Unit 2: Matter & Its Interactions
7th Grade Honors Science
20 Class Meetings

Revised January 2026

Essential Questions

- How do chemical reactions change living things?
- How are photosynthesis and cellular respiration connected through the movement of matter and energy in living things?

Enduring Understandings with Unit Goals

EU 1: Atoms make up everything from simple molecules to extended structures.
- Identify the relevant components of simple molecules and extended structures.
- Describe relationships between atoms and molecules.

EU 2: Chemical reactions can change physical compositions of matter but do not change the type of atom in the reactant
- Distinguish between substances at the macro level.
- Determine whether a chemical reaction has occurred and identify the product.

EU 3: Physical and chemical changes to natural resources that impact society.
- Compare and contrast the physical and chemical properties of matter.
- Demonstrate and explain the effects of physical change in daily activity.

EU 4: Matter and energy are constantly transformed and recycled through photosynthesis and cellular respiration, allowing living things to grow, survive, and maintain balance in ecosystems.
- Explain how photosynthesis converts light energy into chemical energy by rearranging matter to produce glucose and oxygen.
- Explain how cellular respiration breaks down glucose to release usable energy and how this process connects to photosynthesis through the cycling of matter and flow of energy.

Standards

Next Generation Science Standards:
- MS-PS1-1**:** Develop models to describe the atomic composition of simple molecules and extended structures.
- MS-PS1-2**:** Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
- MS-PS1-3**:** Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.
- MS-PS1-4**:** Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
- MS-PS1-5**:** Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.
- MS-PS1-6: Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of an organism
- MS-PS1-7: Develop a model to describe how food is rearranged through chemicals forming new molecules that support growth and/or release energy as matter moves through an organism.

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Common Core State Standards:

- 7.RP.A.1**:** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
- 7.RP.A.2**:** Recognize and represent proportional relationships between quantities.
- 7.RP.A.2c**:** Represent proportional relationships by equations.
- CCSS.ELA-LITERACY.RL.7.1: Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

ISAAC Vision of the Graduate Competencies

Competency 1: Write effectively for a variety of purposes.
Competency 2: Speak to diverse audiences in an accountable manner.
Competency 3: Develop the behaviors needed to interact and contribute with others on a team.
Competency 4: Analyze and solve problems independently and collaboratively.
Competency 5: Be responsible, creative, and empathetic members of the community.

Unit Content Overview

1. **Atomic Composition**
   - Identify the relevant components of simple molecules and extended structures.
   - Describe relationships between atoms and molecules.

2. **Molecular State**
   - Discover substances (solids, liquids, and gases).
   - Determine whether a chemical reaction has occurred.
   - Compare and contrast physical and chemical properties before, during, and after an interaction.
   - Compare and contrast pure substances and mixtures.

3. **Synthetic materials come from natural resources.**
   - Discover chemical processes for creating synthetic materials.
   - Distinguish between and explain how physical and chemical properties contribute to the function of a synthetic material.
   - Demonstrate and explain the effects of the production and use of synthetic resources.

4. **Photosynthesis and Cellular Respiration**
   - Explain the purpose, reactants and products of photosynthesis and cellular respiration using words, diagrams and equations.
   - Explain how energy is transformed.
   - Use models and evidence to explain how photosynthesis and cellular respiration support growth, repair, and survival.

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Key Terms and Vocabulary: matter, atom, element, molecule, physical property, chemical property, states of matter, solid, liquid, gas, conservation of matter, physical change, chemical change, temperature, reaction, reactants, products, mass, photosynthesis, carbon dioxide, oxygen, sunlight, cellular respiration, ATP, glucose

Interdisciplinary Connection:

- Language Arts, Math

Daily Learning Objectives with *TWPS Activities*

Students will be able to…

- Compare and contrast the characteristics of the states of matter.
  - *Describe the different states of matter? How are they different?*
- Determine and explain whether a chemical reaction has occurred.
  - *How do you know if a chemical reaction has occurred?*
- Distinguish between physical and chemical properties before, during, and after an interaction.
  - *Describe what physical changes you notice in the labs at the beginning, middle and end.*
- Analyze and interpret data to identify patterns in the characteristics of properties of substance. **
  - *What observations can we make from the data? Describe the changes.*
- Collaboratively plan and carry out an investigation in a closed system.
  - *How is a closed system different from an open system?*
- Compare and contrast pure substances and mixtures.
  - *How are pure substances and mixtures the same and different?*
- Explain the matter is not created or destroyed during a chemical reaction**
  - *Do you think the total mass before and after the reaction is the same or different?*
- Discuss the relationship between pressure and the state of matter in a system.
  - *How does adding different types of energy change states of matter?*
- Contemplate and explain why the number and types of atoms do not change in a chemical reaction, they are just rearranged.
  - *Describe the behaviors in atoms during a chemical reaction.*
- Develop a model where the reactants and products, in a reaction, are identified.
  - *Identify and label the reactants and products. How do they interact?*
- Develop and revise a model to predict and describe interactions between particles.
  - *Describe the chemical reaction that occurs in plants.*
- Describe how plants get energy and explain why energy is needed for life processes.
  - *How does light energy transfer into sugar?*
- Identify the reactants and products of photosynthesis.
  - What is the process of photosynthesis? (In words, diagrams, or an equation)
- Explain how matter is conserved and how light energy is transformed into chemical energy during photosynthesis.
  - *Do plants **create new matter** during photosynthesis, or do they only **rearrange existing matter** while changing light energy into chemical energy? Defend your answer with evidence.*
- Explain how cells release energy from food and why all organisms need cellular respiration

- *Why do organisms need oxygen to breathe?*
- Identify the reactants and products of cellular respiration.
  - *What are the reactants and products of cellular respiration, and how do they show that matter is conserved?*
- Explain how matter is rearranged in cellular respiration and how chemical energy is converted into usable energy.
  - *Which is more important in cellular respiration: conserving matter or releasing usable energy? Support your claim.*
- Demonstrate content knowledge for success on the unit exam.

Instructional Strategies/Differentiated Instruction

- Whole group instruction
- Guided notes
- Student-led instruction
- Independent problem-solving
- Collaborative problem-solving
- Graphic Organizer
- Cross-curricular problem solving (independent and collaborative)
- Accountable Talk
- Homework
- Word walls with visuals
- Small group instruction
- Interactive Notebook
- Warm up activities
- Flexible grouping
- Independent reading
- Lab Demonstrations
- Exit slips
- Investigations/labs

EL Differentiated Instruction:

- Sentence starters
- Simplified directions
- Prompting and questioning
- Alternate responses when needed
- Explicit modeling
- Key vocabulary
- Visuals
- Vocabulary word bank
- Reading and accountable talk discussions of texts
- Tiered Instruction
- Hands-on activities
- SIOP strategies- Teachers implement SIOP strategies

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Assessments

FORMATIVE ASSESSMENTS:

- Warm-ups (NGSS IAB)
- Whiteboards
- Mid-class check-ins
- Exit Slips
- Accountable Talk Discussions
- Think Write Pair Share TWPS
- Student-led instruction
- CER (Claim Evidence Reasoning)
- Homework
- Performance Task- Photosynthesis and Cellular Respiration
    - Teacher's Scoring Guide

SUMMATIVE ASSESSMENTS:

- Pear Assessment Quiz - EU 1, EU 2
- Pear Assessment Quiz – EU 3, EU 4
- Performance Task- Photosynthesis and Cellular Respiration
- Unit 2 Summative Test

Unit Task

Unit Task Name: Photosynthesis and Cellular Respiration

Description: In this unit task, students will demonstrate their understanding of photosynthesis, cellular respiration, and chemical reactions by completing diagrams, analyzing chemical reactions, and interpreting data. On the first day, students will choose photosynthesis or chemical respiration to complete a diagram (EU4), identify the type of reaction, and explain how the process happens. (EU1, EU2, EU3). On the second day, students will graph data related to both processes, describe and explain trends in the graph. Students will explain why the graph goes up or down using evidence from photosynthesis and cellular respiration, showing how matter is rearranged and energy flows through a living system.

Evaluation: Unit Task Teacher Scoring Guide

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Unit Resources
● Next Gen Science Standards ● Khan Academy ● Open Sci Ed ● Flipped Google Classroom Videos ● Newsela - Higher Level Text ● Worksheets ● Calculator ● Laptops ● Google Slides ● NGSS Practice ● Kids Discovery Infographics ● Pear Assessment ● Turner's Graph of The Week ● Diffit.com

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