LESSON MAKER PRO

Copper Supply Choices

Calculate how much copper mining and recycling can provide.

HIGH SCHOOL · ES.7

ES.7 "Obtain, evaluate, and communicate information to describe the development, management, and recycling of mineral resources."

NAME _____ DATE _____

FROM ORE TO USABLE COPPER

Ore grade tells you what percent of an ore's mass is copper. Multiply the ore mass by the grade to find the copper it contains, then multiply by the recovery percent to find how much a mine can supply. Use the same recovery step for copper in scrap that is sent for recycling.

WORKED EXAMPLE

A mine processes 350 kg of ore that is 14% copper. It recovers 70% of the copper in the ore. How many kilograms of copper does the mine supply?

1. Copper in the ore: 350 × 14/100 = 49 kg.
2. Copper recovered: 49 × 70/100 = 34.3 kg.

Answer: 34.3 kg of copper

PRACTICE 6 problems

1 An ore sample has a mass of 500 kg and is 4% copper. How many kilograms of copper does it contain?

ANSWER _____

2 A mine processes 600 kg of ore that is 5% copper. How many kilograms of copper are in the ore?

ANSWER _____

3 A deposit yields 400 kg of ore that is 15% copper. How many kilograms of copper are in that ore?

ANSWER _____

4 A 200 kg ore sample contains 50 kg of copper. What is its copper grade?

ANSWER _____

5 Ore contains 120 kg of copper. A mine recovers 75% of it. How many kilograms of copper does the mine supply?

ANSWER _____

6 Old wiring contains 90 kg of copper. A recycler recovers 60% of it. How many kilograms of copper can be reused?

ANSWER _____

APPLY IT Show your work

1 A repair club needs 8 kg of copper for replacement parts. Use the collection record to find how much copper it can recover from old wiring. How many more kilograms does the club need?

OLD WIRING COLLECTION RECORD

Wiring collected	Copper in wiring	Copper recovered
20 kg	40%	75% of its copper

ANSWER _____

2 A supplier needs 16 kg of copper for a community gaming event's equipment. It processes 240 kg of ore that is 5% copper and recovers 50% of that copper. It also recovers 2/3 of the copper in 18 kg of old wire. Does the supplier have enough copper, and by how much?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two suppliers each need to provide 20 kg of copper. Both recover 50% of the copper in their ore and 50% of the copper in their scrap. Use the records to decide which plan meets the target while processing less ore. Show the copper supplied by mining and recycling in each plan.

COPPER SUPPLY PLANS

Plan	Ore processed	Copper grade	Copper in scrap
A	200 kg	15%	10 kg
B	160 kg	20%	8 kg

WORK SPACE AND ANSWER

Copper Supply Choices

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	An ore sample has a mass of 500 kg and is 4% copper. How many kilograms of copper does it contain?	**20 kg**
2	A mine processes 600 kg of ore that is 5% copper. How many kilograms of copper are in the ore?	**30 kg**
3	A deposit yields 400 kg of ore that is 15% copper. How many kilograms of copper are in that ore?	**60 kg**
4	A 200 kg ore sample contains 50 kg of copper. What is its copper grade?	**25%**
5	Ore contains 120 kg of copper. A mine recovers 75% of it. How many kilograms of copper does the mine supply?	**90 kg**
6	Old wiring contains 90 kg of copper. A recycler recovers 60% of it. How many kilograms of copper can be reused?	**54 kg**

PART 2 · APPLY IT

1. **The club recovers 6 kg and needs 2 kg more.** The wiring contains 20 × 40/100 = 8 kg of copper. The recycler recovers 8 × 75/100 = 6 kg, leaving a shortage of 8 − 6 = 2 kg.
2. **Yes. The supplier has 18 kg of copper, which is 2 kg more than needed.** Mining supplies 240 × 5/100 × 50/100 = 6 kg, and recycling supplies 18 × 2/3 = 12 kg. Together they supply 18 kg, which exceeds 16 kg by 2 kg.

CHALLENGE

Plan B. Plan A supplies 15 kg from ore and 5 kg from scrap, for 20 kg total. Plan B supplies 16 kg from ore and 4 kg from scrap, for 20 kg total. Plan B processes 40 kg less ore.

Accept equivalent fraction or decimal calculations when the final masses and units are correct. In the challenge, students must account for recovery from both ore and scrap before comparing ore use.