Teaching
Amazing National Parks

Students solve problems using data presented in a table.

Tasks	◆ Tier 1 Below Level	● Tier 2 On Level	⬠ Tier 3 Above Level
Use given data to solve problems.	X	X	X
Use data to create a new table.	X		
Compare and compute with whole numbers.	X	X	X
Apply understanding of fractions and decimals.		X	
Estimate to solve problems.	X	X	X
Formulate new problems based on data.	X		X
Use data to create a bar graph.		X	
Use measures of central tendency.			X

Getting Started

See the tips below for introducing the lesson. Make copies of the student data sheet (page 9) and the appropriate leveled activity sheet for each group of learners (pages 10–12).

Access prior knowledge by discussing what students have read about national parks, as well as any experiences they have had visiting them. Review place value through millions.

◆ Tier 1

- **Use the Data:** Review how to read rows and columns on a table. Clarify that "authorize" means to make official and that an "acre" is a measure of area, using a local benchmark to give a sense of the size. Review place value and comparing, ordering, rounding numbers through millions.

- **Make a Table:** Provide graph paper for each student. Have them set up their tables as shown in the sample. Point out that the new table will not present new information but will display the same information in a different order.

- **Write About It:** Suggest that students generate problems based on the revised table.

● Tier 2

- **Use the Data:** Review the meaning of "authorize" and use local benchmarks to help students understand an "acre." Discuss place value through millions and rounding large numbers. Use the data in the table to practice rounding larger numbers. Demonstrate how to use place value concepts to solve item 6.

- **Make a Graph:** Provide graph paper. Discuss the advantages of bar graphs for comparing data. Clarify intervals chosen for graphs. Consider pairing students. Display the completed graphs for students to compare and contrast.

- **Write About It:** Brainstorm useful information about national parks.

⬠ Tier 3

- **Use the Data:** Challenge students to think critically about what the table doesn't show. Model using the data to write a "what if" question. Work through a question to model. Review the concepts of *mean, median, mode,* and *range* for items 4–5.

- **Create the Question:** Model one or more items. Challenge students to develop more than one question for each answer in items 6–9.

- **Write About It:** Invite volunteers to share with the class the problems they formulate.

Amazing National Parks: Data Sheet

The National Park Service (NPS) is a government agency. It cares for about 400 sites across the United States. The NPS manages parks in every state except Delaware. It oversees more than just parks. It also protects rivers, monuments, historical sites, seashores, recreation areas, and trails. Even the White House is an NPS site! Hundreds of millions of visitors enjoy our national parks every year.
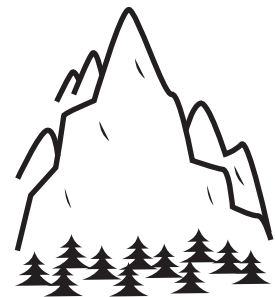
Yellowstone was the first national park. It was established in 1872. The table below lists some other spectacular national parks. It shows their location, year of authorization, and size in acres.
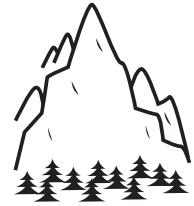
Notable National Parks

* 1 acre = 4,840 square yards, about the size of a soccer field
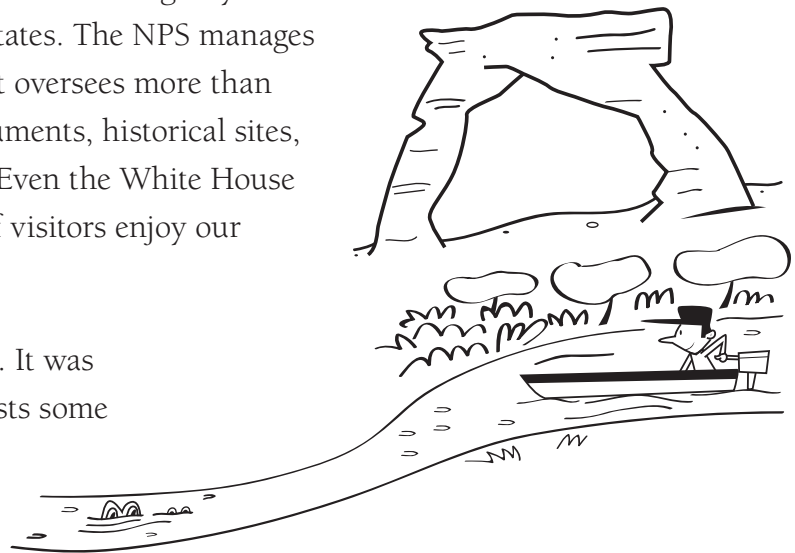
Park Name	State	Authorized	Size, in Acres*
Acadia	Maine	1916	47,390
Arches	Utah	1929	76,519
Big Bend	Texas	1935	801,163
Cuyahoga Valley	Ohio	1974	32,861
Denali	Alaska	1917	4,740,912
Everglades	Florida	1934	1,508,539
Grand Teton	Wyoming	1929	309,995
Kings Canyon	California	1890	461,901
Mammoth Cave	Kentucky	1926	52,830
Mesa Verde	Colorado	1906	52,122
Petrified Forest	Arizona	1906	221,540
Shenandoah	Virginia	1926	199,074

◆ Amazing National Parks:

Activity Sheet

Use the Data Complete each statement.

1. _____ is a national park in Texas.

2. The _____ is in Florida. It was authorized in the year

_____ .

3. _____ is bigger than Shenandoah but smaller than Grand Teton.

4. Big Bend is about 4 million acres smaller than _____ .

5. The two parks that differ in size by 708 acres are _____ and _____ .

6. There were two parks authorized 20 years after Mesa Verde was. They are
_____ and _____ .

7. Two parks authorized in the same year have a combined size of about 400,000 acres. They
are _____ and _____ .

Make a Table

The table on the Data Sheet lists national parks in alphabetical order by name. On a sheet of graph paper, make a **new** table that lists the same parks by how big they are. Follow these steps:

- ↻ Draw a table with 13 rows and 4 columns. Make the columns wide enough to write in.

- ↻ Give your table a new title and use the same headings as the table on the Data Sheet.

- ↻ Use your knowledge of place value. List the parks in the table **in order from largest to smallest size in acres**. Record the state, year, and size in acres for each.

Title: _____

Park Name	State	Authorized	Size, in Acres

Write About It

Make up your own problem based on data about national parks from the Data Sheet.
Show your solution on the back of the page.

● Amazing National Parks: Activity Sheet

Use the Data) Solve each problem.

1. Which two parks were authorized 39 years after Kings Canyon National Park was?

_____

2. Which park is 23,689 acres smaller than Arches? _____

3. What is the difference in size between the largest and smallest parks listed? _____

4. Which two parks have a combined size of about 1 million acres? _____

_____

5. Which two parks differ in size by about 240,000 acres? _____

_____

6. Which park is about one-tenth the size of Denali? _____

Which park is about one-hundredth the size of Denali? _____

Make a Graph

A bar graph shows comparisons. On graph paper, make a vertical bar graph. Compare the sizes in acres of the five smallest parks in the table on the Data Sheet. Follow these steps:
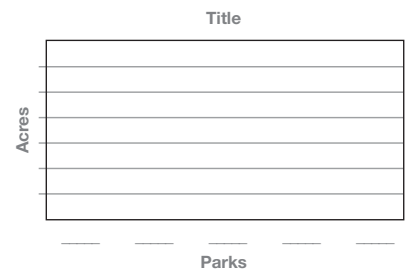
⟲ Round the number of acres of each park to the nearest thousand.

⟲ Draw vertical and horizontal axes.

⟲ Label the vertical axis **Acres**. Label the horizontal axis **Parks**. Give your graph a title.

⟲ Choose a scale for the vertical axis that fits the data. Start with 0. Label equal intervals.

⟲ List the parks in alphabetical order along the horizontal axis.

⟲ Draw bars to represent the data.

Compare your graph with a classmate's. Check one another's work. Explain to each other why you chose the scale and intervals you did.

Write About It

The table on the Data Sheet gives only three facts about each national park listed. Suppose you could add three new columns to the table. What kinds of data would you add? Make a list.

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⬟ Amazing National Parks:
Activity Sheet
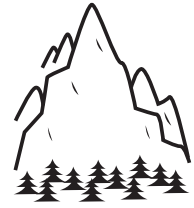
(**Use the Data**) Use the table on the Data Sheet and any new data
included below to answer each *What if?* question.

1. What if 20,000 acres were added to Cuyahoga Valley National Park? Which parks would it be larger than? _____

2. What if the number of acres of Mesa Verde National Park were increased by a factor of 10? Where would this park appear, in size order, from greatest to least acreage? _____

3. What if Utah's Zion National Park with its 146,598 acres replaced Arches National Park in the table? Which of the following descriptions of park sizes would be affected: the mean, median, mode, range? _____

4. What if South Dakota's Badlands National Park, established in 1929, were added to the table? How would it affect the authorization data? _____

5. About 20,000 employees and about 145,000 volunteers work in the National Park system. What if the same number of workers worked in each of the 391 areas the National Park Service runs? About how many workers would be at each site? _____

(**Create the Question**)

The exercises below have answers but not questions. Your job is to use the information in the table to write questions for the answers.

6. **Answer:** 1926   **Question:** _____

_____

7. **Answer:** about one-third as great   **Question:** _____

_____

(**Write About It**)

Make up two **Create the Question** problems of your own for classmates to solve. Write the solutions (questions for the answers) on the back of the page.

Answer Key

Amazing National Parks

Tier 1, page 10: Use the Data: 1. Big Bend 2. Everglades; 1934
3. Petrified Forest 4. Denali 5. Mammoth Cave, Mesa Verde 6.
Mammoth Cave, Shenandoah 7. Grand Teton, Arches; Make a Table:
Check student tables; Write About It: *Answers will vary.*

Tier 2, page 11: Use the Data: 1. Grand Teton, Arches 2. Mammoth
Cave 3. 4,708,051 acres 4. Big Bend, Shenandoah 5. Kings Canyon,
Petrified Forest 6. Kings Canyon, Acadia; Make a Graph: *Answers will
vary. Check student graphs*; Write About It: *Sample answers: number of
visitors each year, number of park rangers, kinds of activities, closest airport*

Tier 3, page 12: Use the Data: 1. Acadia, Mesa Verde, Mammoth
Cave 2. 4th, after Denali, Everglades, and Big Bend 3. Only the mean
would change. 4. It would change the mode of the data to 1929. 5.
Sample answer: about 400; Create the Question: *Answers will vary.
Sample questions: 6. In what year were Mammoth Cave and Shenandoah
authorized as national parks? 7. How does the size of Arches compare with
the size of Petrified Forest?* Write About It: *Answers will vary.*