LESSON MAKER PRO

Compare the Samples

Use metric units and rates to make sense of science data.

HIGH SCHOOL · FSL.3A.4

FSL.3A.4 "Use mathematical and computational thinking to (1) use and manipulate appropriate metric units, (2) express relationships between variables for investigations..."

NAME _____ DATE _____

COMPARE FAIRLY

A rate shows how one measurement changes compared with another, such as milligrams per liter or degrees per minute. To find milligrams per liter (mg/L), divide the amount in milligrams by the volume in liters. Since 1 L = 1000 mL, divide milliliters by 1000 to convert to liters. When combining samples, add both their amounts and their volumes before finding the rate.

WORKED EXAMPLE

A lab sample contains 150 mg of dissolved salt in 250 mL of water. What is its concentration in mg/L?

1. Convert the volume: 250 / 1000 = 0.25 L.
2. Divide the amount by the volume: 150 / 0.25 = 600.

Answer: 600 mg/L

PRACTICE 6 problems

1 Convert 750 mL to liters.

ANSWER _____

2 A water sample contains 90 mg of dissolved minerals in 300 mL. Find the concentration in mg/L.

ANSWER _____

3 The table shows the sodium in two drinks. How many milligrams of sodium are in both drinks together?

SODIUM IN TWO DRINKS

Drink	Sodium (mg)
A	120
B	160

ANSWER _____

4 Use the table to rank samples A, B, and C from greatest to least mineral concentration in mg/L.

MINERAL SAMPLES

Sample	Volume (mL)	Minerals (mg)
A	200	80
B	400	120
C	800	160

ANSWER _____

5 Use the table to find the temperature increase per minute. If the pattern continues, what will the temperature be at 8 minutes?

HEATING A WATER SAMPLE

Time (min)	Temperature (°C)
0	17
2	23
4	29

ANSWER _____

6 The table shows solids collected at two creek sites. Which site had the greater total, and by how many milligrams?

SOLIDS COLLECTED

Site	Morning (mg)	Afternoon (mg)
A	35	45
B	50	20

ANSWER _____

APPLY IT Show your work

1 You are choosing a drink for after-school practice. Use the table to find which drink has less sodium per liter and by how much.

DRINK LABELS

Drink	Volume (mL)	Sodium (mg)
A	450	180
B	700	210

ANSWER _____

2 An environmental club tests two filters using the same muddy water. Use the table to find which filter trapped more sediment per liter of water and by how much.

FILTER TEST RESULTS

Filter	Water tested (mL)	Sediment trapped (mg)
A	350	35
B	300	48

ANSWER _____

CHALLENGE One step up

A creek cleanup team combines two tests from each site. The table gives the solids found in each test and the volume of each test. Use these categories: low is below 200 mg/L, moderate is 200 to less than 300 mg/L, and high is 300 mg/L or more. Find the combined concentration for each site, then name its category. Show how you used both tests.

CREEK TEST RESULTS

Site	Test 1 solids (mg)	Test 2 solids (mg)	Volume per test (mL)
P	30	50	200
Q	40	80	200

WORK SPACE AND ANSWER

ANSWER KEY

Compare the Samples

HIGH SCHOOL · FSL.3A.4

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Convert 750 mL to liters.	**0.75 L**
2	A water sample contains 90 mg of dissolved minerals in 300 mL. Find the concentration in mg/L.	**300 mg/L**
3	The table shows the sodium in two drinks. How many milligrams of sodium are in both drinks together?	**280 mg**
4	Use the table to rank samples A, B, and C from greatest to least mineral concentration in mg/L.	**A, B, C**
5	Use the table to find the temperature increase per minute. If the pattern continues, what will the temperature be at 8 minutes?	**3 °C per minute; 41 °C at 8 minutes**
6	The table shows solids collected at two creek sites. Which site had the greater total, and by how many milligrams?	**Site A, by 10 mg**

PART 2 · APPLY IT

1. **Drink B, by 100 mg/L** Drink A has 180 / 0.45 = 400 mg/L. Drink B has 210 / 0.7 = 300 mg/L, which is 100 mg/L less.
2. **Filter B, by 60 mg/L** Filter A trapped 35 / 0.35 = 100 mg/L. Filter B trapped 48 / 0.3 = 160 mg/L, which is 60 mg/L more.

CHALLENGE

Site P: (30 + 50) / 0.4 = 200 mg/L, moderate. Site Q: (40 + 80) / 0.4 = 300 mg/L, high.

Accept equivalent calculations that use milliliters consistently before converting to mg/L. For the challenge, each site's combined volume is 400 mL, or 0.4 L.