

X. What Is Physical Science?

by 3andB Staff Writer | May 14, 2025

Standard: MS-PS Overview

The World of Physical Science

Physical science is the study of non-living systems and the basic laws that govern our universe. Ever wondered what makes stars shine or why your skateboard rolls downhill? That's physical science at work!

The Building Blocks of Our Universe

Physical science focuses on matter and energy - the basic stuff that makes up everything around us. Matter is anything that has mass and takes up space, from the air you breathe to your favorite graphic novel. Energy is what allows things to move or change, like the heat that warms your hot chocolate or the electricity powering your video games.

Scientists in this field use math, technology, and careful testing to find patterns in natural events. These discoveries help us understand how our world works and create cool technologies that make our lives better.

Physical science is the study of non-living matter and energy, including physics (forces, motion) and chemistry (substances and their properties).



Students exploring the microscopic world during their physical science lab.

Branches of Physical Science

Physical science splits into several cool fields, each looking at different parts of our world:

Physics studies motion, forces, and energy. When you kickflip your skateboard or play a video game, you're seeing physics in action! Physics explains why a soccer ball curves when kicked and how your phone can connect to satellites far above Earth.

Chemistry looks at what things are made of and how substances mix and change. Chemistry shows why your bike might rust in the rain, why baking soda and vinegar create an explosion for science fair volcanoes, and how the medicines in your cabinet work.

Astronomy explores objects in space, from planets to stars to galaxies. Through astronomy, we learn about our place in the universe and all the amazing objects you can spot with a telescope or binoculars.

Earth science studies our planet's structure and history. This includes everything from cool rocks and crystals to oceans, weather, and how mountains form over time.

Materials science is where chemistry and physics team up! These scientists design and study new materials with special properties. Think about the ultra-light metals in your bike frame or the super-tough glass on your phone screen. Materials scientists created those! They're also developing new "smart materials" that can change shape or color based on temperature or electricity.

How Physical Science Affects You

You might be thinking, "Why should I care about physical science?" The truth is, it affects almost everything you do! Your favorite sports use physics - from the perfect curve of a baseball pitch to why swimmers wear those sleek suits in competitions. The chemicals in your shampoo, sunscreen, and even the dyes that color your clothes were all developed using chemistry principles.

Have you ever wondered why your smartphone doesn't overheat even when you've been playing games for hours? That's because engineers used their knowledge of thermodynamics (a branch of physics) to design cooling systems. Even music connects to physical science - the sound waves that create your favorite songs follow patterns that physicists study!

Solving Tomorrow's Challenges

Physical science helps us tackle big problems in our world. Scientists are creating new clean energy sources like solar panels. They're inventing better ways to clean dirty water and making new medicines that work better.

Climate scientists use physical science to understand how our atmosphere works. They can predict how weather patterns might change. Engineers use these same ideas to design cars and buildings that use less energy and create less pollution.

Connections to Other Sciences

Physical science works together with other sciences. It connects with life sciences when we study how your body uses energy from food. It teams up with earth sciences to explain how volcanoes work or what causes hurricanes.

The same rules that explain why your basketball falls when you drop it also help explain how plants grow and how weather forms. Everything connects!

Physical science helps us understand our universe, from tiny atoms to massive galaxies. When you learn physical science, you gain cool knowledge for solving real problems and an awesome appreciation for the amazing world all around you.

Did You Know?

Lightning Science: Lightning is hotter than the surface of the sun! Lightning reaches about $30,000^{\circ}\text{C}$, while the sun's surface is only about $5,500^{\circ}\text{C}$.

Invisible Matter: About 85% of all matter in the universe is "dark matter" that we cannot see! Scientists only know it exists because of its gravitational effects on galaxies.

X. What Is Physical Science?

GUIDED NOTES

Key Terms

Define the following important terms from the article:

1. Physical Science: _____
2. Matter: _____
3. Energy: _____
4. Physics: _____
5. Chemistry: _____

Main Concept Overview

Fill in the blanks to complete these important statements about physical science.

Word Bank: energy, materials, technologies, systems, problems

1. Physical science studies non-living _____ and the basic laws of our universe.
2. Matter and _____ are the building blocks that make up everything in our universe.
3. Scientists use physical science discoveries to develop new _____ that improve our lives.
4. Materials scientists design and study new _____ with special properties.
5. Physical science helps us tackle big global _____ like climate change and pollution.

Matching Section

Match each branch of physical science with its correct description:

- | | |
|----------------------------|--|
| _____ 1. Physics | A. Studies objects in space like planets and galaxies |
| _____ 2. Chemistry | B. Examines what things are made of and how substances mix and change |
| _____ 3. Astronomy | C. Studies our planet's structure, oceans, weather, and history |
| _____ 4. Earth Science | D. Studies motion, forces, and energy |
| _____ 5. Materials Science | E. Combines chemistry and physics to design new substances with special properties |

True/False Questions

Mark each statement as True or False:

1. _____ Physical science only studies living things.
2. _____ Chemistry helps explain why some metals rust in the rain.
3. _____ The same scientific principles that explain why a basketball falls also help explain weather patterns.
4. _____ Physical science discoveries are not used in everyday technology.
5. _____ Engineers use physical science principles to design more efficient buildings and vehicles.

Fill in the Table

Physical Science Branch	Examples in Your Daily Life
Physics	
Chemistry	
Astronomy	
Earth Science	
Materials Science	

Critical Thinking Questions

1. How might understanding physical science help you solve a problem at home or at school? Give a specific example and explain your reasoning.

2. If all knowledge of physical science suddenly disappeared, what technologies or activities in your daily life would be most affected? Explain why.

X. What Is Physical Science? - Reflection Questions

#1

How does physical science influence the technology you use every day?

Think about the devices you rely on most. Consider the physical science principles that make your phone, headphones, or game systems work. How might understanding these principles change how you use or care for these items?

#2

Which branch of physical science most interests you, and why?

Consider what aspects of physics, chemistry, astronomy, earth science, or materials science spark your curiosity. Think about what questions you'd like to explore further and how this field connects to your personal interests.

#3

What's one way you use physical science when cooking or preparing food?

Think about heating, cooling, mixing, or measuring ingredients. How does understanding physical science help you make better food or understand what happens during cooking?

X. What Is Physical Science? - - Reflection Questions

#4

What physical science principles do you observe in your favorite sport or hobby?

Consider the forces, energy transformations, or materials involved in activities you enjoy. How might understanding the science behind these activities help you improve your skills or appreciation of them?

#5

If you could invent something new using physical science, what would it be?

Think about a problem you'd like to solve or something that would make life more fun. How might understanding physical science help you create this invention?

#6

What's the most surprising thing you learned about physical science in this chapter?

What fact or idea was most unexpected or interesting to you? How does it change how you think about the world around you?

X. What Is Physical Science? - Hypotheticals

Scenario: Mysterious Ice Cubes

You put two ice cubes in different cups. One cup has plain water, and the other has salt water. You notice the ice cube in salt water floats higher than the one in plain water. You remember learning about physical properties in science class.

Questions:

- a) What physical property explains why ice floats in water?
- b) Why might adding salt to water make the ice float differently?
- c) How could this knowledge be useful in your everyday life?

Scenario: Playground Physics

You and your friend are on the swings at the playground. You notice that pushing harder makes you go higher, and tucking your feet under makes you swing faster. You're curious about the physics involved.

Questions:

- a) What gives you energy when you first start swinging?
- b) Why does tucking your feet change how fast you swing?
- c) How could you help a younger student swing higher using what you know about physics?

TERM	DEFINITION
Astronomy	
Chemistry	
Earth Science	
Energy	
Matter	
Materials	
Physical Science	
Physics	
Systems	
Technology	

Physical Science

L F B H B S T F P G T U Y D O K B L F L R Y S S
J N Q E H G F N G H X E Y P V Q R V E C H Q K D
M G C L J F E T U Z Y I C B K A V K Z Y W Q S Y
I A G Q X T W F W S E S O J C Q L V N P N G K S
V E T W V C S Z T H V I I D M V V L U I C O Z Y
A P Z E W L D R C T H H I C S A M B R O P F B C
D Y Z E R P W P R H C C A L S P Z C E X T E U P
O I V X Q I G E T E E Q V M T P C A H W H I F C
R P D G S Y A G N O P M D H A N V H N P E Q J X
J Y Y U Z L C L H E V A I W G T H H J S R E Q A
G R A U I I N P S D R Z Y S N T T Q V I M B E N
J F S X F R P J C D V G F N T L V E Y O O H Z G
Y O T D G R K N X M I Q Y V Z R I D R B D T X O
A Y R C E B D K N Q N N W Q N S Y U Y U Y P Y T
I O O L X K R I P Z J O W E T Z T R P L N N D R
R K N V T D M R M Q D S U B S T A N C E A J J Q
H Q O H U T C M I B U J C K A A C K C N M E A I
D Y M S A J I A J R N J X C K B I H K L I D D G
N Y Y M G I Q B U O W M Q E O H B P B Y C H I U
U K P I I A B H M C K B F J A J M B A D S T J T
E K N D M Q N Q W D U A O R B R M U R N Y I T P
M J W O B F U E H G X K R T R B T L D Z D V S S
J N T I O W B M J W J L C J U U Z H L D E V D G
A L U P X Y I V T T L J E V T W Q L C O P T S U

Thermodynamics

Substance

Physics

Materials

Matter

Force

Energy

Earth

Chemistry

Astronomy

Physical Science

Across

6. A push or pull that can change an object's motion, like gravity pulling a skateboard downhill.

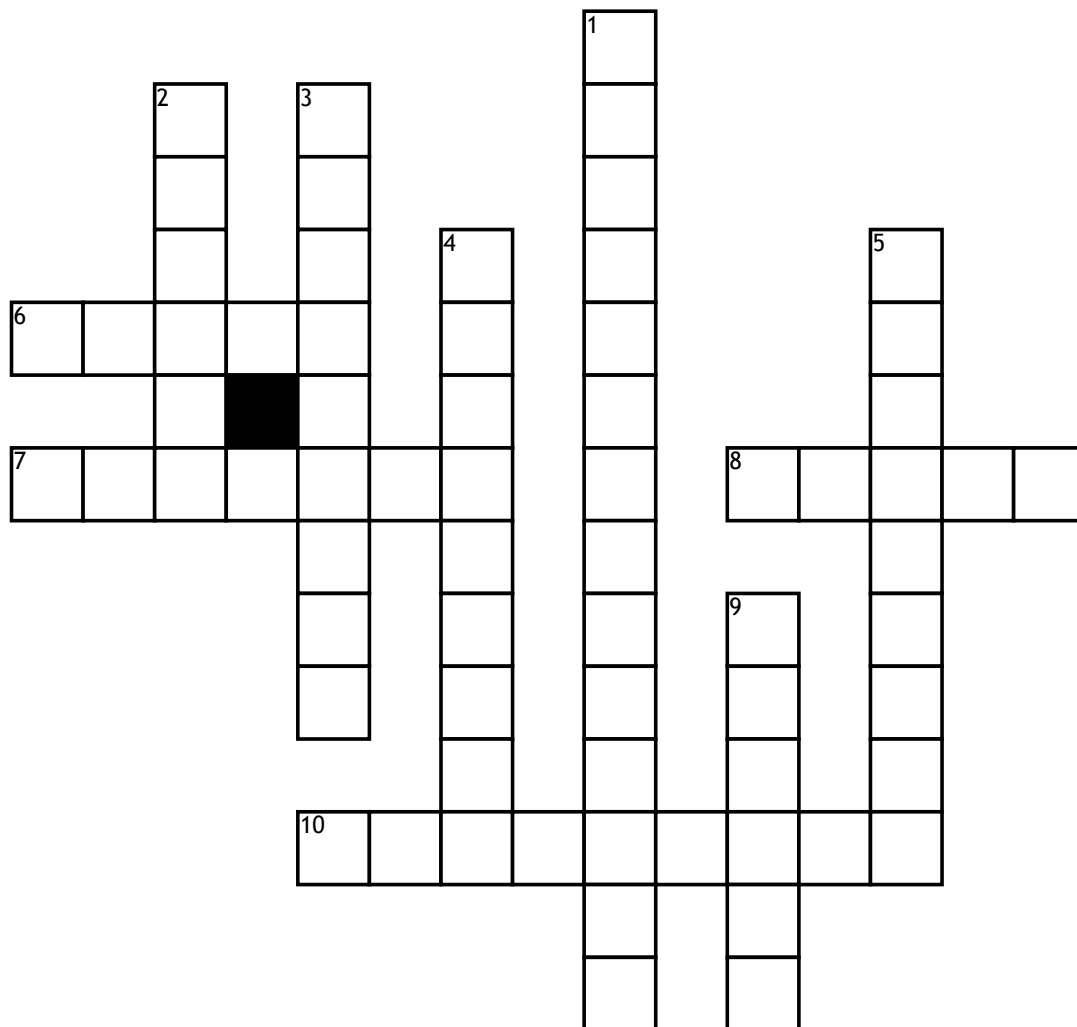
7. The study of motion, forces, and energy that explains how things move and interact.

8. The study of our planet's structure and history, including rocks, oceans, weather, and mountain formation, _____ Science

10. The branch of physical science that examines what substances are made of and how they mix and change.

Down

1. The branch of physics dealing with heat and temperature and their relation to energy and work.



2. What allows things to move or change, such as heat warming hot chocolate or electricity powering video games.

3. The field where chemistry and physics combine to design and study new materials with special properties, _____ Science

4. A specific type of matter with consistent properties, like water, metal, or salt.

5. The study of objects in space, including planets, stars, and galaxies.

9. Anything that has mass and takes up space, from air to books to people.