Englewood Public School District
Science
Grade 5
First Marking Period

Unit 1: Properties of Matter

Overview: In this unit of study, students describe that matter is made of particles too small to be seen by developing a model. The crosscutting concept of *scale, proportion, and quantity* is called out as an organizing concept for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in *developing and using models*, *planning and carrying out investigations*, and use these practices to demonstrate understanding of the core ideas.

Time Frame: 15 days

Enduring Understandings: Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by means other than seeing.

Essential Questions:
How can properties be used to identify materials?
What kind of model would best represent/describe matter as made of particles that are too small to be seen?

Standards	Topics and Objectives	Activities	Resources	Assessments
(5-PS1-3): **Make observations and measurements to identify materials based on their properties.** **(5-PS1-1):** **Develop a model to describe that matter is made of particles too small to be seen.**	**Topics** Properties of Matter Twenty-First Century Themes and Skills include: • The Four C's • Environmental Literacy **Objectives** **<u>Matter Foldable and Matter Modeling</u>**: The student will identify the three states of matter, and model how the particles that	**<u>Matter Foldable and Matter Modeling:</u>** Students will use items such as buttons and pom poms to create 3D models of the particles in each state of matter**.** (5.MD.1, MP.4) **<u>Mystery Powders – Day 1:</u>** Using common white powders, observation, recording and deduction skills are practiced in this entry-level experiment. Students practice teamwork skills and develop lab	**<u>Matter Foldable and Matter Modeling:</u>** • <u>Foldable</u> • <u>Exit Slip</u> • Cardstock or other heavy paper for each student. • A lot of Items that can be used for 3D model (buttons, pompoms, beads, and tokens). • Craft Glue for each group to share. **<u>Mystery Powders Day 1:</u>** • <u>Safety Procedures</u> • <u>Observation Chart</u>	**Formative Assessments:** Do Now/Ticket to Leave Journal Entries **<u>Matter Foldable and Matter Modeling:</u>** Exit Slip **Benchmark Assessments:** Exact Path **Summative Assessments:** **<u>Mystery Powders – Day 1:</u>**

	are too small to be seen are arranged in each. **Mystery Powders – Day 1:** Students will learn to use clear and concise language while observing and recording evidence. **Mystery Powders – Day 2:** Students will record observations using precise language. **States of Matter – Part 1:** Students will observe the properties of states of matter. **The Particles of Matter:** Students will explain how matter is made up of small particles.	rapport. (MP.5, CRP4, CRP8, 5-PS1-3) **Mystery Powders – Day 2:** This lesson is a continuation of observations from Mystery Powders Day 1. We proceed with the vinegar test and watch it do crazy things to our white powders. (CRP4, RI.5.7, 5-PS1-1) **States of Matter – Part 1**: Students begin by discussing the three states of matter. Students then observe the properties of liquids, solids, and gases. At the end of this lesson, students explore whether or not air takes up space by conducting an investigation. (W.5.7, W.5.9) **The Particles of Matter:** Students will watch a video on atoms and defining key vocabulary words. Students then explore atoms, molecules, and elements by taking notes during a class discussion and the creation of a class poster. At the end of the lesson, students build upon their new understanding of atoms, molecules, and elements by completing their own research. (5.NBT.1, W.5.8, CRP6, 8.1.5.A.1)	• Labs File **Lesson Materials and Equipment:** • Powders: Salt, sugar, Epsom salt, baking soda, cornstarch, & white powdered laundry detergent. • Liquids: Tincture of iodine, vinegar, & grape juice. • Baby food jars (6 per group) or small glass containers • Plastic spoons (6 per group) • Goggles • Black construction paper • Blank overhead plastic transparencies • Plastic straws • Masking tape, & pens • Measuring teaspoons • Plastic trays to hold the baby food jars • Observation chart **Mystery Powders – Day 2:** • Vinegar • Evaporation Set Up • Observation Chart **States of Matter – Part 1:** • Lap book • Research Pocket • Sample Lap book • Water • Plastic Cups • Marble • Clay • Cotton balls **The Particles of Matter:** • Poster paper • Shared Source 1 • Shared Source 2	Evaporation Set Up Observation Sheet **Mystery Powders – Day 2:** Observation Sheet **States of Matter:** Air Investigation Lap Book **The Particles of Matter:** Poster **Alternative Assessments:** Students will measure and describe physical quantities such as weight, time, temperature, and volume. Charts, Performances, Observations Students will model with mathematics as they attempt to understand that matter exists even though it is made of particles too small to be seen. Entry/Exit tickets Students will conduct research by using text and media resources to build their knowledge of the physical properties of matter. Computer research, rubrics, Graphic organizers

		• Shared Source 3 • Shared Source 4 **Additional Resources:** **Books:** **Amazing Materials.** Sally Hewitt. Physical Science for 5th & 6th Graders **Web**: **http://sbsciencematters.com/lesson-units/5th-grade/5physical-chemistryandmatter/**	Students will draw evidence from informational texts to support their design choices as they build and share their models of matter at the particle level. Foldables, charts, PowerPoint presentations

Accommodations and Modifications:

Students with special needs: Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

ELL/ESL students: Students will be supported according to the recommendations for "can do's" as outlined by WIDA – https://www.wida.us/standards/CAN_DOs/
This particular unit has limited language barriers due to the physical nature of the curriculum.

Students at risk of school failure: Formative and summative data will be used to monitor student success at first signs of failure student work will be Reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations. More time and will be made available with a certified instructor to aid students in reaching the standards.

Gifted and Talented Students: Students excelling in mastery of standards will be challenged with complex, high level challenges related to the complexity In planning and carrying out investigations and analyzing and interpreting data.

English Language Learners	Special Education	At-Risk	Gifted and Talented
• Use project-based science learning to connect science with observable phenomena.	• Increase one on one and small group time • Utilize modifications & accommodations delineated in the	• Increase one on one and small group time • Using visual demonstrations, illustrations, and models	• Use project-based science learning to connect science with observable phenomena. • Curriculum compacting • Inquiry-based instruction

• Speak and display terminology • Teacher modeling • Peer modeling • Provide ELL students with multiple literacy strategies. • Word walls • Use peer readers • Give page numbers to help the students find answers • Provide a computer for written work • Provide two sets of textbooks, one for home and one for school • Provide visual aides • Provide additional time to complete a task • Use graphic organizers	student's IEP • Work with paraprofessional • Use multi-sensory teaching approaches. • Work with a partner • Provide concrete examples • Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA). • Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).	• Give directions/instructions verbally and in simple written format. Oral prompts can be given. • Peer Support • Teachers may modify instructions by modeling what the student is expected to do • Instructions may be printed out in large print and hung up for the student to see during the time of the lesson. • Review behavior expectations and make adjustments for personal space or other behaviors as needed. • Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).	• Independent study • Higher order thinking skills • Adjusting the pace of lessons • Interest based content • Real world scenarios • Student Driven Instruction • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understand-ings. • Structure the learning around explaining or solving a social or community-based issue. • Collaborate with after-school programs or clubs to extend learning opportunities.
Interdisciplinary Connections:			

ELA-NJSLS/ELA:
RI.5.7: Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-PS1-1)
W.5.7: Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (5-PS1-3)
W.5.8: Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-PS1-3)
W.5.9: Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-PS1-3)

Mathematics:
MP.4: Model with mathematics. (5-PS1-1), (5-PS1-2), (5-PS1-3)
MP.5: Use appropriate tools strategically. (5-PS1-2), (5-PS1-3)
5.MD.1: Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems. (5-PS1-2)**5.NBT.1:** Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents the place to its left.

Career Ready Practices:
CRP4: Communicate clearly and effectively and with reason.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
CRP6: Demonstrate creativity and innovation.

Integration of Technology Standards NJSLS 8:
8.1.5.A.1: Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

Integration of 21st Century Skills:
9.1.4.B.1: Participate in brainstorming sessions to seek information, ideas, and strategies that foster creative thinking.

Key Vocabulary:
Matter: Anything that has mass and takes up space.
Physical Property: are measured and observed without changing the matter.
Chemical Property: substances that have the ability to react or combine with each other to create a new substance.
Atoms: tiny building blocks of matter
Molecules: two or more atoms bonded together
Elements: more than one substance that cannot be broken down into similar substances.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations • Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (5-PS1-3) **Developing and Using Models** • Use models to describe phenomena. (5-PS1-1)	**PS1.A: Structure and Properties of Matter** • Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3) • Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. (5-PS1-1)	**Scale, Proportion, and Quantity** • Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-3) • Natural objects exist from the very small to the immensely large. (5-PS1-1)

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Unit 2: Changes to Matter

Overview: In this unit of study, students develop an understanding of the idea that regardless of the type of change that matter undergoes, the total weight of matter is conserved. Students determine whether the mixing of two or more substances results in new substances. The crosscutting concepts of *cause and effect* and *scale, proportion, and quantity* are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations* and *using mathematics and computational thinking*. Students are expected to use these practices to demonstrate understanding of the core ideas.
This unit is based on 5-PS1-4 and 5-PS1-2.

Time Frame: 15 days

Enduring Understandings:
When two or more different substances are mixed, a new substance with different properties may be formed.
The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.
No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Note: Mass and weight are not distinguished at this grade level.)

Essential Questions:
How can we make slime?
How can baking soda and vinegar burst a zip-lock bag?

Standards	Topics and Objectives	Activities	Resources	Assessments
(5-PS1-4): Conduct an investigation to determine whether the mixing of two or more substances results in new substances. **(5-PS1-2): Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing**	**Topics** Changes in Matter Twenty-First Century Themes and Skills include: • The Four C's • Environmental Literacy **Objectives** **<u>Time For Slime:</u>** Students will complete an investigation to determine if a new substance is produced when two substances are mixed.	**<u>Time For Slime:</u>** Students will mix borax, water and glue to form a slime mixture. Students will then investigate the properties of the new substance and compare them to the old substances. **<u>Is It a Chemical Reaction?</u>** Students will learn about chemical reactions and the signs that a chemical reaction took place by combining baking	**<u>Time For Slime:</u>** • Goggles • Elmer's Glue • 20 Mule Team Borax • Measuring Spoons • 2 small plastic cups • Popsicle stick • Water • Food coloring (optional) **<u>Is It a Chemical Reaction?</u>** • One empty Ziploc sandwich bag per group • 50-mL graduated cylinder (or paper cup) • Vinegar in plastic cups for students to pour into graduated cylinder • Baking soda in salsa cups • Eye droppers **<u>Physical Changes vs. Chemical Changes</u>**:	**Formative Assessment:** Do Now/Ticket to Leave Journals **<u>Time For Slime:</u>** Slime exploration **Benchmark Assessments:** Exact Path **Summative Assessments:** **<u>Is it a Chemical Reaction?</u>** Student Lab Report

substances, the total weight of matter is conserved.	**<u>Is It a Chemical Reaction?</u>** Students will be able to identify the signs of a chemical reaction. **<u>Physical Changes vs. Chemical Changes:</u>** Students will determine if changes in matter have created something new or not. **<u>Chemical Reactions:</u>** Students will prove that even though new substances are produced during chemical reactions, the beginning and ending mass/weight stays the same**.** **<u>Changing Matter:</u>** Students provide evidence to support their conclusion that the amount of matter present is conserved or is not conserved when matter changes state**.**	soda and vinegar. (5-PS1-4, MP.5, 5.MD.1) **<u>Physical Changes vs. Chemical Changes</u>**: Students make glue balls, lava lamps, origami dogs, and many more exciting things to help them differentiate between physical and chemical changes**.** (MP.4, MP.2) **<u>Chemical Reactions:</u>** Students examine how mixing baking soda and vinegar results in new substances. They also discover that the beginning and ending mass of this chemical reaction remains the same. (W.5.7, W.5.8, W.5.9, CRP4) **<u>Changing Matter:</u>** Students conduct a hands-on investigation to determine how matter, changing state, effects the property of weight. (5-PS1-2, CRP6,	• <u>Foldable</u> • <u>Investigation Sheet</u> • <u>Rotation Sheet</u> • **Station 1** - colored paper cut into squares for origami and <u>origami instruction template</u> that you can print off from the link in the Explore section. • **Station 2** - empty water bottles prefilled 3/4 full of vegetable oil, water, Alka Seltzer tablets, food coloring • **Station 3** - Aluminum foil cut into 10" x 10" squares, 50 - 80 pennies, tub for water • **Station 4** - Large Bowl, empty water bottle, vinegar, baking soda, balloon, funnel, spoon • **Station 5** - small cups, water, microwave, Borax, bottle of glue, craft sticks, Ziploc bag • **Station 6** - apple for each group, plastic knife, plate **<u>Chemical Reactions:</u>** **Materials:** • <u>10 Ziploc Freezer Quart Bags</u> (1 for each team) • <u>10 Cups of Baking Soda</u>* (1 for each team) • <u>10 Cups of Vinegar</u>* (1 for each team) • 30 pairs of goggles (1 for each student) • <u>Teacher Writing Prompt</u> **<u>Changing Matter:</u>** **Warm Up:** • A cup with a stick of butter in it for students to observe and record properties of • Whiteboard and marker for each group **Guided Practice:** • Microwave for melting the butter • <u>Is it the Same or Different - Comparison Chart</u> for each student **Explore:** • <u>Is It the Same or Different - investigating weight</u> for each student • Microwave • 3 thick plastic cups per group • 1 balance per group • 1 stick of butter per group	Student Drawings **<u>Physical Changes vs. Chemical Changes</u>**: Student Lab Sheets **<u>Chemical Reactions:</u>** Student notes Student paragraph **<u>Changing Matter:</u>** Student lab report **<u>Alternative Assessments:</u>** Conduct an investigation to determine whether the mixing of two or more substances results in new substances. Learning/Response Logs Students can conduct short research projects, using both print and digital sources, to build their understanding of physical changes to matter. Visual Representations, Graphic Organizers Use appropriate tools in strategic ways when measuring physical properties of

		CRP8, 8.1.5.A.1)	• 4 - 5 ice cubes per group • 1 Hershey's bar per group **Wrap Up:** • Freezer **<u>Additional Resources:</u>** **<u>Books:</u>** **<u>Change It! Solids, Liquids, Gasses and You</u>.** Adrienne Mason **<u>Web:</u>** **<u>https://newpathworksheets.com/science/grade-5</u>** **<u>https://www.havefunteaching.com/resource/science/physical-changes-matter-worksheet/</u>** **<u>https://www.science4us.com/elementary-physical-science/matter/changes-in-matter/</u>** **<u>https://betterlesson.com/lesson/639234/matter-and-heat-irreversible-changes</u>**	substances, such as weight or volume. Kinesthetic Assessments, Discussion, Questioning Model with mathematics when organizing data into tables or charts, and using the data as evidence to explain changes that occur. Graphic Organizers, Written Questions, Summary, Essay

Accommodations and Modifications:

Students with special needs: Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

ELL/ESL students: Students will be supported according to the recommendations for "can do's" as outlined by WIDA – https://www.wida.us/standards/CAN_DOs/
This particular unit has limited language barriers due to the physical nature of the curriculum.

Students at risk of school failure: Formative and summative data will be used to monitor student success at first signs of failure student work will be Reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations. More time and will be made available with a certified instructor to aid students in reaching the standards.

Gifted and Talented Students: Students excelling in mastery of standards will be challenged with complex, high level challenges related to the complexity In planning and carrying out investigations and analyzing and interpreting data.

English Language Learners	Special Education	At-Risk	Gifted and Talented
● Provide ELL students with multiple literacy strategies. ● Speak and display terminology ● Teacher modeling ● Peer modeling ● Word walls ● Use peer readers ● Give page numbers to help the students find answers ● Provide a computer for written work ● Provide two sets of textbooks, one for home and one for school	● Teachers may modify instructions by modeling what the student is expected to do ● Utilize modifications & accommodations delineated in the student's IEP ● Work with paraprofessional ● Use multi-sensory teaching approaches. ● Work with a partner ● Provide concrete examples ● Restructure lesson using UDL principals (http://www.cast.org/our	● Teachers may modify instructions by modeling what the student is expected to do ● Using visual demonstrations, illustrations, and models ● Give directions/instructions verbally and in simple written format. Oral prompts can be given. ● Peer Support ● Increase one on one time ● Instructions may be printed out in large print and hung up for the student to see during the time of the lesson. ● Review behavior	● Interest based projects ● Curriculum compacting ● Inquiry-based instruction ● Independent study ● Higher order thinking skills ● Adjusting the pace of lessons ● Real world scenarios ● Student Driven Instruction ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Use project-based science learning to connect science with observable phenomena. ● Structure the learning around

● Provide visual aides ● Provide additional time to complete a task ● Use graphic organizers	-work/about-udl.html#.VXmoXcfD_UA). ● Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).	expectations and make adjustments for personal space or other behaviors as needed. ● Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. ● Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).	explaining or solving a social or community-based issue. ● Collaborate with after-school programs or clubs to extend learning opportunities.

Interdisciplinary Connections:

ELA-NJSLS/ELA:
W.5.7: Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (5-PS1-2), (5-PS1-4)
W.5.8: Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-PS1-2)(5-PS1-4)
W.5.9: Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-PS1-2), (5-PS1-4)

Mathematics:
MP.2: Reason abstractly and quantitatively. (5-PS1-2)
MP.4: Model with mathematics. (5-PS1-2)
MP.5: Use appropriate tools strategically. (5-PS1-2)
5.MD.1: Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems. (5-PS1-2)

Career Ready Practices:
CRP4: Communicate clearly and effectively and with reason.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

Integration of Technology Standards NJSLS 8:
8.1.5.A.1: Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

Integration of 21st Century Skills:
9.1.4.B.1: Participate in brainstorming sessions to seek information, ideas, and strategies that foster creative thinking.

Key Vocabulary:
React: to undergo a reaction
Dissolve: to cause to pass into solution: dissolve salt in water
Chemical Reaction: The process in which two or more substances combine to make one or more new substances that have different properties than the original ones.
Mixture: A substance containing two or more materials with different properties
Law of Conservation of Mass: The mass of an object or collection of objects never changes, no matter how the parts are rearranged.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations • Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (5-PS1-4) **Using Mathematics and Computational Thinking**	**PS1.A: Structure and Properties of Matter** • The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2) **PS1.B: Chemical Reactions** • When two or more different substances are mixed, a new substance with different	**Cause and Effect** • Cause and effect relationships are routinely identified and used to explain change. (5-PS1-4) **Scale, Proportion, and Quantity** • Standard units are used to measure and describe physical quantities such as weight,

• Measure and graph quantities such as weight to address scientific and engineering questions and problems. (5-PS1-2)	properties may be formed. (5-PS1-4)	time, temperature, and volume. (5-PS1-2) - ***- Connections to Nature of Science*** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** • Science assumes consistent patterns in natural systems. (5-PS1-2)