Alabama Science

Grade 8

Matter and Its Interactions

Structure and Properties

Structure and Function

1 Plan and carry out investigations to support the claim that pure substances can be described and defined by their properties, including solubility, electrical conductivity, and density. 8.1

Structure and Properties

Energy and Matter

2 Develop and manipulate models to explain changes in particle motion, temperature, and state of a pure substance when thermal energy is added to or removed from a system. 8.2

Structure and Properties

Structure and Function

3 Justify a claim, based on evidence from investigations, that pure substances differ from mixtures, including solutions. 8.3

Structure and Properties

Patterns

4 Obtain and communicate information from the periodic table, including atomic number, number of electrons and neutrons, average atomic mass, groups, and periods, to illustrate the structure and composition of atoms of different elements. 8.4

- a Analyze and interpret data to differentiate among elements based on their properties and classify the elements as metals, nonmetals, or metalloids. 8.4.A

Structure and Properties

Structure and Function

5 Obtain, evaluate, and communicate information from the periodic table to make predictions about the reactivity of the main group elements. 8.5

- a Use valence electron configuration to model ionic and covalent bonds. 8.5.A

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:ructure and Properties

Stability and Change

6 Observe and analyze data regarding characteristic properties of substances before and after they are combined to determine whether a chemical reaction has occurred. 8.6

Chemical Reactions

Energy and Matter

7 Analyze data from an investigation to determine whether thermal energy is released or absorbed in a chemical reaction. 8.7

a Design and test a device that can release or absorb thermal energy by chemical reactions. 8.7.A

8 Engage in an argument from evidence to support the claim that matter is conserved in a chemical reaction. 8.8

a Use a model to verify that atoms of reactants are conserved as products in a chemical reaction. 8.8.A

Motion and Stability: Forces and Interactions

Forces and Motion

Cause and Effect

9 Use data from an investigation to identify factors that affect acceleration. 8.9

10 Develop and use models to illustrate how individual external forces affect the motion of objects. 8.10

11 Use models to demonstrate each of Newton's laws of motion and explain the effect of net force on objects. 8.11

a Use mathematical representations to explain how the sum of external forces on an object and the object's mass affect its acceleration. 8.11.A

12 Use a model to identify factors affecting the strength of noncontact forces, including magnetic, gravitational, and electrical forces, and demonstrate that fields exist even though the objects are not in contact. 8.12

a Design and construct an electromagnet and modify the design to change its strength. 8.12.A

Energy

Types of Energy

Scale, Proportion, and Quantity

13 Analyze graphical displays of data to describe the relationship of mass and velocity of an object to its kinetic energy (KE). 8.13

14 Use models to construct an explanation of how a system of objects may contain varying amounts of potential energy, including gravitational, elastic, and chemical. 8.14

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Conservation of Energy

Systems and System Models

15 Use models to construct an explanation of how energy is transformed but still conserved. 8.15

16 Develop and use a model to construct an explanation of how electrical energy is transferred and transformed. 8.16

Waves and Their Applications in Technologies for Information Transfer

Wave Properties

Scale, Proportion, and Quantity

17 Use models of mechanical and electromagnetic waves to qualitatively describe the relationships among wave properties, including amplitude, wavelength, and frequency. 8.17

Information Transfer

Scale, Proportion, and Quantity

18 Construct an argument from evidence that digital and analog signals encode and transmit information differently. 8.18

Use models to compare and contrast light and sound wave behaviors, including reflection, refraction, diffraction, and speed, as waves propagate and interact with matter. 8.17.A

a **Use models to compare and contrast light and sound wave behaviors, including reflection, refraction, diffraction, and speed, as waves propagate and interact with matter.** 8.17.A