Case Details

Case Title:

Lab Spill

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Grade Level(s):

Middle School

Subject(s):

Physical Science

Summary:

Talia and DeAndre join their classmates for physical science class, but to their surprise, their classroom has been cordoned off by a Haz-Mat team. As they look in from the hallway, they see a big mess on the floor, and two troublemakers from a higher grade being detained! The Haz-Mat team must figure out how to separate this mixture of solids and figure out what each substance might be, and they need to do it fast in case the student body needs to be evacuated or hospitalized for exposure. The clock is ticking, and the sooner they figure out if any of the substances are hazardous, the better!

Adapted from:

Mo, S.J., Thompson, A., Shaefer, D., & Beam, M. (2004). Chemical spill at Milton High School.

Suggested Citation:

Turner, B. L., & Shamsid-Deen, K. K. (2008). *Lab spill*. Retrieved June 03, 2012 from Emory University, CASES Online Web site: http://www.cse.emory.edu/cases/casedisplay.cfm?case_id=165

Learning Objectives:

1. At the end of this case, students should know:
2. The difference between physical and chemical properties of substances.
3. The difference between an element and a compound.
4. The physical and chemical properties of common substances.
5. Common separation techniques for unknown mixtures of solids.
6. The chemical symbol/formula for each unknown substance.
7. At the end of this case, students should be able to:
8. Research common physical (states of matter, color, texture, size, etc.) and chemical (solubility, magnetism, acidity, etc.) properties of several substances unknown to them in textbooks and online.
9. Complete a separation lab activity using all of the non-hazardous unknown substances, exercising safe laboratory behavior retained from a previous case

involving lab safety.

10. Make hypotheses about what each unknown substance might be, based on physical and chemical properties and research in textbooks and online.

National/State Standards:

Georgia Performance Standards Addressed:

SCSh3. Students will identify and investigate problems scientifically. (NSES Content Standard A).

S8P1. Students will examine the scientific view of matter. (NSES Content Standard B)

a. Distinguish between atoms and molecules.

b. Describe the difference between pure substances (elements and compounds) and mixtures.

c. Distinguish between physical and chemical properties of matter as physical (i.e., density, melting point, boiling point) or chemical (i.e., reactivity, combustibility).

d. Distinguish between changes in matter as physical (i.e., physical change) or chemical (development of a gas, formation of precipitate, and change in color).

e. Recognize that there are more than 100 elements and some have similar properties as shown on the Periodic Table of Elements.