

NORMAN BORLAUG DAY PLANNING [INDOOR VERSION]

Teachers: Sam Kraft, Lindsey Ahlers, Christen Foster

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Title: Wonderful World of Water

Standards:

NGSS5-LS2-1 » Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

5-LS1-1 » Support an argument that plants get the materials they need for growth chiefly from air and water.

CCSS.ELA-LITERACY.W.5.2 » Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

Objectives:

Students will...

- Be able to identify the insects that are brought up from the water either using the knowledge that they come with or through looking at the identification guides provided.
- Be able to explain the connection between water insects and water quality.

Differentiation:

- **ADHD:** For students with ADHD, we will make sure that they are able to do some of the hands on work, as this will keep them engaged with the lesson. We recognize that being outside, in the middle of a farm is not the ideal place for trying to keep the attention of a student with ADHD, however we will be sure to be moving around, as teachers, enough to keep their attention on us, while also allowing them the chance to work either on their own or with a partner. For these students, as well as the rest of the students who will require differentiation, we will be sure to state directions at the beginning of the activity, while still being willing to provide follow up instructions and questions to keep the students on the right track. Having a student with ADHD work with a particular student during smaller group work time will also be beneficial. (If we are unsure of who a good role model might be for the student, we will ask a teacher.)
- **ELL students:** For these students, one option is for one of the teachers to break off from whole group and help that particular student (or students). When they are working one-on-one, that particular teacher will be helping the student(s) understand the topics by answering any questions that they have or modeling more explicitly for that student. Another option, and something that we will work to include anyways, is using as many visuals as possible to accompany the vocabulary that we are using throughout our lesson. This will not only allow the students to be taking in the lesson auditorily, but visually, too. If the student seems as though they might work better if they were working more with a peer, rather than a Luther teacher (that they might not be very comfortable). It will take some work for us to pay attention and see what student(s) the ELL student tends to hang around, as this would be a good partner for him/her.
- **Autism:** Making sure that we are not only being clear in what it is that we are saying, but also using any necessary visuals or materials to engage the student in the lesson will be helpful for a student with Autism. We will have the vocabulary terms written out on cards/pieces of paper to serve as a visual reminder and cue of the terms from the lesson.
- **Blind:** For students who have no sight (or trouble seeing), we would encourage them to feel the tools to get a sense of what they are, with the aid of someone else. Instead of having the draw/write about what they found, we will have them verbally share about what they heard or felt, potentially giving another insight into something that the rest of them might have overlooked. [If there is a para/available teacher, we would have the teacher work with the student to write/draw for the,

allowing them to still reflect upon what they learned. Instead of writing/drawing about the insects that they saw, they might instead draw/write about the tool that they felt/explored with their touch.]

Materials:

- D-Net (one for teacher to collect the insects)
- Buckets/containers
 - One 5-gallon bucket
 - White dish buckets - enough for one bucket per group (we used 7)
- Featherweight forescepts
- Eyedroppers
- Identification guides [[here](#)]
- Insect drawing page [[here](#)]
- Magnification glasses
- Vocab Cards/Posters/Written on the board [[here](#)]
- Forescepts

5E Lesson Plan - Procedure

Engagement → Exploration → Explanation → Elaboration → Evaluation

ENGAGEMENT [Describe how the teacher will capture students' interest. What kind of questions should the students ask themselves after the engagement?]

Students will be gathered on the floor near the teachers at this point in time.

1. We will start by asking the students questions about what they know about water, water quality, and where their water comes from
 - a. Questions:
 - i. What do you know about water quality?
 - ii. How do you know where your water comes from?
 - iii. How do you know the water you use to drink or bathe is clean?
 - b. What is water quality?
 - i. Pollution of water
 - ii. Color of water
 - iii. Insects within water
2. Defining vocabulary
 - a. Macroinvertebrate → visible to the eye, animal without a backbone
 - b. Naiad → the developmental stage of hemimetabolous insects before they become an adult. Naiads are the water based “teenagers” of insects.
 - c. Insects → a small animal (arthropod) that has three “tagma” (head, thorax, abdomen), six legs, antennae, and generally one or two pairs of wings.
 - d. Tagma → sections of a body connected by joints found most commonly on animals in the phylum Arthropoda

SAFETY

- Before allowing the students to go off on their own and work with their groups and buckets, we will go over the tools and the (safety) expectations.
 - We will introduce them to each of the tools (petri dishes, eyedroppers, featherweight forceps, identification guides) and remind them of how to (and how not to use) each of them. The teacher will be sure to mention that the tools need to be used gently and respectfully so no harm comes to the insects.
 - We will talk about how the water that is in each of their buckets needs to stay in the bucket, unless a teacher helps/tells them to do otherwise.
- No carrying anything with water in it. If it needs to be moved for whatever reason, ask a teacher to help you. We don't want any spills!
 - Keep all the water and tools on the tarps/tables.
- The students will be instructed to put water into their smaller dishes before moving insects from

the bucket.

EXPLORATION [Describe what hands-on/minds-on activities students will be doing. List “big idea” conceptual questions the teacher will use to encourage and/or focus students’ exploration.]

» All teachers will be walking around, checking in with groups, to see what/talk to each of the students «

1. Students will break off into six to seven groups. [This will be dependent upon how many buckets we will have access to.] Each “station” (each station includes: bucket with water, magnifying glass, forceps, eye dropper, smaller dishes to put the insects that find into, and two identification guides) [\[here\]](#)
 - a. Within each group: Prior to allowing the students to go off on their own and begin looking in their buckets, each teacher will go over what is at each station that the students have access to (and are encouraged to use)
 - b. Then, for the next 10–15 minutes, the students will be able to explore their station’s bucket, pulling out anything that they find that they think might be important to the water quality, placing whatever they find into the smaller dishes. The teachers will be walking around, checking in with groups, helping ensure safety is being enforced (specifically seeing if they have tried using the identification guides at all yet; and helping them with their use as needed).

EXPLANATION [Student explanations should precede introduction of terms of explanations by teacher. What question of techniques will the teacher use to help students connect their exploration to the concept under examination? List higher order thinking questions which teachers will use to elicit student explanations and help them to justify their explanations.]

- What do you know about _____ (insect)? Have you seen it elsewhere?
- If you’ve never seen this macroinvertebrate before, what can you do to identify it?
- How do these two compare? What is different about them? [When looking at two macroinvertebrates that have been found in the bucket.]
- If you had to describe _____ (the insect that they have found) to someone who has never seen it before, how would you do it? [i.e. colors, textures, size, smell, etc.]
- Which insects did you find that are “good tells” to determine if the water is polluted?
- Why is it important to know water quality when on a farm?
- Why would it have been important for Norman Borlaug to monitor water quality?

ELABORATION [Describe how students will develop a more sophisticated understanding of the concept(s). What vocabulary will be introduced and how will it connect to students’ observations? How is this knowledge applied in our daily lives?]

1. After the students have had time to explore at their stations, the teachers will call the group back together. The students will be instructed to leave whatever they found at their stations, at the table/near the bucket that it came from, and to come gather near the teachers.
 - a. If we are in the classroom, this will be done by turning the lights off, to get the students attention.
 - b. If we are elsewhere, we will use the “If you can hear me clap once...twice...etc.” method of getting their attention.
2. Once the students have gathered in the front of the room, the teachers will prompt the students using “So what did we find?” This will allow the students the chance to take that question in any direction they feel fits.
 - a. The students may choose to talk about what they saw (which insects, etc.)
 - b. They might also choose to talk about whether the insects that they found led them to believe that the water quality of the water was good or not.

3. The teachers will ask the students if they found anything in the water that they had not already covered. If so, the teacher will walk to that particular group's station in order to carry the dish with the insect in it back to the front (to prevent any opportunities for spilling).
4. The teacher will then hand out a worksheet (that will be used as an exit ticket) [\[here\]](#) to the students. On this worksheet, there are two sections. The students will select one of the insects in their bucket to focus on. They will draw a diagram of the insect and then write a description of the insect on the other side. Prior to the exploration in the buckets, the students will be instructed to use the identification guides at their table to identify which insects they are seeing, and use that to share out with the whole class at the end of the lesson.

EVALUATION [How will students demonstrate that they have achieved the lesson objective? This should be embedded throughout the lesson as well as at the end of the lesson.]

1. Students will be able to state which (common name) insects are good tells of water quality.
 - a. They will complete step #3 from the above section as an "exit ticket," further explaining one particular insect that they saw/learned about.
2. Students will complete their exit ticket (drawing and describing one insect that they saw in their bucket at any point throughout their exploration time during the lesson). If time allows they will share out with their peers about what they found (if time is cut short, the teacher will just ask in general, by having students raise their hands, checking in to see how many people found particular insects.
 - a. They will hand this to the teacher as they are walking out the door on their way to the next station.

To reset for the next group...

- *While one teacher is going to pick up the next class, the other two teachers will dump the dishes from the previous groups back into the buckets. They will clean up any spills, and tidy things up before the next group comes.*