# Unit 5 - Chemical Reactions

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

## Unit Overview

To identify a mysterious reddish-brown substance appearing in the pipes of a fictional town, students use digital and physical models and hands-on observations to investigate how atoms are rearranged into different patterns to form new substances during chemical reactions (scale, proportion, and quantity; patterns). Students apply their understanding to construct explanations about how the reddish-brown substance formed as a result of a chemical reaction between the pipes and fertilizer in the water supply.

## Enduring Understandings

How do substances change into different substances during chemical reactions?

## Essential Questions

How do new substances form?
How can you tell one substance from another?
Why do different substances have different properties?
Can substances change into different substances?
How do substances change into different substances during chemical reactions?
What happens to atoms during a chemical reaction?

## Learning Objectives

Different substances have different properties.
Things that are too small (or too large) to see can be studied with models.
Substances have different properties because they are made of different groups of atoms. These groups vary in the type or number of atoms that make up the group.
Groups of atoms repeat to make up a substance.
During a chemical reaction, one or more starting substances (reactants) change into one or more different substances (products).
During a chemical reaction, atoms do not change from one type to another.
During a chemical reaction, atoms rearrange to form different groups of atoms.
During a chemical reaction, all of the atoms that make up the reactants rearrange to form the products.
During a chemical reaction, atoms cannot be created or destroyed.
Identify and measure physical and chemical properties of matter
Describe and model the difference between atoms, molecules, and compounds
Use the periodic table to identify similarities in elements

Conduct physical changes and chemical reactions and use signs of a chemical reaction to identify them
Model how matter is not created or destroyed in a chemical reaction through experiments, measurements, and chemical formulas
Create heat or cold packs to demonstrate chemical reactions gaining or losing energy
Determine the difference between a natural resource and a synthetic material and identify the chemical reactions that create synthetic materials
Science Innovators Scrapbook Project. (Lessons satisfy the following legislative requirements: DEI, LGBTQIA+ & People w/ Disabilities, AAPI, Climate Change, and Amistad.

## Standards: Content

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| 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-PS1-5 | 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 | Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. |

## Standards: Interdisciplinary

## Assessment Evidence

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| Formative | Teacher observations, Class discussions, Lab Activities, Key concepts and vocabulary quizzes, Warm Ups, Open Ended Responses, Modeling, Simulations, Innovators Monthly Research |
| Summative | In correlation with the NJSLS, students must demonstrate the following as summative assessments:<br>MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures.<br>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.<br>MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.<br>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.<br>MS-PS1-6. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.<br><br>Other summative assessments will include but are not limited to: projects, summative tests, |

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| | lab skills demonstrations, vocabulary quizzes, and Science Fair projects. |
| Alternative & Benchmark | Alternative assessments as required by student IEP/504/I&RS- Read to the student and chart oral responses. Word banks, sentence frames, oral responses, graphic organizers, observations, orally administered assessments, and anecdotal notes.<br>Benchmark – LinkIt Benchmark Assessment, Teacher Generated Assessments |
| Assessment Evidence Resource | |

## Instructional Resources

Smartboard, Computers, Websites and digital interactives/models, Multi-media presentations, Video Streaming, Amplify Digital Curriculum, Generation Genius, BrainPop, Microsoft 365, Primary and Secondary Source Documents, Lab Materials as needed, Amplify Readings, Labs, Simulations

Instructional Resource List

## Curricular Mandates

*Below are the curricular requirements as defined in NJ Administrative Code and Statute*

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| X | Amistad | X | Diversity, Equity, and Inclusion |
| X | Holocaust | X | LGBT and Disabilities (Grades 6-12) |
| X | Climate Change | X | Asian American & Pacific Islander |

## Social Emotional Learning (SEL) Competencies

*NJ Social and Emotional Learning Competencies & Sub-Competencies*

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| | Self-Awareness | | Relationship Skills |
| X | Responsible Decision-Making | X | Social Awareness |
| | Self-Management | | |

## 21st Century Skills & Themes

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| X | Global and Cultural Awareness | X | Technology Literacy | | Planning and Budgeting |
| X | Creativity and Innovation | | Financial Institutions | | Risk Management and Insurance |
| X | Information and Media Literacy | | Digital Citizenship | | Economic and Government Influences |
| X | Critical Thinking and Problem Solving | | Credit Profile | | Career Awareness and Planning |
| | Civic Financial Responsibility | | Financial Psychology | | |