

Author's Name: Chelsea Patrick
 Lesson Title: It's the Factors of Life: Abiotic and Biotic Factors of Biomes
 Grade Level: 7th Grade
 Essential Question: How can we use our understanding of abiotic and biotic factors to help with the sustainability of different species?

Lesson Foundations

Content Standards	7.LS.2 In any particular biome, the number, growth, and survival of organisms and populations depend on biotic and abiotic factors.		
Learning Objective(s)	1) SWBAT explain how different abiotic and biotic factors impact the Pacific Salmon. 2) SWBAT compare biomes of the Pacific Salmon to that of the Ohio Walleye.	Assessment(s)	1. Gallery Walk Handout 2. Brainstorm 3. Comparison Activity 4. Exit Ticket
Materials & Resources	Grouping Cards (squares of laminated colored construction paper), Got It! Laminated game cards, Gallery Walk Packet, Think-Pair-Share Handout, ChromeBooks, Notecards A Tale of Two Fisheries: http://origins.osu.edu/article/tale-two-fisheries-fishing-and-over-fishing-american-waters		

Instructional Procedures/Steps

Opening 10 Minutes	<p>Opener: Welcome and GOT IT! Game Review</p> <ol style="list-style-type: none"> As students enter the room, the instructor will hand out Grouping Cards at random. In this case, they are laminated pieces of different colored construction paper. The instructor will notify the students to sit at the table that is the same color as their grouping card and to pick up their It's the Factors of Life Handout from the bin at the front of class. Once class has started, the instructor will explain the GOT IT! Game: Each group has a GOT IT! Card in the middle of their table. After the question has been asked in full, students will raise their card. The first group to raise their card will be allowed to answer; correct answers get 1 point and incorrect answers will allow another team to steal. Arguing with the judge results in a loss of 1 point. Groups may not hold onto the card while on the table and may only place their hands on the card when the question has been fully asked and the group is ready to answer the question.
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	<ol style="list-style-type: none"> 4. Begin game; keep tally of the teams' scores on the board. Go to Question 1 on Slideshow and read out the question from the Instructor's List. Reveal answers on the next slide after question has been answered. <ol style="list-style-type: none"> a. What's the definition of a biome? b. Give three examples of a biome. c. What biomes are Pacific Salmon a part of? d. What's the definition of an abiotic factor? e. What are two examples of abiotic factors impact Ohio? f. What's the definition of a biotic factor? g. True or False: There are five indigenous salmon of the genus <i>Onorhynchus</i>, also known as Pacific Salmon. h. Bonus (+2 points): Name 3 of the five known indigenous salmon. <p>Agenda and LO's</p> <ol style="list-style-type: none"> 1. Have the team with the highest score from the review game to pick a representative to read out the agenda for the day on the PowerPoint. <ol style="list-style-type: none"> a. GOT IT! Review Game b. Gallery Walk c. Brainstorm d. Comparison Activity e. Exit Ticket 2. Have the team with the second and 3rd place teams to select a representative to read out the LO's from the PowerPoint.
<p>Instruction 35 Minutes</p>	<p>Gallery Walk</p> <ol style="list-style-type: none"> 1. There are five posters around the room with different images depicting factors that impact the Pacific Salmon. Students will rotate around to the different posters with 4 minutes at each to answer the questions in their handout. 2. Show the Gallery Walk PowerPoint slide and read over the rules and expectations. 3. Send students to their first poster; start the timer when ready for the first round. 4. As students are at the different posters, float and ask questions as needed. Examples of questions are listed below: <ol style="list-style-type: none"> a. Poster 1 (Blue): Kenai Brown Bear with a fresh salmon catch (biotic) <ol style="list-style-type: none"> i. What evidence did you gather that this was a biotic factor? ii. What would happen to the brown bear population if the salmon population decreased? Increased?

- iii. What would happen to the salmon population if the bear population increased? Decreased?
 - iv. Is conservation of the brown bear or the salmon population important? Why or why not?
 - b. Poster 2 (Red): Grand Coulee Hydroelectric Dam (abiotic)
 - i. What evidence is there that this is an abiotic factor?
 - ii. Do you think the positive of the hydroelectric dam outweigh the negative impact it has on the salmon population?
 - iii. How might this dam impact the biome/ecosystem as a whole?
 - c. Poster 3 (Green) Clearcut logging (biotic)
 - i. What happens to waterways when excessive logging occurs?
 - ii. If there were an abundance of trees along this waterway, how would it impact the salmon? The biome/ecosystem as a whole?
 - d. Poster 4 (Orange) Pollution from urbanization (abiotic)
 - i. Is it possible for urbanization to never produce pollution? Why or why not?
 - ii. How does pollution stem from urbanization?
 - iii. Are there any types of urban pollution that you contribute to? Can you think of ways to reduce that contribution?
 - e. Poster 5 (Purple) Commercial Fishing (biotic)
 - i. Several laws have been implemented to limit how much salmon can be fished commercially; how does this impact the salmon population?
 - ii. What would happen if these laws were no longer in place?
 - iii. Hatcheries exist to replenish the depleted salmon population; what are the pros and cons of having hatcheries?
5. Once the last poster has been visited, have students return to their original group table. Have two students hand out the Think-Pair-Share Handout.

Brainstorm

1. Draw two brainstorm bubbles on the board. Pose the following question for students to think about with the people at their table:
 - a. Brainstorm any additional factors that might impact the Pacific Salmon and explain what would happen to the population. (Left Bubble)
 - b. Which of the factors you have brainstormed or saw in the gallery walk might also be a factor of native Ohio Walleye? (Right Bubble)
2. Allow students to work in their groups to brainstorm answers. Have students put any answers they come up with on a notecard (placed in a stack on their tables) and tape to the board in the appropriate bubble.
3. As students come up with their notecards, organize them by similar idea.



	<p>4. After about 3 minutes, have the students finish their last notecard. Then begin to discuss the similar ideas the groups came up with to lead into the comparison activity.</p> <p>Comparison Activity</p> <ol style="list-style-type: none"> 1. Have two students hand out the Comparison Graphic Organizer and two students hand out Chromebooks to each student. 2. Have students access the following sites with information about Walleye to help them fill out their graphic organizers. <ol style="list-style-type: none"> a. https://ohiohistorycentral.org/w/Walleye b. http://wildlife.ohiodnr.gov/fishing/fishing-tips-by-species/walleye#tabr1 <ol style="list-style-type: none"> i. For this site, there are tabs labelled “Tips” and “Seasonal Fishing Approaches” that contain helpful information about how factors could impact Walleye. 3. Allow students to work on their graphic organizer. They may work together or individually. 4. Questions to ask while students work: <ol style="list-style-type: none"> a. While the websites don’t give exact factors that impact Walleye, how can you go about discovering factors? b. You found that temperature impacts Walleye and their migration patterns; do you think temperature could impact Salmon too? How could you find out? c. Which factors negatively impacted Salmon or Walleye? Which ones positively impacted Salmon or Walleye? d. How might you be able to change a factor from negatively impacting a population to positively impacting it?
<p>Closure 5 Minutes</p>	<p>Closing Time – Exit Ticket</p> <ol style="list-style-type: none"> 1. Instruct students to complete the exit ticket on the back of their graphic organizer handout. 2. Have students who finish help collect papers and put back ChromeBooks. 3. Explain to students that tomorrow they will use their understandings of different factors to help create a sustainability plan for either the Pacific Salmon or the Walleye with their group.
<p>Accommodations/ Enrichment</p>	<ol style="list-style-type: none"> 1. Different colors may be substituted depending on those with visual accommodations 2. Different comparison graphic organizers can be used to accommodate different styles 3. If timing permits, the Brainstorming activity could be turned into a Think-Pair-Share

References:

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