8th Grade

Science Curriculum

(weekly)

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| **Month** | **Week** | **Big Idea** | | **Essential Questions** | **Concepts** | **Competencies** | **Vocabulary** | **Standard** | **Eligible Content** |
| **August** | 26th-29th scientific method | Solid, liquid and gaseous earth materials all circulate in large scale systems at a variety of time scales, giving rise to landscapes, the rock cycle, ocean currents, weather, and climate.  The cell is the basic unit of structure and function for all living things.  Energy is neither created nor destroyed. Energy can be transformed from one form to another, but transformation between forms often results in the loss of useable energy through the production of heat.  An object’s motion is the result of all forces acting on it.  Matter has observable physical properties and the potential to mix and form new materials.  Populations of organisms evolve by natural selection. | | What causes the great variation at Earth’s surface?  How can one cell function as an organism?  How do energy transformations explain that energy is neither created nor destroyed?  What causes objects to move?  How do scientists identify and sort materials?  What allows some populations of organisms to change and survive while others cannot? | The Scientific Method can be used to solve scientific problems and questions for any science topic. | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship. | Hypothesis  Conclusion  Procedure  data | 3.2.7, 3.2.10 | S8 A.1.1.1  S8A1.1.2  S8 A 1.1.3  S8A.1.1.4 |
| **Sept.** | 2-5-measuring review/scientific method | Matter has observable physical properties and the potential to mix and form new materials.  An object’s motion is the result of all forces acting on it. | | What causes objects to move?  How do scientists identify and sort materials? | Mass is a measure of the amount of matter in an object.  Materials are characterized by having a specific amount of mass in each unit of volume (density). | Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data.  Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship. | Mass,  Volume,  Density  Weight | 3.2.7, 3.2.10 | S8.A.1.3.1, S8.A.1.3.2, S8.A.2.1.1, S8.A.2.1.2, S8.A.2.1.4, S8.A.2.2.1, S8.A.2.2.2 |
| **Sept** | 8th-12th- matter/mixtures | Matter has observable physical properties and the potential to mix and form new materials. | | How do scientists identify and sort materials? | All matter is made up of particles, which are far too small to see directly through a microscope.  Particles are always in motion with the smallest motion in solids progressing to the largest motion in gases. | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship.  Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. | Matter  Substance  Physical property  Chemical property  mixture | 3.4.7, 3.4.10 | S8.A.3.2.1, S8.A.3.2.2, S8.A.3.2.3, S8.A.3.3.1, S8.A.3.3.2  S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.2.1.3, S8.A.2.1.4, S8.A.2.1.5 |
| **Sept** | 15th-19th- matter/mixtures | Matter has observable physical properties and the potential to mix and form new materials. | | How do scientists identify and sort materials? | All matter is made up of particles, which are far too small to see directly through a microscope.  Particles are always in motion with the smallest motion in solids progressing to the largest motion in gases.  Changing a substance’s state of matter may change its density but not its composition. | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship.  Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. | Matter  Substance  Physical property  Chemical property  mixture | 3.4.7, 3.4.10 | S8.A.3.2.1, S8.A.3.2.2, S8.A.3.2.3, S8.A.3.3.1, S8.A.3.3.2  S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.2.1.3, S8.A.2.1.4, S8.A.2.1.5 |
| **Sept** | 22nd-25th- physical and chemical properties/changes | Matter has observable physical properties and the potential to mix and form new materials. | | How do scientists identify and sort materials? | All matter is made up of particles, which are far too small to see directly through a microscope.  A substance has characteristic properties such as density, boiling point, freezing point, solubility, all of which are independent of the mass or volume of the sample.  Changing a substance’s state of matter may change its density but not its composition.  When two or more substances are combined, they may form a mixture and maintain their original properties or they may react chemically to form a new substance with new properties. | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship.  Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. | Matter  Substance  Physical property  Chemical property  mixture  physical change  chemical change | 3.4.7, 3.4.10 | S8.A.3.2.1, S8.A.3.2.2, S8.A.3.2.3, S8.A.3.3.1, S8.A.3.3.2  S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.2.1.3, S8.A.2.1.4, S8.A.2.1.5 |
| **Oct.** | 29th-Oct.3rd- atoms, periodic table | Matter has observable physical properties and the potential to mix and form new materials. | | How do scientists identify and sort materials? | All matter is made up of building blocks called atoms. Atoms are characterized by their parts including protons, electrons, and neutrons.  Elements are the basic building blocks of matter that cannot be broken down chemically and are made up all of the same type of atoms.  There are over one hundred known elements each with characteristic properties from which all other matter is made. | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship.  Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. | Atom  Element  Molecule  Compound  Chemical formula  Electron  Nucleus  Proton  Neutron  Energy level  Atomic number  Isotope  Mass number  Atomic mass  Periodic table  Group  period | 3.4.7, 3.4.10 | S8.A.3.2.1, S8.A.3.2.2, S8.A.3.2.3, S8.A.3.3.1, S8.A.3.3.2  S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.2.1.3, S8.A.2.1.4, S8.A.2.1.5 |
| **Oct.** | 6th-10th-atoms, elements, periodic table | Matter has observable physical properties and the potential to mix and form new materials. | | How do scientists identify and sort materials? | All matter is made up of building blocks called atoms. Atoms are characterized by their parts including protons, electrons, and neutrons.  Elements are the basic building blocks of matter that cannot be broken down chemically and are made up all of the same type of atoms.  There are over one hundred known elements each with characteristic properties from which all other matter is made.  Compounds may only be broken down into simpler types of matter (elements) by chemical means. | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship.  Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. | Atom  Element  Molecule  Compound  Chemical formula  Electron  Nucleus  Proton  Neutron  Energy level  Atomic number  Isotope  Mass number  Atomic mass  Periodic table  Group  period | 3.4.7, 3.4.10 | S8.A.3.2.1, S8.A.3.2.2, S8.A.3.2.3, S8.A.3.3.1, S8.A.3.3.2  S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.2.1.3, S8.A.2.1.4, S8.A.2.1.5 |
| **Oct.** | 13-15-bonding | Matter has observable physical properties and the potential to mix and form new materials. | | How do scientists identify and sort materials? | When two or more substances are combined, they may form a mixture and maintain their original properties or they may react chemically to form a new substance with new properties.  Compounds may only be broken down into simpler types of matter (elements) by chemical means. | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship.  Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. | Valence electrons  Ions  Polar bond  Non-polar bond  Covalent bond | 3.4.7, 3.4.10 | S8.A.3.2.1, S8.A.3.2.2, S8.A.3.2.3, S8.A.3.3.1, S8.A.3.3.2  S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.2.1.3, S8.A.2.1.4, S8.A.2.1.5 |
| **Oct.** | 20-24-chemical reactions | Matter has observable physical properties and the potential to mix and form new materials. | | How do scientists identify and sort materials? | When two or more substances are combined, they may form a mixture and maintain their original properties or they may react chemically to form a new substance with new properties.  Compounds may only be broken down into simpler types of matter (elements) by chemical means. | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship.  Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. | Reactants  Products  Endothermic  Exothermic  Open system  Closed system  Coefficient  Synthesis  Decomposition  Replacement | 3.4.7, 3.4.10 | S8.A.3.2.1, S8.A.3.2.2, S8.A.3.2.3, S8.A.3.3.1, S8.A.3.3.2  S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.2.1.3, S8.A.2.1.4, S8.A.2.1.5 |
| **Oct.** | 27-31-chemical reactions | Matter has observable physical properties and the potential to mix and form new materials. | | How do scientists identify and sort materials? | When two or more substances are combined, they may form a mixture and maintain their original properties or they may react chemically to form a new substance with new properties.  Compounds may only be broken down into simpler types of matter (elements) by chemical means. | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship.  Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. | Reactants  Products  Endothermic  Exothermic  Open system  Closed system  Coefficient  Synthesis  Decomposition  Replacement | 3.4.7, 3.4.10 | S8.A.3.2.1, S8.A.3.2.2, S8.A.3.2.3, S8.A.3.3.1, S8.A.3.3.2  S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.2.1.3, S8.A.2.1.4, S8.A.2.1.5 |
| **Nov.** | 3-7-chemical reactions | Matter has observable physical properties and the potential to mix and form new materials. | | How do scientists identify and sort materials? | When two or more substances are combined, they may form a mixture and maintain their original properties or they may react chemically to form a new substance with new properties.  Compounds may only be broken down into simpler types of matter (elements) by chemical means. | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship.  Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. | Reactants  Products  Endothermic  Exothermic  Open system  Closed system  Coefficient  Synthesis  Decomposition  Replacement | 3.4.7, 3.4.10 | S8.A.3.2.1, S8.A.3.2.2, S8.A.3.2.3, S8.A.3.3.1, S8.A.3.3.2  S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.2.1.3, S8.A.2.1.4, S8.A.2.1.5 |
| **Nov.** | 10-14-chemical reactions | Matter has observable physical properties and the potential to mix and form new materials. | | How do scientists identify and sort materials? | When two or more substances are combined, they may form a mixture and maintain their original properties or they may react chemically to form a new substance with new properties.  Compounds may only be broken down into simpler types of matter (elements) by chemical means. | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship.  Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. | Reactants  Products  Endothermic  Exothermic  Open system  Closed system  Coefficient  Synthesis  Decomposition  Replacement | 3.4.7, 3.4.10 | S8.A.3.2.1, S8.A.3.2.2, S8.A.3.2.3, S8.A.3.3.1, S8.A.3.3.2  S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.2.1.3, S8.A.2.1.4, S8.A.2.1.5 |
| **Nov.** | 17-21-chemical reactions/solutions | Matter has observable physical properties and the potential to mix and form new materials. | | How do scientists identify and sort materials? | When two or more substances are combined, they may form a mixture and maintain their original properties or they may react chemically to form a new substance with new properties. | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship.  Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. | Reactants  Products  Endothermic  Exothermic  Open system  Closed system  Coefficient  Synthesis  Decomposition  Replacement | 3.4.10 | S8.A.3.2.1, S8.A.3.2.2, S8.A.3.2.3, S8.A.3.3.1, S8.A.3.3.2  S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.2.1.3, S8.A.2.1.4, S8.A.2.1.5 |
| **Nov.** | 24-25-chemical reactions/acids/bases | Matter has observable physical properties and the potential to mix and form new materials. | | How do scientists identify and sort materials? |  | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship.  Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. | Reactants  Products  Endothermic  Exothermic  Open system  Closed system  Coefficient  Synthesis  Decomposition  Replacement | 3.4.10 | S8.A.3.2.1, S8.A.3.2.2, S8.A.3.2.3, S8.A.3.3.1, S8.A.3.3.2  S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.2.1.3, S8.A.2.1.4, S8.A.2.1.5 |
| **Dec.** | 3-5-chemical reactions/acids and bases | Matter has observable physical properties and the potential to mix and form new materials. | | How do scientists identify and sort materials? | Compounds may only be broken down into simpler types of matter (elements) by chemical means. | Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship.  Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. | Reactants  Products  Endothermic  Exothermic  Open system  Closed system  Coefficient  Synthesis  Decomposition  Replacement | 3.4.10 | S8.A.3.2.1, S8.A.3.2.2, S8.A.3.2.3, S8.A.3.3.1, S8.A.3.3.2  S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.2.1.3, S8.A.2.1.4, S8.A.2.1.5 |
| **Dec.** | 8-12- describe motion, speed, velocity | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Models (graphs) of an object’s velocity versus time can be used to infer the presence of absence of unbalanced forces. | Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Motion  Reference point  Distance  Speed  Velocity  slope | 3.4.7, 3.4.10 | S8.A.1.3.1, S8.A.1.3.2, S8.A.2.1.1, S8.A.2.1.2, S8.A.2.1.4, S8.A.2.2.1, S8.A.2.2.2 |
| **Dec.** | 15-19-acceleration, graph acceleration | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Models (graphs) of an object’s velocity versus time can be used to infer the presence of absence of unbalanced forces. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Speed  Velocity  Slope  acceleration | 3.4.7, 3.4.10 | S8.A.1.3.3, S8.B.3.1.1, S8.B.3.1.2, S8.B.3.1.3 |
| **Jan.** | 5-9- forces | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Unbalanced forces acting on an object cause changes in its velocity. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Force  Newton  Net force | 3.4.7, 3.4.10 | [S8.A.1.3.1](http://www.pdesas.org/Standard/StandardsBrowser#27519?cf=y), [S8.A.1.3.2](http://www.pdesas.org/Standard/StandardsBrowser#27520?cf=y), [S8.A.2.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27525?cf=y), [S8.A.2.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27526?cf=y), [S8.A.2.1.4](http://www.pdesas.org/Standard/StandardsBrowser#27528?cf=y), [S8.A.2.2.1](http://www.pdesas.org/Standard/StandardsBrowser#27532?cf=y), [S8.A.2.2.2](http://www.pdesas.org/Standard/StandardsBrowser#27533?cf=y)  S8.A.1.3.3, S8.B.3.1.1, S8.B.3.1.2, S8.B.3.1.3 |
| **Jan.** | 12-16friction and gravity | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Two of the fundamental forces that exist in the universe are gravity and electromagnetism.  Friction is an example of an electromagnetic force that opposes motion between two surfaces. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Friction  Sliding friction  Static friction  Fluid friction  Rolling friction | 3.4.7, 3.4.10 | |  |  | | --- | --- | |  | [S8.A.1.3.1](http://www.pdesas.org/Standard/StandardsBrowser#27519?cf=y), [S8.A.1.3.2](http://www.pdesas.org/Standard/StandardsBrowser#27520?cf=y), [S8.A.2.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27525?cf=y), [S8.A.2.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27526?cf=y), [S8.A.2.1.4](http://www.pdesas.org/Standard/StandardsBrowser#27528?cf=y), [S8.A.2.2.1](http://www.pdesas.org/Standard/StandardsBrowser#27532?cf=y), [S8.A.2.2.2](http://www.pdesas.org/Standard/StandardsBrowser#27533?cf=y) |   [S8.A.1.3.3](http://www.pdesas.org/Standard/StandardsBrowser#27521?cf=y), [S8.B.3.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27567?cf=y), [S8.B.3.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27568?cf=y), [S8.B.3.1.3](http://www.pdesas.org/Standard/StandardsBrowser#27569?cf=y) |
| **Jan.** | 19-22- friction and gravity | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Two of the fundamental forces that exist in the universe are gravity and electromagnetism.  The gravitational force is a universal force that depends on how much mass the objects have and how far apart they are.  Mass is a measure of the amount of matter in an object.  The magnitude of the gravitational force is weight (oz, lb, newtons). | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Gravity  Mass  weight | 3.4.7, 3.4.10 | [S8.A.1.3.1](http://www.pdesas.org/Standard/StandardsBrowser#27519?cf=y), [S8.A.1.3.2](http://www.pdesas.org/Standard/StandardsBrowser#27520?cf=y), [S8.A.2.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27525?cf=y), [S8.A.2.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27526?cf=y), [S8.A.2.1.4](http://www.pdesas.org/Standard/StandardsBrowser#27528?cf=y), [S8.A.2.2.1](http://www.pdesas.org/Standard/StandardsBrowser#27532?cf=y), [S8.A.2.2.2](http://www.pdesas.org/Standard/StandardsBrowser#27533?cf=y)  [S8.A.2.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27526?cf=y),  [S8.A.1.3.3](http://www.pdesas.org/Standard/StandardsBrowser#27521?cf=y), [S8.B.3.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27567?cf=y), [S8.B.3.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27568?cf=y), [S8.B.3.1.3](http://www.pdesas.org/Standard/StandardsBrowser#27569?cf=y) |
| **Jan.** | 26-30Newton’s Laws | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | An object will stay at rest or continue at a constant velocity unless acted upon by an external, unbalanced force.  Unbalanced forces acting on an object cause changes in its velocity. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | inertia | 3.4.7, 3.4.10 | [S8.A.1.3.1](http://www.pdesas.org/Standard/StandardsBrowser#27519?cf=y), [S8.A.1.3.2](http://www.pdesas.org/Standard/StandardsBrowser#27520?cf=y), [S8.A.2.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27525?cf=y), [S8.A.2.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27526?cf=y), [S8.A.2.1.4](http://www.pdesas.org/Standard/StandardsBrowser#27528?cf=y), [S8.A.2.2.1](http://www.pdesas.org/Standard/StandardsBrowser#27532?cf=y), [S8.A.2.2.2](http://www.pdesas.org/Standard/StandardsBrowser#27533?cf=y)  [S8.A.1.3.3](http://www.pdesas.org/Standard/StandardsBrowser#27521?cf=y), [S8.B.3.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27567?cf=y), [S8.B.3.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27568?cf=y), [S8.B.3.1.3](http://www.pdesas.org/Standard/StandardsBrowser#27569?cf=y) |
| **Feb.** | 2-6Newton’s Laws | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | An object will stay at rest or continue at a constant velocity unless acted upon by an external, unbalanced force.  Unbalanced forces acting on an object cause changes in its velocity. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | inertia | 3.4.7, 3.4.10 | [S8.A.1.3.1](http://www.pdesas.org/Standard/StandardsBrowser#27519?cf=y), [S8.A.1.3.2](http://www.pdesas.org/Standard/StandardsBrowser#27520?cf=y), [S8.A.2.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27525?cf=y), [S8.A.2.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27526?cf=y), [S8.A.2.1.4](http://www.pdesas.org/Standard/StandardsBrowser#27528?cf=y), [S8.A.2.2.1](http://www.pdesas.org/Standard/StandardsBrowser#27532?cf=y), [S8.A.2.2.2](http://www.pdesas.org/Standard/StandardsBrowser#27533?cf=y)  [S8.A.1.3.3](http://www.pdesas.org/Standard/StandardsBrowser#27521?cf=y), [S8.B.3.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27567?cf=y), [S8.B.3.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27568?cf=y), [S8.B.3.1.3](http://www.pdesas.org/Standard/StandardsBrowser#27569?cf=y) |
| **Feb.** | 9-13- Newton’s Laws | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | An object will stay at rest or continue at a constant velocity unless acted upon by an external, unbalanced force.  Unbalanced forces acting on an object cause changes in its velocity. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | inertia | 3.4.7, 3.4.10 | [S8.A.1.3.1](http://www.pdesas.org/Standard/StandardsBrowser#27519?cf=y), [S8.A.1.3.2](http://www.pdesas.org/Standard/StandardsBrowser#27520?cf=y), [S8.A.2.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27525?cf=y), [S8.A.2.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27526?cf=y), [S8.A.2.1.4](http://www.pdesas.org/Standard/StandardsBrowser#27528?cf=y), [S8.A.2.2.1](http://www.pdesas.org/Standard/StandardsBrowser#27532?cf=y), [S8.A.2.2.2](http://www.pdesas.org/Standard/StandardsBrowser#27533?cf=y)  [S8.A.1.3.3](http://www.pdesas.org/Standard/StandardsBrowser#27521?cf=y), [S8.B.3.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27567?cf=y), [S8.B.3.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27568?cf=y), [S8.B.3.1.3](http://www.pdesas.org/Standard/StandardsBrowser#27569?cf=y) |
| **Feb.** | 17-20- momentum | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Unbalanced forces acting on an object cause changes in its velocity.  An object will stay at rest or continue at a constant velocity unless acted upon by an external, unbalanced force. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Momentum  Law of conservation of momentum | 3.4.7, 3.4.10 | [S8.A.1.3.1](http://www.pdesas.org/Standard/StandardsBrowser#27519?cf=y), [S8.A.1.3.2](http://www.pdesas.org/Standard/StandardsBrowser#27520?cf=y), [S8.A.2.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27525?cf=y), [S8.A.2.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27526?cf=y), [S8.A.2.1.4](http://www.pdesas.org/Standard/StandardsBrowser#27528?cf=y), [S8.A.2.2.1](http://www.pdesas.org/Standard/StandardsBrowser#27532?cf=y), [S8.A.2.2.2](http://www.pdesas.org/Standard/StandardsBrowser#27533?cf=y)  [S8.A.1.3.3](http://www.pdesas.org/Standard/StandardsBrowser#27521?cf=y), [S8.B.3.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27567?cf=y), [S8.B.3.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27568?cf=y), [S8.B.3.1.3](http://www.pdesas.org/Standard/StandardsBrowser#27569?cf=y) |
| **Feb.** | 23-27- free fall/circular motion | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Unbalanced forces acting on an object cause changes in its velocity.  An object will stay at rest or continue at a constant velocity unless acted upon by an external, unbalanced force. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Free fall  Centripetal force  Centrifugal force | 3.4.7, 3.4.10 | [S8.A.1.3.1](http://www.pdesas.org/Standard/StandardsBrowser#27519?cf=y), [S8.A.1.3.2](http://www.pdesas.org/Standard/StandardsBrowser#27520?cf=y), [S8.A.2.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27525?cf=y), [S8.A.2.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27526?cf=y), [S8.A.2.1.4](http://www.pdesas.org/Standard/StandardsBrowser#27528?cf=y), [S8.A.2.2.1](http://www.pdesas.org/Standard/StandardsBrowser#27532?cf=y), [S8.A.2.2.2](http://www.pdesas.org/Standard/StandardsBrowser#27533?cf=y)  [S8.A.1.3.3](http://www.pdesas.org/Standard/StandardsBrowser#27521?cf=y), [S8.B.3.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27567?cf=y), [S8.B.3.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27568?cf=y), [S8.B.3.1.3](http://www.pdesas.org/Standard/StandardsBrowser#27569?cf=y) |
| **March** | 2-5work/power | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Unbalanced forces acting on an object cause changes in its velocity.  An object will stay at rest or continue at a constant velocity unless acted upon by an external, unbalanced force. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Work  Joule  Power  watt | 3.4.7, 3.4.10 | [S8.A.1.3.1](http://www.pdesas.org/Standard/StandardsBrowser#27519?cf=y), [S8.A.1.3.2](http://www.pdesas.org/Standard/StandardsBrowser#27520?cf=y), [S8.A.2.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27525?cf=y), [S8.A.2.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27526?cf=y), [S8.A.2.1.4](http://www.pdesas.org/Standard/StandardsBrowser#27528?cf=y), [S8.A.2.2.1](http://www.pdesas.org/Standard/StandardsBrowser#27532?cf=y), [S8.A.2.2.2](http://www.pdesas.org/Standard/StandardsBrowser#27533?cf=y)  [S8.A.1.3.3](http://www.pdesas.org/Standard/StandardsBrowser#27521?cf=y), [S8.B.3.1.1](http://www.pdesas.org/Standard/StandardsBrowser#27567?cf=y), [S8.B.3.1.2](http://www.pdesas.org/Standard/StandardsBrowser#27568?cf=y), [S8.B.3.1.3](http://www.pdesas.org/Standard/StandardsBrowser#27569?cf=y) |
| **March** | 16-20-work, power, machines | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Mechanical advantage, using less force over a greater distance, allows the same work to be performed with less effort. |  | Work  Joule  Power  Watt  Machine  Input force  Output force  Mechanical advantage  efficiency | 3.4.7, 3.4.10 | S8.A.1.3.1, S8.A.1.3.2, S8.A.2.1.1, S8.A.2.1.2, S8.A.2.1.4, S8.A.2.2.1, S8.A.2.2.2  S8.A.1.3.3, S8.B.3.1.1, S8.B.3.1.2, S8.B.3.1.3 |
| **March** | 23-27-work, power, machines, mechanical advantage | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Mechanical advantage, using less force over a greater distance, allows the same work to be performed with less effort. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Machine  Input force  Output force  Mechanical advantage  Efficiency  Simple machine  Inclined plane  Wedge  Screw  Lever  Fulcrum  Pulley  Wheel and axle  Compound machine | 3.4.7, 3.4.10 | S8.A.1.3.1, S8.A.1.3.2, S8.A.2.1.1, S8.A.2.1.2, S8.A.2.1.4, S8.A.2.2.1, S8.A.2.2.2  S8.A.1.3.3, S8.B.3.1.1, S8.B.3.1.2, S8.B.3.1.3 |
| **March** | 30-31-electromagnetism | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Moving electric charges produce magnetic forces and moving magnets produce electric forces. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Magnet  Magnetism  Electromagnetism  Electromagnet | 3.4.10 | S8.A.1.3.1, S8.A.1.3.2, S8.A.2.1.1, S8.A.2.1.2, S8.A.2.1.4, S8.A.2.2.1, S8.A.2.2.2  S8.A.1.3.3, S8.B.3.1.1, S8.B.3.1.2, S8.B.3.1.3 |
| **April** | 7-10- kinetic, potential, etc. forms of energy, energy transformations | Energy is neither created nor destroyed. Energy can be transformed from one form to another, but transformation between forms often results in the loss of useable energy through the production of heat. | | How do energy transformations explain that energy is neither created nor destroyed? | Energy appears in different forms and can be transformed within a system.  Energy can be transformed within a system or transferred from one system to another (or from a system to its environment) in different ways. Thermal energy is transferred from warmer objects to cooler objects. Mechanical energy can be transferred when two objects push or pull on one another. Electromagnetic energy can be transferred when an electrical source such as a battery or generator is connected in a complete circuit to an electrical device. Chemical energy is transferred when particles are rearranged in a chemical reaction.  Batteries store chemical energy and transform it into electrical energy. | Describe the flow of energy from the sun, throughout the earth system, living and non-living, from the cellular scale to the global scale, and describe the transformations of that energy as it moves through the system. | Energy  Kinetic energy  Potential energy  Elastic potential energy  Gravitational potential energy  Mechanical energy  Nuclear energy  Thermal energy  Electrical energy  Electromagnetic energy  Chemical energy  Energy transformation  Law of conservation of energy | 3.4.7, 3.4.10 | S8.B.3.1.1, S8.B.3.1.3, S8.C.2.1.1, S8.C.2.1.3, S8.C.2.2.1 |
| **April** | 13-17- thermal energy, heat, ccr, **ELIGIBLE CONTENT COMPLETE** | Energy is neither created nor destroyed. Energy can be transformed from one form to another, but transformation between forms often results in the loss of useable energy through the production of heat. | | How do energy transformations explain that energy is neither created nor destroyed? | Thermal energy is transferred from warmer objects to cooler objects.  Heat energy is usually a by-product of an energy transformation.  Heat moves in predictable ways, normally flowing from warmer objects to cooler ones, until the objects reach the same temperature. | Describe the flow of energy from the sun, throughout the earth system, living and non-living, from the cellular scale to the global scale, and describe the transformations of that energy as it moves through the system. | Energy  Kinetic energy  Potential energy  Elastic potential energy  Gravitational potential energy  Mechanical energy  Nuclear energy  Thermal energy  Electrical energy  Electromagnetic energy  Chemical energy  Energy transformation  Law of conservation of energy | 3.4.7, 3.4.10 | S8.B.3.1.1, S8.B.3.1.3, S8.C.2.1.1, S8.C.2.1.3, S8.C.2.2.1 |
| **April** | 20-24- specific heat, conductors, insulators | Energy is neither created nor destroyed. Energy can be transformed from one form to another, but transformation between forms often results in the loss of useable energy through the production of heat. | | How do energy transformations explain that energy is neither created nor destroyed? | Heat energy is usually a by-product of an energy transformation.  Heat moves in predictable ways, normally flowing from warmer objects to cooler ones, until the objects reach the same temperature. | Describe the flow of energy from the sun, throughout the earth system, living and non-living, from the cellular scale to the global scale, and describe the transformations of that energy as it moves through the system. | Conduction  Convection  Radiation  Specific heat  Thermal expansion  insulator | 3.4.7, 3.4.10 | S8.B.3.1.1, S8.B.3.1.3, S8.C.2.1.1, S8.C.2.1.3, S8.C.2.2.1 |
| **April** | 27-May 1-- TESTING | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Moving electric charges produce magnetic forces and moving magnets produce electric forces.  Batteries store chemical energy and transform it into electrical energy. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Electric force  Electric field  Static  Friction  Conduction  Induction  Electric current  Circuit  Insulator  Voltage  Resistance  Ohm’s Law | 3.4.10 | S8.A.1.3.1, S8.A.1.3.2, S8.A.2.1.1, S8.A.2.1.2, S8.A.2.1.4, S8.A.2.2.1, S8.A.2.2.2  S8.A.1.3.3, S8.B.3.1.1, S8.B.3.1.2, S8.B.3.1.3 |
| **May** | 4-8 | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Moving electric charges produce magnetic forces and moving magnets produce electric forces.  Batteries store chemical energy and transform it into electrical energy. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Electric force  Electric field  Static  Friction  Conduction  Induction  Electric current  Circuit  Insulator  Voltage  Resistance  Ohm’s Law | 3.4.10 | S8.A.1.3.1, S8.A.1.3.2, S8.A.2.1.1, S8.A.2.1.2, S8.A.2.1.4, S8.A.2.2.1, S8.A.2.2.2  S8.A.1.3.3, S8.B.3.1.1, S8.B.3.1.2, S8.B.3.1.3 |
| **May** | 11-15 | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Moving electric charges produce magnetic forces and moving magnets produce electric forces.  Batteries store chemical energy and transform it into electrical energy. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Electric force  Electric field  Static  Friction  Conduction  Induction  Electric current  Circuit  Insulator  Voltage  Resistance  Ohm’s Law | 3.4.10 | S8.A.1.3.1, S8.A.1.3.2, S8.A.2.1.1, S8.A.2.1.2, S8.A.2.1.4, S8.A.2.2.1, S8.A.2.2.2  S8.A.1.3.3, S8.B.3.1.1, S8.B.3.1.2, S8.B.3.1.3 |
| **May** | 18-21 | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Moving electric charges produce magnetic forces and moving magnets produce electric forces.  Batteries store chemical energy and transform it into electrical energy. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Electric force  Electric field  Static  Friction  Conduction  Induction  Electric current  Circuit  Insulator  Voltage  Resistance  Ohm’s Law | 3.4.10 | S8.A.1.3.1, S8.A.1.3.2, S8.A.2.1.1, S8.A.2.1.2, S8.A.2.1.4, S8.A.2.2.1, S8.A.2.2.2  S8.A.1.3.3, S8.B.3.1.1, S8.B.3.1.2, S8.B.3.1.3 |
| **May** | 26-29 | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Moving electric charges produce magnetic forces and moving magnets produce electric forces.  Batteries store chemical energy and transform it into electrical energy. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Electric force  Electric field  Static  Friction  Conduction  Induction  Electric current  Circuit  Insulator  Voltage  Resistance  Ohm’s Law | 3.4.10 | S8.A.1.3.1, S8.A.1.3.2, S8.A.2.1.1, S8.A.2.1.2, S8.A.2.1.4, S8.A.2.2.1, S8.A.2.2.2  S8.A.1.3.3, S8.B.3.1.1, S8.B.3.1.2, S8.B.3.1.3 |
| **June** | 1-3 | An object’s motion is the result of all forces acting on it. | | What causes objects to move? | Moving electric charges produce magnetic forces and moving magnets produce electric forces.  Batteries store chemical energy and transform it into electrical energy. | Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system.  Use appropriate technologies to make precise quantitative measurements and observations and to organize and analyze the data. | Electric force  Electric field  Static  Friction  Conduction  Induction  Electric current  Circuit  Insulator  Voltage  Resistance  Ohm’s Law | 3.4.10 | S8.A.1.3.1, S8.A.1.3.2, S8.A.2.1.1, S8.A.2.1.2, S8.A.2.1.4, S8.A.2.2.1, S8.A.2.2.2  S8.A.1.3.3, S8.B.3.1.1, S8.B.3.1.2, S8.B.3.1.3 |
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