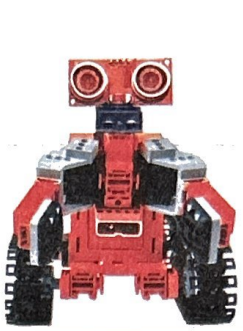
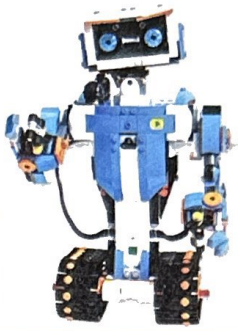
UNDERSTAND: What are rates and what do they tell you?

Explore Rate Concepts



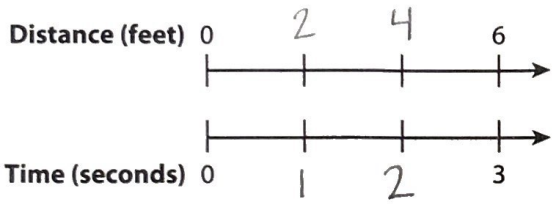


RED TEAM	BLUE TEAM
6 feet every 3 seconds	12 feet every 4 seconds

Model It

➤ **Complete the problems about equivalent ratios.**

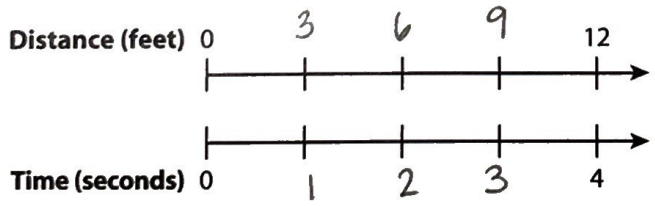
1. Teams of students in Ms. Seda's class make robots. The Red Team's robot travels 6 feet every 3 seconds. The model shows the ratio 6 : 3. Complete the model to show the equivalent ratio that tells how far the Red Team's robot travels in 1 second.



2. A ratio that compares the number of units of one quantity to 1 unit of another quantity is a **rate**. You can use the word ***per,*** which means *for each* or *for every,* to write a rate. A speed in feet per second is a rate that compares distance to time.

   a. The Red Team's robot travels at a rate of 2 feet per second.

   b. The Blue Team's robot travels 12 feet every 4 seconds. Complete the model to show this robot's rate in feet per second.



The Blue Team's robot travels at a rate of 3 feet per second.

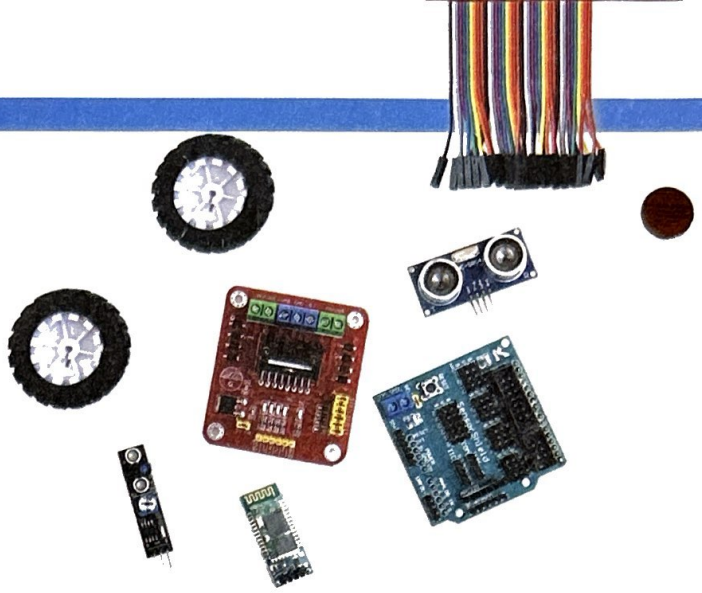
DISCUSS IT

Ask: How do your models show each robot's rate?

Share: Other rates I have heard of are *dollars per pound, . . .*

Learning Targets SMP 2, SMP 3, SMP 7

- Understand the meaning of a rate.
- Use rate language to describe a ratio relationship.
- Use models to find and compare rates.

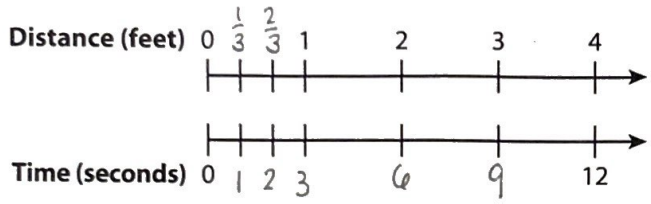


Model It

➤ **Complete the problems about rates.**

3 The Yellow Team's robot is not working properly. It travels only 4 feet every 12 seconds.

a. Complete the model to show the robot's rate in feet per second.



b. Does your model show that the Yellow Team's robot travels *more than 1 foot* or *less than 1 foot* in 1 second? Explain.

The yellow robot travels less than 1 foot per second because the equivalent ratio on the number line is $\frac{1}{3}$ ft per sec

c. Use your model to complete the sentences.

In 1 second, the Yellow Team's robot travels $\frac{1}{3}$ foot.

The robot travels at a rate of $\frac{1}{3}$ foot per second.

d. The Red Team, the Blue Team, and the Yellow Team race their robots. Which robot will win? Justify your answer.

The Blue Team: The rates show the blue teams robot travels more feet each second so it is the fastest.

DISCUSS IT

Ask: How can division help you write a rate?

Share: A rate will include a fraction when . . .

4 **Reflect** How is writing a rate related to what you know about writing equivalent ratios?

To write a rate you start with a ratio. Then you write an equivalent ratio using 1 as one of the quantities.