Checking a Model Magnetic Mineral Sort

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A class models sorting a mineral sample. The sample contains magnetite grains that are attracted to a magnet and quartz grains that are not. Some grains are stuck together. A magnet can lift a cluster that contains magnetite even when quartz is attached.

Test	**Total solid collected by magnet (g)**	**Magnetite in collected solid (g)**
Before separating joined grains	18.0	12.0
After separating joined grains	13.0	12.0

1 Calculate the mass of quartz in the collected solid in each test. Show how you used the two columns. [1]

Answer and work

2 What changed in the collected solid after joined grains were separated?

(1) Its magnetite mass increased.

(2) Its quartz mass increased.

(3) Its quartz mass decreased while its magnetite mass stayed the same.

(4) The masses of both minerals decreased by the same amount.

3 Explain how the magnet could collect quartz in the first test even though the model says quartz grains are not attracted to it. [1]

Answer and work

The class learns that each starting sample contained 15.0 g of magnetite. The class wants to report both the fraction of magnetite recovered and the fraction of the collected solid that is magnetite.

4 For the second test, calculate these two fractions. Use a different denominator for each. [1]

Answer and work

5 If the goal is to collect more of the original magnetite, which fraction should be compared in a follow-up trial? Explain. [1]

Answer and work