

# Chromatography Worksheet

- 1) Do you think that chromatography would be useful for separating a very large quantity of a mixture? Explain why or why not.
  
- 2) If the mobile phase in a chromatographic experiment moved 15 centimeters and the  $R_f$  value of one of the compounds in the mixture was 0.85, how far would the compound move on the paper?
  
- 3) If the mobile phase in a chromatographic experiment moves 20 centimeters, how big do you believe the difference in  $R_f$  value should be to efficiently separate the mixture? Explain your answer.
  
- 4) We can frequently enhance the effectiveness of chromatography by altering the polarity of the solvent. Do you think we could make similar enhancements by changing the polarity of the stationary phase? Explain.

# Chromatography Worksheet - Solutions

- 1) Do you think that chromatography would be useful for separating a very large quantity of a mixture? Explain why or why not.

**Paper chromatography or thin layer chromatography would not be handy for separating a large quantity of a mixture. However, column chromatography is frequently used to isolate chemicals from quantities of mixtures up to 5-15 grams. For larger quantities of mixtures, other methods are most often employed, such as the use of separatory funnels.**

- 2) If the mobile phase in a chromatographic experiment moved 15 centimeters and the  $R_f$  value of one of the compounds in the mixture was 0.85, how far would the compound move on the paper?

$$15 \times 0.85 = 12.75 \text{ cm}$$

- 3) If the mobile phase in a chromatographic experiment moves 20 centimeters, how big do you believe the difference in  $R_f$  value should be to efficiently separate the mixture? Explain your answer.

**Student answers will depend on what they feel is a good separation. Each difference in  $R_f$  value of 0.05 will cause a 1 cm separation when the mobile phase moves 20 cm – it's up to you to decide whether this is sufficient separation or if the inevitable smearing of the unknown will require a larger difference.**

- 4) We can frequently enhance the effectiveness of chromatography by altering the polarity of the solvent. Do you think we could make similar enhancements by changing the polarity of the stationary phase? Explain.

**Changing the polarity of the stationary phase will have a similar effect. For example, if you were to have a very polar stationary phase, polar solutes will tend to stay toward the bottom because they will prefer the stationary phase to the mobile phase. If the stationary phase is less polar, polar solutes will tend to move greater distances.**