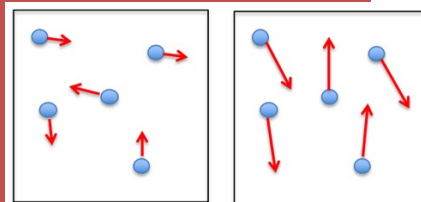
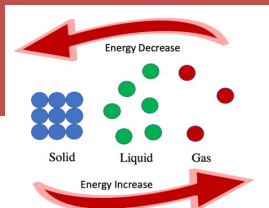


Matter and the Particle Theory

Middle School 5E Lesson

The 5E model is a scientifically proven method to improve student engagement and learning in your classroom



- ✓ Engagement
- ✓ Exploration
- ✓ Explanation
- ✓ Elaborate
- ✓ Evaluate



TWF

Complete Teacher Instructions



Matter and the Particle Theory - 5E Lesson

Matter and the Particle Theory

Ongoing

Lesson Objective:

Students will learn about the following:

- Matter
- States of Matter
- Solids, Liquids, and Gases
- State Conversions
- Particle Motion and Kinetic Energy
- Temperature
- Heat Transfer and Thermal Energy
- The states of matter → cooking and food preservation
- How does atmospheric pressure affect the states of matter?

Possible Student Misconceptions:

- Matter is either solid or liquid: Some students don't realize that matter can change state.
- Particles in solids don't move: Students may think that particles in solids are static.
- Cold objects have "cold particles".
- All gases are visible: Students may believe that all gases are visible like smoke or steam.
- Mass and weight are the same: Confusing mass with weight is a common misconception.
- Atoms and molecules are the same: Some students may use the terms atoms and molecules interchangeably, not understanding that an atom is the smallest unit of an element and a molecule is a group of atoms bonded together.
- Heat and temperature are the same: Students often confuse heat with temperature.

Materials:

- 1 device (smartphone, Chromebook, laptop, tablet, or computer) per 3 students
- A means of projecting a presentation
- Internet access
- General classroom objects

Teacher Notes:

- The presentations as well as the student notes are in Google and Office formats and can easily be used in class or online.
- All videos can be accessed directly from the presentation. To retrieve them, click on the video icon while in slideshow mode and it will automatically open for you. If it does not, right-click on the image and click **Edit Hyperlink** or something similar.
- I've created a video walkthrough if needed. It can be accessed here - <https://youtu.be/oCIKIP9SaDQ>
- I don't believe in long lessons. If you feel your students are losing their focus, stop the presentation and give them a 5-minute break. If you'd like to show more videos, I recommend my video collection here - <http://www.teachwithfergy.com/science>. There are tons of brain-break videos to choose from all grouped by category.

Matter and the Particle Theory - 5E Lesson

Engagement Phase

There are two options for the engagement phase depending on the level of your students. Both are readings that include comprehension and extension questions.

1. *Properties of Matter - Science Reading Article - Grade 5-7*
2. *Matter - Exploring the World Around You - Reading Article - Grade 8 and Up*

Teacher Notes:

- The students will watch a short video introducing cell organelles and answer questions related to the video. This is an excellent way to introduce the topic to your students.

Exploration Phase

Exploration - Lab Station Activity

- In groups of 2-3, have your students complete *'Matter and the Particle Theory - Lab Station Activity'*. Once they're done, they will submit their passport to you.

Teacher Notes:

- The complete instructions for my Lab Station activity can be found in the *START HERE - Instructions* file.

Explanation Phase

Lesson

- Complete the lesson *'Particle Motion, Temperature, and States of Matter MS Lesson.'*
- In the lesson, there are multiple embedded videos and plenty of opportunity to engage, interact and check for your students' understanding throughout the lesson.

Teacher Notes:

- All videos can be accessed directly from the presentation. To retrieve them, click on the video icon while in slideshow mode and it will automatically open for you. If they don't open, right-click the image and select **Edit Hyperlink** or something similar.
- I've created a video walkthrough if needed. It can be accessed here - <https://youtu.be/oCIKIP9SaDQ>

Duration: 1 hour

Teacher Role - Facilitate learning and guide student understanding

Goals

- ☐ Connect student's experiences
- ☐ Create interest
- ☐ Ask questions
- ☐ Understand the objectives of the lesson

Duration: 1 hour

Teacher Role - Facilitate learning and guide student understanding

Goals

- ☐ Students receive experiences with
- ☐ Students use a creative thinking
- ☐ Students make observations, results, and make connections

Duration: 1-2 hours

Teacher Role - Explain concepts by presenting material found in the presentation.

Goals

- ☐ Students develop understanding of content
- ☐ Observations are discussed and
- ☐ Students develop vocabulary
- ☐ Students are able to connect the concepts presented to previous experiences

Elaborate Phase

There are two options for the elaborate phase depending on what you want to do in your classroom. Feel free to do either or both.

This phase involves the students completing an activity or assignment that forces them to expand their thinking and knowledge of the topic.

1. *'Particle Theory and Matter Classification - Digital Interactive Notebook Pages'*
2. *'Matter and the Particle Infographic Assignment - Middle School Science'*

Teacher Notes:

- Students will work individually or in small groups
- Students will need one device per group

Evaluate Phase

Have your students complete the following activity - *'Matter - Speed Quizzing.'*

Your students will demonstrate their understanding and evaluate their own progress

Duration: 1-3 hours

Teacher Role - Facilitate learning and keep students focused

Goal

- ☐ Students use their newly obtained knowledge to propose solutions and extend their learning to new situations

Duration: 1 hour

Teacher Role - Distribute and collect.

Goal

- ☐ Students are given the opportunity to demonstrate their understanding and evaluate their own progress

Each phase is clearly described

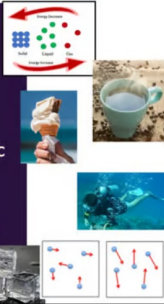
Complete Lesson



Particle Motion, Temperature, and States of Matter

Included in your bundle:

- Matter
- States of Matter
- Solids, Liquids, and Gases
- State Conversions
- Particle Motion and Kinetic Energy
- Temperature
- Heat Transfer and Thermal Energy



Middle School

Videos embedded directly into the slides.
One-click access.

Solids

- _____
- Think of an ice cube in a glass
- Molecules are close together
- Fixed volume
 - Difficult to compress (squeeze into smaller space)



Solid



Solids

- Fixed shape and so it does not take the shape of its container
- Think of an ice cube in a glass
- Molecules are close together
- Fixed volume
 - Difficult to compress (squeeze into smaller space)



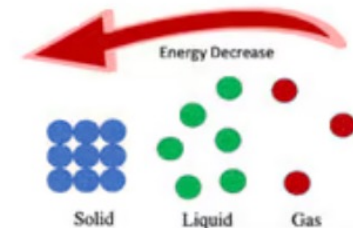
Solid



Conversion



- If you remove energy, the opposite happens
- Removing energy will cause the particles to lose kinetic energy and move slower
- Gases will become liquids which will then become solids



Student and Teacher versions of the presentations.

Interactive and Engaging Activities

TWF

Speed Quizzing

All matter is composed of ____.

particles

A ____ buoyant object will float.

positively

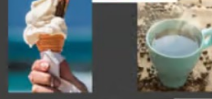
A fast-moving review activity where students quiz each other, swap cards, then move on to someone new.




Matter and the Particle Theory Lab Station Activity

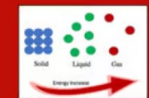
Station 1
Get Hands-On - Draw water molecules (three spheres) and label them. Draw the water molecules (H₂O) and label them. Draw the water molecules (H₂O) and label them.

Station 5
Applicability Reading - Read the following information article and answer the associated questions found below in the Applicability Reading section of your passport.


Matter Science Reading Comprehension Article - Grade 8 and Up

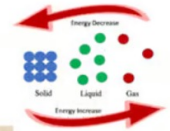
The Properties of Matter Exploring the Building Blocks of the Universe





MATTER AND THE PARTICLE THEORY INFOGRAPHIC ASSIGNMENT

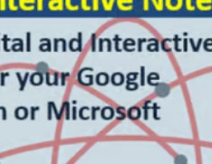
- Students are tasked with creating an infographic that demonstrates their understanding of photosynthesis
- Full rubric included





Chapter 1: Particle Theory and Classification of Matter Digital Interactive Notebook Pages

- 100% Digital and Interactive
- Perfect for your Google Classroom or Microsoft OneDrive





The Properties of Matter Science Reading Comprehension Article - Grade 5-7

Improve your students' Scientific Literacy and Analysis Skills, use as an Emergency Substitute Plan or Create Applicability in your Classroom





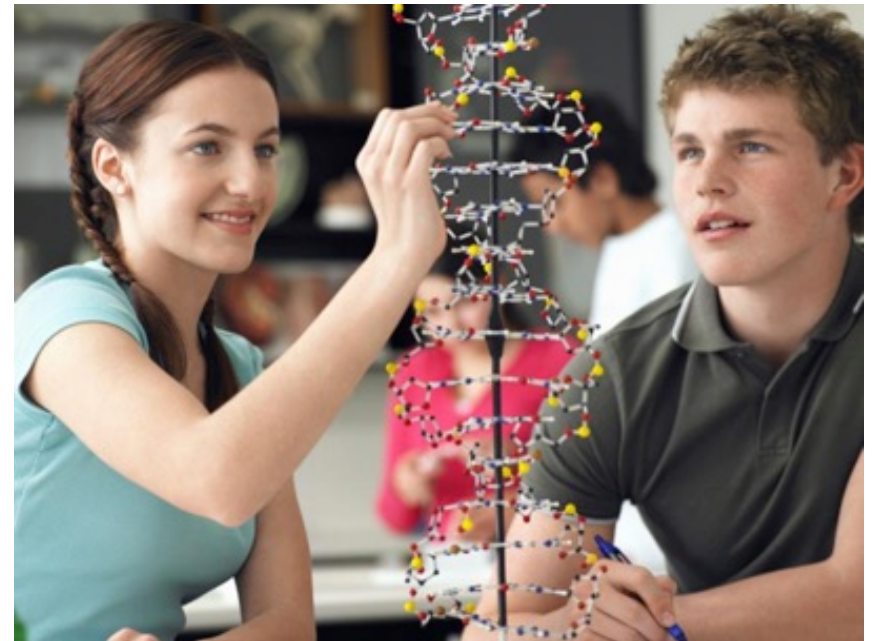
Get away from tired practices and unengaged students



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Provide a Scientifically-Proven means of instruction

TWF



Incorporate Technology and Increase Collaboration



TWF

