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Culturally Relevant Pedagogy in the STEM Classroom
Assignment: Lesson and Assessment

Lesson Rationale

In kindergarten, the NGSS focuses specifically on three main ideas. These ideas include Earth's Systems (weather), Motion and Stability (push and pull) and Earth and Human Activity/From Molecule to Organisms (how living things survive and adapt). For the purpose of this lesson, I will be focusing on the standard [K-ESS3-1 Earth and Human Activity](#): Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live. In introducing this idea to young children, I use life cycles as a way to explain this NGSS concept in a way that is engaging and connects our lives to the world around us.

Having already completed the monarch butterfly life cycle and learning about what this insect needs to survive and why it migrates, at this point in the year I have moved on to learning about apples and apple trees, another living thing that connects to all of my students. We are all able to discuss what an apple is and our experiences with apple picking at the orchards. To jump start this curriculum, we take a field trip to our local apple orchard to learn about what apples need to grow. The children will learn about what apple trees need to live and how they are able to grow in different locations around the world, as well as how an apple tree is living but a picked apple is not.

The essential questions for this lesson will be: What do apple trees need to survive? What makes an appropriate habitat for apples? The goals will include connecting the monarch butterfly life cycle to that of an apple tree, and what identifies both as being "living". The

children will know that apple trees need the same essential components (air, water, sunlight, and the right climate) to survive.

Background Information

I have 18 children in my kindergarten class, half identify as female and half identify as male. All of my children are white except for one, who is bi racial. One of my children has two mothers, while another's mother is from the Ukraine and speaks to him in two languages. I have one child who has experienced severe trauma, and though was adopted by his aunt at the age of two or three, has the brain function of a child still at that age. He has spent three years in preschool, and thus is my oldest student, and will turn seven this year. He is supported by his own paraprofessional. Another one of my children, a female, also experienced trauma as her mother admits to using drugs before she knew she was pregnant, and then again after the child was born. The child and her brother were removed from the home due to drug usage and unsafe behaviors. She is now back with her mother in a stable environment, although her mother recently left her boyfriend who the child considers "dad". Dad is still involved in the child's life and often picks her up from school.

Of my 18 children, three are only children, and three are younger with much older, teen age siblings. Five of my children are the older sibling, and seven are younger with a more typical age spread. One of the younger siblings that I currently have is often late for school or absent, and though for a while his father was not living with them he is now back in the home. Of the rest of my class, 14 of my children have parents that are still married, and though three have biological fathers that are not involved in their lives, they have other positive male role models that they consider "dad".

Highlighted Multicultural Components

In thinking about the cultural needs of my students, it is easy to assume that they have all visited an apple orchard to go picking with family or that they eat apples or apple products at home. In knowing that my students come from a diverse background in terms of family structures, I cannot assume that they have had this experience. In order to make sure we begin this curriculum on a level playing field we kick off our apple study with a trip to the orchard. This is to ensure that whether or not the children have had the opportunity to go apple picking and learn about how apples grow, I will know that they all have this experience before we start, as well as learn the same information as each other from one tour guide. Once we have had this trip we discuss what we did and learned at the orchard including making cider with a cider press, learning how apples grow, and why bees are extremely important in the growth and well being of the apple tree. Afterwards we bring a number of apples back to our classroom. We make different things using our apples including apple sauce, and try apple cider and apple juice. The children have the chance to share their opinions about these foods and how they are made, and what would be the difference between cider and juice, as well as apple sauce made with peels and without. Before we explore the essential questions for this lesson plan, the class has the opportunity to experience, observe, and navigate the basic information surrounding apples and apple trees, with the focus on the habitat and location of apples and what they need to survive being the culminating project.

Technology Component

At my school I am lucky enough to have a Technology Specialist to help with any project. For our monarch butterfly study, she helped each child record a video to share with their family on a web platform entitled See Saw. This video was a culmination of all of the learning that took place during this curriculum and a way for the children to share their final project with their family. This year we have been piloting See Saw, which is a platform to share content with families and to be able to set goals for the students. This year I am using See Saw to photograph the work of my children, as well as to create an online video portfolio of what they are learning. At the end of this study, just as with the monarch butterfly, the children will each have the chance to share their knowledge with their families through a recording.

I also intend to use technology in order to share with the class the different locations of apple tree habitats, which will tie into our mapping unit later on in the school year. Since we are unable to travel to all of these places, we can view them online together and trace their location on our classroom map.

Lesson Plan

| Lesson Section/Time | Teacher and Student Activities (Include formative assessment) | Key Questions and Connections to NGSS |
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| <p>Engage (Part 1)</p> <p>Day 1</p> <p>30 minutes (more time allowed if needed for discussion and group work)</p> | <p>Start off the lesson by having the children gather in a group. Ask the question: “What is a habitat?” Allow time for children to turn and talk to each other, and then to share out their ideas. Record their ideas on a chart paper without correcting any misconceptions (pre-assessing any prior knowledge). Use this later to refer to at the end of the lesson to evaluate what content has been learned. Follow with “What is a habitat for an apple tree?”</p> <p>After recording all answers to the question, read a book on apple trees. <u>Apples</u> or <u>The Season of Arnold’s Apple Tree</u> both by Gail Gibbons are two good books to start with as they are level appropriate for kindergarten, non-fiction, and short.</p> <p>At the end of the book, do a movement activity with the children to get them up – a song or game to move bodies in order to be able to sit back down and complete the discussion.</p> <p>After the movement break ask the children: Do all living things need a habitat? Record answers without correcting any misconceptions (pre-assessing any prior knowledge).</p> <p>Ask the question: What is your habitat?</p> <p>Give children time to illustrate the habitat that they live in (used as a formative assessment).</p> <p>The second lesson will re gather the students on the rug. Read another non-fiction book about apples – ask the question: What does an apple tree need to survive? Record answers – this time facilitate the discussion and ask question based on answers – for example, if a child says something such as “apple juice”, direct the learning towards why an apple tree does not need apple juice to survive.</p> <p>After this discussion, take a movement break.</p> | <p>What is a Habitat?</p> <p>Do all living things need a habitat?</p> <p>What is your habitat?</p> |

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| <p>Engage (Part 2)</p> <p>Day 2</p> <p>30 minutes</p> | <p>Re gather on the rug and put children into groups of no more than 4. Ask each group to choose an apple tree from a group of photographs on the floor. The photographs will depict different kinds of apple trees from different locations around the world.</p> <p>Allow time for each group to study the details of their chosen apple tree, and then draw and label a picture as a group. They should include in the label what variety of apple grows on their tree (used as a formative assessment).</p> | <p>What does an apple tree need in a habitat to survive?</p> |
| <p>Explore</p> <p>Day 3</p> <p>60-75+ minutes</p> | <p>Begin today’s lesson by reviewing the expectations for working in groups and using multiple materials. Have children sit with their apple groups and ask the question: How will you create a habitat for your apple tree? Allow time for discussion and for groups to design, draw, and label a plan. Discuss the purpose of creating a design and why people like architects and engineers use designs as guides for building.</p> <p>When groups are finished they are to come to the meeting area and sit as a group with their plan. Allow for at most 10 minutes total for each group to share their tree, and where their tree is located. As each group talks, list on chart paper the things that are needed for each habitat – make the connection that every tree needs the same components to survive. When groups are finished, use time to have the class compare the information. For example, apples grow in all 50 states and in many countries</p> | <p>How will you create a habitat for your apple tree?</p> <p>What components will you include to make sure it is able to survive?</p> |

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| | <p>around the world.</p> <p>When finished, get ready have groups go to their tables to create their apple tree and its habitat.</p> <p>At the end of the time, do a “gallery walk” – this is where the class walks around to each habitat to observe and listen as each group describes their habitat and the elements used in building. In a gallery walk the children can look but they don’t touch. There is also time to ask questions.</p> <p>Photograph the finished designs to share for the next lesson.</p> | |
| <p>Explain Day 4 15 minutes</p> | <p>For this component children have the opportunity to look at the photographs of each final habitat and critique the constructions. Each group should have a chance to talk about their tree and how they included the survival components in their design.</p> <p>Ask the question: What did you learn about habitats for apple trees? Record answers on chart paper to refer to during the “evaluate” lesson.</p> | <p>Did your original plan match your final construction? If not, what was your thinking in changing the original design?</p> <p>What have you learned about apple trees and what they need to survive?</p> |

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| <p>Elaborate</p> <p>Day 5</p> <p>15+ minutes</p> | <p>After having time to look at the apple trees, is there anything that each group needs to add or take away? Allow time to re visit the trees to see if any changes need to be made. If changes need to be made give groups extended time to adjust their creation.</p> | <p>Will you change anything about your tree and its habitat?</p> |
| <p>Evaluate</p> <p>Day 6</p> | <p>On the final day of this series of lessons, begin by re visiting the answers gathered on day one and day four to all questions asked. Focus on day one, and the question, “What is a habitat?” Read the answers – did any knowledge change? What has been learned? Do all living things need a habitat? Do all living</p> | <p>How is the habitat of an apple tree different than that of a human? habitat?</p> |

things need to same components to survive?

After discussing the answers and comparing information from day one, day four, and today, have the children go to write and draw how their own habitat differs from that of their apple tree.

This will be information as the summative assessment.