

USING FRACTIONS TO COMPARE AMUSEMENT PARKS BY STATE

TEACHER VERSION

Subject Level:
Elementary School Math

Grade Level:
3

Approx. Time Required:
30 minutes

Learning Objectives:

- Students will be able to create a visual model of fractional data.
- Students will be able to use their visual model to answer questions about the data.

United States® Census Bureau

Classrooms Powered by Census Data

STATISTICS IN SCHOOLS

Activity Description

Students will predict how many amusement parks are in their state. They will then analyze census data on the numbers of amusement parks in all 50 states in 2022. Then students will write numbers as fractions and create a visual model of the data. (The District of Columbia, Puerto Rico, and Island Areas are not included in activity data.)

Suggested Grade Level:
3

Approximate Time Required:
30 minutes

Learning Objectives:
- Students will be able to create a visual model of fractional data.
- Students will be able to use their visual model to answer questions about the data.

Topics:
- Fractions

Skills Taught:
- Adding fractions with like denominators
- Comparing fractions with like denominators
- Modeling fractions

Materials Required

- The student version of this activity, 5 pages
- Crayons or colored pencils

Activity Items

The following item is part of this activity. The item, its data source, and instructions for viewing the source data online appear at the end of this teacher version.

- Item 1: Amusement Parks by State, 2022

For more information to help you introduce your students to the U.S. Census Bureau, read "*Census Bureau 101 for Students*."

Standards Addressed

See charts below. For more information, read "*Overview of Education Standards and Guidelines Addressed in Statistics in Schools Activities*."

Common Core State Standards for Mathematics

Standard	Domain	Cluster
CCSS.MATH.CONTENT.3.NF.A.2.B Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.	3 NF – Number & Operations: Fractions	Develop understanding of fractions as numbers.
CCSS.MATH.CONTENT.3.NF.A.3.D Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	3 NF – Number & Operations: Fractions	Develop understanding of fractions as numbers.

Common Core State Standards for Mathematical Practice

Standard
CCSS.MATH.PRACTICE.MP4. Model with mathematics. Students will create a visual model representing census data. Then they will use their models to answer questions about the data.

National Council of Teachers of Mathematics' Principles and Standards for School Mathematics

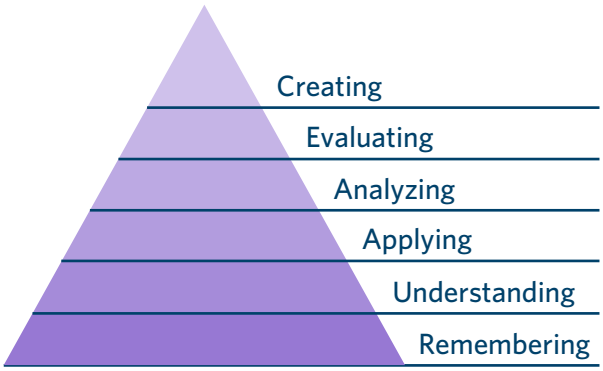
Content Standard	Students should be able to:	Expectation for Grade Band
Number and Operations	Understand numbers, ways of representing numbers, relationships among numbers, and number systems.	Use models, benchmarks, and equivalent forms to judge the size of fractions.
Algebra	Use mathematical models to represent and understand quantitative relationships.	Model problem situations with objects and use representations such as graphs, tables, and equations to draw conclusions.
Data Analysis and Probability	Select and use appropriate statistical methods to analyze data.	Compare different representations of the same data and evaluate how well each representation shows important aspects of the data.

Guidelines for Assessment and Instruction in Statistics Education

GAISE does not apply for this activity.

Bloom's Taxonomy

Students will ***create*** a model of fractional data and use it to ***analyze*** those data.



Teacher Notes

Before the Activity

Students must understand the following key terms:

- **Compare** – to find how things are similar
- **Contrast** – to find how things are different
- **Data** – facts usually represented by numbers
- **Less than** – when one amount is smaller than another amount, identified by the symbol "<"
- **Greater than** – when one amount is larger than another amount, identified by the symbol ">"

Students should have the following skill:

- Understanding fractions as part of a whole

Teachers should review with students that a fraction is part of a whole. To help students visualize the concept, teachers could have them each write down a number between 0 and 30 and then raise their hands if their number is below 7, then between 8 and 20, and then more than 20. Teachers would count the hands raised for each range and explain that this number represents a fraction of the whole class.

Teachers should tell students that during the activity they will compare and contrast the numbers of amusement parks in each U.S. state and that all 50 states represent a whole.

During the Activity

Teachers should complete this activity with students, modeling and prompting them throughout.

Teachers should support students in creating a visual model of the data by asking them questions like: What is the whole of the data? What are the parts?

After the Activity

Teachers will lead a class discussion about the usefulness of students' visual models, as well as how students could improve their modeling.

Teachers should urge students to reflect on how precisely their model represents the fractional data and what they could do to improve it. Teachers could ask questions like: Are all the parts of your visual model equal in value? Is there a faster way to break up the model, for example, instead of using 50 parts, using five parts that each represent 10?

Extension Ideas

- Teachers could ask students to create a second visual model (e.g., a graph) for their data.
- Teachers could incorporate geography into the activity by having students color states on a U.S. map according to the data from **Item 1**. Teachers could discuss how this type of data representation is not fractional or mathematical because the size of each state varies, making the parts of the whole unequal.

Student Activity

Click ***here*** to download a printable version for students.

Activity Items

The following item is part of this activity and appears at the end of this student version.

- Item 1: Amusement Parks by State, 2022

Student Learning Objectives

- I will be able to make a model of data using fractions.
- I will be able to use my model to answer questions about the data.

1. Think about fun places to go in the state where you live. How many amusement parks do you think were in your state in 2022? Circle one of the three sentences below to answer this question.

   Student answers will vary.

   I think there were between 0 and 7 amusement parks in my state.

   I think there were between 8 and 20 amusement parks in my state.

   I think there were more than 20 amusement parks in my state.

2. Using the data in **Item 1: Amusement Parks by State, 2022**, fill in the blanks in the sentence below to show how many amusement parks were in your state in 2022.

   Student answers will vary depending on the state chosen.

   My state, _____, had ____ amusement parks.

3. Was your answer from question 1 correct or incorrect?

   Student answers will vary.

4. Of the 50 states in the United States, what fraction had between 0 and 7 amusement parks in 2022? To answer this question, count how many states in **Item 1** have between 0 and 7 amusement parks and write that number in the blank below.

   $\frac{21}{50}$

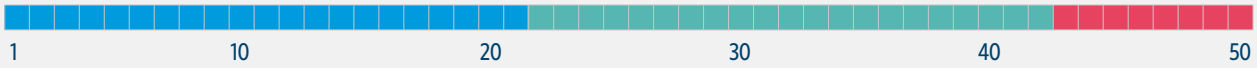
5. What fraction of states had between 8 and 20 amusement parks in 2022? Count how many states in **Item 1** have between 8 and 20 amusement parks and write that number in the blank below.

$$\frac{21}{50}$$

6. What fraction of states had greater than 20 amusement parks in 2022? Count how many states in **Item 1** have greater than 20 amusement parks and write that number in the blank below.

$$\frac{8}{50}$$

7. The chart below is divided into 50 equal parts, and each part stands for one of the 50 states. Use the fractions you counted from questions 4, 5, and 6 to fill in all 50 parts with three colors. Each color should show the fraction of states that have:
   - Between 0 and 7 amusement parks
   - Between 8 and 20 amusement parks
   - Greater than 20 amusement parks



States that have between 0 and 7 amusement parks

States that have between 8 and 20 amusement parks

States that have greater than 20 amusement parks

8. Compare the fraction of states that have between 0 and 7 amusement parks with the fraction of states that have greater than 20 amusement parks, using a comparison symbol. What does your comparison mean?

$$\frac{21}{50} > \frac{8}{50}$$

This means there are more states with between 0 and 7 amusement parks than states with more than 20 amusement parks.

9. Explain your answer to question 8 using your chart.

More parts (21 out of 50) are colored in for states with between 0 and 7 amusements parks, and fewer parts (8 out of 50) are colored in for states with more than 20 amusement parks.

10. What is the fraction of states that have between 0 and 7 amusement parks plus the fraction of states that have between 8 and 20 amusement parks? Write a number sentence to show your work.

$$\frac{21}{50} + \frac{21}{50} = \frac{42}{50}$$

Reflection Question

If you were going to build a new amusement park in any state in the United States, where would you build it and why? How could you use the data from **Item 1** to help you make your decision?

Student answers will vary but could include: I would build my amusement park in Vermont, because there are not very many amusement parks there (between 0 and 7).

Item 1: Amusement Parks by State, 2022

Number of Amusement Parks in Each State

	Between 0 and 7	Between 8 and 20	Greater than 20
Alabama		X	
Alaska	X		
Arizona			X
Arkansas	X		
California			X
Colorado		X	
Connecticut		X	
Delaware	X		
Florida			X
Georgia			X
Hawaii	X		
Idaho		X	
Illinois		X	
Indiana	X		
Iowa	X		
Kansas	X		
Kentucky		X	
Louisiana		X	
Maine	X		
Maryland		X	
Massachusetts		X	
Michigan		X	
Minnesota		X	
Mississippi	X		
Missouri			X

	Between 0 and 7	Between 8 and 20	Greater than 20
Montana	X		
Nebraska	X		
Nevada	X		
New Hampshire		X	
New Jersey			X
New Mexico	X		
New York			X
North Carolina		X	
North Dakota	X		
Ohio		X	
Oklahoma		X	
Oregon	X		
Pennsylvania		X	
Rhode Island	X		
South Carolina		X	
South Dakota	X		
Tennessee		X	
Texas			X
Utah		X	
Vermont	X		
Virginia		X	
Washington	X		
West Virginia	X		
Wisconsin		X	
Wyoming	X		

Data source: www.census.gov/programs-surveys/sis/resources/data-tools/state-facts.html