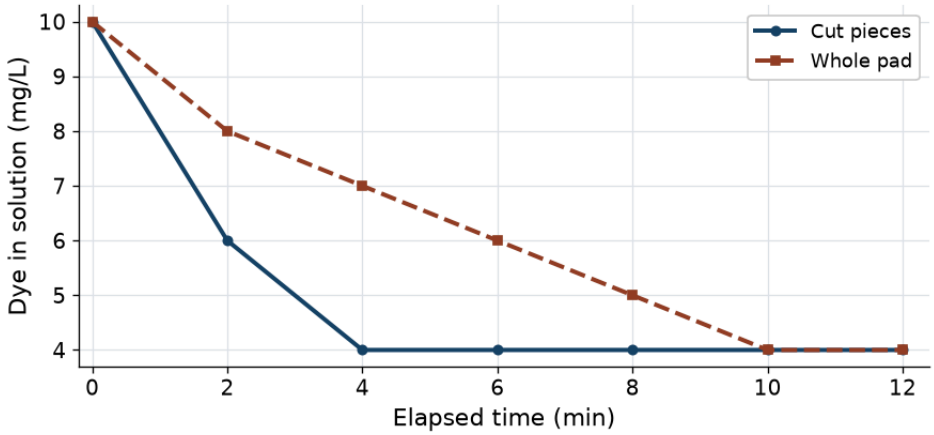
Comparing Dye Uptake in Two Felt Shapes

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

A textile class models dye binding to sites on a piece of felt. Dye can attach to a site and can also come off it. Students leave one pad whole and cut an equal mass of the same felt into small pieces. They place the felt in separate baths with the same starting dye concentration, water volume, and temperature.



Dye concentration remaining in each bath.

1 Use the first two minutes to compare the average rate at which dye concentration decreases in the two baths. Give the rates in mg/L per minute. [1]

Answer and work

2 Which conclusion is supported at the end of the test?

(1) Both baths contain the same dye concentration.

(2) The cut-piece bath contains less dye than the whole-pad bath.

(3) The whole-pad bath returns to its starting concentration.

(4) The two baths have no dye remaining.

The class transfers the dyed whole pad to a fresh container of clear water. The class observes dye appear in that water.

3 Which direction of the reversible change does the rinse observation demonstrate? Explain using the starting condition of the rinse water. [1]

Answer and work

4 Explain how the original bath can have a constant dye concentration while individual dye particles still move between the bath and the felt. [1]

Answer and work