Iowa Science

Seventh Grade

Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects. 7-PS2-1	**1** **Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.** 7-PS2-1
Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. 7-PS2-2	**2** **Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.** 7-PS2-2
Construct an explanation using data to determine the factors that affect the strength of electric and magnetic forces. 7-PS2-3	**3** **Construct an explanation using data to determine the factors that affect the strength of electric and magnetic forces.** 7-PS2-3
Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. 7-PS2-4	**4** **Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.** 7-PS2-4
Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even	**5** **Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.** 7-PS2-5

though the objects are not in contact. 7-PS2-5	
Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. 7-PS3-1	6 Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. 7-PS3-1
Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. 7-PS3-2	7 Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. 7-PS3-2
Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. 7-PS3-4	8 Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. 7-PS3-4
Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. 7-PS3-5	9 Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. 7-PS3-5
Use arguments based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the	10 Use arguments based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. 7-LS1-4

probability of successful reproduction of animals and plants respectively. 7-LS1-4	
Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. 7-LS2-1	11 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. 7-LS2-1
Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. 7-LS2-2	12 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. 7-LS2-2
Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. 7-LS2-3	13 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. 7-LS2-3
Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. 7-LS2-4	14 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. 7-LS2-4
Evaluate competing design solutions for maintaining biodiversity and ecosystem services. 7-LS2-5	15 Evaluate competing design solutions for maintaining biodiversity and ecosystem services. 7-LS2-5
Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the	16 Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. 7-ESS1-1

sun and moon, and seasons. 7-ESS1-1	
Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. 7-ESS1-2	17 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. 7-ESS1-2
Analyze and interpret data to determine scale properties of objects in the solar system. 7-ESS1-3	18 Analyze and interpret data to determine scale properties of objects in the solar system. 7-ESS1-3
Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. 7-ESS2-4	19 Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. 7-ESS2-4
Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, considering relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. 7-ETS1-1	20 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, considering relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. 7-ETS1-1
Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. 7-ETS1-2	21 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. 7-ETS1-2
Analyze data from tests to determine similarities and differences among several design solutions	22 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. 7-ETS1-3

to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. 7-ETS1-3

Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. 7-ETS1-4

23 **Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.** 7-ETS1-4