

INQUIRY LAB – “DECODING” AN UNKNOWN MIXTURE



WHAT TO TURN IN, in order:

Pre-lab vocabulary
List of ideas
List of materials
Initial observations
Hypothesis
Procedure
Data Tables 1-3
Conclusion
Questions # 1-5

Objectives

- To physically separate a mixture of unknown components
- To review the concepts of heterogeneous and homogeneous mixtures
- To review the concepts of chemical and physical change

Pre-lab vocabulary for review

(define in your own words)

| | |
|-----------------|-------------|
| chemical change | precipitate |
| heterogeneous | solubility |
| homogeneous | solvent |
| mixture | solute |
| physical change | supernatant |



Before the pre-lab: suggestions

- 1) Refer to previous labs, especially the chemical reactions lab, for ideas.
- 2) Discuss with your peers in your class and other classes.
- 3) Research online about separation of mixtures.

Pre-lab –DAY 1

- 1) Brainstorm in your lab groups about ways that a mixture can be separated.
- 2) Write a list of ideas to be submitted later. Each person needs his or her own list.
- 3) Construct a list of materials (equipment and chemicals) that you think you may need to separate your mixture. Each person needs his or her own list. What equipment and chemicals do you want to have available during the lab? If you don't ask for it, it will not be available!
- 4) Each lab group must turn in one list of materials to the teacher at the end of the period.

5) In collaboration with your lab partners, construct a detailed procedure outlining what you will try to do with your mixture. Your group needs to design and write out a detailed, step-by-step procedure for separation. You will adapt the procedure during lab as needed.

Lab Procedure –DAY 2-3

- 1) Each lab group will be given an unknown mixture of three substances. Some components of the mixture will be dissolved in water, and some may be settled at the bottom or top. Make sure the unknown identification letter (A-F) of your mixture has been recorded.
- 2) Record initial observations of your mixture. Write a hypothesis as to what substances may be in the mixture. Water is the main solvent but is not one of the three unknown components.
- 3) Your group should follow your procedure for separation, revising and adapting it as necessary. You must separate and identify all three components and be “checked off” by the teacher for each component.
- 4) You need to construct at least three data tables.

Data Table 1 – unknown letter (A-F) and the identity of the three components, including all relevant chemical formulas

Data Table 2 – all relevant balanced chemical equations as positive tests for your unknowns

Data Table 3 – summary of procedures used (check-list, flow chart, etc.)

Data Table 4 (optional) – be creative

- 5) You must write a conclusion about the lab. The conclusion should be a summary of what you personally learned as a result of doing this lab.
- 6) Obtain the lab materials available as needed. You may use anything that you suggested or anything else that has been suggested by other classmates.
- 7) Work as a team. Collaborate. Investigate. Have fun!

Post-Lab –DAY 4

Refine and finalize your lab report.

Questions

- 1) What methods did your group initially agree to use for your procedure?
- 2) Did your group have to change your initial plans? Why or why not?
- 3) What method of separation was easiest to do? Why?
- 4) What method of separation was the most difficult? Why?
- 5) What was the most difficult part of the lab as a whole?