EE.HS-ESS3-3

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Target Level	**Precursor Level**	**Initial Level**	**Accessibility Considerations for Science and Engineering Practice: Using Mathematics and Computational Thinking**
Analyze data to determine the effects of a conservation strategy on the level of a natural resource.	Organize data on the effects of conservation strategies (e.g., using less energy, using rechargeable batteries, recycling or repurposing materials).	Gather data on the effects of a local (e.g., class or school-wide) conservation strategy.	• Access mathematical information through concrete pictures and/or tactile representations/objects. • Represent relationships between variables with diagrams showing only the most relevant information. • Use templates or organizers to organize data in meaningful ways.

Activity Title	**Estimated Classroom Time Needed**	**Essential Questions**
Conserving Natural Resources	One session (recycling program can be ongoing)	• Can the student determine whether a conservation strategy was effective? • Can the student recognize the effect of conservation on our natural resources?

Suggested Materials

- Pictures or tactile representations of natural resources (e.g., wind, soil, water, wood, coal, oil, sunshine)
- Recycled materials
- Data about local recycling rates that student can organize into a table or tactile graph

Engage Students in the Activity

Have a discussion about the importance of recycling. Build on prior knowledge about natural resources (e.g., water, wood, metal, coal)—materials in the environment that humans use for many things. Natural resources are used for electricity, transportation, and many objects. Some resources are limited, and we cannot get more of them (i.e., not renewable in 100 years), like oil. This is why it is important to not be wasteful of natural resources. Talk about how students recycle and how the community recycles to conserve natural resources. It might be helpful to compare the terms *renewable* and *recyclable*. Recycling, while using recovered resources, does not make more of a resource.

Use a sample video to build or link to prior knowledge on natural resources:
"Natural Resources," https://www.brainpop.com/science/energy/naturalresources/
"Resources: Welcome to the Neighborhood," https://www.youtube.com/watch?v=8LfD_EKze2M
"Science Video for Kids: Natural Resources of the Earth," https://www.youtube.com/watch?v=Qw6uXh9yM54

Activity Description

In this activity, students will collect data about materials recycled in local areas.

Define (throughout the activity): recycle, natural resources

Step 1: Collect recyclable materials for the classroom or the school (e.g., paper, plastic water bottles). The students will collect data (e.g., sort into categories and count items) about the amount and type of objects being recycled. Students can sort the information in multiple ways (type of item, resource being conserved). Once sorted, students can identify which categories have the most and least amounts. An extension of this step is to to create a table or a tactile graph of the data.

Step 2: Present students with data about local recycling. Information can be taken from government resources or can be simulated by the teacher. For example, the table includes data regarding recycling in Sedgwick County, Kansas. Here, recycling paper has increased over a 3-year period. Provide students with data points and ask them to organize the information (2012, 25,000 tons; 2013, 27,000 tons; 2014, 32,000 tons) in a table or tactile graph.

Sedgwick Recycling	
Year	**Tons of Paper**
2012	25,000
2013	27,000
2014	32,000

What do you think of this activity? Let us know: **http://tinyurl.com/gnjlu42**

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Step 3: After students have organized the information in a table or tactile graph, ask questions about the pattern of the data. Some example questions could include: Which year had the greatest (or least) amount of paper recycled? What happened the second year of collection (more or less was recycled)? Talk with students about how the data relate to the conservation of natural resources. In this example, more recycling of paper helped save more trees, a natural resource. (To elaborate on the link between recycling paper and saving trees, you can investigate how much of a natural resource is used to make something. For example, 12 trees are used to produce one ton of paper. In 2012, 25,000 tons of paper was recycled. Therefore, more than 2,000 trees were saved in 2012). You can also talk to students about the impact of recycling less—more natural resources would have to be used for the things we make.

Ideas for Differentiating the Activity		
At the Target level:	***At the Precursor level:***	***At the Initial level:***
Students will use data to determine the effects of a conservation strategy on the level of a natural resource.	Students will organize data in a table or tactile graph.	Students will gather data (count) from real-word conservation strategies (e.g., recycling).
Checks for Understanding		
At the Target level, students will:	***At the Precursor level, students will:***	***At the Initial level, students will:***
Accurately identify patterns in data regarding a conservation strategy and make connections between the data and levels of natural resource (e.g., recognize patterns in recycling increasing and understanding that more recycling saves trees from being cut down to make paper).	Accurately organize or identify data in a table or tactile graph when given a prompt.	Accurately count the number of objects and identify groups of objects with the greatest and fewest numbers.