

Rationale for the proposed unit

In 4th grade students are expected to learn how to read line plots in math. I plan to add this extra lessons to Topic 11 Represent and Interpret data on line plots. I will use data from <https://www.cia.gov/library/publications/resources/the-world-factbook/> about China, Japan, North Korea, South Korea, Mexico and the United States of America (students will have access to it on their Chromebooks) Countries that form part of the Pacific Basin (an area that we study in Social Studies). Students will have learned: Line plot, outlier. In second grade students recorded date on line plots using small whole numbers. In third grade students recorded data using inches and fractions. Now they will use their knowledge of place value and rounding to plot date on a number line.

Skill and content objectives

Overarching Understandings: Data can be represented in tables, graphs, and line plots. Collecting, organizing and analyzing data often supports answering mathematical questions about a situation.

4.NBT Number and operations in Base Ten

4.NBT.1 Recognize that in multi-digit whole numbers, a digit in one place represents ten times what it represents in the place to its right.

4.NBT.2 Read and write multi-digit whole numbers using ten base numerals, number names, and expanded form. Compare two multi-digit whole numbers based on meanings of the digits in each place, using >, =, or < symbols to record the results of comparisons.

4.NBT.3 Use place value understanding to round multi digit whole numbers to any place.

4.MD Measurement and Data

4.MD.B Represent and interpret data

	Day 1	Day 2	Day 3
	Read Line Plots	Make Line Plots	Use Line Plots to Solve problems
Objective	Read and Interpret data using line plots	Represent data using line plots and interpret data in line plots to solve problems	Solve problems involving line plots and fractions
Content Standard	4.NBT.1, 4.NBT.2, 4.NBT.3 , 4.MD.B	4.NBT.1, 4.NBT.2, 4.NBT.3 , 4.MD.B	4.NBT.1, 4.NBT.2, 4.NBT.3 , 4.MD.B

Day 1

How can You Read Data in a Line Plot?

Objective Read and Interpret data using line plots.

Content Standard 4.NBT.1, 4.NBT.2, 4.NBT.3, 4.MD.B

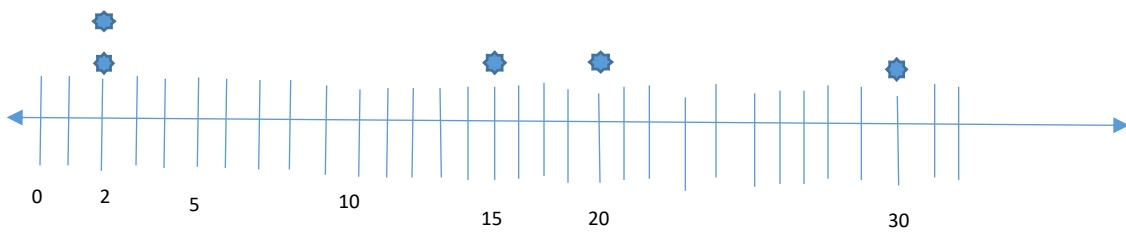
Anticipatory Set:

“Students, last week we were practicing how to read line plots and interpret data, but we were using made up information from our book. I want us to continue practicing how to read line plots and interpret data using real world information.

Has anyone ever hear of the C.I.A.? What do you know? (Allow some time for students to share what they know). Let me tell you a small secret... The C.I.A. has a website with a lot of “Intelligence” that it has gathered on every country on the whole wide world!!!! I will show you how to access it, because we will be using data gathered by the C.I.A. to create and read line plots. As you remember from Social Studies we live in an area of the World, known as “The Pacific Basin” that is way we will use and compare different data from U.S.A., Japan, China, North Korea, and South Korea. “

Instruction

Coastline in Kilometers (In thousands, rounded to the nearest thousand)



Thousand Kilometers

Country		Coastline
China	CH	14,500 km
Japan	JA	29,741 km
North Korea	NK	2,495 km
South Korea	SK	2,413 km
United States	USA	19,924 km

“The title of our line plot is Coastline in Kilometers, according to our dictionary, ‘the coast is the land along a sea. The boundary of a coast, where land meets water, is called the coastline.’ Remember that a line plot shows data along a number line. Each marker above a point on the number line represents one piece of data. An outlier is any number in the data set that is very different from the rest of the numbers.”

(Show students the Coastline line plot) What do you noticed about the table? (Allow time for students to think and answer). What do you notice about the distances? (Allow time for students to think and answer). Is there a piece of data that is very different from the others? (Allow time for students to think and answer). Which numbers have data on them? (Allow time for students to think and answer). What do the numbers represent? (Allow time for students to think and answer). How many markers are on 2 thousand kilometers? (Allow time for students to think and answer). How many markers are on 15 thousand kilometers? (Allow time for students to think and answer). How many markers are on 20 thousand kilometers? (Allow time for students to think and answer). How many markers are on 30 thousand kilometers? (Allow time for students to think and answer).”

“If you noticed, we have data on 2 and 30 that are farther away from the others. But 2 has two pieces of data on it (making them similar). The only one that is very different from the rest is 30, making it our outlier.”

Closure

“Will all sets of data have an outlier? Turn to your partner and explain your thinking. Could a set of data have more than one outlier? Turn to your partner and explain your thinking.”

Independent Practice.

“I want you to work in teams of two students, and use the plot line to answer the following questions. Make sure to explain your thinking in complete sentences. You can also use the map of the world, that we have on the whiteboard.”

1. What countries are we using to compare their coastline?
2. Look at the map of the world. Which country do you believe will have the longest coastline? Explain your thinking.
3. What countries have coastlines of similar sizes?
4. Compare the United States and China, Which of the two countries has the longest coastline?
5. Which country has the longest coastline? How can it have such a long coastline? Explain your reasoning.
6. Which country has the shortest coastline?

Day 2

How can you Make Line Plots?

Objective Represent data using line plots and interpret data in line plots to solve problems.

Content Standard 4.NBT.1, 4.NBT.2, 4.NBT.3, 4.MD.B

Anticipatory Set:

“Students, last week we were practicing how to make line plots to help us use and interpret data, but we were using made up information from our book. I want us to continue practicing how to make line plots, but using real world information.

We will continue using CIA information about countries in the ‘The Pacific Basin’ that is way we will use and compare different data from U.S.A., Mexico, Japan, China, North Korea, and South Korea.”

Instructions:

Border Countries			
China	CH	14	Afghanistan, Bhutan, Burma, India, Kazakhstan, North Korea, Kyrgyzstan, Laos, Mongolia, Nepal, Pakistan, Russia, Tajikistan, & Vietnam.
Japan	JA	0	Islands, surrounded by ocean.
Mexico	MX	3	Belize, Guatemala, & USA.
North Korea	NK	3	China, South Korea, & Russia.
South Korea	SK	1	North Korea.
United States of America	USA	2	Canada, & Mexico.

“Making a Line Plot

Step 1 Draw a number line and choose a scale based on the amounts of countries at the border. The scale should show data values from the least to the greatest.

Step 2 Write a title for the line plot. Label the line plot to tell what the numbers represent.

Step 3 Draw a dot for each country that shares its border with that number of countries.”

Closure

“What will be the lowest number on the line plot? What will be the largest number on the line plot? Turn to your partner and explain your thinking. Remember that the number of dots refers to each country that has that number of border neighbors.”

Independent Practice.

“I want you to work in teams of two students, and create a line plot line using the data from the table ‘Border Countries’. Make sure to explain your thinking in complete sentences.”

1. What countries are we using to compare their number of border neighbors?
2. What is the most common number of border neighbors in the line plot? What countries share the same number of border neighbors?
3. Which number is the outlier? What country is it?
4. China and the United States of America are about the same size, how come they have a different number of border neighbors? Explain your reasoning.
5. How can it be, that there is a country with zero border neighbors?

Day 3

How can You Use Line Plots to solve Problems?

Objective Solve problems involving line plots.

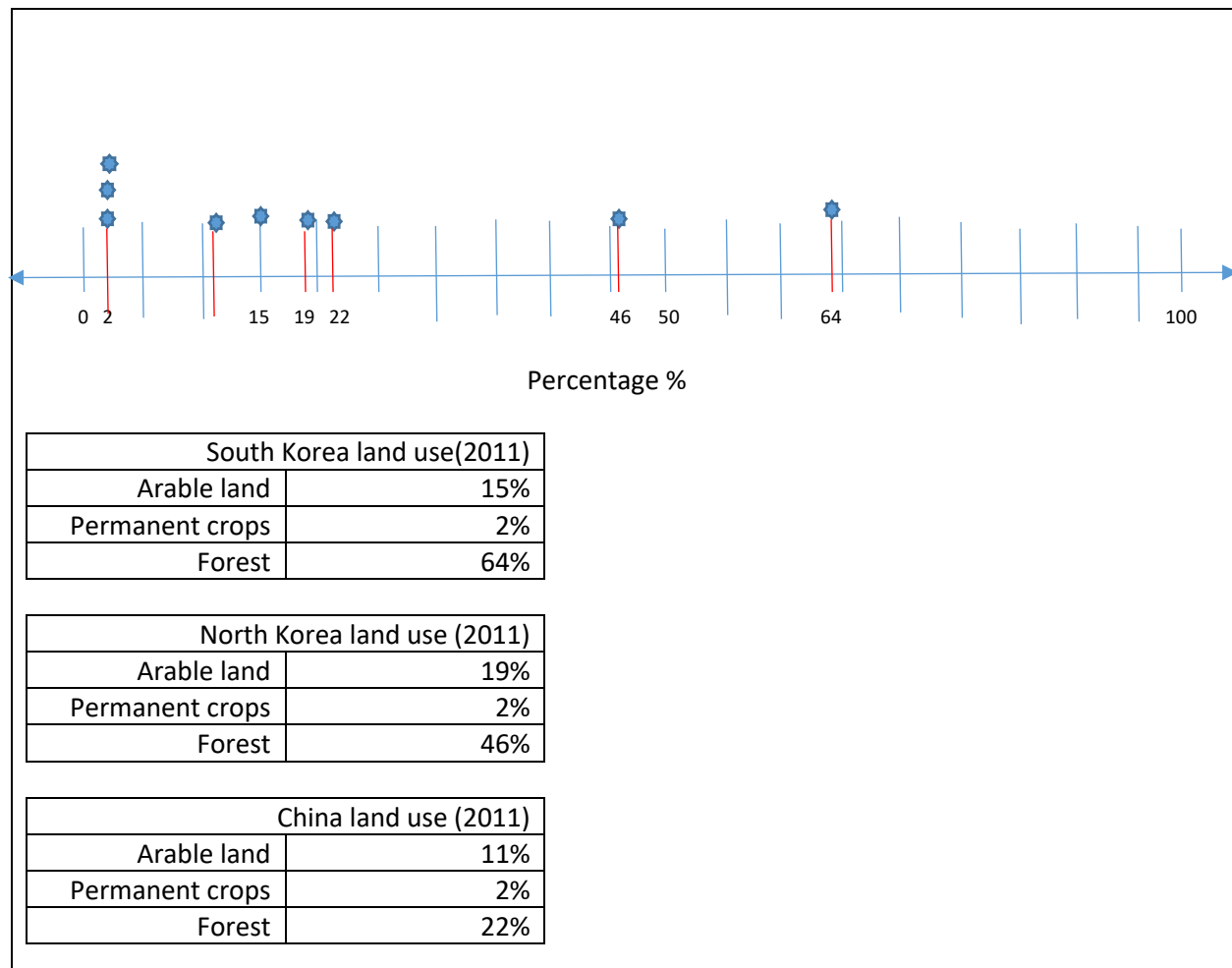
Content Standard 4.NBT.1, 4.NBT.2, 4.NBT.3, 4.MD.B

Anticipatory Set:

“Students, last week we were practicing how to use line plots to help us, solve problems, but we were using made up information from our book. I want us to continue practicing how to use line plots to solve problems, but using real world information.

We will continue using CIA information about countries in the ‘The Pacific Basin’ that is way we will use and compare different data about different land use in China, North Korea, and South Korea.”

Instructions:



“China, North Korea, and South Korea have different percentages of land use allocated for different purposes, in this lesson we will use only the data for arable land, permanent crops, and forest. The line plot shows the percentages of land use as of 2011.

Arable land - land cultivated for crops like wheat, maize, and rice that are replanted after each harvest.

Permanent crops - land cultivated for crops like citrus, coffee, and rubber that are not replanted after each harvest, and includes land under flowering shrubs, fruit trees, nut trees, and vines.

Forest area - land spanning more than 0.5 hectare with trees higher than five meters and a canopy cover of more than 10% to include windbreaks, shelterbelts, and corridors of trees greater than 0.5 hectare and at least 20 m wide.”

Closure

“Look at the line plot and think about the following questions. What does each line on the line plot represent? (Allow time for students to think and answer). Using the information of the line plot, what is the smallest percentage of land use? (Allow time for students to think and answer). What is the largest percentage of land use? (Allow time for students to think and answer). Is there an outlier? What is the outlier? (Allow time for students to think and answer).”

Independent Practice.

“I want you to work in teams of two students, read the line plot line and use the data to solve the following word problems. Make sure to explain your thinking in complete sentences.”

1. What is the difference between the largest and smallest percent of land use?
2. Richard says that 64% is the most common percent of land use for the three countries. Do you agree? Explain your thinking.
3. Xavier read the line plot trying to find the most common percent. What was the most common percent of land use?
4. Which of the following statements are true? Select all that apply.
 - The outlier is 64%.
 - China has the highest percent of forest land use.
 - The most common percent is for permanent crops.
 - North Korea has 46 % of forest.
 - All of the above
5. If we add all the land mentioned in the line plot for China, North Korea, and South Korea. Which one has more land use accounted for in the line plot?
6. What is the largest percent of land used for forest?
7. What is the largest percent or land used for arable land?

A plan for assessing student achievement

I will use the assessment created by Pearson Envision Math 2.0, Topic 11. Topic Assessment. Represent and Interpret Data on line plots. Pages 619, and 620