

Classroom activity

Space for Waste

Group Members: _____

Date: _____

The United States (U.S.) is the world's largest producer of solid waste, or trash, that consumers throw away. Think about your home. What are things that you and your family members throw away? What do you do with your trash each week? Do you separate recyclable materials? Where do you think your trash goes? Where do you think your recyclables go?

The U.S. has a federal agency that works to protect the environment and human health. This agency is called the Environmental Protection Agency (EPA). Think about working for the EPA. What kind of information would you need to collect and study about trash?



What is the project about?

In this project, you will investigate per capita solid waste production by:

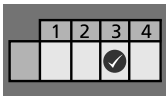
- Analyzing the data about trash in the U.S.
- Using scientific notation to perform calculations regarding U.S. trash production
- Comparing data about trash in the U.S. over several years
- Calculating and comparing trash in California with the U.S. as a whole
- Researching different ways to reduce the per capita trash production

What are the steps of the project?

✓ Check each step as you complete it.

- ☐ Review the rubric. Set a goal for how you want to rate your work.
- ☐ Answer these background questions with your group or to yourself:
 - What kinds of things are found in trash?
 - Why is it important for the EPA to collect and maintain data about trash production in the U.S.?
 - What are the different ways to dispose of trash?
 - What does *per capita* mean?
 - What are some ways to reduce the per capita trash production?
- ☐ Now look at the details:
 - The EPA maintains data regarding the amount of trash generated in the U.S. in different years.
 - Each state in the U.S. is responsible for keeping data about trash production and disposal.

- ☐ You may find these materials useful as you complete the project:



project rubric

The Situation

The following table provides the number of tons of trash generated in the U.S. for different years.

U.S. Trash Generation Rates		
Year	Total generation (tons) in Standard Form	Total generation (tons) in Scientific Notation
2000	243,500,000	
2005		2.537×10^8
2010	251,100,000	
2015		2.621×10^8
2018	292,400,000	

The following table provides the U.S. population in different years.

U.S. Population		
Year	Approximate population in Standard Form	Approximate population in Scientific Notation
2000	282,400,000	
2005		2.968×10^8
2010	311,200,000	
2015		3.246×10^8
2018	332,100,000	

The population of California in 2018 was about 39,400,000, or 3.94×10^7 .

The total generation of trash for California in 2018 was about 46,300,000, or 4.63×10^7 tons.

Analyze the Situation

If you are working as a group, discuss the questions and agree upon an answer.

Use the information in the tables to analyze the situation. These questions will also help you analyze the situation.

1. The given data tables provide some values in standard form and others in scientific notation. Complete the tables for the missing values in standard form and scientific notation for each year.

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2. Using the first data table, convert tons of trash to pounds of trash for each given year. Complete the table to display your data. Represent your conversions in scientific notation. (Remember there are 2,000 pounds in 1 ton.)

U.S. Municipal Solid Waste Generation Rates	
Year	Total generation (pounds)
2000	
2005	
2010	
2015	
2018	

3. How many more pounds of trash were there in 2018 than in 2015 for the U.S.? Express your answer in scientific notation.

4. Find the per capita, or average, amount of trash generated by each person in the U.S. in 2018, in pounds. Express your answer to the nearest pound.

5. Find the per capita, or average, amount of trash generated by each person in the U.S. per day in 2018, in pounds. Express your answer to the nearest tenth of a pound.
- _____
6. How many pounds of trash were generated in the state of California in 2018? Express your answer in scientific notation.
- _____
7. Find the per capita, or average, amount of trash generated by each person in California in 2018, in pounds. Express your answer to the nearest pound.
- _____
8. Find the per capita, or average, amount of trash generated by each person in California per day in 2018, in pounds. Express your answer to the nearest tenth of a pound.
- _____

The Questions

If you are working as a group, discuss the questions and agree upon an answer.

- A. **Make Conjecture:** Between what years did the amount of trash generation decrease? Why do you think this might have occurred? Explain your answer.

- B. Does the amount of U.S. trash generation or the U.S. population seem to be growing more rapidly? How did you decide? Hint: Research the specific reason for the significant increase in trash in 2018.

- C. For 2018, how did the per capita trash generation for California compare to that of the U.S.?

D. Justify Your Reasoning: What are some ways the amount of trash could be potentially reduced in the U.S. moving forward? Use the image below to help you generate your response.

