____

For the following four questions, please circle the letter of the ONE best answer.

4. A watershed is:

   a. The source of a river, its creeks and streams, and the place where it joins a lake or larger river
   b. All of the land area that drains water to a lake or river
   c. A governmental organization that manages water quality
   d. None of the above

5. Which of the following is found in a Michigan river or stream with good water quality?

   a. A large number of caddisflies, mayflies, and stoneflies and their larvae
   b. Low levels of dissolved oxygen
   c. A large number of carp and suckers
   d. Only one or two different kinds of water bugs

6. What is *lake sturgeon?*

    a. An invasive plant species
    b. A native fish species
    c. A threatened crayfish species
    d. A macroinvertebrate species

7. What is the most common cause of pollution of streams, rivers, and oceans?

    a. Dumping of garbage by cities
    b. Surface water running off yards, city streets, paved lots, and farm fields
    c. Trash washed into the ocean from beaches
    d. Waste dumped by factories

Questions about you.

8. Are you a: Boy Girl *(circle one)*

9. In September, what grade will you be in, and what school will you attend?

    Grade: _____ School: _____

10. What is your home zip code _____ and city _____?

Pre-Evaluation for ages 12-14

1. How much would you say you know about watersheds, water sampling, and the Grand River? (*Circle one number*)

Very much		*Some*		*A little or none*
5	4	3	2	1

2. Which one word BEST describes your feelings about studying science? (*Choose only ONE*)

Fun	Challenging	Hard	Boring

3. List THREE things you think of when you hear the word scientist.

   1. _____
   2. _____
   3. _____

For the following four questions, please check the box of the ONE best answer.

4. A watershed is:

   - ☐ The headwaters, tributaries, and mouth of a river
   - ☐ All of the land area that drains water to a lake or river
   - ☐ A governmental organization that manages water quality in a given territory
   - ☐ None of the above

5. Which of the following indicates a Michigan river or stream with good water quality?
   - ☐ A large number of caddisflies, mayflies, and stoneflies and their larvae
   - ☐ Low levels of dissolved oxygen
   - ☐ pH below 4 or above 9
   - ☐ Limited diversity in the types of aquatic macroinvertebrates

6. In the Great Lakes region, what type of species is *lake sturgeon?*
   - ☐ An invasive species
   - ☐ A native species
   - ☐ A threatened species
   - ☐ B and C
7. What is the most common cause of pollution of streams, rivers, and oceans?
   - ☐ Dumping of garbage by cities
   - ☐ Surface water running off yards, city streets, paved lots, and farm fields
   - ☐ Trash washed into the ocean from beaches
   - ☐ Waste dumped by factories

Please provide a little information about yourself.

8. In September, what grade will you be in, and what school will you attend?

   Grade: _____ *School*: _____

9. How do you describe your race and ethnicity? *Check all that apply.*
   - ☐ Asian
   - ☐ Black/African American
   - ☐ Hispanic/Latino, or Spanish origin
   - ☐ Native Amerian/Indigenous peoples
   - ☐ Multi-racial
   - ☐ Pacific Islander
   - ☐ White
   - ☐ A race or origin not listed above: _____

10. What is your home zip code _____ and city _____?

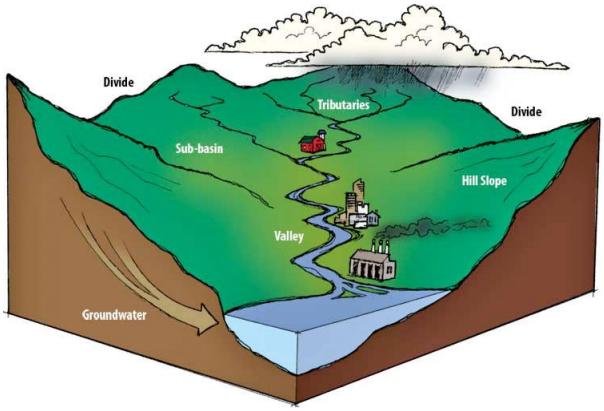
11. In school, what types of grades do you usually get on your report cards? *Check the best answer.*
   - ☐ Mostly “A”s
   - ☐ “A”s and “B”s
   - ☐ Mostly “B”s
   - ☐ “B”s and “C”s
   - ☐ Mostly “C”s
   - ☐ “C”s and below
   - ☐ Home schooled/not graded
   - ☐ Other (please describe) _____

12. How do you describe your gender? *(Circle one)*

Male	Female	Other	Prefer not to answer

Watershed Wonders - Day 1

Today's objectives: I can explain what a watershed is! I can tell you which watershed I live in! Go ahead, ask me!



Let's talk! Ask me about:

What are we doing tomorrow?
What do I need to bring tomorrow?
What is a watershed?
What is our watershed called?
Who lives in the watershed?
What did I see in the earth explorers exhibit?
What did I do with a tarp today?

Schedule

Day 1: What's a watershed?		
Time	*Activity*	*Location*
9:00	Welcome campers	Museum entrance
9:10-9:30	Introductory Activities/Icebreakers	Classroom
9:30	Pre-Evaluation	Classroom
9:45	Bathroom break	
10:00 - 10:15	Distribute lab notebooks. Mystery Bag activity (ages 6-11)/A Lemon of a Lesson activity (ages 12-14)	Earth Explorers Exhibit
10:15-10:30	Earth Explorers: Scientific Observation	Earth Explorers Exhibit
10:30-10:45	Whats a watershed? (Video)	Classroom
10:45-11:15	Build Your Own Watershed	Outside
11:15	Snack break	Outside or Habitats Exhibit
11:25-11:35	Who lives in the watershed?	Outside or Habitats Exhibit
11:50-12:00	Closing Session with instructions for field trip	Outside or Habitats Exhibit

Materials and Activity Explanations

Mystery Bags (Ages 6-11)

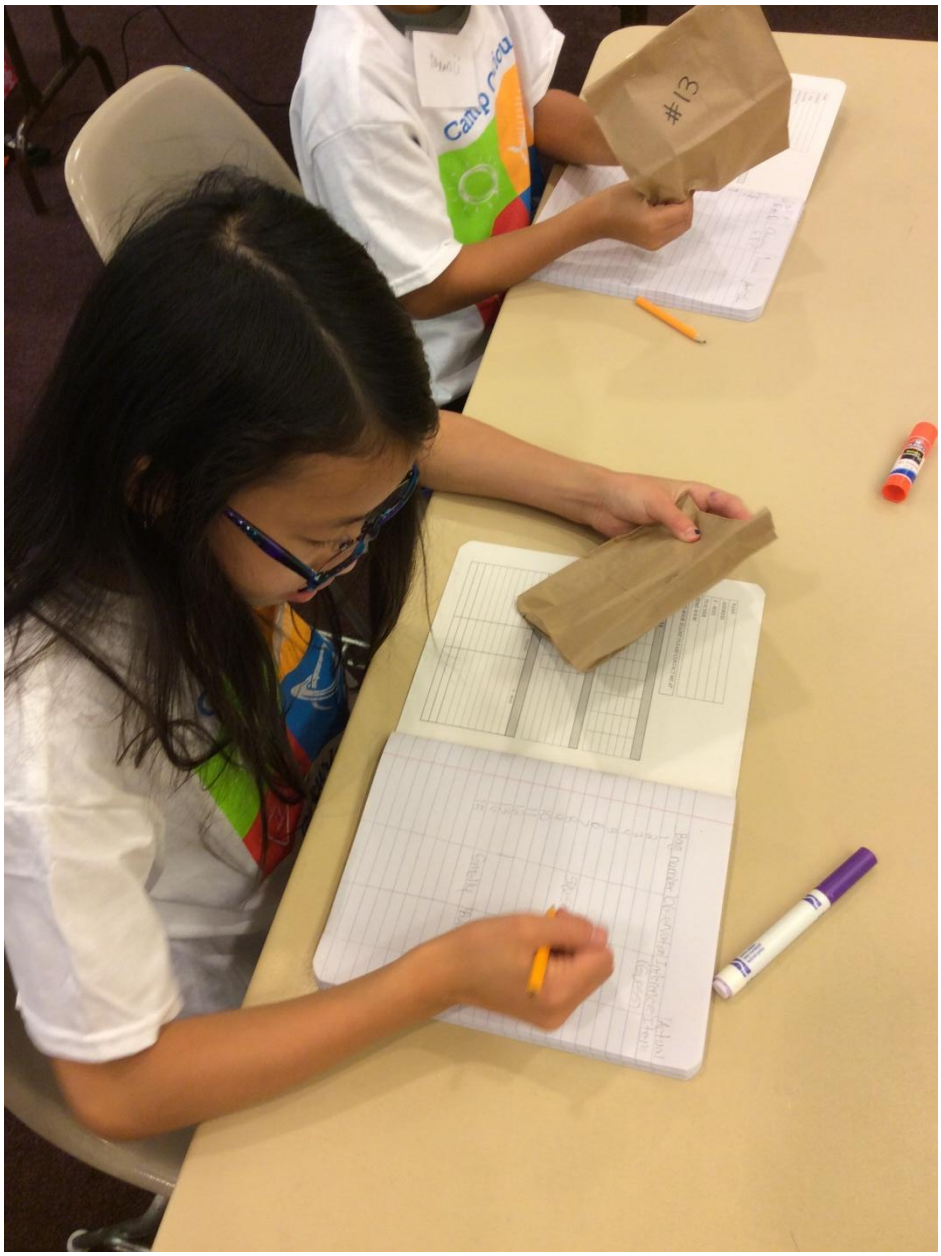
Objective: Campers will be able to describe and classify objects based on their observable properties. Campers will develop an understanding of high quality scientific observation that will continue to be honed throughout camp.

Activity: Campers will practice making sensory observations to uncover the identity of objects that they cannot see. They will pass around paper bags filled with items to investigate by touching and smelling. This allows campers to prepare their minds to think outside the box and practice observation skills that will be highlighted for the rest of camp. The items included: rice, coffee beans, nuts and bolts, lavender, pebbles, Altoids mints, and a bar of soap.

The campers recorded their observations and inferences on the table below and glued it into their journals. The instructor will wrap up the session by leading a short conversation on the usefulness of close observations and about what types of observations were most helpful in guessing the objects.

Mystery Bags

Bag #	Observations	Inference (Informed Guess)	Actual Item


#13

A Lemon of a Lesson (Ages 12-14)

Objective: Campers will be able to describe and classify objects based on their observable properties. Campers will develop an understanding of high quality scientific observation that will continue to be honed throughout camp.

Activity: This activity is based on Minogue (2008) and it is intended to demonstrate the importance of making detailed sensory observations. The instructor will introduce the activity by describing that observation is a crucial scientific skill that will be focused on throughout the camp. Every student will be given a lemon, a measuring tape, and a hand lens. They will spend five minutes making as many detailed observations as they can to get to know their lemon inside and out. The instructor will circulate and suggest that campers consider length, circumference, distinguishing features, etc. They will also be prompted to make a detailed sketch. When time is up, the instructor will collect the lemons and distribute them randomly around the room, directing the campers to use their notes to find their original lemon. If time, push campers to switch notes with a partner and then find their lemon using their observations. To wrap up, the instructor will lead a conversation about which characteristics were helpful in identifying the lemons and which parts of the activity were challenging. The instructor will highlight the takeaway message that vague, general observations are not helpful in science.

References

Minogue, J. (2008, Feb.). A lemon of a lesson. *Science and Children, 45*(6), 25-27.

Earth Explorers: Scientific Observation

Objective: Campers will hone their close observation skills and record their notes/sketches in their journal. Older campers will be particularly encouraged to think curiously like a scientist and generate questions based on observation.

Activity: This activity began with a discussion around the following questions:

- What do you think 'observation' means?
- Why do scientists do observations?
- Where can you do a scientific observation?
- What senses do you use to make an observation?
    - What is something that you could observe with your sense of sight/hearing/smell/etc
- How would you observe an animal/river/storm/etc?
- What are things you are interested in observing?

For the 9-11 age group, instructors focused on the distinction between qualitative and quantitative observations.

For the 12-14 age group, instructors focused on developing investigatable questions from observations.

During the summer camp, the National Geographic traveling exhibit, Earth Explorers, was at the museum. This was a great benefit of having the camp run through the museum, and campers were able to experience situations where observations lead to scientific discovery in environments around the world. Campers used their journals to record three observations* for each biome represented in the exhibit (the polar region, ocean, rain forest, mountain and cave, and savanna). Afterwards, campers participated in a think-pair-share to discuss their observations.

*Campers aged 6-8 drew their observations
*Campers aged 9-11 drew and wrote their observations
*Campers aged 12-14 wrote observations made using all senses and generated investigatable questions that came out of observation

Earth Explorers exhibit description:

Organized around Earth's spectacular eco-zones Earth Explorers brought the unparalleled adventures of National Geographic to life. Visitors learned about the daring men and women who venture into dangerous and remote parts of the world to discover new places, protect our planet's biodiversity and unearth new scientific discoveries.

In this exhibit, visitors explored an arctic cabin, tested their ability to live in an ice-covered world, descended into the deep ocean in a 3-D submersible and explored how life forms at varying depths, even coming face-to-face with a great white shark. They also identified incredible insects from the Amazon while learning the benefits of biodiversity, ascended into the thin air of the Himalayas and soared in a hot air balloon over the Savanna to learn about the life of elephants and other mammals.


BECOME A DETECTIVE
CAN YOU READ THE SIGN?


HOP ON
LET'S GO!

What is a Watershed?

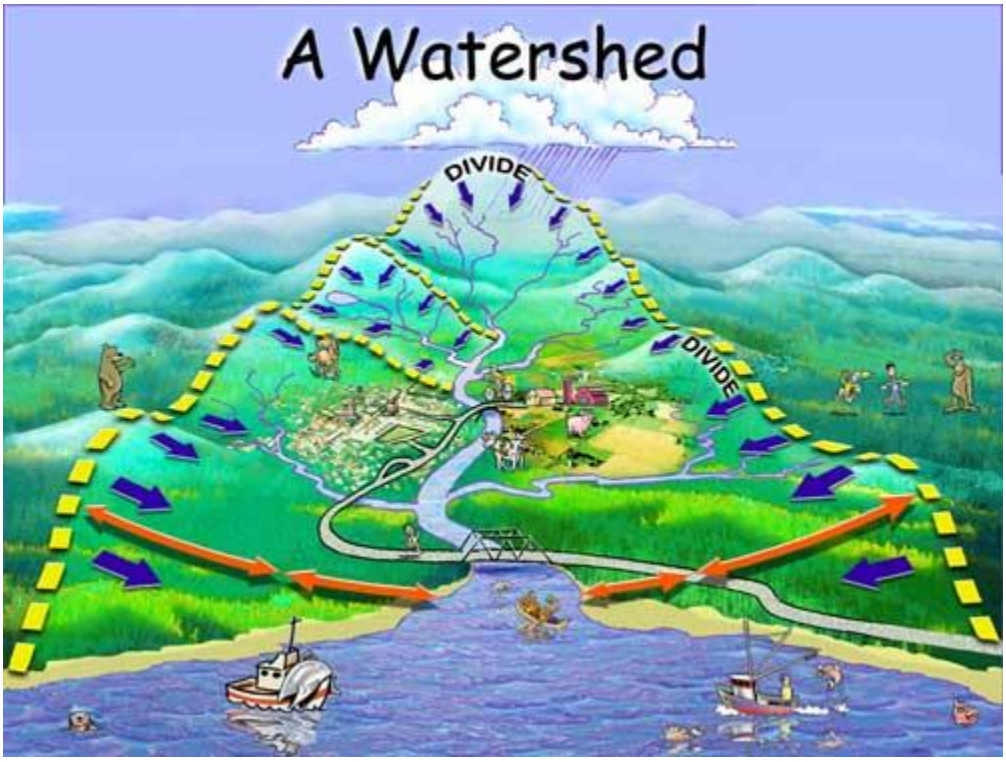
Objectives: Campers will be able to explain the terms and concepts associated with a watershed. Campers will be able to describe a typical watershed structure and how watersheds work.

Activity: The following video clips will be shown:

Battle River Watershed. (2013, Dec. 2). *What is a Watershed?* [Video file]. Retrieved from https://www.youtube.com/watch?v=QOrVotzBNto

Community Collaborative Rain, Hail & Snow Network. (2016, Jun. 30). *Watersheds!* [Video file]. Retrived from https://www.youtube.com/watch?v=2pwW2rlGIa8

MataMataMusic. (2009, Apr. 22). *What's a Watershed?* [Video file] Retrieved from https://www.youtube.com/watch?v=f63pwrMXkV4



Build Your Own Watershed

Objectives: Campers will continue to build their definitions and understandings of watersheds. Campers will be able to construct a basic model of a watershed.

Activity:

Instructors will show the video *Build a Watershed,* produced by PBS Kids' Plum Landing program in which children construct model watersheds and cover basic terminology. Then, campers will construct a basic watershed with marker and paper, including houses, trees, cars, etc. Then, to demonstrate nonpoint source pollution from runoff water will be sprayed on top of the paper to simulate rainfall.

Campers will then create a large, 3D model of a watershed outside with a tarp and plastic replicas of cars, animals, houses, and other landscape features. Food coloring will be used to model various sources of pollution, like animal waste, oil, and pesticides/fertilizer. Through this modeling, they will visualize that all the water and waste is drained into the same common body of water. This will assist campers in developing an understanding of the concept of a watershed.

References

Plum Landing: PBS Kids. (2014, Aug. 27). *Build a watershed.* [Video file]. Retrieved from https://www.youtube.com/watch?v=lBMgGWM-8mQ

Who Lives in the Watershed?

Objective: Campers will begin to be familiar with species living in West Michigan Habitats. Campers will also review watershed terminology and concepts.
Activity:

What Am I?

Objective:

Activity: Children sit in a circle in groups of 3 to 5. The instructor will distribute a post-it note to each camper and ask them to write any term related to the Grand Rapids watershed that they've learned so far. Without showing anybody else, each camper will place their post-it note onto the forehead of the camper sitting to their right.

Then, campers will take turns asking their group yes/no questions to figure out the term on their forehead (e.g. Am I alive? Am I found in water? Am I smaller than a human?)

Watershed Wonders - Day 2

Today's objectives: Campers will be able to take and evaluate a water sample. To do this, campers will be able to explain what each measurement indicates about water quality.

Let's talk! Ask me about:

What did I see today?
Where did I go?
What insects did I see/find?
What did I learn about water sampling?
What was in my water sample?

Schedule

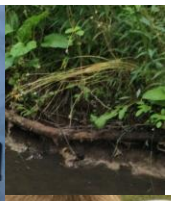
Day 2: How do I sample water in my watershed?		
Time	*Activity*	*Location*
9:00	Campers arrive	Museum entrance
9:15	Get on the bus and go!	parking lot
9:30-11:30	WMEAC Water sampling	Huff Park, Lamberton Creek
11:45	Return to museum	

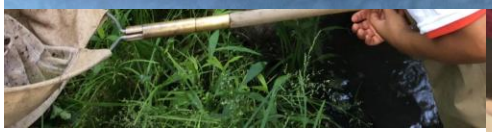
WMEAC Water Sampling

Objective: Campers will conduct water sampling and develop an understanding of what each measurement indicates about water quality.

Activity: Campers used WMEAC's Teach for the Watershed Field Journal to identify macroinvertebrates and evaluate the health of Lamberton Creek which runs through local Huff Park. They examined how macroinvertebrates fit into aquatic food webs. They were also guided through several chemical water tests from the Lamotte Water monitoring kit. (pH, dissolved oxygen, nitrates, phosphates) and physical analyses (temperate and turbidity). Campers reflected on how harmful levels of each measurement could negatively impact stream health.


dissolved oxygen
0 ppm
4 ppm
8 ppm
nitrate
5 ppm
20 ppm
40 ppm
phosphate
1 ppm
2 ppm
4 ppm





Watershed Wonders - Day 3

Today's objectives: Campers will be able to describe what lives in their watershed, particularly lake sturgeon.

Let's talk! Ask me about:

Who lives in our watershed?
What did I learn about sturgeon?
Why are sturgeon special?
What are the differences between the Grand River water sample and the Lamberton Creek water sample?

Schedule

Day 3: What's in a Watershed?		
Time	*Activity*	*Location*
9:00	Campers arrive	Museum Entrance
9:15- 9:30	Journal Reflection	classroom
9:30:-9:50	Who Lives in our Watershed?	West Michigan Habitats exhibit
9:50 - 10:00	Sturgeon: A Special species	Sturgeon exhibit
10:00 - 10:10	Observations/Temperature	Classroom
10:10-10:15	Break	
10:15	Observation group	Classroom
10:25-10:30	Water Sampling: Water temperature and chemistry	riverfront
10:45-11:15	River hike and "Meet my Friend" activity	Along the Grand River
11:15-11:30	Frogs, Insects, and Flowers Game	Ah-Nab-Awen Park
11:30-11:40	Journal Observations and Drawing	Park/river front
11:45	Head back to museum	

Journal Reflection

Objectives: Campers will reflect on the water sampling field trip in order to review the water quality measurements and what they indicate. They will also continue to hone their scientific observation capabilities.

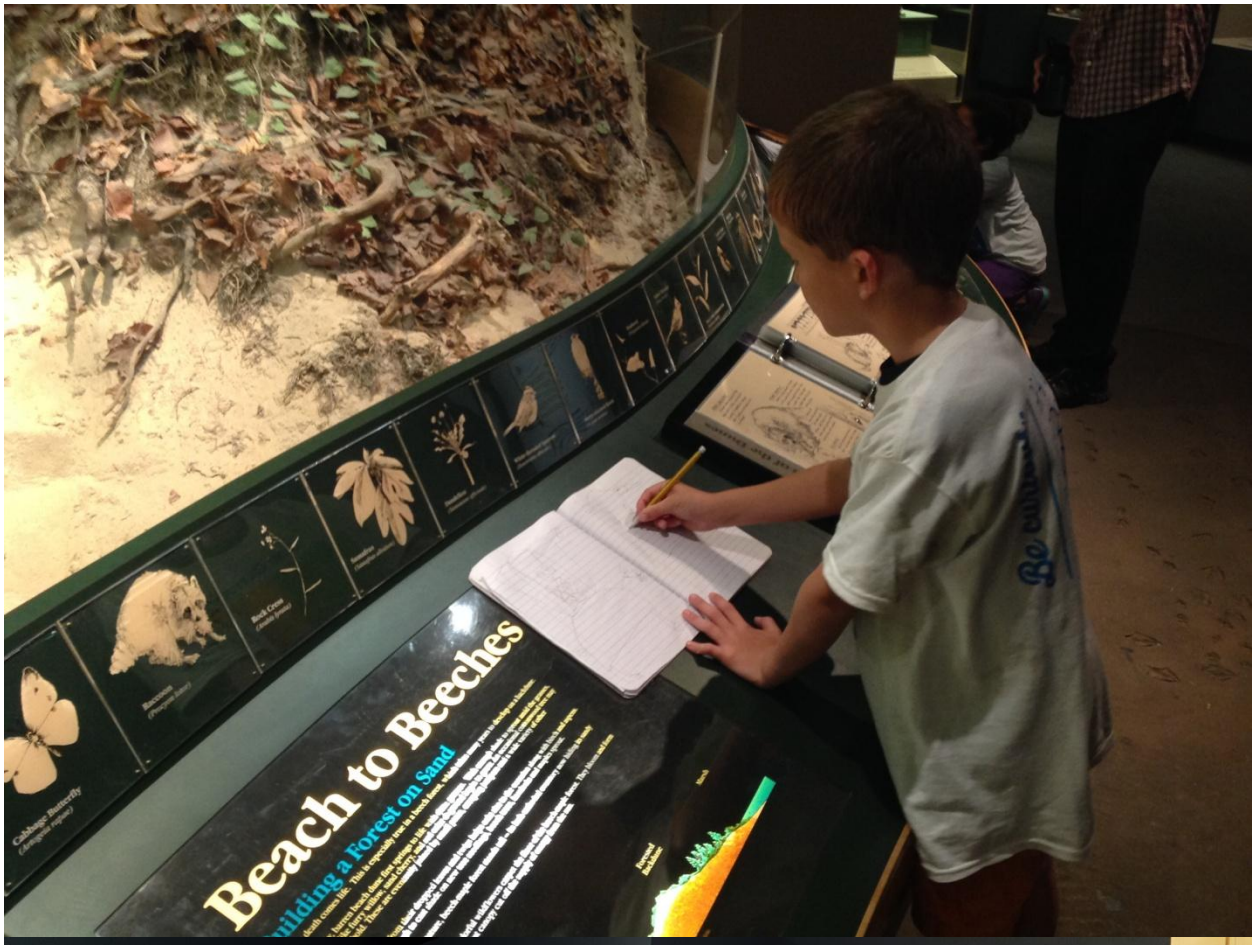
Activity: Campers will glue pictures from the water sampling field trip into their journal. The instructor will prompt them to write and/or sketch detailed observations about the picture. They will also prompt campers to write about what each picture was, the process of water sampling, and what they learned about the various measurements.

Who lives in our Watershed?

Objectives: Campers will be able to understand different habitats in the Grand River watershed and learn about what lives in each habitat. Campers will demonstrate how each habitat provides for its wildlife by creating and performing skits.

Activity: This activity took place in the permanent exhibit: West Michigan Habitats. An instructor was positioned at each of the habitats to explain the display and answer questions (forest, wetland, and dune) while campers explored the exhibit space. Campers visited each habitat display and learned about what Michigan's habitats are like and how our watershed impacts each of these environments.

Afterwards, campers broke into small groups and were assigned one of the habitats. Their task was to create a skit to demonstrate what organisms live in each habitat and to share what they learned about the habitats. Instructors lead a discussion about why we should care about our watershed and how we can preserve our beautiful habitats.


Beach to Beeches
Building a Forest on Sand


FROG


Building the Dunes
Beach to B
Building a Forest on Sand

A detailed description of West Michigan Habitats--a permanent GRPM exhibit--is provided below:

West Michigan Habitats At The Grand Rapids Museum

A large, meandering exhibit that transports young and old alike through the natural environments of West Michigan. The life-like exhibits of mounted animals and plants in their natural settings must be seen to be believed.

- Dioramas with light, sound, images and hands-on activities that kids can use to learn about fish in Lake Michigan, microscopic life in a drop of marsh water, fragile sand dune, wetland, and woods ecosystems and the impact of the lifestyle choices humans make that affect the natural environment.
- The Kent Scientific Institute room is a re-creation of the Public Museum's exhibit hall before 1900, with huge shells, fossils, minerals and exotic animal skeletons, including a mastodon replica in a Victorian period setting.

Sturgeon: A Special Species

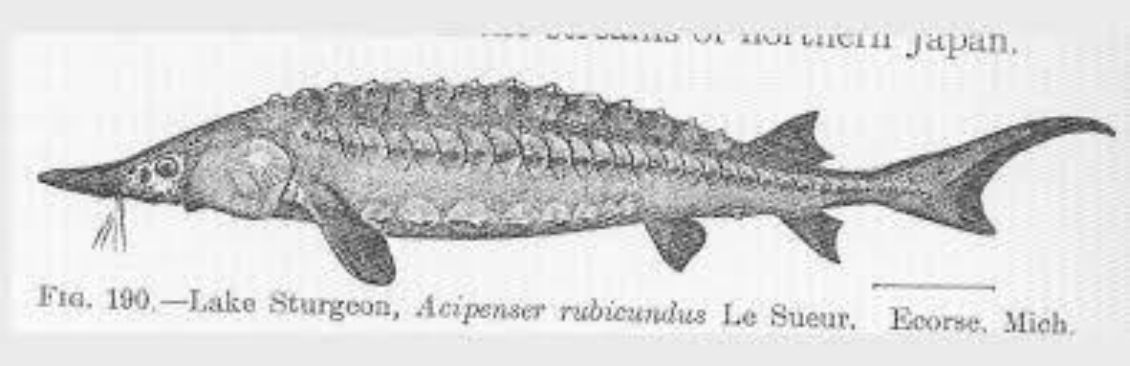


Fig. 190.—Lake Sturgeon, *Acipenser rubicundus* Le Sueur. Ecorse, Mich.

Objective: Campers will be able to explain the natural history of the lake sturgeon. Campers will learn about strategies being used to protect sturgeon in their community.

Activity: According to the Department of Natural Resources, "of the 29 species of sturgeon worldwide, only the lake sturgeon (*Acipenser fulvescens*) is native to Michigan. Lake sturgeon are the largest and longest living fish to swim in Michigan's waters, with the potential to weigh more than 250 lb and reach 150 years of age (Scott and Crossman 1973). These unique life history traits, along with delayed maturation, intermittent spawning, low natural mortality of adults, and high fecundity tend to buffer lake sturgeon from extremes in the environment (Peterson et al. 2006). These characteristics have contributed to the success of the species, but they have also put them at risk due to human-induced mortality and habitat changes."

Campers have the opportunity to visit the sturgeon exhibit in the museum and learn about sturgeon and how to improve our watershed to have a comeback on sturgeon. They were able to learn the history and the benefits of sturgeon and witness a feeding.

A detailed description of Grand Fish, Grand River--a permanent GRPM exhibit--is provided below:

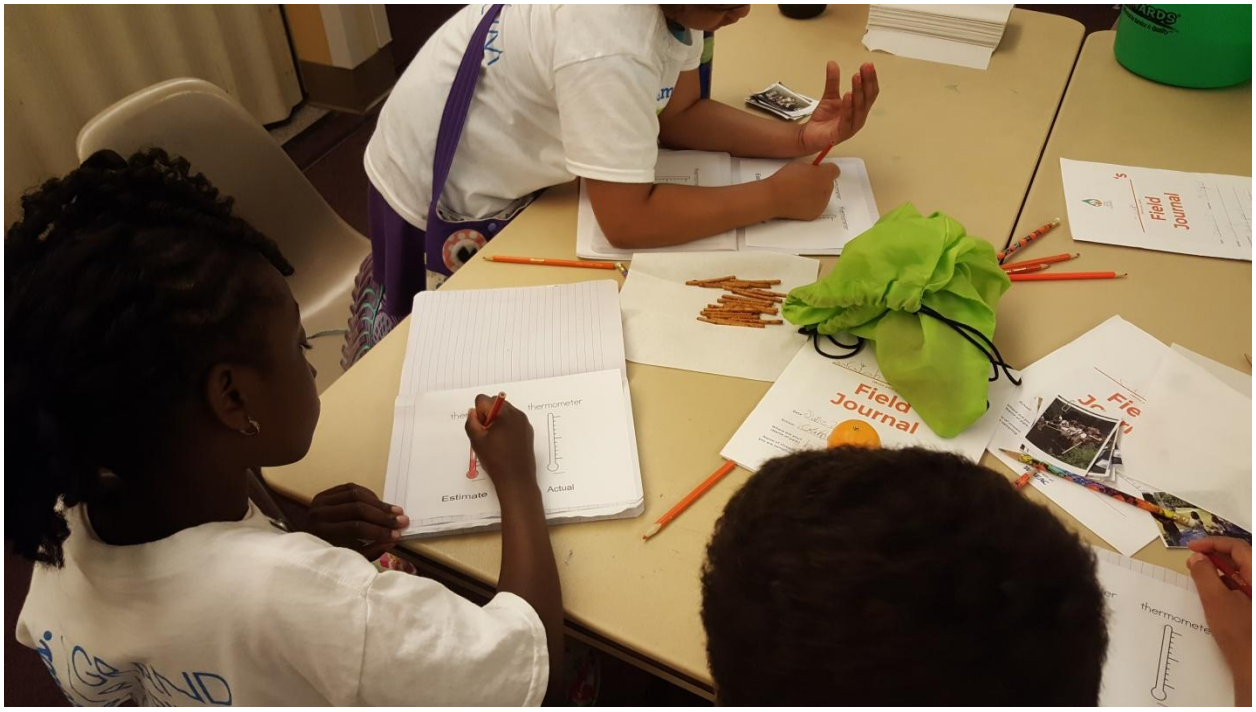
Grand River, Grand Fish explores how the Great Lakes region's largest and oldest fish, the Lake Sturgeon, once found in great abundance, is now a threatened species in our watersheds. The exhibit takes visitors through the connections to Native Americans, fishing history in the region and current science. Using artifacts from the GRPM Collections, along with the two live sturgeon, it will tie together the cultural, historical and scientific connections and explore rehabilitation efforts for this species in the Grand River and throughout the Great Lakes region.

Lake Sturgeon live along the rocky bottoms of our lakes and rivers, and are an important environmental indicator for the health of our ecosystem. These fish have fossil ancestors that from the Early Jurassic Period – the age of the dinosaurs. Lake Sturgeon have affected the region historically and culturally and still do today.

Temperature

Objectives: Campers will be able to measure water temperature and explain how temperature impacts life in our watershed.

Activity: Campers will test the temperature and describe how it will impact water testing results. First, campers will learn to use thermometers by taking a temperature reading of ice water in buckets, and they will write down their inferences and actual readings. Campers will also be able to relate temperature to the sturgeon exhibit and compare the tank's temperature compared to the actual river temperature.



Water Sampling: Water Temperature and Chemistry

Objectives: Campers will be able to sample water from the Grand River and compare measurements with samples from the previous day.

Activity:
Campers as young as 6 were able to see levels that were healthy and compare those in our own watershed. WMEAC demonstrated how to navigate water testing and introduced the concept when we visited the stream in the park. Here, campers had the opportunity to test the Grand River back at the museum and tie everything they learned with WMEAC and compare the results.

River Hike and “Meet My Friend” Activity

Objective: Campers will spend time exploring their environment to discover an object of interest, fostering their curiosity and observational skills. Campers will also think critically and creatively about habitat requirements and stewardship actions related to the object they find.

Activity: Campers will be taken on a short hike during which time each person collects something from the natural environment (nothing may be broken or picked from any living thing). The item has to be either lying on the ground or resting on another object (e.g. stump or log). Everyone keeps his object hidden from all other players.

Following the hike, each person is given the opportunity to build a small home for their 'friend'. They are also asked to give their friend a name, and to think of one way in which they could take care of their friend, if it was still out in its natural environment.

When all in the group is ready, everyone tours the small homes that have been created, and meets each special friend. E.g. "This is my friend Twiggy. He is a small branch that I found lying on the ground. I've built him a house from soft leaves and moss that I found on the ground. If he was still on a tree, I could take care of him by protecting him from the wind. I could build a fence so the wind wouldn't snap him off from his tree. I could also make sure he doesn't catch diseases -I could check for termites and insects that might harm him."

Watershed Wonders - Day 4

Today's objectives: Campers will be able to describe ways to keep their watershed clean. Campers will get a chance to reflect on their camp experience.

Let's talk! Ask me about:

What can you do to keep our watershed clean?
What was your favorite thing about camp?
What activity did you do in the park today?
Ask me to show you my journal from the week!
Ask me to tell you a little about my journal entries!

Schedule

Day 4: What's my part?		
Time	*Activity*	*Location*
9:00	Campers arrive	Museum entrance
9:30-9:40	Photo/Journal Activity	Classroom
9:10-9:30	Scavenger Hunt/A-Z Scavenger Hunt/Geocaching	Ah-Nab-Awen Park
9:40-10:10	Macroinvertebrate samples	Riverfront
10:30-10:45	Bathroom break and Snacks	
10:45-11:00	Post Assessment Evaluations	Classroom
11:00-11:15	Watercolor watershed	Classroom
11:15-11:35	Reflection and Wrap Up	classroom
11:40	Carousel Rides	

Photo/Journal Activity

Objective:

Activity: Campers will be given materials to attach items or pictures from the scavenger hunt to their journal.

Day 4 Journal (part 1)

- Attach items found in the scavenger hunt to the journal
- Art as observation: (could do this as an art walk)
    - Campers all sit in one spot
    - Draw the image with only ovals
    - Then try to draw another with only rectangles
    - Start drawing the scene and pass
    - Add on to the journal that you receive
- (If not included in the scavenger hunt) Alphabet observation: can they find something for every letter of the alphabet in the park?
    A: ant
    B: bark, etc

(Part 2)

- Write about your favorite part of camp
- Share favorite pages with each other

Scavenger Hunt (ages 6-8)

Objective: Campers will be able to use what they have learned about observations to find items in a scavenger hunt.

Activity: Campers will go to the park to participate in this activity. Once at the park, they will be given a paper bag with a list of items to find and place in the bag. Every bag will contain a marker so when the item is collected it can be crossed off. Some items will not be able to be placed in the bag but can be crossed off when found.
Campers can work together or independently. They will be looking for the following items:

- 3 different shaped leaves
- An oval shaped item
- A piece of grass
- A feather
- An American Flag
- An ant
- An acorn
- A piece of litter
- A piece of bark
- A crooked stick
- A pine cone
- A stone
- Water
- A duck
- Something that smells good
- Something that you think is pretty

A-Z Scavenger Hunt (Ages 9-11,12-14)

Objective: Campers will be able to use what they have learned about observations to find items in a scavenger hunt.

Activity:

Campers will be given a paper bag and a paper with the alphabet listed. They will try to find an object that can either be written on the space next to the letter or placed in the bag. For example, for the letter T the student could write tree or place a twig in the bag. They will be encouraged to focus on items that relate to the environment or watershed concepts.

Macroinvertebrate Sampling

Objective: Determine water quality of the Grand River based on macroinvertebrates.

Activity: Students will identify and classify organisms from the Gran River. The instructor will collect the organisms (safety concerns in the Grand) and the students follow the same procedure as used in teach for the watershed (WMEAC hand-out).

Post Evaluation Materials

Post Evaluation Ages 6-8

Select a picture from your logbook that shows a GREAT DAY you had at camp and tape it here. Or, DRAW A PICTURE of a great day at camp.

What is happening in this picture?

What was fun about it?

Post Evaluation Ages 9-11

Photo Journal – Use Journal to document activities with photos provided by instructor.

1. When 5-10 minutes remain, instruct students to begin the writing portion if they have not already written a response to the two lines.

2. Review younger students' answers for legibility and clarity as the form is turned in. If you don't know what you're looking at or cannot read the student's answers, ask the student, "Tell me what is in your picture," or "Help me understand what you have written here," as necessary. If the handwriting is unclear, attach a sticky note that clarifies the content for other readers.

3. Follow procedures for submitting..

Photo Reflection: I AM CURIOUS

Select a picture from your logbook that shows a time when you felt CURIOUS.

1. This picture reminds me of a time I was CURIOUS about:

2. What questions did you have?

3. What did you do, or WILL you do, to answer your questions?

4. What else do you want to say about what's in this picture?

Describe the picture or TAPE YOUR PICTURE TO THE BACK WHEN YOU ARE DONE

Photo Reflection: ME AND ENVIRONMENTAL STEWARDSHIP

Select a picture from your logbook that shows a time when you wondered about ENVIRONMENTAL STEWARDSHIP.

1. What is this a picture of?

2. What thoughts or feelings about environmental stewardship does this picture remind you of?

3. What did you do, or WILL you do, about your thoughts and feelings about environmental stewardship?

4. How does this picture make you feel – happy, sad, confused, excited, something else?

Describe the picture or TAPE YOUR PICTURE TO THE BACK WHEN YOU ARE DONE

End-of-Camp Survey for Campers Aged 12-14

1. AFTER participating in this camp, how much would you say you know about watersheds, water sampling, and the Grand River? *(Circle one number)*

Very much		*Some*		*A Little or None*
5	4	3	2	1

2. How much would you say you knew about watersheds, water sampling, and the Grand River BEFORE you came to this camp? *(Circle one number)*

Very much		*Some*		*A Little or None*
5	4	3	2	1

3. After participating in this camp, which word BEST describes your feelings about studying science? *(Choose only ONE)*

Fun	Challenging	Hard	Boring

4. List THREE things you think of when you hear the word scientist.

   1. _____
   2. _____
   3. _____

5. During this camp, how much have you learned about these science topics and science skills? *Circle one number for each line.*

	A Lot		*Some*		*Little or none*
What a watershed is	5	4	3	2	1
Habitats in West Michigan watersheds	5	4	3	2	1
What lives in West Michigan watersheds	5	4	3	2	1
Water quality sampling	5	4	3	2	1
How to work well in teams	5	4	3	2	1
How to collect and analyze data	5	4	3	2	1

6. In this camp we explored water quality sampling, the Grand River, and general ideas about watersheds. Pick ONE way in which your thinking on these topics has changed and write about it briefly in the boxes below.

I used to think:	Now I know:
This is how I learned it:	

7. After attending this camp, are you interested in learning more about watersheds, water sampling, and the Grand River? *Circle one:* Yes No

For the following four questions, please check the box of the ONE best answer.

8. A watershed is:
   - ☐ The headwaters, tributaries, and mouth of a river
   - ☐ All of the land area that drains water to a lake or river
   - ☐ A governmental organization that manages water quality in a given territory
   - ☐ None of the above
9. Which of the following indicates a Michigan river or stream with good water quality?
   - ☐ A large number of caddisflies, mayflies, and stoneflies and their larvae
   - ☐ Low levels of dissolved oxygen
   - ☐ pH below 4 or above 9
   - ☐ Limited diversity in the types of aquatic macro invertebrates
10. In the Great Lakes region, what type of species is *lake sturgeon?*
    - ☐ An invasive species
    - ☐ A native species
    - ☐ A threatened species
    - ☐ B and C
11. What is the most common cause of pollution of streams, rivers, and oceans?
    - ☐ Dumping of garbage by cities
    - ☐ Surface water running off yards, city streets, paved lots, and farm fields
    - ☐ Trash washed into the ocean from beaches
    - ☐ Waste dumped by factories

About this camp.

12. How did you feel about the amount of time spent out-of-doors in this camp? *Circle one answer.*

Too much time outside for me	About the right amount of time outside for me	Not enough time outside for me

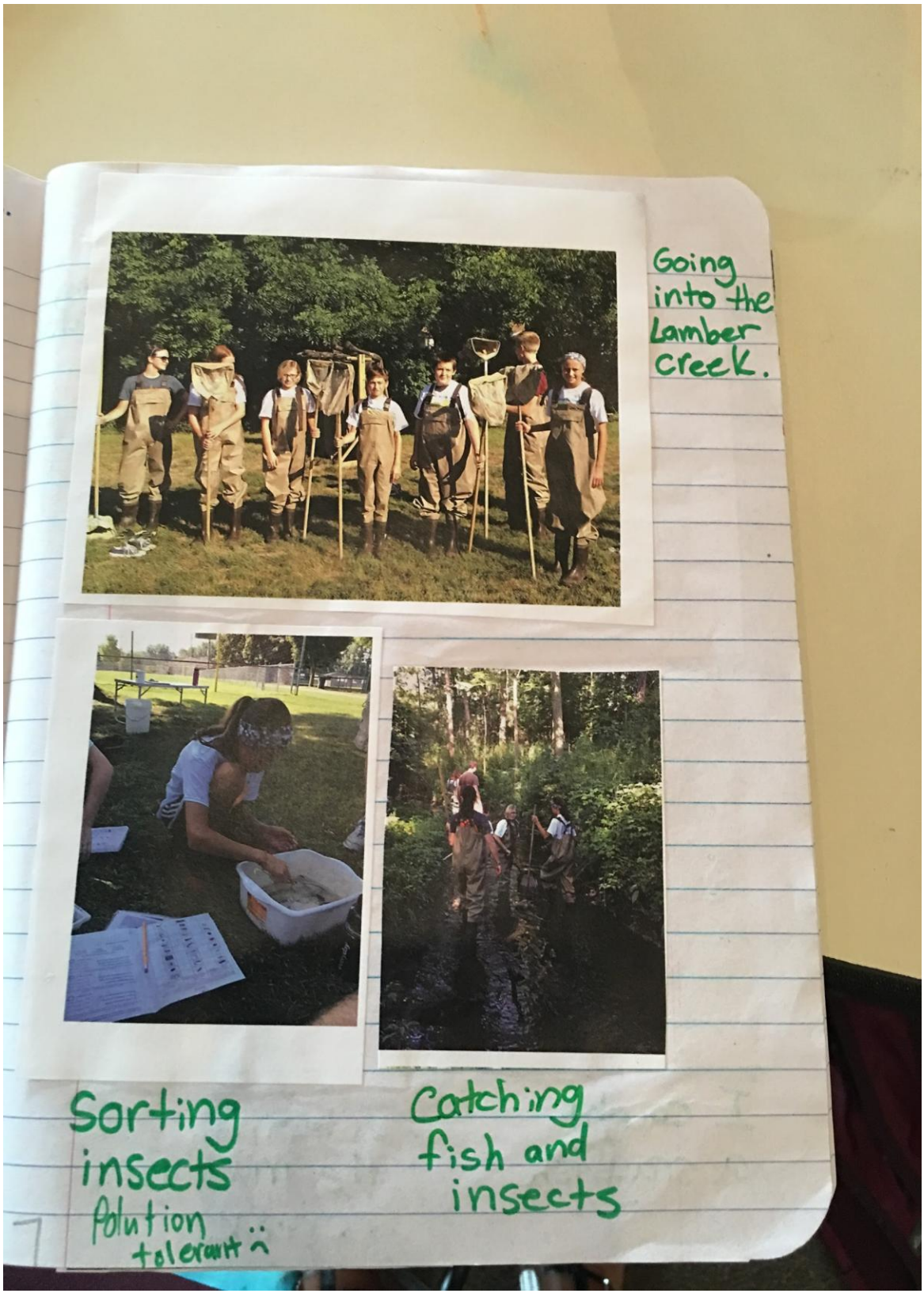
13. The BEST part about this camp was:

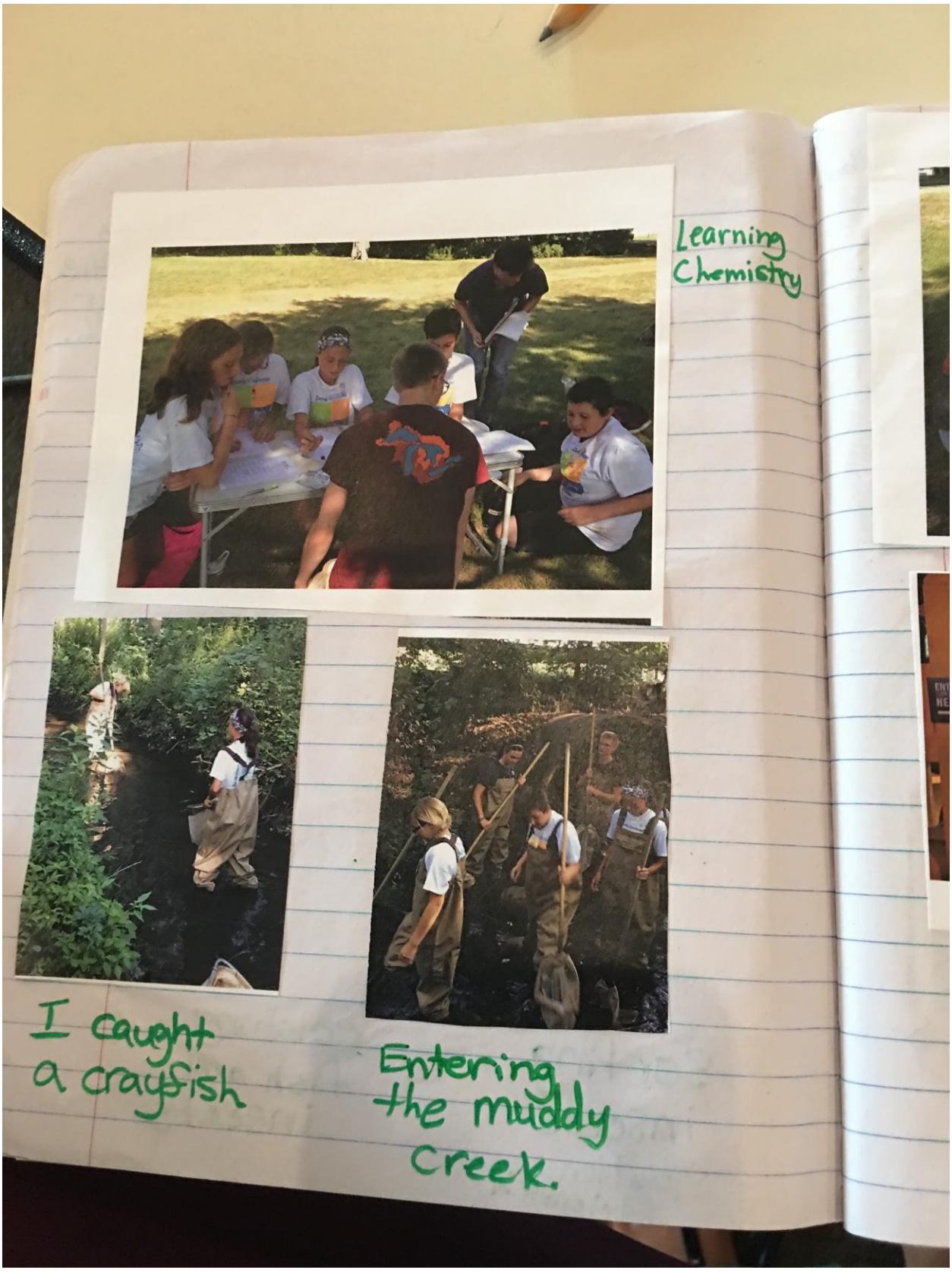
14. My least favorite part about this camp was:

15. Would you recommend this camp to a friend? *Circle one:* Yes No

    Why or why not?

Appendix: Selections of Student Journals



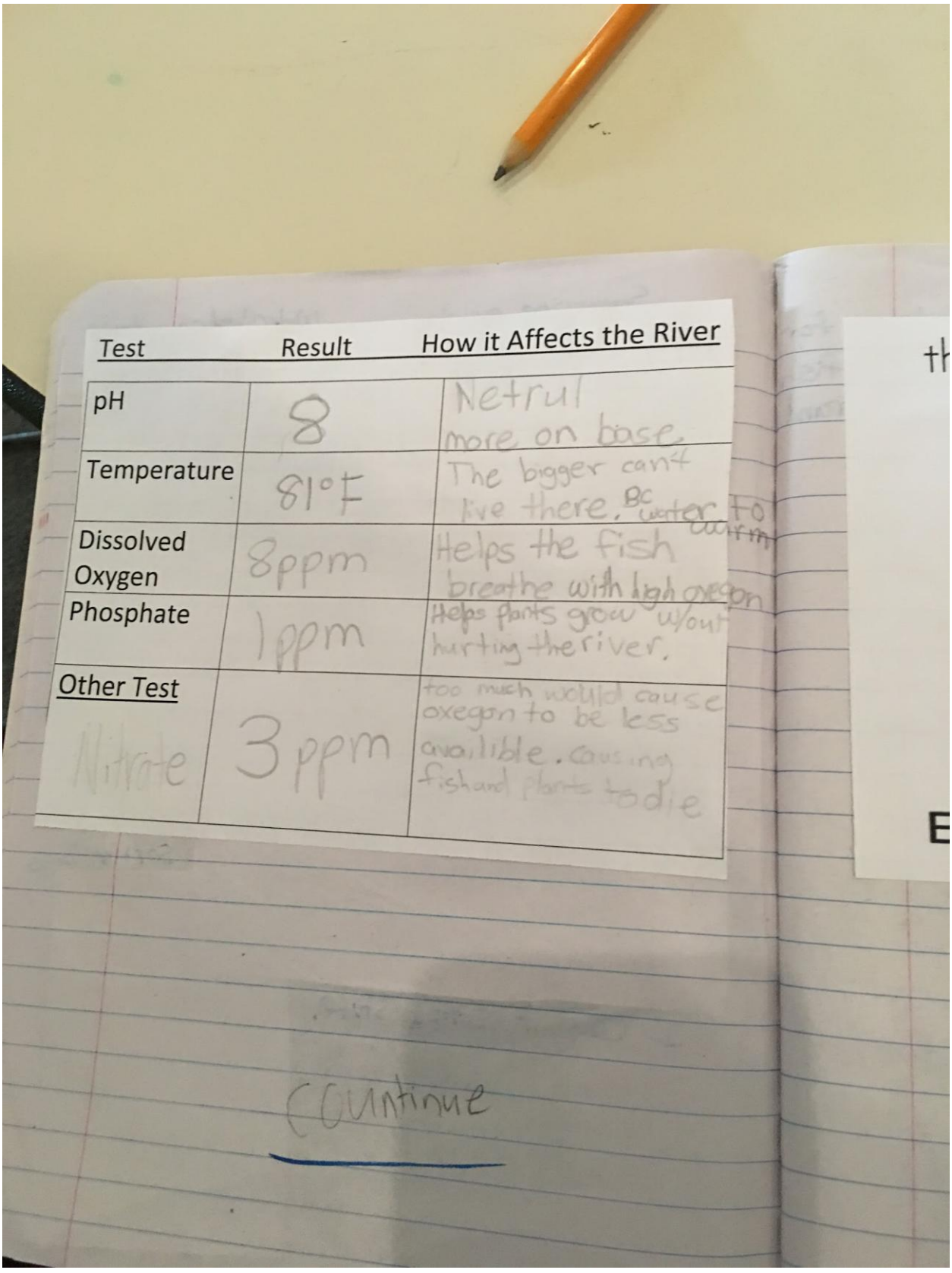

Learning Chemistry
I caught a crayfish
Entering the muddy creek.

Making a road of cars.

Putting insects into ice cube trays.

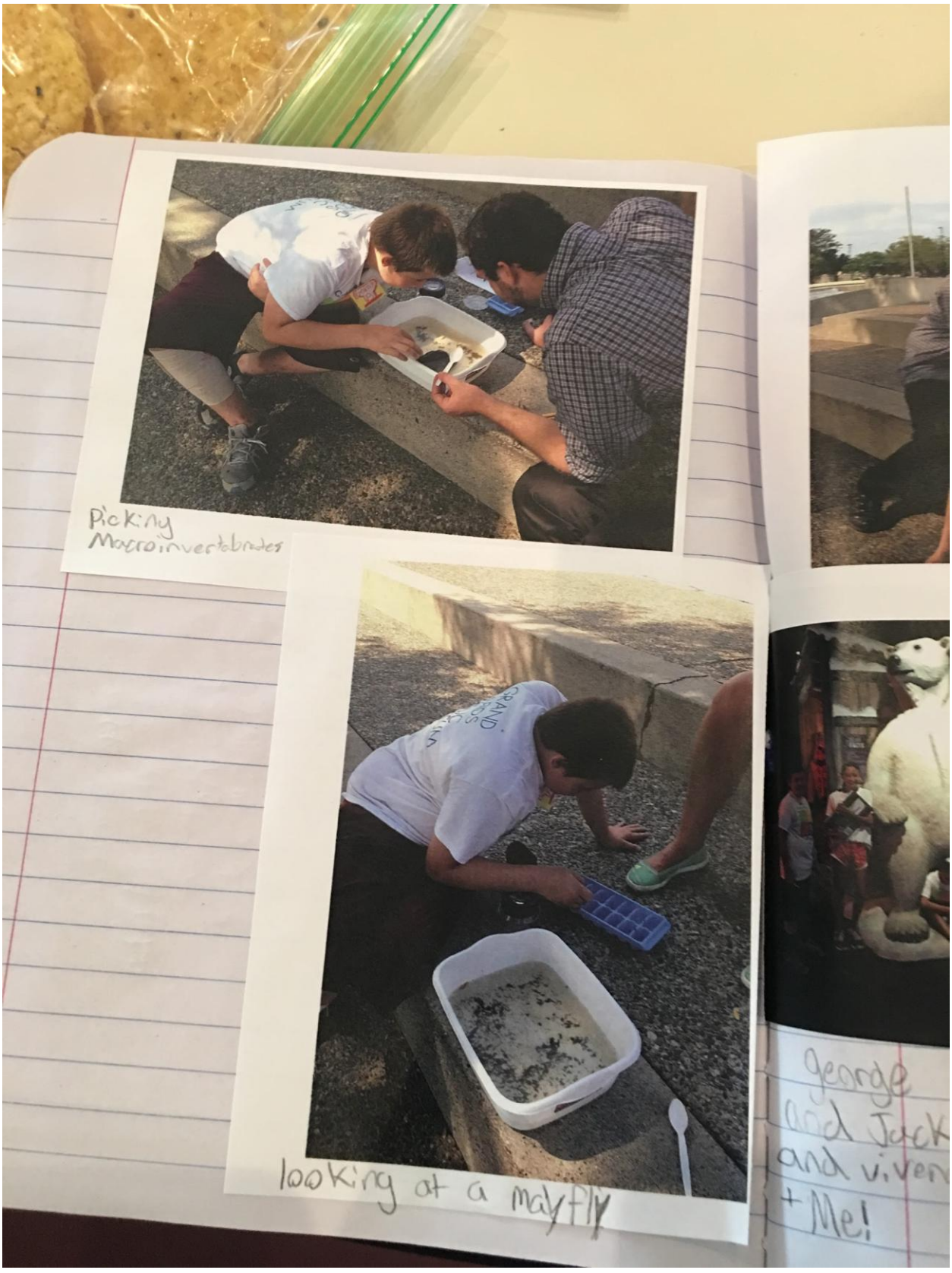
Spraying polution (food coloring) on the watershed.

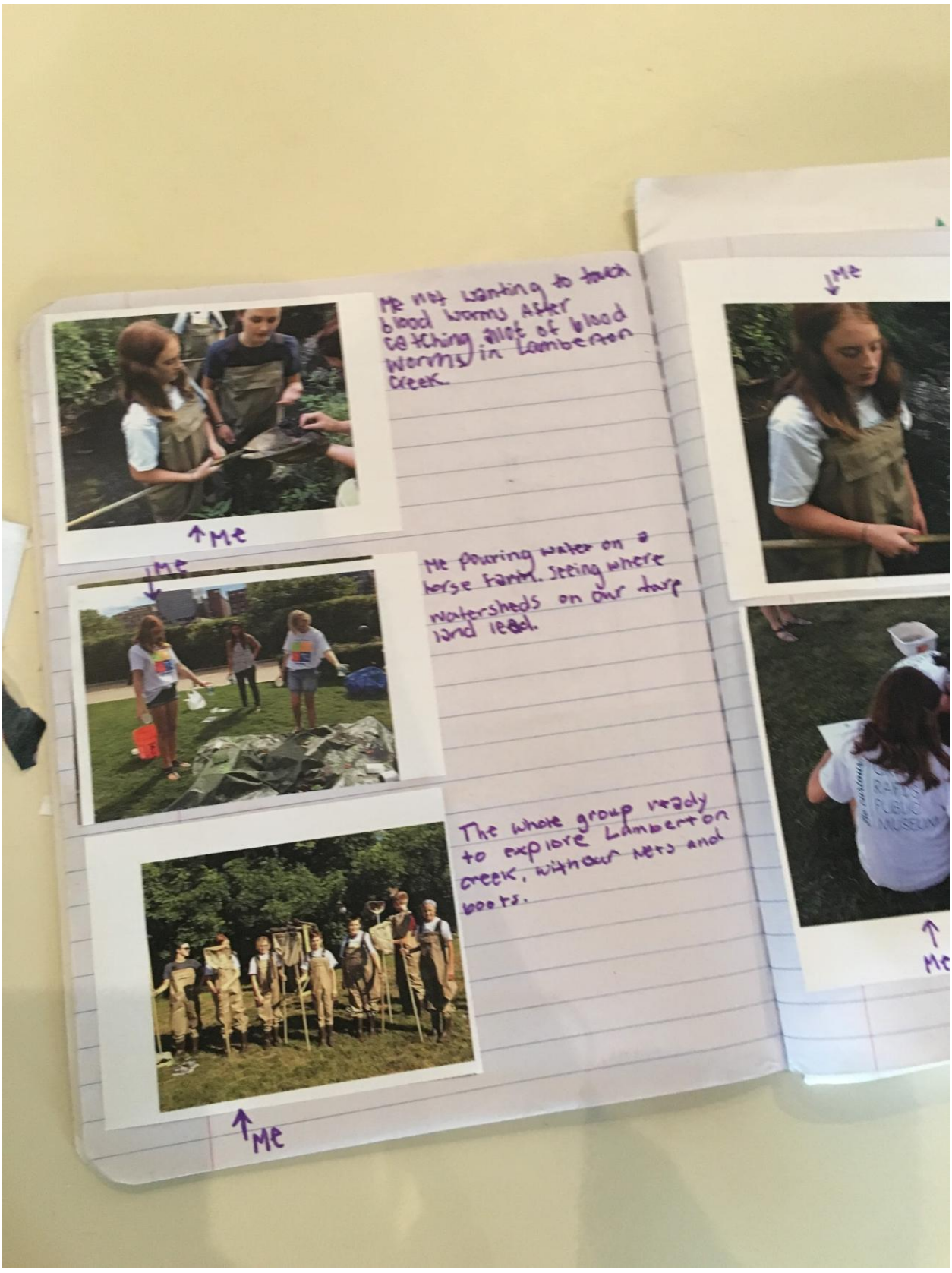
Sooo hot in these boots



Test	Result	How it Affects the River
pH	8	Netrul more on base.
Temperature	81°F	The bigger can't live there. Bc water to warm
Dissolved Oxygen	8ppm	Helps the fish breathe with high oxegon
Phosphate	1ppm	Helps plants grow w/out hurting the river.
Other Test Nitrate	3ppm	too much would cause oxegon to be less availible. causing fish and plants to die

Countinue


Picking Macroinvertebrates
looking at a mayfly
George and Jack and Vivien + Me!


Me
Me not wanting to touch blood worms. After catching alot of blood worms in Lamberton creek.
Me
Me pouring water on a horse farm. Seeing where watersheds on our tarp land label.
Me
The whole group ready to explore Lamberton creek, with our nets and boots.
Me
Me