

Spanish Fork High 2014-2015

Don Learning Targets for

Physics with Technology

I CAN describe the motion of an object in terms of position, time, and velocity.

- I CAN calculate the average velocity of a moving object using data obtained from measurements of position of the object at two or more times.
- I CAN distinguish between distance and displacement.
- I CAN distinguish between speed and velocity.
- I CAN determine and compare the average and instantaneous velocity of an object from data showing its position at given times.
- I CAN collect, graph, and interpret data for position vs. time to describe the motion of an object and compare this motion to the motion of another object.

I CAN analyze the motion of an object in terms of velocity, time, and acceleration.

- I CAN determine the average acceleration of an object from data showing velocity at given times.
- I CAN describe the velocity of an object when its acceleration is zero.
- I CAN collect, graph, and interpret data for velocity vs. time to describe the motion of an object.
- I CAN describe the acceleration of an object moving in a circular path at constant speed.
- I CAN analyze the velocity and acceleration of an object over time.

I CAN relate the motion of objects to a frame of reference.

- I CAN compare the motion of an object relative to two frames of reference.
- I CAN predict the motion of an object relative to a different frame of reference.
- I CAN describe how selecting a specific frame of reference can simplify the description of the motion of an object.

I CAN use Newton's first law to explain the motion of an object.

- I CAN describe the motion of a moving object on which balanced forces are acting.

- I CAN describe the motion of a stationary object on which balanced forces are acting.
- I CAN describe the balanced forces acting on a moving object commonly encountered.

I CAN analyze forces acting on an object.

- I CAN observe and describe forces encountered in everyday life.
- I CAN use vector diagrams to represent the forces acting on an object.
- I CAN measure the forces on an object using appropriate tools.
- I CAN calculate the net force acting on an object.

I CAN use Newton's second law to relate the force, mass, and acceleration of an object.

- I CAN determine the relationship between the net force on an object and the object's acceleration.
- I CAN relate the effect of an object's mass to its acceleration when an unbalanced force is applied.
- I CAN determine the relationship between force, mass, and acceleration from experimental data and compare the results to Newton's second law.
- I CAN predict the combined effect of multiple forces on an object's motion.

I CAN explain that forces act in pairs as described by Newton's third law.

- I CAN identify pairs of forces acting between two objects.
- I CAN determine the magnitude and direction of the acting force when magnitude and direction of the reacting force is known.
- I CAN provide examples of practical applications of Newton's third law.
- I CAN relate the historical development of Newton's laws of motion to our current understanding of the nature of science

I CAN relate the strength of the gravitational force to the distance between two objects and the mass of the objects.

- I CAN investigate how mass affects the gravitational force.
- I CAN distinguish between mass and weight.
- I CAN describe how distance between objects affects the gravitational force.
- I CAN explain how evidence and inference are used to describe fundamental forces in nature, such as the gravitational force.
- I CAN research the importance of gravitational forces in the space program.

I CAN describe the factors that affect the electric force.

- I CAN relate the types of charge to their effect on electric force.
- I CAN describe how the amount of charge affects the electric force.
- I CAN investigate the relationship of distance between charged objects and the strength of the electric force.
- I CAN research and report on electric forces in everyday applications found in both nature and technology.

I CAN determine kinetic and potential energy in a system.

- I CAN identify various types of potential energy.
- I CAN calculate the kinetic energy of an object given the velocity and mass of the object.
- I CAN describe the types of energy contributing to the total energy of a given system.

I CAN describe conservation of energy in terms of systems.

- I CAN describe a closed system in terms of its total energy.
- I CAN relate the transformations between kinetic and potential energy in a system.
- I CAN gather data and calculate the gravitational potential energy and the kinetic energy of an object and relate this to the conservation of energy of a system.
- I CAN evaluate social, economic, and environmental issues related to the production and transmission of electrical energy.

I CAN describe common energy transformations and the effect on availability of energy.

- I CAN describe the loss of useful energy in energy transformations.
- I CAN investigate the transfer of heat energy by conduction, convection, and radiation.
- I CAN describe the transformation of mechanical energy into electrical energy and the transmission of electrical energy.
- I CAN research and report on the transformation of energy in electrical generation plants and include energy losses during each transformation.

I CAN demonstrate an understanding of mechanical waves in terms of general wave properties.

- I CAN differentiate between period, frequency, wavelength, and amplitude

of waves.

- I CAN investigate and compare reflection, refraction, and diffraction of waves.
- I CAN provide examples of waves commonly observed in nature and/or used in technological applications.
- I CAN identify the relationship between the speed, wavelength, and frequency of a wave.
- I CAN explain the observed change in frequency of a mechanical wave coming from a moving object as it approaches and moves away.
- I CAN explain the transfer of energy through a medium by mechanical waves.

I CAN describe the nature of electromagnetic radiation and visible light.

- I CAN describe the relationship of energy to wavelength or frequency for electromagnetic radiation.
- I CAN distinguish between the different parts of the electromagnetic spectrum.
- I CAN explain that the different parts of the electromagnetic spectrum all travel through empty space and at the same speed.
- I CAN explain the observed change in frequency of an electromagnetic wave coming from a moving object as it approaches and moves away.
- I CAN provide examples of the use of electromagnetic radiation in everyday life.