



## **Brita**

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### **Abstract**

This student activity sheet is designed to guide students through the mathematical modeling process as they investigate the impact of plastic water bottles on the environment. Students must formulate questions and assumptions, compute answers, interpret in the context of the problem and then validate their model by assessing the reasonableness and other elements that might also factor into the problem. Through the investigation of plastic water bottles, the activity presents students with a real life problem and the opportunity to practice critical thinking, unit conversions, measurement, basic geometry, and basic arithmetical computations.

## **Brita**

1. Guess how many times all the water bottles used within the US in a year would wrap around the world.  
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2. Guess how many water bottles the ad suggests could have been saved by using Brita. \_\_\_\_\_
3. What is the first question to solve?
4. What is the second unknown in the video? What are you trying to determine? (You will solve this question in number 11).
5. What information do you need to solve the first question?
6. What assumptions must be made? Are all bottles the same? What path around the Earth should you lay the water bottles along? How should the bottles be lined up? Do the bottles follow the Earth's elevation above sea level?
7. Why are making such assumptions necessary?
8. Under the assumptions made, how many times would all the water bottles wrap around the world? Show all work.
9. How reasonable do you think our estimate is? Which assumption created the most error in your calculation? What changes would you make in order to make the model and calculations more precise?

10. What other countries contributed to this problem? Are there other plastic products we not consider that couldn't be replaced with a Brita pitcher?
11. If we were to consider several years of trash accumulation what are some other factors we would have to take into account considering what we know about plastics? How would that influence our calculations?
12. Using the information below, how many water bottles could have been saved by using one Brita water filter?  
Show all work.  
Aquifina Bottle Volume: **16.9 Fluid Ounces**  
1 Gallon = **128 Fluid Ounces**  
Average Number of Gallons Filtered before Replacing Brita Filter: **42 gallons**