

STICKY SITUATION: TEACHER GUIDE

Subject: Life Science

Grade Level: Middle School

Last Updated: March 8, 2008

Case Summary

During an exciting game of basketball between the Cleveland Cavaliers and the Houston Rockets, LeBron James embarrasses Tracy McGrady with a slam dunk for the ages. But as LeBron returns to earth after soaring through the air, he slips on a mysterious substance on the court. What could this substance be? Is it alive; is it dead, how did it get there? It's up to you and your investigation team to find out!!!!!!!

Credits

This case was written by Jereme Doss (PhD Student, Polymer Chemistry, Clark Atlanta University, Atlanta, GA) and Tania Armer (teacher, Chamblee Middle School, Chamblee, GA) fellows of the Emory University PRISM program (<http://www.prism.emory.edu>). Authors may be contacted at tania_t_armer@fc.dekalb.k12.ga.us.

Learning Objectives

1. Identify the sample to be made of eukaryotic cells
2. Identify the different organelles and list their functions.
3. Explain the difference between prokaryotic and Eukaryotic cells.
4. Draw a prokaryotic and eukaryotic cell.
5. Explain the differences between plant cells and animal cells.
6. Determine what a cell needs in order to grow and divide
7. Understand the process of cell division.
8. Re-enforce proper lab techniques.
9. Identify the type of tools that you can use in order to identify cells

Georgia Performance Standards

- S7CS1.* Students will explore of the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works. (NSES Content Standard C)
- a. Understand the importance of—and keep—honest, clear, and accurate records in science.
 - b. Understand that hypotheses can be valuable, even if they turn out not to be completely accurate.
- S7CS2.* Students will use standard safety practices for all classroom laboratory and field investigations. (NSES Content Standard C)
- a. Follow correct procedures for use of scientific apparatus.

- b. Demonstrate appropriate techniques in all laboratory situations.
 - c. Follow correct protocol for identifying and reporting safety problems and violation
- S7L2. Students will describe the structure and function of cells, tissues, organs, and organ systems. (NSES Content Standard C)
- a. Explain that cells take in nutrients in order to grow and divide and to make needed materials.
 - b. Relate cell structures (cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria) to basic cell functions.
 - c. Explain that cells are organized into tissues, tissues into organs, organs into systems, and systems into organisms.
 - d. Explain that tissues, organs, and organ systems serve the needs cells have for oxygen, food, and waste removal.
 - e. Explain the role of the major organ systems in the human body.

Assessment

Students will work in groups on the scenes, therefore student evaluation forms were handed to each of the students. Individual achievement was assessed by assignments such as the organelle poster project, in which the teacher provides each student with an organelle to present on a poster. The students are given a list of organelles from which to choose. In addition, there is a cell drawing assignment where the students had to make detailed sketches of both prokaryotic and eukaryotic cells (see *Student Materials* document).

Overall grading for the case is based on their combined grades for their box charts and products. Grading will be based on a 5-point scale (5=excellent, 4=very good, 3=good, 2=fair, 1=poor) that will be converted into a percentage and from there into total points depending on the weight of the assignment, for each of two criteria:

1. Accuracy and depth of product components; attention to grammar and mechanics
2. Individual contribution/participation within the team

Implementation Strategy

This case is designed to take place over two 52-minute class periods. It has three scenes (see *Student Materials*). This case was facilitated by two facilitators (but can be done with a single teacher). Rather than placing a facilitator with every group, the students spent time working on the box chart with their group and then a master box chart was put together by the whole class. The students were allowed 10 minute intervals to discuss the scene and work on their box charts. The class was then reconvened and volunteers were asked to provide the teacher/facilitator with their observations, questions, hypotheses and learning issues. During the group time, the teacher/facilitators floated from group to group, checking progress and helping guide students in the desired train of thought.

Implementation schedule

Day 1

Read Scene One, research, box charts	20 min
Read Scene Two, research, box charts	20 min
Read Scene Three, final thoughts	10 min

Day 2

Student work on assignments

Case Notes

1. *What worked?*

As the students entered the room they were greeted by a picture of LeBron James dunking on the overhead projector. There was also a visual scene consisting of a basketball, a mystery substance (we used Nickelodeon “Gack”), and a pair of athletic shoes. Making a visual for the case makes the students feel like they are a part of the story instead of just reading it. The set up was similar to the Lab Safety case (Turner and Shamsid-Deen, 2004). The green gack spilled on the floor next to a basketball, a gym bag and pair of basketball shoes. Caution tape surrounded the area.

2. *How did students respond?*

The students were very receptive to the case. They wanted to find out what the green substance was and where it came from.

3. *Tips for the future:*

For higher grades, the case concepts can be developed in more detail and the products can be designed to go more in-depth. For the seventh grade, this exercise can be good for an introduction to the types of cells (prokaryotic, eukaryotic, plant or animal), as well as cell division. The case can also be used for reinforcement of what has already been taught in class.

4. *How can the case be improved or altered?*

The case can be improved by performing experiments to determine if the mystery substance (gack) is alive. Such as observing a sample under the microscope and dissolving the substance in water. Test like this would reinforce what students learned about the characteristics of living things.

Resources

Denison, TS. (1999) Investigate and connect, life science grades 4-8.

Holt Science and Technology (2001). Life Science, Austin: Harcourt Education Company.

Maton, A., Hopkins, J., Johnson, S. et al. (1993) Cells: Building Blocks of life, 2nd ed. Englewood Cliffs, NJ: Prentice Hall.

Roland, John R. (1993) Human biology activities kit, San Francisco, John Wiley & Sons Inc.

Turner BL & Shamsid-Deen K (2004) What happened?!?! Retrieved October 5, 2007 from Emory Cases Online website: <http://www.cse.emory.edu/cases/>