

Lesson Steps

Objective:

Students will be able to understand the three states of matter and more specifically why matter expand. They would be able to answer four Essential questions about the three states of Matter by using Discover Board Builder.

Materials and resources:

- Paper
- Pencil
- Computers with internet access for each students
- lab notebooks
- Science notebook
- LCD projector
- Mimeo
- Engage" videos through Discovery Science
- Discovery Board Builder

Essential Questions

1. How are particles in solids, liquids, and gases the same? How are they different?

2. If you increase the temperature of a matter, then what would happen?
3. Explain why a balloon deflate when put it in a freezer or cold water?
4. Does kinetic energy be playing any role in inflating or deflating the balloon? If you think “YES”, then explain your thinking and if you think “NO” then what is the reason behind your answer.

Curriculum Expectations

P.CM.04.11 "Explain how matter can change from one state (liquid, solid, gas) to another by heating and cooling.

Ontario Curriculum:

Overall Expectation:

1. Conduct investigations that explore the properties of matter and changes in matter;
2. Demonstrate an understanding of the properties of matter, changes of state, and physical and chemical change.
3. ***Specific Expectations***
 1. use scientific inquiry/experimentation skills to investigate changes of state and changes in matter
 2. use appropriate science and technology vocabulary, including mass, volume, properties, matter, physical/reversible changes, and chemical/irreversible changes, in oral and written communication

3. use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes

Assessment

- On-going assessment, feedback directly through Board Builder in the "feedback" section.
- **The traffic light** “Students hold up a green, amber or red sign to indicate whether they understand, think they understand but are not quite sure or do not understand. This diagnostic technique help me to check understanding of the concepts before students leave class. Then I will spend more time with students showing the amber and red light. This will be an energetic and entertaining activity, helpful in diagnosis and dealing with misconceptions. After identifying the misconception and I will re-brief the issues related to it.
- [Peer Assessment rubric:](#)
- [Self-Assessment form:](#)
- [Self-Assessment response sheet](#)(For teacher only)
- [Group Project Assessment Rubric](#)

Differentiated Instruction

Students with special needs:

- Students with writing difficulty can use the computer to sketch their effort.
- Students with hearing difficulty can be provided with computers having voice instructions.

- It will be more fruitful to make a small group of Students with special needs, so that they can discuss and review their assessments with their peers and with the teacher as well.
- Exceptional students or students with disabilities such as ADHD can be allowed to come to the front of the class
- Teacher can help to read the feedback for the students.
- They can be provided with text-to-speech instruments to read comments

For ELL students

- ELL/students may be buddied with another student to scribe.
- Assessment in the student's' first language (if possible).
- Modification of linguistic complexity.
- Embedding glossaries into the test for non-content vocabulary.
- Given the option to draw their ideas.
- Read to text can be provided to help them in reading
- As an ESL teacher I always keep picture dictionaries in different languages with pictures

Instructions:

Day1 and Day 2

- Gauge Student's prior knowledge by creating a KWL with them.
- Activate prior knowledge by viewing "Engage" videos through Discovery Science Techbook (MI>4th Grade>Changes in Matter>Changing States) either the whole group or in the computer lab.
- Students will read an article about "[Particles in Motion](#)".

- Provide students with the list of Essential Questions.
- Discussion about the three states of matter and the article “Particle in Motion”.
- Review terms that may be unfamiliar, such as "matter" “Kinetic Energy” and "states".
- Assign "[Matter and Temperature](#)” to the students.
- Bring students to the computer lab for completion.
- Monitor student progress and assist as needed.
- On-going assessment.

Day 3

- Complete in-class lab. [Directions here.](#)
- Perform “Traffic Light Activity” to identifying the misconception or any confusion about the topic and then re-brief the issues related to it.

Note: Before moving to final project, it is important to discuss their misconceptions, confusions or issues related to the topic

- Discuss and create the assessment criteria for “Board Builder Group Project”.

Day 4 and Day 5

- Explain and assign "[Board Builder](#)" project.
- Bring students to the computer lab to work on their projects.
- Monitor student progress and assist as needed.

- The on-going assessment followed by “feedback” directly through Board Builder in the "feedback" section.

Day 6

- Students present finished Boards in class using the LCD projector and Mimeo, then complete the self-assessment and peer assessment rubrics.
- Discussion about
 - What did they learn so far about the topic?
 - Opinion about the teamwork.
 - Do they learn more through teamwork or individually?
 - What issues did they face during this project?
 - What changes do they want to make in the project if given a chance to re-do it?
 - Feedback about the Board Builder.

Reference:

Grade Level Content Expectation. (2009). Science v.1.09. Michigan Department of Education.

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