

## Activity Sheet 2: Unit Rate

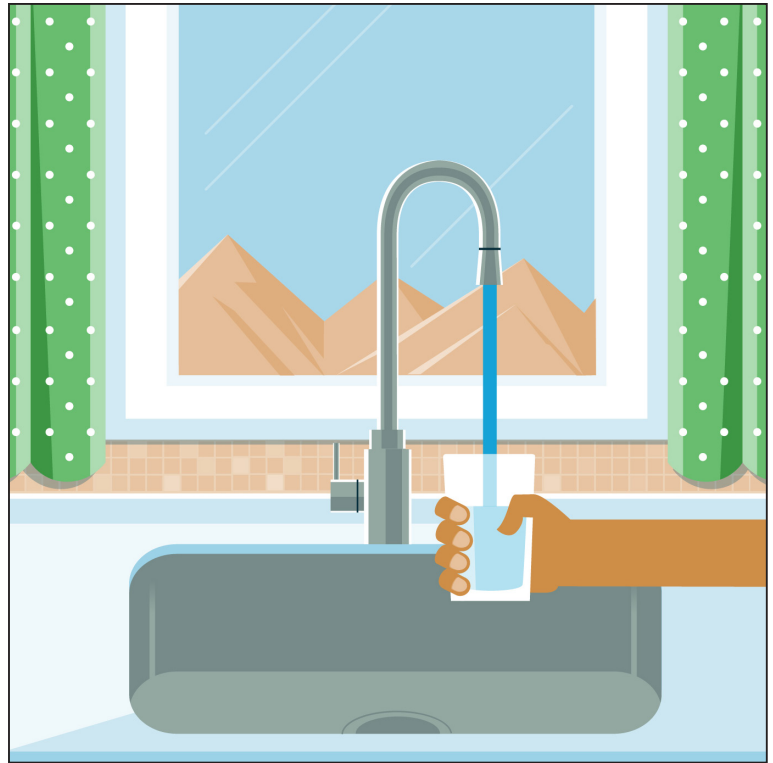
Name: \_\_\_\_\_

Date: \_\_\_\_\_

# A First-Rate Design

You are an architect for the firm of RATIONAL Innovations, Inc., a company that specializes in using mathematical principles to design environmentally friendly facilities. For a water treatment facility that you are designing to bring clean water to people's homes, there are several areas where math is needed in order to translate your plans into reality.

Here are some of the calculations you encounter:



## WORK THE MATH

*Use a separate sheet of paper for your responses.*

- 1** You have selected a nontoxic, eco-friendly paint for the facility's exterior. One paint company charges \$87.50 for a  $5\frac{1}{2}$ -gallon drum while another charges \$27.50 for a  $2\frac{1}{2}$ -gallon drum. You need 100 gallons, and both paints are equally durable. Which paint should you choose?
- 2** The community needs 400,000 gallons of clean water per hour. With your budget, you can design a facility to treat 10 million gallons per day. Does your design meet the community's needs? Explain your thinking.
- 3** Getting the steel beams to the community's remote construction site is tricky. The mountainous "Devil's Highway" is  $165\frac{2}{5}$  miles from the steel plant, and trucks on this highway can drive, on average, only  $22\frac{1}{2}$  miles per hour. Using the Smithtown Road, the distance is  $320\frac{1}{2}$  miles, and trucks can drive 55 miles per hour. Which route is faster?
- 4** The facility needs 350 filters in its water filtration machines. One contractor can install 28 filters every two days while another can install 98 filters in seven days. Which contractor is faster? Explain your thinking.
- 5** To make sure the facility's foundation is sound, you hire an engineering consultant. She estimates that she will need 36 hours to complete her review. She offers two payment options:  
**Option 1:** A \$4,000 flat fee plus \$100 per hour she works.  
**Option 2:** \$250 per hour she works.  
Which option is less expensive, and why?