

## THE ULTIMATE MERGER: TEACHER GUIDE

**Subject:** Physical Science

**Grade Level:** Eighth grade, Middle School

**Last Updated:** June 15, 2010

### Case Summary

If it had a mind you can reason with it, if it had a face you can look it in the eye, if it had a body you can shoot it. Now man is no longer the Supreme Being on this planet. Terror has no shape! Can you and your friends figure out what it is?

### Credits

This case was written by Laurisa London and Laurenee London (PhD student, Polymer Chemistry, Clark Atlanta University, Atlanta, GA) Malissa Summers and Deirdre Mitchell (Teacher, McNair Middle School, Decatur, GA) curriculum development fellows of the Emory College Center for Science Education (<http://www.cse.emory.edu>). Authors may be contacted at [mcs Summers@hotmail.com](mailto:mcs Summers@hotmail.com) (Malissa Summers), [deirdre\\_mitchell@yahoo.com](mailto:deirdre_mitchell@yahoo.com) (Deirdre Mitchell), [laureneelondon@comcast.net](mailto:laureneelondon@comcast.net) (Laurenee London) and [laurisalondon@gmail.com](mailto:laurisalondon@gmail.com) (Laurisa London).

### Learning Objectives:

1. Describe the four states of matter
2. Recognize physical and chemical properties
3. Distinguish between changes in matter as physical or chemical development of a gas, formation of precipitate
4. Identify and demonstrate the law of conservation
5. Describe the difference between pure substances (compounds and mixtures).

### Georgia Performance Standards OR Georgia Quality Core Curriculum

- S8PI*. Students will examine the scientific view of the nature of matter.
- b*. Describe the difference between pure substances (elements and compounds) and mixtures.
  - c*. Describe the movement of particles in solids, liquids, gases, and plasmas states.
  - d*. Distinguish between physical and chemical properties of matter as physical (i.e., density, melting point, boiling point) or chemical (i.e., reactivity, combustibility).
  - e*. Distinguish between changes in matter as physical (i.e., physical change) or chemical (development of a gas, formation of precipitate, and change in color).
  - g*. Identify and demonstrate the Law of Conservation of Matter.

### Assessment

Students will be evaluated based on class participation, individual contributions and group presentation. See student materials for group presentation rubric and individual report template.

Sample tasks that can also be used for assessment purposes are:

1. Oobleck Lab and Lab Report/write-up
2. Box Chart
3. Learning Issues Report
4. Thinking Map
5. Daily summaries or “Think About It”
6. Stations: Compounds and Mixtures
7. Compare and Contrast Compounds and Mixtures

### **Implementation Strategy**

This case will follow a class period of introducing the students to Matter. Students will be given information on basic characteristics, like volume, mass and other concepts that will assist in understanding matter and its characteristics. Exploration will be conducted using stations/centers and small group assignments, along with note taking.

It would be advisable to have roles for students such as: scribe, group moderator, reporter, etc. Each student can be assigned learning issues to research and bring back their assignments in a certain time, if class time allows. Learning Issues can also be assigned as homework.

Implementation should take three days on a block schedule where students are seen for 90 minutes during each class period every other day.

#### ***Session One (Day 1)***

Students will view the video clip (The Blob trailer) and review (act out or read) Scene 1. Students will later break into groups of 4-5 students, and discuss new vocabulary, facts and learning issues developed from the Scene.

- |                                 |       |
|---------------------------------|-------|
| - Scene/Case Analysis           | 15min |
| - Box Chart A/reference chart   | 30min |
| - Group/Class discussion        | 10min |
| - Identify Learning Issues      | 10min |
| - Launch Lab (States of Matter) | 25min |

Learning issues report will be completed for Homework #1

#### ***Session 2 (Day 2)***

\*\*Oobleck and glue solution should be prepared ahead of time for students.

1. Pour 4 cups of water into a large glass jar. Add 1/4 cup Borax and stir until it is dissolved.

2. In the 2<sup>nd</sup> jar, mix 1 cup water and 1 cup white craft glue. Tighten the lid and shake well until mixed. If you want colored putty, add food coloring or paint to the water and glue mixture.

During the second session, students will present their learning issues to their groups and then the class. Discussion of findings will take place followed by OOBLECK lab.

**\*\*Optional or Extension:** At the end of the lab the students will view a second clip containing fun polymer experiments.

- Oobleck Lab	30min
- Data Analysis & Lab Report	30min
- Share Results and Discuss	25min
- Clean-Up	15min

### ***Session 3 (Day 3)***

Students will review Scene 2. Students will later break into groups of 4-5 students, and discuss new vocabulary, facts and learning issues developed from the Scene.

- Scene/Case Analysis	15min
- Box Chart A/reference chart	20min
- Stations	20min
- Share Results and Class discussion	10min
- Learning Issue Report	25min

Thinking Map: Compounds and Mixtures will be completed for Homework #2

## Case Notes

Dividing the students into groups of four worked very well. Within the group each group members were given the roll of a scribe, group moderator, and reporter. Each group rotated to each station and completed the labs. Allowing the students to rotate themselves according to what station is available at that moment does not work. The students tend to rush each other to get their work completed and the room looked chaotic due to students walking around the room in a random formation. So, you should give them a set time to complete the labs at each station. Although, I praise their eagerness, the students should be more mindful and patient when working with their peers. Also, you should insure that each lab station is cleaned after each group to maintain a clean lab environment. One can do so by taking a mental note or producing an actual check list to check each group off before every rotation.

The students were able to easily pick up on the learning issues that we hid in the scene. However, we had to do more intense facilitation than normal to keep them on track. The students were very engaged in carrying out the labs and were very excited and pleased with the products. After rotating to every station, the students had to answer 3 to four questions that corresponded to each lab. The overall implementation took two days, with the first day allocated to the first scene, movie, box chart and the second day for completing the labs.

**Facilitator Guide (optional):**

Below is a sample Box Chart with probing questions the facilitator can use to keep students moving on the right track.

## Box Chart A

<b>Big Idea (Main Idea):</b> Matter	
<p><b>Facts:</b> <i>(Information found in the Scene)</i></p> <p>-a meteor landed in the woman's backyard. -inside the meteor was a jell-like substance -the substance started out like a solid but changed into a liquid</p>	<p><b>Learning Issues:</b> <i>(Things you need to look up or research)</i></p> <p>-What is mass? -What is a meteor? -What is a substance? Or jelly-like substance? Are their different kinds of substances? If so, what are they? -Identify what materials are used in a therapeutic ball and its properties. -What are properties of a solid? -What are properties of a liquid? -What is mater? -What are the different types of properties of matter? -What are physical characteristics? Are there other characteristics of matter?</p>
<p><b>Next Steps:</b> <i>(What you plan to do to find out information about your leaning issues. Who's going to do what in your group? Group roles? Learning Issue assignments? )</i></p>	

**Probing questions for facilitator:**

***(DO NOT GIVE TO STUDENTS USE AS A GUIDE TO KEEP STUDENTS MOVING)***

- What is a jelly-like substance you have seen? What kind of properties does it have? How is that like or not like the substance in the scene?
- What are the properties of the ball used in physical therapy? What is it made of? Why are certain materials used in the ball?
- What exactly is a substance?
- If it's both liquidly and solid can it possibly be a mixture of something? If so, what?
- What kind of properties does the substance possess? Do they remind you of something you know?
- What has a certain mass and takes up space?
- What are mixtures? Are there different types? (Homogeneous and Heterogeneous)

**Resources:**

KrechonProduction [poster]. *The Blob Trailer*. Retrieved June 15, 2010 from <http://www.youtube.com/watch?v=sixDADVvnxA>.

Jefferson Lab (2011). *Thomas Jefferson National Accelerator Facility*. Retrieved June 15, 2010 from <http://education.jlab.org/>.

Science Kids at Home. *Pushy Putty or Flubber*. Retrieved June 15, 2010 from [http://www.sciencekidsathome.com/science\\_experiments/pushy-putty-or-flubber.html](http://www.sciencekidsathome.com/science_experiments/pushy-putty-or-flubber.html).

Thinking Maps (2011). Retrieved June 15, 2010 from <http://www.thinkingmaps.com>.