Amanda Tornabene

TITLE: Math in Our Environment

GRADE LEVEL: Kindergarten

LENGTH OF TIME: 8 45-50 minute class periods

STATEMENT OF PURPOSE:

Students will learn, apply, and practice mathematical concepts of counting, cardinality, addition, subtracting, and measuring, through the integration of environmental science concepts. Students will study and use trees, particularly tree growth, in order to better understand climate change. Students will have a clearer, fuller understanding of mathematics concepts by using them in conjunction with the science material.

ESSENTIAL QUESTIONS:

1) How can we count numbers?
2) How can we use numbers to add and subtract?
3) What can trees tell us about climate change?
    a) What do tree rings tell us about climate change?
    b) What do tree rings tell us about the trees themselves?
4) What can birds tell us about climate change? (i.e. What are they doing?)
5) Why is reusing paper important?
6) How can we reuse paper?

OBJECTIVES:

Students will...

- ★ Count tree rings on wood slices
- ★ Relate the tree rings counted to the age of the tree the wood slice came from
- ★ Record and compare their tree slice ages
- ★ Determine numbers/ages that are greater than, less than, or equal to those of their peers
- ★ Solve simple addition and subtraction word problems based on trees/tree rings
- ★ Solve simple addition and subtraction word problems based on climate change and bird movement/relocation
- ★ Determine climate through observation of tree rings
- ★ Determine ways to reuse paper

STANDARDS:

MATHEMATICS -

CCSS.MATH.CONTENT.K.CC.A.1 Count to 100 by ones and by tens.

CCSS.MATH.CONTENT.K.CC.A.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

CCSS.MATH.CONTENT.K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

CCSS.MATH.CONTENT.K.CC.B.4.A When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.

CCSS.MATH.CONTENT.K.CC.B.4.B Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.

CCSS.MATH.CONTENT.K.CC.B.4.C Understand that each successive number name refers to a quantity that is one larger.

CCSS.MATH.CONTENT.K.CC.C.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.1

CCSS.MATH.CONTENT.K.OA.A.1 Represent addition and subtraction with objects, fingers, mental images, drawings1, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.

CCSS.MATH.CONTENT.K.OA.A.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.

SCIENCE -

K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.

K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.
[Clarification Statement: Examples of relationships could include that deer eat buds and

leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.]

K-ESS3-3 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment. [Clarification Statement: Examples of human impact on the land could include reusing paper and recycling cans and bottles.]

5E Model	5E Objectives
Engage	1 DAY = Tree and climate information introduced to students; Students remain at their desks for showing of NASA pages and related video; NASA page on 'What Trees Can Tell Us About Climate Change.' is presented to students first, followed by the Youtube video on trees (*4:49-5:55)*; Students will engage in a 'turn and talk' after viewing the Youtube video to discuss what they have learned from both resources **Resources** What Can Trees Tell Us About Climate Change? (n.d.). Retrieved from https://climatekids.nasa.gov/tree-rings/ How Do Trees Grow? (2019). Retrieved from https://www.youtube.com/watch?v=SWPqQxz-7gg

Explore	1 DAY = Wood slices given out individually; Students count number of tree rings on their wood slice (individually); Students record the number of tree rings they've counted in their math journals; Students complete tree ring counting worksheet **Standards** CCSS.MATH.CONTENT.K.CC.A.1 Count to 100 by ones and by tens. CCSS.MATH.CONTENT.K.CC.A.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects). CCSS.MATH.CONTENT.K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality. CCSS.MATH.CONTENT.K.CC.B.4.A When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. CCSS.MATH.CONTENT.K.CC.B.4.B Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted. CCSS.MATH.CONTENT.K.CC.B.4.C Understand that each successive number name refers to a quantity that is one larger. **Materials** ○ (Craft) Wood slices **Resources** Printables. (n.d.). Retrieved from https://gumbootkids.com/printables/

Explain	1 DAY = Return wood slices to students; Students refer to their recorded number of tree rings to add to a class chart; Students (with me), as a class, determine number of tree rings that are greater than, less than, or equal to one another; Students come up to the board to solve addition and subtraction word problems using tree rings as the object/manipulative; Students view NASA resource page on birds and climate change; Students come up to the board to solve addition and subtraction word problems based on birds relocating. **Standards** CCSS.MATH.CONTENT.K.CC.C.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.1 CCSS.MATH.CONTENT.K.OA.A.1 Represent addition and subtraction with objects, fingers, mental images, drawings1, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. CCSS.MATH.CONTENT.K.OA.A.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem. **Materials** ○ (Craft) Wood slices **Resources** Birds and climate change. (n.d.). Retrieved from https://climatekids.nasa.gov/extreme-weather-birds/
Elaborate	1 DAY = Students observe the width and color(s) of the tree rings to determine climate; Students explain how/why tree rings are wider during what would have been wet, warm years, and thinner during what would have been dry, cold years; Students determine and explain how/why trees grow more during the wet, warm years and less during the dry, cold years; Students acknowledge that sunlight and water are both necessary for tree growth; Students identify the connection between trees, other plants, animal and human life and our common need(s) for water and sunlight. Note: NASA resource page will be left on the smartboard for students to reference.

	Standards K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive. K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. [Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.] **Materials** ○ (Craft) Wood slices **Resources** What Can Trees Tell Us About Climate Change? (n.d.). Retrieved from https://climatekids.nasa.gov/tree-rings/
Evaluate	1 DAY = Students watch Youtube video on how paper is recycled; Students engage in class discussion (with me) to list on the wipe-off board why recycling paper is important for the preservation of trees AND for climate/climate change; Students brainstorm and determine ways to reuse paper in order to limit the number of trees cut down annually (for the production of paper); Students present their ideas and explanations via writing and drawing and submit their papers to me. **Standards** K-ESS3-3 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment. [Clarification Statement: Examples of human impact on the land could include reusing paper and recycling cans and bottles.] **Resources** What Can How is Paper Recycled? Waste Paper Recycling Process. (2018). Retrieved from https://www.youtube.com/watch?v=X-N5jb-fWTs