

Physics - 9th Grade 2011-2012 Benchmark Blueprint

Green Dot Public Schools

Assessments

Motion and Forces

	1	2	3	4
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|------------|---|---|--|---|
| 1.0 | Students know Newton's laws predict the motion of most objects. As a basis for understanding this concept: | | | |
| 1.a | 6 | 3 | | |
| 1.b | 4 | 3 | | 3 |
| 1.c | 6 | 3 | | 3 |
| 1.d | 4 | 3 | | 3 |
| 1.e | 4 | 3 | | |

Conservation of Energy and Momentum

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|------------|--|---|--|---|
| 2.0 | Students know the laws of conservation of energy and momentum provide a way to predict and describe the movement of objects. As a basis for understanding this concept: | | | |
| 2.a | | 3 | | 3 |
| 2.b | | 3 | | 3 |
| 2.c | | 4 | | 3 |
| 2.d | | 3 | | |
| 2.e | | 3 | | |
| 2.f | | 3 | | |
| 2.g | | 3 | | |

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Heat and Thermodynamics		1	2	3	4
3.0	Students know energy cannot be created or destroyed, although in many processes energy is transferred to the environment as heat. As a basis for understanding this concept:				
3.a	Students know heat flow and work are two forms of energy transfer between systems.				3
3.b	Students know the work done by a heat engine that is working in a cycle is the difference between the heat flow into the engine at high temperature and the heat flow out at a lower temperature (First Law of Thermodynamics) and that this is an example of the law of conservation of energy.				3
3.c	Students know thermal energy (commonly called heat) consists of random motion and the vibrations and rotations of atoms and molecules. The higher the temperature, the greater the atomic or molecular motion.				3
3.d	Students know most processes tend to decrease the order of a system over time, and energy levels are eventually distributed uniformly.				3
3.e	Students know entropy is a quantity that measures the order or disorder of a system, and is larger for a more disordered system.				3
Waves		1	2	3	4
4.0	Students know waves have characteristic properties that do not depend on the type of wave. As a basis for understanding this concept:				
4.a	Students know waves carry energy from one place to another.				3
4.b	Students know how to identify transverse and longitudinal waves in mechanical media such as springs, ropes, and the Earth (seismic waves).				3
4.c	Students know how to solve problems involving wavelength, frequency, and wave speed.				3
4.d	Students know sound is a longitudinal wave whose speed depends on the properties of the medium in which it propagates.				3
4.e	Students know radio waves, light and X-rays are different wavelength bands in the spectrum of electromagnetic waves whose speed in vacuum is approximately 3×10^8 m/s (186,000 miles/second).				3
4.f	Students know how to identify the characteristic properties of waves: interference (beats), diffraction, refraction, Doppler effect, and polarization.				3



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Electric and Magnetic Phenomena		1	2	3	4
5.0	Students know electric and magnetic phenomena are related and have many practical applications. As a basis for understanding this concept:				
5.a	Students know how to predict the voltage or current in simple direct current electric circuits constructed from batteries, wires, resistors, and capacitors.			3	3
5.b	Students know how to solve problems involving Ohm's law.			3	3
5.c	Students know any resistive element in a DC circuit dissipates energy which heats the resistor. Students can calculate the power (rate of energy dissipation) in any resistive circuit element by using the formula Power = (potential difference IR) times (current I) = I ² R.			3	3
5.e	Students know charged particles are sources of electric fields and experience forces due to the electric fields from other charges.			3	
5.f	Students know magnetic materials and electric currents (moving electric charges) are sources of magnetic fields and experience forces due to magnetic fields of other sources.			3	
5.g	Students know how to determine the direction of a magnetic field produced by a current flowing in a straight wire or in a coil.			3	
5.h	Students know changing magnetic fields produce electric fields, thereby inducing currents in nearby conductors.			3	
5.i	Students know plasmas, the fourth state of matter, contain ions and/or free electrons and conduct electricity.			3	
Total Number of Items		24	37	42	42