LESSON MAKER PRO

Model the Situation

Choose quantities that make a situation clear.

HIGH SCHOOL · HSN-Q.A.2

CCSS.Math.Content.HSN-Q.A.2 "Define appropriate quantities for the purpose of descriptive modeling."

NAME _____ DATE _____

CHOOSE USEFUL QUANTITIES

Choose a quantity that can change, and define x with clear units. Then combine rates and fixed amounts so your expression describes the quantity the situation asks for.

WORKED EXAMPLE

An art center charges a $6 registration fee and $14 for each workshop. Define x and write an expression for the total cost.

1. Let x = number of workshops.
2. The workshop cost is 14x dollars.
3. Add the $6 registration fee: 6 + 14x.

Answer: x = number of workshops; total cost = 6 + 14x dollars.

PRACTICE 5 problems

1 A gym charges $11 for each day pass. In the expression 11x, what does x represent? Include units.

ANSWER _____

2 A planter holds 18 liters when full. What quantity should you measure to describe how full the planter is? Include units.

ANSWER _____

3 A music app costs $13 each month plus $4 per downloaded album. Define x, then write an expression for the monthly cost.

ANSWER _____

4 A track team runs 7 laps of 400 meters each. Which quantity describes the total distance, number of runners, distance in meters, or time in seconds? Give its value.

ANSWER _____

5 A plant is 15 centimeters tall and grows 2 centimeters each week. Define x so that 15 + 2x describes the plant's height.

ANSWER _____

APPLY IT Show your work

1 You want to save $96 for a tablet. You save $12 each week. Define x, write a model for your savings after x weeks, and find how many weeks you need.

WORK SPACE

ANSWER _____

2 A gamer has 45 GB of data remaining and uses 5 GB each week. Define x and write a model for the data remaining after x weeks. How many full weeks can pass while at least 10 GB remains?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A school dance committee has $180. A DJ costs $72, and decorations cost $9 per table. The committee also has 340 social media followers. Define x, write a model for money remaining, find the greatest number of tables it can decorate, and explain why the followers do not belong in the model.

WORK SPACE AND ANSWER

Model the Situation

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A gym charges $11 for each day pass. In the expression 11x, what does x represent? Include units.	**x is the number of day passes.**
2	A planter holds 18 liters when full. What quantity should you measure to describe how full the planter is? Include units.	**The volume of water in liters.**
3	A music app costs $13 each month plus $4 per downloaded album. Define x, then write an expression for the monthly cost.	**x = number of downloaded albums; monthly cost = 13 + 4x dollars.**
4	A track team runs 7 laps of 400 meters each. Which quantity describes the total distance, number of runners, distance in meters, or time in seconds? Give its value.	**Distance in meters, 2800 meters.**
5	A plant is 15 centimeters tall and grows 2 centimeters each week. Define x so that 15 + 2x describes the plant's height.	**x is the number of weeks.**

PART 2 · APPLY IT

1. **x = number of weeks; savings = 12x dollars; 8 weeks.** Use 12x because the savings rate is $12 per week. Solve 12x = 96 to get x = 8.
2. **x = number of weeks; remaining data = 45 - 5x GB; 7 full weeks.** The remaining data is 45 - 5x. Solve 45 - 5x >= 10, giving x <= 7.

CHALLENGE

x = number of decorated tables; money remaining = 180 - 72 - 9x dollars; greatest number of tables = 12; the number of followers does not change the money available or the decoration cost.

Accept equivalent wording for defined quantities when the units are clear. Accept equivalent expressions with terms in a different order, such as 14x + 6.