

| Subject/Grade: Science 5 | | Lesson Title: States of Matter | | Teacher: Johnna Hertlein | |
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| Outcomes & Indicators | | | | | |
| Outcome: MC5.1 Investigate the characteristics and physical properties of materials in solid, liquid, and gaseous states of matter. Curriculum Link | | Indicators: <ul style="list-style-type: none"> - Recognize that matter is anything that has mass and takes up space. - Classify materials in their environment as solids, liquids, or gases based on personal observation. - Determine the distinguishing characteristics which enable scientists to differentiate between solids, liquids, and gases. | | Goals: <ul style="list-style-type: none"> - Students can differentiate between a solid, gas, and a liquid. - Students understand what matter is and what it is made up of. | |
| Instructional Strategies: <ul style="list-style-type: none"> - Powerpoint with information, videos, and activities October 13 Lesson Plan: Matter - Working through a worksheet as we do activities Matter Worksheets | | | | | |
| Summary: <ul style="list-style-type: none"> - Students are introduced to matter and what it is. A full group discussion about what is considered matter. - Students discover that all matter is made up of very tiny particles called atoms, watch a video. - Students are introduced to the three states of matter: solids, liquids, and gases. An activity in table groups for them to discuss what would go into each category. Solids, Liquids, Gases - Teacher demonstration with a hammer to begin the discussion of what a solid is and how scientists classify solids. - Activity using a balloon and an empty bottle (in table groups) to begin the discussion on gases and how scientists classify them. - Follow up activity with the cap on the bottle squeezing it then comparing it to how it feels with a water bottle full of water. Begin discussion on how scientists classify liquids. - Have students stand up and “act out” what the atoms of the solid, liquid, and gas look like in the corresponding state. - Investigate activity to think about if sand and shaving cream are classified as solids or liquids. - Watch a video to summarize what we learned. <p style="text-align: center;">*As we go through activities we will work through filling out the Matter Worksheets *</p> | | | | | |
| Evaluation <ul style="list-style-type: none"> - Using the worksheet to determine what students understood, what still needs to be understood. Formative evaluation. | | | | | |
| Materials <ul style="list-style-type: none"> - Hammer - 7 plastic water bottles - 6 balloons - Shaving cream; plate - Sand; 2 cups - Printed out: 6 Solids, Liquids, Gases 26 Matter Worksheets | | | | | |

Use presentation to guide lesson:

☐ October 13 Lesson Plan: Matter

What is Matter?

- Group discussion surrounding what matter could be, ask students examples of matter ~1 minute
- What is matter explanation ~1 minute
 - Matter is anything with mass and takes up space
 - Mass is the amount of material that makes up an object
 - Matter is everything we can touch, see, or feel
 - Ask the broad question "What makes up matter?"
- What makes up matter (video) ~7 minutes
 - Matter is made up of atoms! Atoms are so small that we can't see them without special equipment. Remember that matter is anything we can see touch or feel!

What are the 3 States of Matter?

- Introduction & group activity ~7 minutes
 - Solids: the atoms are really close together
 - Liquids: The atoms are close together, but not as close as solids
 - Gas: the atoms are very far apart
 - **ACTIVITY:** hand out the solids, liquids, gases table document and have students work in groups to put examples of each in the table
- Solids & Hammer demonstration, worksheet ~5 minutes
 - **Hammer demonstration:** use the hammer and lightly tap on a desk to show that it's solid
 - Explain that the atoms of a solid are very close together and are very attracted to each other. They vibrate as a group which makes solids stay in the same shape even without a container.
 - Show the animation video
 - Direct students to looking at Question 1 under solids, have them draw what atoms in a solid look like
- Gases introduction activity, explanation & worksheet ~10 minutes
 - Ask students question 1 and the follow up question on the worksheet
 - **Activity:** Give students one bottle and balloon per table, tell them that they need to place the balloon over the top of the bottle carefully then squeeze the balloon to see what happens
 - Worksheet: Answering questions 2 and 3 under gases in table groups

Possible

Adaptations/Modifications:

- Some students may require a little more assistance doing the worksheets, will require me to walk around and be aware of their locations in the classroom
- Keeping in mind students that have struggles with reading, all questions will be read aloud to the class before they do them. Additionally, I will walk around the classroom to make sure they understood what I read/said.

Management Strategies:

- Include a timer when doing activities to keep on time
- Walk around the classroom to ensure students stay on task when working on worksheets or activities

Safety Considerations:

- No harmful chemicals are being used
- When getting up and moving around, a student may trip over a chair; solution is to make sure they don't get 'too crazy'
- Discuss expectations surrounding the activities before
- Place the balloon over the top of the bottle carefully
- Squeeze the bottle with pressure but not a lot of pressure
- When passing around the bottle full of water, pass it nicely around the classroom

- Explain: The atoms in gases aren't attracted to each other and move around freely. Because the atoms act like this they are able to spread out to fill any container they are put in.
- Show animation
- Gases end activity ~4 minutes
 - **Activity:** have students put the lids back on the bottles and squeeze the bottles.
 - Show the animation
 - **Worksheet:** Answer questions 4, 5, and 6 in table groups
- Liquids: ~7 minutes
 - Show students the full bottle of water and have them pass it gently around the classroom to feel it.
 - While students are passing it around and getting the chance to feel it discussion about liquids
 - Liquid atoms are closer together than gas atoms but further away than solid atoms. The atoms are somewhat attracted to each other and only move around a little bit. Because of the way liquid atoms interact with each other, liquids are able to take the shape of any container we put them into.
 - Show animation
 - **Worksheets:** Questions 1-4 under liquids. Have students work in table groups to answer the questions. Walk around and see if any of the groups need help.
- Summary wrap up of solids, liquids, gases & kinesthetic activity ~7 minutes
 - Tell students they are all going to stand up and act out what the atoms look like in solids, liquids, and gases.
 - Tell students to show what solid atoms look like (should get close together, not moving around alot)
 - Tell students to show what liquid atoms look like (should get farther apart and move around a little bit)
 - Tell students to act out what gas atoms look like, remind them to be safe with how they are moving around (get far apart and moving around quite a bit)

Inquiry about sand & shaving cream


- Demonstration & Discussion & Worksheet ~6 minutes
- **Demonstration:** put shaving cream on the plate and ask students If you don't touch it, does the pile of shaving cream keep its shape without a container?
 - Does this mean it's a solid?
 - No, if you look closely at the shaving cream, it's actually a liquid containing a lot of little gas

bubbles. The combination of a liquid with a lot of little gas bubbles causes the liquid to keep its shape like a solid.

- Direct students to fill out questions 1 & 2 on the worksheet
- **Demonstration:** pour the sand from one cup to the other cup and ask students: Does the sand take the shape of the cup?
 - Does this mean that sand is considered a liquid?
 - No, Each piece of the sand is a solid but because the pieces are so small when you pour them they take on the shape of the container
- Direct students to fill out questions 3 & 4 on the worksheet

Note: this may be skipped if running out of time

Wrap up video

- Located in the slide show 3 minutes
-  States Of Matter - Solids, Liquids & Gases | Propert...

1 hour lesson

Reflection

Students were extremely engaged throughout the entirety of this lesson and the “breaks” in lecture style for them to do hands-on activities worked extremely well. In some cases it was difficult to get the students to redirect their focus back to “listening” again, but once they were reminded it was alright. It may be necessary to have students bring the bottles to the front of the classroom in between the different trials. I do believe that this could have been altered into being a more inquiry style lab, but the structure of the lesson worked well.

Teacher Comments

- Very Clear instructions
- Introduction & Group Activity: AWESOME! Went through them as a class
- Calm, easy going voice
- Kids responded well to you and asked for help when needed
- Ask more leading questions before explaining. Give opportunities for them to answer