Unit 01: Material Magic: Properties & Phases of Matter

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

Standards Alignment

New Jersey Student Learning Standards

PS1: Matter and Its Interactions
PS1.A: Structure and Properties of Matter

Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)

Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)

A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

PS1.B: Chemical Reactions

Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)

ETS1: Engineering Design
ETS1.A: Defining and Delimiting an Engineering Problem

Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) (secondary to K-ESS3-2)

Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)

ETS1.B: Developing Possible Solutions

Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-1) (secondary to K-ESS3-3) (secondary to 2-LS2-2)

ETS1.C: Optimizing the Design Solution

Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-1) (secondary to 2-ESS2-1)

SCI.2-PS1	Matter and Its Interactions
SCI.2.PS1.A	Structure and Properties of Matter
SCI.2.PS1.B	Chemical Reactions
SCI.2.ETS1.B	Developing Possible Solutions
SCI.2.ETS1.C	Optimizing the Design Solution

2-PS1-3	Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
2-PS1-4	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
2-PS1-2	Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.
2-PS1	Matter and its Interactions
3-5-ETS1	Engineering Design
3-5-ETS1-1.ETS1.A	Defining and Delimiting Engineering Problems

Integration of Career Readiness, Life Literacies and Key Skills

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Technology / Integration of Computer Science and Design Thinking

TECH.8.1.2	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.2.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.2.E.1	Use digital tools and online resources to explore a problem or issue.
TECH.8.2.2	Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
TECH.8.2.2.B	Technology and Society: Knowledge and understanding of human, cultural and society values are fundamental when designing technology systems and products in the global society.
TECH.8.2.2.B.1	Identify how technology impacts or improves life.

TECH.8.2.2.C	Design: The design process is a systematic approach to solving problems.
TECH.8.2.2.C.1	Brainstorm ideas on how to solve a problem or build a product.
TECH.8.2.2.C.2	Create a drawing of a product or device that communicates its function to peers and discuss.

Interdisciplinary Connections: NJSLS for ELA, Social Studies, Science and/or Math Section

	Craft and Structure
LA.K-12.NJSLSA.R4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
LA.RI.2	Reading Informational Text
LA.K-12.NJSLSA.W	Writing
LA.RI.2.4	Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.
LA.K-12.NJSLSA.W2	Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
LA.K-12.NJSLSA.SL	Speaking and Listening
	Comprehension and Collaboration
LA.K-12.NJSLSA.SL1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
LA.W.2.2	Write informative/explanatory texts in which they introduce a topic, use evidence-based facts and definitions to develop points, and provide a conclusion.
LA.SL.2.1	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
LA.SL.2.1.A	Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).
LA.SL.2.1.B	Build on others' talk in conversations by linking their explicit comments to the remarks of others.
LA.SL.2.1.C	Ask for clarification and further explanation as needed about the topics and texts under discussion.

Integration of Diversity, Equity and Inclusion; Climate Change; Informational and Media LiteracyNew Section

see Crosswalks

21st Century Life and Careers

Stage I: Desired Results

Transfer/Overview/Rationale

Transfer / Overview / Rationale
Unit Rationale The purpose of this unit… **Students will develop the idea that by taking advantage of the properties of materials, we can solve many problems in our lives.**

Meaning

Essential Questions

Essential Questions

Why do we wear clothes?

Can you really fry an egg on a hot sidewalk?

Why are so many toys made of plastic?

What materials might be invented in the future?

Enduring Understanding/Indicators of Understanding

Enduring Understanding/Indicators of Understanding

1. Materials have a set of unique properties that determine their use.
2. Manmade materials of everyday objects are chosen based on their properties.
3. Important properties of materials are whether they are an insulator, a conductor, or if a material is meltable.
4. All meltable material melts at different temperatures.
5. New materials are constantly being invented and made into products that could be available in the future.

Acquisition (Student Learning Objectives)

Knowledge

Knowledge

Students will know…

- Matter is anything that has mass and takes up space
- The physical properties of different states of matter
- The states of matter are solid, liquid, and gas
- A conductor allows heat to move through it
- An insulator does not allow heat to move through it
- A physical change of matter means the state of matter changes
- A chemical change of matter means a new substance is created

Skills

Skills

Student will be skilled at …

- recognizing how materials are chosen based on their properties
- defining the properties of opaque, insulating, conducting, and meltable
- identifying and analyzing the solid and liquid states of matter
- explaining why plastic was invented
- brainstorming futuristic inventions
- defining a problem
- conducting investigations
- analyzing data
- designing probable solutions

Stage 3: Learning Plan

Resource and Mentor Texts

Resources and Mentor Texts

www.mysteryscience.com

www.brainpop.com

Mentor Text/Read Alouds

Mason, A. (2005). Touch it! Materials, matter and you.

Beaty, A. (2013). Rosie Revere, engineer.

Hutts Aston, D. (2012). A rock is lively.

Stille, D. (2004.) Matter: See it, touch it, taste it, smell it.

Van Dusen, C. (2007). If I built a car.

Beaty, A. (2007). Iggy Peck, architect.

Spires, A. (2014). The most magnificent thing.

Hanson, A. (2011). Melting matter.

Zoehfeld, K.W. (2015). What is the world made of? All about solids, liquids and gasses.

Ross, M.E. (2007). What's the matter in Mr. Whiskers' room?

Braun, E. (2012). Joe Joe the wizard brews up solids, liquids and gasses.

MyMatterFlipbook.pdf
Notebook Section Cover

Formative Assessment Strategies

Formative Assessment Strategies

- Participation in class discussions (thumbs up, thumbs down, turn & talk)
- Science notebooks
- Written responses to discussion questions within each mystery
- Teacher observation during discussion groups
- Prepared written quizzes
- Exit Tickets
- Content check-ins using Kahoot, Nearpod, Quizizz
- Graphic Organizers

Learning Activities/Unit of Study

Learning Activities/Unit of Study

- attached Mystery Science Lessons 1-6

Matter-Mystery1

Matter-Mystery2

Matter-Mystery3

Matter-Mystery4

Matter-Mystery5

Modifications and/or Accommodations

Suggested Modifications (ELL, Sp. Ed, GIfted, At-risk of Failure)

English Language Learners

Native language support: The teacher provides auditory or written content to students in their native language.

Adjusted Speech: The teacher changes speech patterns to increase student comprehension. This could include facing the students, paraphrasing, clearly indicating the most important ideas, and speaking more slowly.

Visuals: The teacher uses graphics, pictures, visuals, and manipulatives. This helps ELL students better understand and comprehend the subjects at hand.

Front-Loading Vocabulary: The teacher front loads vocabulary. This means providing students with a list of important vocabulary words they will need to know for a book, lesson, etc. prior to the lesson being taught. Including pictures to go with the vocabulary words is also very beneficial for the students.

Special Education Students

Chunking: The teacher presents information in a way that makes it easy for students to understand and remember. Chunking is based on the presumption that our working memory is easily overloaded by excessive detail. The best way to deliver information is to organize it into meaningful units. Because students with special needs get overloaded easily, chunking is an effective strategy to use with them.

Checking for Understanding: It is important to constantly check for understanding, especially for students who have accommodations. Teachers want to make sure students understand the concepts being covered in a way that makes sense to them.

Extra time: The teacher provides students with special needs extra time to complete work or answer questions. It is important to give students enough time to process their thoughts.

Oral Reading: The teacher will read work orally to students. Class work such as tests and literature circles may need to be read aloud to the student.

Timers: The teacher will use timers as an instructional tool. The use of timers is beneficial for students who have trouble completing tasks. Timers can be helpful so the student is aware of how

much time they have to complete an assignment.

Students with 504 Plans

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Gifted & Talented Strategies

Extensions/Enrichments: Teachers will provide gifted and talented students with extension/enrichment projects. Students will be challenged to further their understanding, to apply acquired knowledge, and/or to produce something in reference to acquired knowledge.

Modify/Change Activities: Teachers will monitor and modify activities to accommodate those students who need to be challenged further. Additional reading, problem-solving, writing, or project work is necessary for those students who are ready to move on at a rate more accelerated than their peers. In this way, G & T students are provided the same opportunity for support as special needs students.

Students at Risk of School Failure

Directions or Instructions: Make sure directions and/or instructions are given in limited numbers. Give directions/instructions verbally and in simple written format. Ask students to repeat the instructions or directions to ensure understanding occurs. Check back with the student to ensure he/she hasn't forgotten.

Peer Support: Peers can help build confidence in other students by assisting in peer learning. Many teachers use the 'ask 3 before me' approach. This is fine, however, a student at risk may have to have a specific student or two to ask. Set this up for the student so he/she knows who to ask for clarification before going to you.

Alternate or Modified Assignments: Always ask yourself, "How can I modify this assignment to ensure the students at risk are able to complete it?" Sometimes you'll simplify the task, reduce the length of the assignment or allow for a different mode of delivery. For instance, many students may hand something in, the at-risk student may jot notes and give you the information verbally. Or, it just

may be that you will need to assign an alternate assignment.

Increase One to One Time: When other students are working, always touch base with your students at risk and find out if they're on track or needing some additional support. A few minutes here and there will go a long way to intervene as the need presents itself.

Contracts: It helps to have a working contract between you and your students at risk. This helps prioritize the tasks that need to be done and ensure completion happens. Each day write down what needs to be completed, as the tasks are done, provide a checkmark or happy face. The goal of using contracts is to eventually have the student come to you for completion sign-offs.

Hands On: As much as possible, think in concrete terms and provide hands-on tasks. This means a child doing math may require a calculator or counters. The child may need to tape record comprehension activities instead of writing them. A child may have to listen to a story being read instead of reading it him/herself.

Tests/Assessments: Tests can be done orally if need be. Break tests down in smaller increments by having a portion of the test in the morning, another portion after lunch and the final part the next day.

Seating: Seat students near a helping peer or with quick access to the teacher. Those with hearing or sight issues need to be close to the instruction which often means near the front.