8th Grade Science

Unit Title	**8.1 Properties of Matter**
Time frame	6.5 weeks
21st Century Themes	Creativity and Innovation Critical Thinking and Problem Solving Communication and Collaboration Productivity and Accountability Leadership and Responsibility
Interdisciplinary focus and technology integration	Technology Math Social Studies

Essential Questions

- What properties help to identify substances?
- How can water be used to determine the density of a substance?
- How does the movement of particles help to identify the states of matter?
- What are the implications of the ongoing development of the atomic theory?

Big Ideas

- Matter can be identified by its properties.

Learning Targets-students will be able to;

- Describe the motion of the particles of a substance relative to its state of matter.
- Identify substances by their physical properties.
- Explain how volume, temperature, and pressure of gas are related.
- Identify the structure/parts of an atom.
- Understand the development of the atomic theory.
- Recognize and apply the organization/information presented in the periodic table of elements.

Assessment

Rubrics	Teacher-Created Assessment
Lab Reports	Classroom Participation
Homework	
Completion	Group Participation

Differentiation

Hands-on Activities
Diagnostic Assessment
Kinaesthetic
Re-teaching
Enrichment Activities
Cooperative Learning
Peer Tutoring
Tiered Instruction
Alternative Assessment

Content Standards

5.1
5.2.6A.1-3
5.2.8.A.1-7

Approaches to Learning

Observation skills- observing and communicating data in a lab report

Analyzing skills – recognizing relationships

Evaluation skills- developing criteria for judging their own work

Scientific Inquiry Skills – formulate questions, hypothesize and conduct experiments

Inquiry skills – formulate questions, hypothesize and conduct experiments

Learning Experiences	Teaching Strategies
"Messing With Mixtures" lab "States of Matter Cartoon"	•Evaluation of lab reports, rubrics to assess writing, written assessment. •Peer/group discussion, lecture, board work, evaluations, discussion of lab work, use of technology. •Utilization of key terms.

Resources

Prentice Hall Science Explorer: Physical Science, 2009

8th Grade Science

Unit Title	**8. 2 Chemistry in Action**
Time frame	6.5 weeks
21st Century Themes	Creativity and Innovation Critical Thinking and Problem Solving Communication and Collaboration Productivity and Accountability Leadership and Responsibility
Interdisciplinary focus and technology integration	Technology Math

Essential Questions	**Big Ideas**
• How does conservation of mass apply to the interaction of materials? • What are the observable characteristics that a chemical reaction has occurred? • What two kinds of energy change can occur during a chemical reaction? • What does a chemical equation tell you? • What is the difference between an ionic bond and a covalent bond?	•Chemical reactions occur based on the structure of an atom. •The production of a new substance shows that a chemical reaction has occurred.

Learning Targets-students will be able to;

- Explain that the production of new substances having different properties shows that chemical reaction has occurred.
- Compare exothermic and endothermic reactions.
- Identify and describe three categories of chemical reactions.
- Apply the principle of conservation of mass to chemical reactions.
- Apply the learned knowledge about chemical reactions to write balanced equations.
- Compare and contrast physical properties of reactants with products after a chemical reaction.
- Determine the properties and relative strength of everyday acids and bases.
- Define and compare solutions, suspensions and colloids.

Assessment

Rubrics	Teacher-created Assessment
Lab Reports	Classroom Participation
Homework Completion	Group Participation

Differentiation

Hands-on Activities
Diagnostic Assessment
Kinaesthetic
Re-teaching
Enrichment Activities
Cooperative Learning
Peer Tutoring
Tiered Instruction
Alternative Assessment

Content Standards

5.1
5.2.6A.1
5.2.6A.2
5.2.6A.3
5.2.8.A.1
5.2.8.A.2
5.2.8.A.3
5.2.8.A.4
5.2.8.A.5
5.2.8.A.6
5.2.8.A.7

Approaches to Learning

Observation skills- observing and communicating data in a lab report

Analyzing skills – recognizing relationships

Evaluation skills- developing criteria for judging their own work

Scientific Inquiry Skills – formulate questions, hypothesize and conduct experiments

Inquiry skills – formulate questions, hypothesize and conduct experiments

Learning Experiences	Teaching Strategies
To be added by teacher	• Evaluation of lab reports, rubrics to assess writing, written assessment • Peer/group discussion, lecture, board work, evaluations, discussion of lab work, use of technology • Utilization of key terms

Resources
Prentice Hall Science Explorer: Physical Science, 2009

8th Grade Science

Unit Title	**8.3 Energy**
Time frame	6 weeks
21st Century Themes	Creativity and Innovation Critical Thinking and Problem Solving Communication and Collaboration Productivity and Accountability Leadership and Responsibility
Interdisciplinary focus and technology integration	Technology Math

Essential Questions	**Big Ideas**
• How are kinetic and potential energy related? • What causes the conversion of energy to occur ? • How are fossil fuels formed? • What is work? • How do machines do work? • What are simple machines?	• Energy is the ability to do work or cause change. • Energy can be transformed from one form to another, but cannot be created or destroyed. • Simple machines make work easier by changing the amount of force needed, the distance over which force is exerted, or the direction in which the force is exerted.

Learning Targets-students will be able to;

- Give an operational definition for force and motion and summarize their relationship.
- Apply the formulas used to calculate acceleration and momentum.
- Identify and describe Newton's Laws of Motion.
- Describe the motion of an object from various vantage points.
- Demonstrate and explain the frictional force acting on an object with the use of a physical model.
- Calculate speed of an object when given distance and time.
- Compare the motion of an object acted on by balanced forces with the motion of an object acted on by an unbalanced force in a given specific scenario.

Assessment

Rubrics	Teacher-created Assessment
Lab Reports	Classroom Participation
Homework Completion	Group Participation

Differentiation

Hands-on Activities
Diagnostic Assessment
Kinaesthetic
Re-teaching
Enrichment Activities
Cooperative Learning
Peer Tutoring
Tiered Instruction
Alternative Assessment

Content Standards

5.2.6.C.1
5.2.6.C.2
5.2.6.C.3
5.2.8.C.1
5.2.8.C.2
5.1

Approaches to Learning

Observation skills- observing and communicating data in a lab report

Analyzing skills – recognizing relationships

Evaluation skills- developing criteria for judging their own work

Scientific Inquiry Skills – formulate questions, hypothesize and conduct experiments

Inquiry skills – formulate questions, hypothesize and conduct experiments

Learning Experiences	Teaching Strategies
•"Bubble Gum Physics Lab" •Investigate each law of motion by completing a series of tasks • Inclined to Roll Lab • Stopping on a Dime Lab • Motion Graph Activity • Cup, Paper, and Coin Activity • Sticky Sneakers Lab • Aluminum Foil Boats • Paper Airplane Contest	•Evaluation of lab reports, rubrics to assess writing, written assessment •Peer/group discussion, lecture, board work, evaluations, discussion of lab work, use of technology •Utilization of key terms

• Egg Drop • Marshmallow Catapult	

Resources

Prentice Hall Science Explorer: Physical Science

8th Grade Science

Unit Title	**8.4 Force and Motion**
Time frame	6 weeks
21st Century Themes	Creativity and Innovation Critical Thinking and Problem Solving Communication and Collaboration Productivity and Accountability Leadership and Responsibility
Interdisciplinary focus and technology integration	Technology Math

Essential Questions	**Big Ideas**
• How are force and mass related to acceleration ? • How do balanced and unbalanced forces affect motion? • What are the two ways to reduce friction? • Can Newton's Laws be used to describe the motion of all matter?	• The motion of an object can be described by its position, speed, direction, and acceleration. • An unbalanced force that acts on an object will cause a change in the objects motion.

Learning Targets-students will be able to;

- Give an operational definition for force and motion and summarize their relationship.
- Apply the formulas used to calculate acceleration and momentum.
- Identify and describe Newton's Laws of motion.
- Describe the motion of an object from various vantage points.
- Demonstrate and explain the frictional force acting on an object with the use of a physical model.
- Calculate speed of an object when given distance and time.
- Compare the motion of an object acted on by balanced forces with the motion of an object acted on by an unbalanced force in a given specific scenario.

Assessment

Rubrics	Teacher-created Assessment
Lab Reports	Classroom Participation
Homework completion	Group Participation

Differentiation

Hands-on Activities
Diagnostic Assessment
Kinaesthetic
Re-teaching
Enrichment Activities
Cooperative Learning
Peer Tutoring
Tiered Instruction
Alternative Assessment

Content Standards

What state content standards are to be addressed?

5.2.6.C.1
5.2.6.C.2
5.2.6.C.3
5.2.8.C.1
5.2.8.C.2
5.1

Approaches to Learning

Observation skills- observing and communicating data in a lab report

Analyzing skills – recognizing relationships

Evaluation skills- developing criteria for judging their own work

Scientific Inquiry Skills – formulate questions, hypothesize and conduct experiments

Inquiry skills – formulate questions, hypothesize and conduct experiments

Learning Experiences	Teaching Strategies
• "Bubble Gum Physics Lab" • Investigate each law of motion by completing a series of tasks • Inclined to Roll Lab • Stopping on a Dime Lab • Motion Graph Activity • Cup, Paper, and Coin Activity	• Evaluation of lab reports, rubrics to assess writing, written assessment • Peer/group discussion, lecture, board work, evaluations, discussion of lab work, use of technology • Utilization of key terms

• Sticky Sneakers Lab • Aluminum Foil Boats • Paper Airplane Contest • Egg Drop • Marshmallow Catapult	

Resources

Prentice Hall Science Explorer: Physical Science, 2009

8th Grade Science

Unit Title	**8.5 Sound and Light**
Time frame	6.5 weeks
21st Century Themes	Creativity and Innovation Critical Thinking and Problem Solving Communication and Collaboration Productivity and Accountability Leadership and Responsibility
Interdisciplinary focus and technology integration	Technology History Math Language Arts Art

Essential Questions	**Big Ideas**
• How does a mechanical wave transfer energy? • What are the properties of a sound wave? • What is an electromagnetic wave? • How does light interact with matter?	• Energy travels in waves

Learning Targets-students will be able to;

- define waves and identify what causes them .
- list and describe the basic properties of waves .
- describe how a wave's speed is related to its wavelength and frequency.
- identify and compare reflection, refraction and diffraction.
- define sound and explain how it travels through different mediums.
- explain the relationship between frequency and pitch in addition to its intensity.
- explain the Doppler Effect and its applications.
- identify the structures of the ear and how it interprets body waves.
- describe an electromagnetic wave and its properties.
- relate particles to electromagnetic waves.
- how the electromagnetic spectrum is arranged.
- describe what happens when light strikes a mirror and identify the ways in which images can be reflected.
- explain refraction and how it relates to the different shapes of lenses.
- identify the factors that determine the color of an object.
- to identify the structures of the eye and how light is sensed and interpreted as

images.
- Identify different instruments using lenses and fiber optics.

Assessment

Rubrics	Teacher-created Assessment
Lab Reports	Classroom Participation
Homework Completion	Group Participation

Diagramming and identifying different wave patterns

Differentiation

Hands-on Activities
Diagnostic Assessment
Kinaesthetic
Re-teaching
Enrichment Activities
Cooperative Learning
Peer Tutoring
Tiered Instruction
Alternative Assessment

Content Standards

5.2.6.C.1
5.2.6.C.2
5.2.6.C.3
5.2.8.C.1
5.2.8.C.2
5.1

Approaches to Learning

Observation skills- observing and communicating data in a lab report

Analyzing skills – recognizing relationships

Evaluation skills- developing criteria for judging their own work

Scientific Inquiry Skills – formulate questions, hypothesize and conduct experiments

Inquiry skills – formulate questions, hypothesize and conduct experiments

Learning Experiences	Teaching Strategies
"Wavy Motions" "How do waves travel" "Changing Colors" " In the Heat of the Light" "Can you see everything with one eye?" "Working with lenses and refraction"	• Evaluation of lab reports, rubrics to assess writing, written assessment • Peer/group discussion, lecture, board work, evaluations, discussion of lab work, use of technology • Utilization of key terms
Resources Prentice Hall Science Explorer: Physical Science	

8th Grade Science

Unit Title	**8.6 Electricity and Magnetism**
Time frame	6 weeks
21st Century Themes	Creativity and Innovation Critical Thinking and Problem Solving Communication and Collaboration Productivity and Accountability Leadership and Responsibility
Interdisciplinary focus and technology integration	Technology History Math Language Arts Art

Essential Questions	**Big Ideas**
• How do magnets interact? • What is electric current?	• There is a relationship between magnetism and electricity.

Learning Targets-students will be able to;

- Conduct an investigation of the forces of magnets.
- Conduct an investigation observing the parts needed for a closed electrical circuit.
- Identify the connection between electricity and magnetism.
- Explain the parts of the light bulb.
- Compare and contract conductors and insulators of electricity.
- Show how magnetism can be used to generate electricity.
- Note the differences on parallel and series circuits.
- Investigate how electrical circuits can produce different effects such as light, heat, sound, and magnetism.

Assessment	
Rubrics	Teacher-created Assessment
Lab Reports	Classroom Participation
Homework Completion	Group Participation

Differentiation
Hands-on Activities Diagnostic Assessment

Kinaesthetic
Re-teaching
Enrichment Activities
Cooperative Learning
Peer Tutoring
Tiered Instruction
Alternative Assessment

Content Standards

5.2.6.D.1
5.2.8.D.1
5.2.8.D.2
5.1

Approaches to Learning

Observation skills- observing and communicating data in a lab report

Analyzing skills – recognizing relationships

Evaluation skills- developing criteria for judging their own work

Scientific Inquiry Skills – formulate questions, hypothesize and conduct experiments

Inquiry skills – formulate questions, hypothesize, and conduct experiments

Learning Experiences	**Teaching Strategies**
• Compare/Contrast graphic organizers for conductors and insulators • Compare/Contrast graphic organizers for bar magnets and electromagnets • Step by step instructions about how to • construct an electric circuit • Students will illustrate a series and parallel circuit • Skills Lab: “Detecting Fake Coins” p 660 • Technology: “Design and Build a Magnetic Paper Clip Holder” pg 668 • Make electricity using a penny • Skills Lab: “Building an Electric Motor” p 734	•Evaluation of lab reports, rubrics to assess writing, written assessment •Peer/group discussion, lecture, board work, evaluations, discussion of lab work, use of technology •Utilization of key terms

Resources

Prentice Hall Science Explorer: Physical Science