| **Water Dawgs Lesson Plan**  **Topic: Stream Habitat Assessments**  **Learning Module #4** | | | |
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| **Lesson Objectives(s):** | | * SWBAT define: riffle, run, pool, thalweg, point bars, substrate, channel sinuosity, bank-cutting, riparian vegetation zone, buffer. * SWBAT describe advantages and disadvantages of using stream habitat assessments as a method of assessing stream ecosystem health. * SWBAT conduct stream habitat assessment of a campus stream. | |
| **Associated NGSS Standard(s):** | | N/A | |
| **Associated A.P. Environmental Science Standard(s):** | | N/A | |
| **Materials:** | | * PowerPoint * Printed Materials   + Lesson Worksheets (WS) – 1 copy per student   + Stream Habitat Assessment Guide – pp. 44-53 of Visual Stream Survey PDF (Handout 1 [H1]) – 1 copy per student   + Basic Visual Form – p. 24 of Visual Stream Survey PDF (Handout 1 [H1]) – 1 copy per student   + Stream Habitat Survey (Handout 2 [H2]) – 2 copies per student * Pencils * Post-its * Poster paper (1) * Clipboards * Optional: water boots and backpacks | |
| **Instructor to do before lesson:** | | * Print:   + Lesson Worksheets (WS) – 1 copy per student   + Stream Habitat Assessment Guide – pp. 44-53 of Visual Stream Survey PDF (Handout 1 [H1]) – 1 copy per student   + Basic Visual Form – p. 24 of Visual Stream Survey PDF (Handout 1 [H1]) – 1 copy per student   + Stream Habitat Survey (Handout 2 [H2]) – 2 copies per student * Look over PPT/Lesson plan * Walk to study stream from the classroom and time the walk. Make sure you know how much time to allot for each walk (20 min given in lesson). * Use one post-it sticky sheet to create list of “pros” and “cons” for using stream habitat assessments for students to stick their sticky notes to. | |
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| **Part of Lesson** | **Time** | **Duration** | **Lesson** |
| **ENGAGE** | 1:00 | 20 min | Opening Activity  \*\*Pass out Lesson Worksheets (WS).  \*\*Explain instructions for opening activity:  -Draw a circle around things they see in the image that could indicate is unhealthy/has poor water quality  -Draw a square around things they see in the image that could indicate that the stream is healthy/has better water quality  -Place a star by their favorite part of the stream  *🡪 You might want to show examples of these actions.*  ^^Allow students 5 minutes for activity  \*\*Ask students to share their choices with their partner. \*\*Ask students to discuss what stream they think is a healthier stream and why.  ^^Allow students 2-3 minutes to talk with their partners  \*\*Lead students in a discussion about the activity:  -Were there things in the image you didn’t recognize or know what they were?  -What are the things in each image you thought might indicate poor water quality? (What did you circle?)  -What are things in each image you thought might indicate healthy water quality? (What did you put a square around?)  -What was your favorite part of each stream? (Each student should share about this)  -Which do you think is the healthier stream and why?  ^^Allow 10 min for discussion |
| **EXPLORE** | 1:20 | 55 min | Stream Habitat Assessment Activity  \*\*Give brief overview about how we can understand some aspects of water quality through examining the stream habitat with our eyes. Water quality monitors usually do this with a standardized form.  \*\*Pass out copies of Stream Habitat Assessment Guide (p. 44-54 of Visual Stream Survey PDF [H1]), and one blank copy of Stream Habitat Survey [H2].  \*\*Split students into pairs (or let them choose).  \*Students will work in pairs using to the Stream Habitat Assessment Guide to perform a stream habitat assessment of a separate stream by evaluating images of that stream that are presented on the PowerPoint.  *🡪 We recommend that you go through each question of the assessment one-by-one on PowerPoint (allow ~5 min for each question of assessment); however, students will read document on their own and fill out habitat assessment surveys with their partners. After each slide (question), you would want to review the “answers.”*  *🡪Make sure to review that form are subjective and there is no “correct” answer.*  ^^5 min for instruction  ^^40-50 min for activity |
| **EXPLAIN** | 2:15 | 15 min | Pros and Cons of Habitat Assessments  \*Students will work with a partner to brainstorm at least one PRO and at least one CON of using a Stream Habitat Survey as a method to assess water quality. Feel free to come up with more than one!  -Pros: inexpensive, relatively quick, can gain important information from visual assessment  -Cons: subjective (varies from person to person), could be dangerous  *🡪 You could have students create this list in a variety of ways, but we suggest you pass out sticky notes and have students work with a partner to come up with 1+ pro and 1+ con, and write each down on a sticky note. Then, have students present pros and cons to class.*  *You can create a “Pro” and “Con” List using one large poster paper.*  ^^Allow ~5 minutes for students to work in pairs, and allow ~10 minutes for sharing out with class. |
| --BREAK | 2:30 | 15 min | BREAK  Instructor should encourage students to use the restroom, get water, etc. before field trip |
| **ELABORATE** | 2:45 | 20 min | \*\*Before leaving the classroom for the campus stream, make sure students gather needed supplies:   * Clipboards * Basic Visual form - p. 24 of Visual Stream Survey PDF (H1]) * Stream Habitat Survey (Handout 2 [H2]) * Pencil * Optional: Backpack * Optional: Wading boots   \*\*Make sure to also go over any safety precautions  \*\*Walk to campus stream from classroom |
|  | 3:05 | 45 min | Habitat Assessment of Campus Stream  \*\*Give a brief overview of the campus stream (Lily Branch) and lead students through Basic Visual Form.  ^^ Allow 10 minutes  \*\*Students will work together in pairs to fill out the Stream Habitat Survey of the campus stream.  ^^Allow 20 minutes    \*\*Discuss Stream Habitat Survey responses with the entire group.  ^^Allow 20 minutes |
|  | 3:50 | 20 min | BREAK  \*\*Walk back to classroom from campus stream  \*\*Give students time to use the restroom, get water, etc. |
| **EVALUATE** | 4:10 | 15 min | Closing Activity  \*\*Have students answer questions on their lesson worksheets (WS).  Question 1:Why can stream habitat assessments be useful in assessing stream health? (What is an advantage of using stream habitat assessments to assess stream health?)  Question 2: What is a disadvantage of using a stream habitat assessment to assess stream health?  ^^Allow 10 min. Collect responses and review after the lesson. |