

Lesson 2.1: Physical Science - Introduction

Weekly Focus: Introduction
Weekly Skill: Comprehension

Lesson Summary: This week students will take a pre- self-evaluation to determine their background knowledge in Physical Science. They will also work with vocabulary for physical science and a reading passage as an introduction to this area of the GED science module in order to become more familiar with its content.

Materials Needed:

- Self-evaluation **Unit 2.1 Handout 1**
- Video **“What is Matter” Unit 2.1 Video** (time 1:16 min.)
- Video questions **Unit 2.1 Handout 2**
- Comprehension reading **Unit 2.1 Handout 3**
- **Matter, Unit 2.1 Handout 4** (6-Way Paragraphs, Introductory Level, pages 2-3)

Objectives: Students will be able to...

- Activate prior knowledge in physical science
- Read passages with vocabulary related to physical science

College and Career Readiness Standards: RI, RST, WHST, SL

ACES Skills Addressed: EC, LS, ALS, CT, SM

Notes: Please review and be familiar with classroom routine notes for: reading for fluency strategies (**Routine 2**), summarizing techniques (**Routine 4**), and self-management skills (**Routine 1**). The notes will help with making a smooth transition to each activity

GED 2014 Science Test Overview – For Teachers and Students

The GED Science Test will be 90 minutes long and include approximately 34 questions with a total score value of 40. The questions will have focus on three content areas: life science (~40%), physical science (~40%), and Earth and space science (~20%). Students may be asked to read, analyze, understand, and extract information from a scientific reading, a news brief, a diagram, graph, table, or other material with scientific data and concepts or ideas.

The online test may consist of multiple choice, drop down menu, and fill-in-the-blank questions. There will also be a short answer portion (suggested 10 minutes) where students may have to summarize, find evidence (supporting details), and reason or make a conclusion from the information (data) presented.

The work students are doing in class will help them with the GED Science Test. They are also learning skills that will help in many other areas of their lives.

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Activities:

Warm-Up: Journal Writing	Time: 10 - 15 minutes
As students enter the class, have students write in their journals, on a piece of notebook paper, or discuss with small groups the following: <u>"What do you think is involved in the study of physical science?"</u> Note: write the question on the board or overhead. Circulate while students are writing. If students seem to be stuck with this question, try to prompt them with questions about what they already know about physical science (physics and chemistry) and what science classes they have had earlier. Other prompts may include having students think of vocabulary they associate with physical science.	

Activity 1: Pre- Self evaluation (Unit 2.1 Handout1)	Time: 10 – 15 minutes
<ol style="list-style-type: none"> 1) Hand out a self-evaluation sheet (<u>Unit 2.1- Handout 1</u>) for students. 2) Have student rate their background knowledge of physical science by using the Likert rating scale. Remind students this is a way for them to assess their own knowledge and determine which areas they may need to work on during this unit. 3) Check to see if students are comfortable with sharing their self-evaluations. You can ask them how they answered each question, or they can share in pairs or table groups. 4) Remind students to keep the evaluation in their folder/binder/notebook. Students will reassess with the bottom portion of the sheet (<u>Unit 2.1 Handout 1</u>) at the end of the unit. 	

Activity 2: What Is Matter? Video with note taking – Unit 2.1 Handout 2)	Time: 20 - 30 minutes
<ol style="list-style-type: none"> 1) Hand out <u>Unit 2.1 Handout 2</u> to students. 2) Explain to students they will watch video and take notes and answer questions from the video. The notes are for their own information and background knowledge on the matter. 3) Preview questions with students (this is a good skill for test taking) checking to make sure they understand what the question is asking. Students may already have some background knowledge which they can use as predictions. 4) Ask students to write down questions they may have from the video. 5) After watching video, review answers to questions as a whole class. 	

Break: 10 minutes

Activity 3: Main Idea Reading (Unit 1 Handout 3)	Time: 45 minutes
<ol style="list-style-type: none"> 1) Hand out (<u>Unit 2.1 Handout 3</u>) to students. 2) Discuss with students that when reading, they should pay close attention to what all of the passage is about. Inform students the passage will go more in depth than the video regarding what matter is. It will also incorporate a lot of the vocabulary from the video. 3) Ask students to read the passage and answer the questions that follow. Circulate the class while students are working independently to help as needed. Remind students to review the guide words in bold on the left to help with new vocabulary. 4) When students are finished, review answers as a whole class. 	

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5) Ask for students to share their answers if they would like. If there is time, you may have students practice reading for fluency and read the passage to each other in pairs.

Wrap-Up: Summarize

Time: 5 minutes

Have students turn to a partner (or write in their journals) to share what they have learned today about matter. Ask them to tell a partner what matter is in one or two sentences. *Note: Use **Routine 4**.*

Extra Work/Homework: Unit 2.1 handout 4

Time: 30 minutes outside of class

Students can read and answer questions from the **6-way Paragraphs** (Introductory Level) reading #1 (pages 2-3) "Matter". This is **Unit 2.1 Handout 4**. This is an excellent opportunity for students to review today's material in an independent manner.

Differentiated Instruction/ELL Accommodation Suggestions	Activity
If some student groups finish early, they can turn their paper over and summarize the reading passage.	Activity 3, Handout 3
Teachers should be aware that ELLs could have some difficult time with writing some of the video. Encourage them to take notes that are meaningful to them. They do not have to write every word but only the words that are important to remember the main idea.	Activity 2, handout 2

Online Resources: <http://www.readworks.org/>

Suggested Teacher Readings:

- GED Testing Service – GED Science Item Sample (to get an idea of what the test may be like)

<http://www.gedtestingservice.com/itemsamplerscience/>

- Assessment Guide for Educators: A guide to the 2014 assessment content from GED Testing Service:

<http://www.riaepdc.org/Documents/ALALBAASSESSMENT%20GUIDE%20CHAPTER%203.pdf>

- Minnesota is getting ready for the 2014 GED test! – website with updated information on the professional development in Minnesota regarding the 2014 GED.

http://abe.mpls.k12.mn.us/ged_2014_2

- Essential Education's 2014 GED Test Curriculum Blueprint (PDF)

<http://www.passged.com/media/pdf/educators/curriculum-blueprint.pdf>

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Unit 2.1 Handout 1

Pre- and Post- Self Evaluation

Pre-Evaluation – Physical Science

Statement	Self-Rating				
1. I can define basic vocabulary in the building blocks of matter: matter, atom, molecule, nucleus, element, and compound.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
2. I can describe chemical properties and reactions related to living systems.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
3. I can describe forms of energy and the conservation, transition, and flow of energy.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
4. I can describe work, motion, and forces in physical science.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
5. I can summarize and paraphrase the main idea in physical science passages.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree

Post-Evaluation – Physical Science

Statement	Self-Rating				
1. I can define basic vocabulary in the building blocks of matter: matter, atom, molecule, nucleus, element, and compound.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
2. I can describe chemical properties and reactions related to living systems.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
3. I can describe forms of energy and the conservation, transition, and flow of energy.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
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Unit 2.1 Handout 2

What Is Matter Video

While watching the short video, try to answer some of the following questions. There is also space for you to write your own questions on the subject.

1. What is matter?
2. What is an atom?
3. What are the three parts of an atom?
4. What are the different types of atoms called?
5. What is the Periodic Table?

What are your questions about matter? How can you find answers to these questions?

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Unit 2.1 Handout 2

What Is Matter Video – ANSWER KEY

While watching the short video, try to answer some of the following questions. There is also space for you to write your own questions on the subject.

1. What is matter?

Matter is anything that has mass (quantity of an object) and volume (the space and object occupies).

2. What is an atom?

An atom is the basic unit of this matter.

3. What are the three parts of an atom?

Protons – neutrons – electrons – they are found inside of the atom

4. What are the different types of atoms called?

Elements (with different numbers of protons, neutrons, and electrons)

5. What is the Periodic Table?

It is a list of all the known elements.

What are your questions about matter? How can you find answers to these questions?

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Unit 2.1 Handout 3 (3 pages of reading passage and 3 pages for questions for a total of 6 pages)

ReadWorks

Structure and Properties of Matter

Structure and Properties of Matter

Everything in our physical world is made of matter. Whether it's a synthetic or natural object, a bowl of cereal, a bike pump or a torrent of hail, it has essential physical properties that define its character as matter.

When we use matter or react to it, we think about it in all sorts of different ways. If we are playing basketball, we think about where the ball is going to go in physical space and how we can control it. If we are making a sandwich, we think about different combinations of flavors and how to make the sandwich taste as good as possible by combining those flavors. If we are deciding what to wear in the morning, we think about the visual qualities of different clothes, imagining what the most appealing combination might be.

As scientists, we can think about matter in two categorical ways. We can think about its physical properties, and we can think about its chemical properties.

Physical properties have to do with the matter itself; chemical properties have to do with how that matter exists in relation to the matter around it.

In the case of, say, a basketball, as scientists, we might think about properties like its appearance (round, knobby texture, orange color), buoyancy (Does it float? Yes.), or conductivity (no, it can't carry an electrical current). Other physical properties, some immediately observable and some only discernible under testing, are boiling point, density, ductility, hardness, magnetism, malleability, mass, melting point, and odor.

These include physical properties we can test using just our five senses and properties we test more rigorously using scientific tools. We can change some of the physical properties of matter, while others are fixed, unless we alter them with the interference of other substances. For instance, we can take a big block of cheddar cheese and chop it into tiny pieces, even put it in a blender, and turn it into cheese puree. That changes the cheese's texture, but not its color. Also, the cheese still has the same level of facility in carrying electrical current. You won't be able to stretch the cheese like a rubber balloon or use it to scratch glass, like a diamond. The blended cheese will still have the same mass as the original block of cheddar. Put it on some nachos and have a snack.

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Structure and Properties of Matter

Another category is matter's chemical properties. Chemical properties are defined by one kind of matter's reaction to other conditions, or types of matter on a chemical level. The product of a chemical reaction is irreversible. When wood burns in a fire, for instance, it changes from wood into ash and smoke. That ash and smoke will never be wood again.

You can usually tell when a chemical change is taking place because there will be a telltale signal. If a substance is changing color, giving off heat, foaming, fizzing, or bubbling, or producing sound or new light, it's probably undergoing some kind of chemical reaction!

Next time you're watching fireworks, take a second to appreciate how many chemical changes and reactions are taking place moment by moment, one right after the other—sometimes right on top of one another. While we can appreciate that chemical changes are always happening all around us, it's fascinating to see a display of chemical change that's designed to express itself so dramatically!

Fireworks are a unique art form based on manipulating the changing chemical properties in reactive matter. Chemists who design fireworks have the fun job of creating exciting-looking-and-sounding chemical reactions between substances. Their first priority is safety, of course. Firework specialists, or pyrotechnicians, are responsible for unleashing those reactions in a carefully choreographed sequence, specially designed to make the show as tense and exciting as possible.

One thing all matter has in common is that its basic building block is the atom. Raisins are made up of atoms. Glass windows and chandeliers are made of atoms. Your parents are made up of atoms. Leonardo Da Vinci's painting the *Mona Lisa* is made up of atoms. The air we breathe is made up of atoms.

Atoms are so tiny that we can't see them—even with the aid of powerful microscopes. Different fundamental types of matter—we call them elements, and they're all listed on the Periodic Table of the Elements—are made up of atoms with different but discrete chemical structures. There are about one hundred elements, and together those elements compose everything in the known physical universe.

Atoms are made up of even smaller component structures. Again, there's no way for us to observe these structures physically. That's what sets them apart from the physical properties of matter, which, as we know, are discernible to our five senses. But those physical properties

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Structure and Properties of Matter

all answer to their basic chemical makeup. The buoyancy of raisins in a bowl of cereal isn't just a random trait. It's because the type of atoms in a raisin is constructed to behave in certain ways in relation to the atoms around it.

On the Periodic Table of the Elements, scientists have, over time, placed different essential atomic types of matter into different groups, based on their atomic or chemical makeup. Those basic materials can combine in practically infinite ways. It's exciting to think about the creative and organic possibilities that matter holds for the future.

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Questions: Structure and Properties of Matter

Name: _____ Date: _____

1. What two categorical ways of thinking about matter are discussed in the passage?

- A solid and liquid
- B natural and unnatural
- C physical and chemical
- D beneficial and harmful

2. What is compared and contrasted with the physical properties of matter in the passage?

- A a painting by Leonardo Da Vinci
- B the Periodic Table of Elements
- C the appearance of a basketball
- D the chemical properties of matter

3. If a substance is producing sound or new light, it is probably undergoing a chemical reaction. The explosion of fireworks produces sound and light.

Based on this information, what is a likely conclusion?

- A The explosion of fireworks is an example of a chemical reaction.
- B The explosion of fireworks is an example of a physical reaction.
- C Chopping a big block of cheese into pieces is an example of a chemical reaction.
- D Chopping a big block of cheese into pieces creates light.

4. A glass bowl falls on the floor and breaks into little pieces. What kind of change has taken place?

- A a physical change
- B a chemical change
- C a psychological change
- D a biological change

5. What is the passage mostly about?

- A fireworks
- B matter
- C scientists
- D magnetism

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ReadWorks

Questions: Structure and Properties of Matter

6. Read this sentence: "In the case of, say, a basketball, as scientists, we might think about **properties** like its appearance (round, knobby texture, orange color), buoyancy (Does it float? Yes.), or conductivity (no, it can't carry an electrical current)."

What does the word "**properties**" mean above?

- A problems or difficulties
- B increases or expansions
- C qualities or characteristics
- D changes or transformations

7. Choose the answer that best completes the sentence below.

Matter can be thought of in two categorical ways, _____, physical and chemical.

- A instead
- B namely
- C earlier
- D later on

8. What is an example of a physical property?

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Questions: Structure and Properties of Matter

9. What is an example of a chemical change?

10. Which is easier to observe, the physical or chemical properties of an object? Support your answer with evidence from the passage.

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ReadWorks

Teacher Guide & Answers: Structure and Properties of Matter

Teacher Guide & Answers

Passage Reading Level: Lexile 1130

1. What two categorical ways of thinking about matter are discussed in the passage?

- A solid and liquid
- B natural and unnatural
- C **physical and chemical**
- D beneficial and harmful

2. What is compared and contrasted with the physical properties of matter in the passage?

- A a painting by Leonardo Da Vinci
- B the Periodic Table of Elements
- C the appearance of a basketball
- D **the chemical properties of matter**

3. If a substance is producing sound or new light, it is probably undergoing a chemical reaction. The explosion of fireworks produces sound and light.

Based on this information, what is a likely conclusion?

- A **The explosion of fireworks is an example of a chemical reaction.**
- B The explosion of fireworks is an example of a physical reaction.
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- A **a physical change**
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ReadWorks

Teacher Guide & Answers: Structure and Properties of Matter

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What does the word "**properties**" mean above?

- A problems or difficulties
- B increases or expansions
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7. Choose the answer that best completes the sentence below.

Matter can be thought of in two categorical ways, _____, physical and chemical.

- A instead
- B **namely**
- C earlier
- D later on

8. What is an example of a physical property?

Suggested answer: Students may name any physical property mentioned in the passage. Examples include mass, buoyancy, and color.

9. What is an example of a chemical change?

Suggested answer: Students may name any chemical change mentioned in the passage. Examples include burning and changing color.

10. Which is easier to observe, the physical or chemical properties of an object? Support your answer with evidence from the passage.

Suggested answer: Answers may vary, as long as they are supported by the passage. For instance, students may respond that physical properties are easier to observe because they often do not require anything besides the object itself to see. Observing a chemical property requires the presence of additional matter or a change in conditions. A person can tell at a glance that a stick is brown (a physical property), while they would have to try setting it on fire to determine that it is flammable (a chemical property).

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Matter (2.1 Handout 4)

TEACHER ANSWER KEY

Main Idea

- a. = **M** – main idea
- b. = **B** – broad idea
- c. = **N** – narrow idea
- 2. subject matter = **a**
- 3. supporting details = **d**
- 4. conclusion = **c**
- 5. clarifying devices = **d**
- 6. vocabulary in context = **a**