**Lesson Plan-**

**Using data to show compassion for the Earth**

**Cultural Relevance**- **Oceti Sakowin Essential Understandings**

OSEU 1: Land and Environment

Standard 1.4 – Identify and explain contemporary environmental issues facing the Oceti Sakowin lands.

Standard 1.5 – Examine strategies the tribal government and other tribal leaders are taking to improve lands and natural gifts of Oceti Sakowin people.

**Lakota Virtues**: Respect and Compassion

**Lakota Story-** The Mysterious Butte- respect; The Woman Who Lived with the Wolves- compassion

Students can also read The Lakota Way by Joseph Marshall III, Respect and Compassion stories.

**Lesson Objectives**- Students will learn their impact on the earth through the collection of data.

Students will be able to interpret and analyze data.

Students will be able to demonstrate this data through graphical representation.

Students will be able to demonstrate compassion and respect for the earth through their graphical representations.

Students will construct an argument using data.

**Standard:**

7.SP.A Use random sampling to draw inferences about a population.

1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.

**Standards for review**

7.G.B Solve real-life and mathematical problems involving angle measure, area, surface area and volume.

6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

**Math Practices**

Construct viable arguments and critique the reasoning of others.

Students will use data to defend their reasoning in a sustainability plan.

Model with mathematics.

Students will construct their own data representation.

**Principles of Learning-**

**Context and Content Relationships-**

This principle is grounded in storytelling. Throughout this lesson, students are asked to analyze and interpret stories and then to tell stories through data. At the end of most days, students are asked to share what they learned for the day orally to the class.

**Recognition of Personal Sovereignty-**

At the close of the lesson students will create their own data display (this can also be done in pairs). Students have their own choice in displaying their data to show understanding.

**Community-Oriented Learning-**

Throughout this lesson students are asked to work in small teams or with a partner. In this lesson, we need the experience of everyone in the room to for success. Students are asked to share investigations and what they have learned to benefit all learners in the class.

**Length of Activity:** Five days (45-50 minute class periods)

**Day 1: Core Problems/Outline of Lesson**

Hook/Lesson Introduction- Compassion story- The Woman Who Lived with the Wolves- Turn and talk

Engage- Data Talk- Notice and wonder

Explore- Data exploration

Explain- write the data story from the data exploration

Closure- explain and share assigned data story

**Day 2: Core Problems/Outline of Lesson**

Hook – Choice:

* 1. Respect story- The Mysterious Butte- Turn and talk OR
  2. Data Talk- Notice and wonder

Engage- West 605- Taken for Granted- Notice and Wonder (act 1 video)

Explore- How **much** trash do you throw away? What is the volume of trash you throw away at lunch?

Explain- Represent the volume of class trash.

Closure- How much trash do we throw away as a school?

Engage- How much trash do we throw away as a school? Turn and talk- how can we find this?

Explore- How many trash bins does our school fill at lunch in a day?

What information do you need to know?

Explain/Closure- students will display their thinking on posters.

**Day 3: Core Problems/Outline of Lesson**

Hook- How much trash do we throw away- finding average

Engage- West 605- Taken for Granted- Notice and Wonder (act 2)

Explore- Your task: Investigate how much trash our school creates at lunch in volume and weight in one week.

Explain- Students will create a poster to demonstrate their predictions.

Closure- students will share their posters.

**Day 4 and Day 5: Core Problems/Outline of Lesson- Display the Data**

*This lesson may take more than one day- provide students with extra time on Day 5 to complete their data story and share their data display.*

Hook- What do we know about the trash in our school?

Engage- West 605- Taken for Granted- Notice and Wonder (act 3)—Now what?

Explore/Explain- Your task- display the data you collected this week to tell the story of our lunch trash.

Closure- Students will explain their data story to the class.

**Materials**

**Day 1:**

PowerPoint (slides Day 1) to include **compassion story, Recycling Data with data talk prompts**

**Data Talk Graphic Organizer-** The Countries Winning the Recycling Race

**Additional Compassion Stories (optional)**

**Data stories**- what is the data story?

**Graphic Organizer**- Data Story

**Day 2:**

PowerPoint (slides Day 2) to include **compassion story, Tik Tok Data talk, Act 1 video**

**Graphic Organizer-** Data Talk

**Graphic Organizer-** Notice and Wonder

**Building materials**

Rectangular prism materials to simulate trash.

Cereal boxes

Tissue boxes

Interlocking cubes (optional)

Rulers

**Class data table**

**Day 3:**

**PowerPoint** to include completed class data for students to find average; Act 2 video

**Student data** to make further predictions with guiding questions

11x17 paper for posters

Markers/colored pencils

**Day 4-5**

**PowerPoint** to include reflection questions, Act 3 video, and data story task

11x17 or 8 ½ x 11 paper for data story

Markers/colored pencils

**Suggested Lesson Activity- Day 1 Data Stories**

*Hook/Lesson Introduction- Compassion story- Turn and talk*

Provide students time to read the **compassion story** The Woman Who Lived with the Wolves. Have the students reflect on the prompt:

*What are the actions in this story that show compassion?*

Pair up with a classmate or table mate and share.

Select from a few students to share the actions they shared at their tables.

*Engage- Data Talk- Notice and wonder*

After student pairs have shared the actions that show compassion. Let them know that they will be thinking about actions that demonstrate compassion throughout the week.

Ask: What are some other actions that may demonstrate compassion?

Have students begin to generate a list of actions.

After a list is started, let students know they will build on this list throughout the week.

And say, we are now going to shift gears slightly to think about compassion towards our planet or the Earth.

Show students the **Country recycling data** from the Youcubed site.

Ask students, as you look at this data, what do you notice? What do you wonder? What are some questions that may have been asked to generate this data?

Provide time to privately reflect on these three questions for three minutes before asking them to share some of their responses.

On the board or poster paper record their responses.

Divide the board into three sections:

*Notice:*

*Wonder:*

*Questions Asked:*

**OR** record on three pieces of poster paper with the same headings**.**

After a list is generated, ask students if they feel recycling is an action that shows compassion?

Ask a few students to respond their thoughts.

*Explore- Data exploration*

Students will continue to explore data and how it is presented.

Let students know that data can be collected and demonstrated in a variety of ways.

Each group of students (groups of three or four is recommended) will explore a different data set.

From the data set they explore they will develop a list of questions that were asked to collect the data and *Explain*- *Write the data story*

As students collaborate to determine the questions asked to collect the data, remind them that their goal is to write the data story, and what they learned from their assigned data.

*Closure- Table share*

Leave 10-15 minutes at the end of class to allow teams of students to share their assigned data and the story their data told them.

**Suggested Lesson Activity- Day2 Volume of Trash**

*Hook/Lesson Introduction – Choice a: Respect story:* The Mysterious Butte- *Turn and talk*

Provide students time to read the Mysterious Butte and reflect on the prompt:

*What are the actions in this story that show respect?*

Pair up with a classmate or table mate and share.

Select from a few students to share the actions they shared at their tables.

*Hook/Lesson Introduction – Choice b: Data Talk- Notice and Wonder*

Show students the **TikTok data** from the Youcubed site.

Ask students, as you look at this data, what do you notice? What do you wonder? What are some questions that may have been asked to generate this data?

Provide time to privately reflect on these three questions for three minutes before asking them to share some of their responses.

Have students share their responses in tables and then ask for students to share with the whole class.

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Students will now begin to think about how much trash they throw away at lunch each day.

Show students the **Act 1 video.**

While students watch the video have students record what they notice and what they wonder. **(Notice and Wonder graphic organizer)**

Provide time to share what they notice and wonder.

Similar to day 1- record the student responses on the board or on chart paper.

Explore- How **much** trash do you throw away? What is the volume of trash you throw away at lunch?

Students will work in teams to “build their trash.”

Provide students with a few moments to record what they usually throw away at lunch. Students can share this at tables.

Then Ask students to build a model of the amount of trash they think they throw away at lunch each day. Students can build this model of their trash using rectangular boxes of varying sizes or interlocking cubes.

Their model should include their total trash to include food and trash.

After students have their team trash built ask them to find the **volume** of their trash.

*Catch and Release*- Students may need a reminder of finding the volume of rectangular prisms. Show them the image of the rectangular prism and ask them to discuss in teams how to find the volume.

Have students complete finding the volume of their trash

*Explain- Represent the volume of class trash.*

Have students share out the volume of their team trash volume.

Record this data on something students can use throughout the week. This could be in a class table on the board, in data software (like excel or sheets) or on a poster. Students will reference this data again.

*Closure- How much trash do we throw away as a school?*

Students will talk at tables to think about making predictions from the class data and share out as a class.

**Suggested Lesson Activity- Day 3 Making predictions**

**Plan ahead- The teacher will need to let students know how many total students are in the school.**

**If you would like you may tell students by grade level and/or also include teaching staff as part of the data.**

*Hook/Lesson Introduction- How much trash do we throw away- finding average*

*Engage- West 605- Taken for Granted- Notice and Wonder (act 2)*

*Explore- Your task: Investigate how much trash our school creates at lunch in volume and weight in one week.*

Students will first develop a plan to determine the information they need to explore this investigation further.

What information do you need to determine the amount of trash our school creates at lunch?

How can you use this information to predict how much trash is generated?

Students’ plans should include upscaling the information they know.

* Using the average volume of trash from their class, students **will need** the total number of students in the school to predict how much volume of trash is thrown away.
* Students **will need** the average weight of trash of a student to predict the total weight of trash.
* Students **will need** the volume of the lunchroom garbage can to determine how many cans are filled in a day and week. (*Volume of cylinders is an 8th grade math standard*)

Once the student plan is approved provide students with **trash exploration further information and questions**.

Students will work in teams to determine *A prediction of how much trash the school creates at lunch in volume and weight in one week.*

*Explain- Students will create a poster to demonstrate their predictions.*

Students will explain the math they used to scale up average volume and weight of trash. Students will explain how they determined the number of trash bags used.

*Closure- students will share their posters.*

**Suggested Lesson Activity- Day 4 and Day 5 Displaying Data**

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Description automatically generated*Hook- What do we know about the trash in our school?*

Students will respond to the reflection questions to think about how they can advocate for less trash at lunch.

*Engage-* Show students the whole West 605 Trash video. Notice and wonder

While they watch have them complete a Notice and Wonder. Also have them think about the jobs a sustainability coordinator does.

Provide students time to share what they notice and wonder at tables. Then ask students to talk at tables about the jobs a sustainability coordinator might do. Have then come up with a list of jobs.

Class share- have students share a few jobs they think a sustainability coordinator might do.

Explore/Explain- Your Task- display the data you collected this week to tell the story of our lunch trash.

Tell students that they will now play the role of a sustainability coordinator. Their role is to use the data they collected this week to convince their peers to throw away less trash. They need to display their data in a way that makes sense and convinces others to be more compassionate to the Earth.

It may be helpful for students to review the data stories they analyzed earlier in the week. They may be laid out in a common area for students to look through to get ideas of how they may display their data.

Students may choose to display volume data, weight data or both. Students may complete their data story independently or in pairs.

Students may also choose to expand their data further to show trash over the course of the school year.

Students will also have time in day 5 to finish their data story.

Closure- with about 30 minutes remaining on day 5 have students share their data story with the class.

**Team Discussion Protocols**

Orbit protocol: An orbit allows a space for all learners to share their thinking on a topic.

* Pose a prompt or question(s) that have multiple answers.
* Allow learners to write down responses with some individual think time.
* “Orbit” around the small group, allowing one person to speak at a time, using a talking stick to give ownership to the person speaking.
* After completing all orbit questions, invite learners to discuss which ideas and themes showed up most in the responses.

Talking Chip protocol: A talking chip conversation allows a space for all learners to share their thinking on a topic, one thought per chip. Different from an orbit, a talking chip conversation is more of a discussion and allows for students to add on more organically to something the may have just heard.

* Team members have an indicated amount of talking chips.
* Pose a prompt or questions that have multiple answers.
* Allow learners to write down responses with some individual think time.
* When prompted to begin discussion, any team member can begin the discussion, placing one of his/her chips in the center of the table.
* Any learner with a chip continues discussing, using his/her chip.
* When all chips are used, teammates each collect their chips and continue the discussion using their talking chips.

Dyad: A dyad provides learners with an indicated amount of time to share their thinking with a partner.

* Pose a prompt or question(s) that have multiple answers.
* Allow learners to write down responses with some individual think time.
* Ask learners to find a partner to share their responses with
* Tell learners who will be speaking first (examples may include: the person who woke up earliest, lives closest to the space, has the most siblings) Identify the first speaker.
* Person 1 has an indicated amount of time to share the responses to the posed prompt/question(s). While person 1 shares person 2 listens to understand and may not speak. This is not a conversation.
* After the indicated amount of time, partners switch roles. Person 2 shares their responses to the prompt/question(s), and person 1 will listen to understand.
* After the indicated amount of time for person 2 to speak has concluded, provide partners with an indicated amount of time to have an open conversation about the similarities or differences from what they shared.
* Ask learners to thank their partner ☺