Moon Area School District Curriculum Map

Course: Physics
Grade Level: 10, 11, 12
Content Area: Science
Frequency: Full-Year Course
Textbook: Serway, R.A & Faughn, JS. Physics. New York, Holt, 2006.

Big Ideas

1. Measurement
2. One-dimensional motion
3. Vector addition
4. Two-dimensional motion
5. Force
6. Newton's laws of motion
7. Work
8. Energy
9. Momentum
10. Rotational equilibrium
11. Waves and light
12. Reflection / refraction
13. Thin lenses
14. Electric force
15. Electric fields
16. Electric circuits
17. Electric potential
18. Capacitors

Essential Questions

19. What is the difference between accuracy and precision?
20. What are the differences between accelerated, non-accelerated, and decelerated motion?
21. How is free fall an example of one-dimensional motion?
22. In what ways are one dimensional motion and two-dimensional motion related?
23. How does initial and final velocity of an object compare to each other when an object is projected into the air and returns to the same height?
24. How does the mass of an object affect the size of the force needed to accelerate it?
25. What different energy conversions take place when a person is jumping on a trampoline?
26. What is the purpose of using padding to cushion a blow?
27. How is kinetic energy conserved in an elastic collision but not in an inelastic collision?
28. How can the two conditions of equilibrium be used to describe a balanced seesaw?
29. Why is light considered to have a dual nature?
30. Why does a moving object vibrate with a constant frequency?
31. Why does light bend as it goes from one medium into another medium?

32. What changes in the image occur as an object of a concave mirror is moved closer to the mirror?
33. What affects do changing the size of a charge, the sign of a charge or the distance between have on the net electrical field?
34. How are voltage and current related in a circuit?
35. How are charge, capacitance and voltage related in a circuit?

Primary Resource(s) & Technology:
Holt Physics, Microsoft Teams,
Promethean Boards, Student Laptops/iPads

Pennsylvania and/or focus standards referenced at:
www.pdesas.org
www.education.pa.gov

Big Ideas/ EQs	Focus Standard(s)	Assessed Competencies (Key content and skills)	Timeline
1, 19	Measurement and significant figures 3.2.P.B1 3.2.P.B6	• Make precise and accurate measurements in the SI system. • Use significant figures in calculations • Convert between the English and Metric System • Informal laboratory on measurement	August - September (2 Weeks)
2, 20, 21	Kinematics 3.2.P.B1 3.2.P.B6	• Solve linear motion problems using one dimensional motion equations • Use one dimensional motion equations to solve free fall problems • Determine the acceleration of gravity in a formal laboratory	September – October (4-5 weeks)
3, 4, 22, 23	Vectors and Dynamics 3.2.P.B1 3.2.P.B6	• Add vectors using graphical and mathematical methods (Trig.) • Use one dimensional equations to solve problems in two dimensions • Vector lab • Determine displacement when an object projected into the air at some angle	October – November (4-5 weeks)

		• Predict where a ball will land on the floor when rolled off a desk	
5, 6, 24	Newton's Laws of Motion 3.2.10.B1 3.2.10.B6 3.2.P.B1 3.2.P.B6 3.2.12.B6	• Explain motion in terms of Newton's three laws of motion • Use Newton's second law of motion to find the acceleration of an object	November (3 weeks)
7, 8, 25	Mechanical Energy 3.2.10.B2 3.2.10.B6 3.2.P.B2 3.2.P.B6 3.2.12.B6	• Relate work energy and power • Use the law of conservation of energy to mathematically determine position or velocity. • Show the conservation of kinetic and potential energy in an air track a laboratory	December (3 weeks)
9, 26, 27	Momentum 3.2.10.B1 3.2.10.B6 3.2.P.B1 3.2.P.B2 3.2.P.B6 3.2.12.B2 3.2.12.B6	• Solve equations with momentum and impulse • Write and solve equations showing the conservation of momentum in inelastic and elastic collisions • Show the conservation of momentum in two types of collisions in an air track laboratory	December – January (3-4 weeks)
10, 28	Torque and Rotational Motion 3.2.10.B1 3.2.10.B6 3.2.P.B1 3.2.12.B1 3.2.12.B6	• Use 1st and 2nd laws of equilibrium to predict forces • Complete a lab on equilibrium	January-February (3 weeks)
11, 29, 30	Waves 3.2.10.B5 3.2.P.B5	• Describe the nature of waves and list different types of waves • Describe the nature of light and the electromagnetic Spectrum. • Explain electromagnetic spectral lines for certain elements. • Use Plank's equation and deBroglie's equation to determine the frequency of solid moving objects.	February-March (4-5 weeks)

12, 13, 31, 32	Light, Lenses, and Mirrors 3.2.10.B5 3.2.10.B6 3.2.P.B5 3.2.12.B6	• Use Snell's law to mathematically show how light goes from one medium to the next • Use the critical angle to explain total internal reflection • Use ray diagrams to predict where images will form in mirrors and list their nature • Use the mirror equations to mathematically predict the location of images in spherical mirrors • Use ray diagrams to predict where images will form in lenses and list their nature • Use the lens equations to mathematically predict the location of images. • Complete a lab on the location of a images formed from lenses	March-April (3-4 weeks)
14, 15, 33	Electric Forces and Fields 3.2.10.B4 3.2.P.B4 3.2.12.B4 3.2.10.B6	• Describe static electric Force and Electric fields as vector quantities. • Define the force felt between charged particles as repulsive or attractive. • Use coulomb's law and the law of charges to mathematically determine the size and direction of the static electric force around two or more charged particles. • Use the definition of the electric field to determine the size and direction of the electric field surrounding a point charge. • Use the electric field line model to represent the relative size and direction of an electric field surrounding a point charge. • Use the definition of the electric field to describe the size and direction the electric field in a continuous electric field. • Mathematically determine the Electric Potential (voltage), surrounding a point charge. • Mathematically determine the potential difference and change in electric potential energy when moving from one position to another position around a point charge.	April-May (3-4 weeks)

16, 17, 18, 34, 35	Circuits 3.2.10.B4 3.2.P.B4 3.2.12.B4	• Describe what is meant by current, voltage and resistance in a circuit. • Use Ohm's law mathematically relate current, voltage and resistance. • Determine the power dissipated, energy used and cost when operating an electrical appliance. • Draw schematic diagrams to represent circuits. • Determine the equivalent resistance in a series and parallel circuit. • Determine the current, voltage, power, and energy dissipated in each individual element of complex circuit.	May-June (4 weeks)