

Curriculum Map: Academic Physics

Crawford Central School District

Cochranton High School

Science/Physics

Course Description: The topics included are making measurements; recording and interpreting data; description of forces; kinematics and dynamics; description of temperature and heat and their effects on matter, waves, light, electricity; and nuclear changes in matter.

Unit Title: Kinematics and Dynamics (Forces and the Laws of Motion)

Suggested time frame: 9 weeks

Standards: 3.2.P.B1-7, CC.3.6.11-12.B, CC.3.5.11-12.C, CC.3.5.11-12.D, CC.3.5.11-12.H

Essential Questions:

- 1) Where do units come from?
- 2) How can a measurement be precise, but lack accuracy?
- 3) How can the motion of an object be described in a measurable and quantitative way?
- 4) What is a force?
- 5) What causes the motion of an object?

Competency	Vocabulary	Strategy	Resource
Perform laboratory procedures applying their understanding of forces and motion to predict the outcomes of moving objects.	Hypothesis, Accuracy, Precision, Significant Figures, Measurement, Conversion Factors, Uniform Motion, Displacement, Velocity, time, Acceleration, Gravity, Vector and Scalar Force, Newton,	Notes, example problems, labs, readings, homework, online simulations, formative assessment, summative assessment, differentiated instructions, cooperative learning.	<i>Conceptual Physics</i> . 2015. Pearson. Simulation Websites Labs Online Demos and Videos

Unit Title: Work and Energy

Suggested time frame: 9 weeks

Standards: 3.2.P.B1-7, CC.3.6.11-12.B, CC.3.5.11-12.C, CC.3.5.11-12.D, CC.3.5.11-12.H

Essential Questions:

- 1) How do an object's mass distribution and interactions with other object's and forces at a distance influence the object's motion?
- 2) Can kinematic equations be derived from kinetic and potential energy? If so, how?
- 3) Is the amount of work done on an object always conserved?
- 4) How does power from a moving object such as a car, the power used by an electric device, for example a light bulb?

Competency	Vocabulary	Strategy	Resource
Perform laboratory procedures applying their understanding of work and types of energy to determine the relationship between the work done on an object and the conversion of energy.	Work, energy, potential, kinetic, elastic potential, momentum, elastic/inelastic collisions, conservation of energy/momentum. Work-energy theorem.	Notes, example problems, labs, readings, homework, online simulations, formative assessment, summative assessment, differentiated instructions, cooperative learning.	<i>Conceptual Physics</i> . 2015. Pearson. Simulation Websites Labs Online Demos and Videos

Unit Title: Heat and Thermodynamics

Suggested time frame: 9 weeks

Standards: 3.2.P.B1-7, CC.3.6.11-12.B, CC.3.5.11-12.C, CC.3.5.11-12.D, CC.3.5.11-12.H

Essential Questions:

- 1) What is thermodynamics?
- 2) What impact do the Laws of Thermodynamics have on machines
- 3) How is the temperature of a substance related to the thermal energy of its atoms?
- 4) What is the underlining principle behind the movement of heat by conduction, convection, and radiation?

Competency	Vocabulary	Strategy	Resource
Perform laboratory procedures applying their understanding of temperature and heat to explain and investigate the characteristics of heat transfer.	Heat, temperature, specific heat, Celsius, conductivity, expansion, R-value, conduction, convection, radiation, latent heat	Notes, example problems, labs, readings, homework, online simulations, formative assessment, summative assessment, differentiated instructions, cooperative learning.	<i>Conceptual Physics</i> . 2015. Pearson. Simulation Websites Labs Online Demos and Videos

Unit Title: Waves, Sound, and Light

Suggested time frame: 9 weeks

Standards: 3.2.P.B1-7, CC.3.6.11-12.B, CC.3.5.11-12.C, CC.3.5.11-12.D, CC.3.5.11-12.H

Essential Questions:

- 1) How do electromagnetic waves compare to mechanical waves?
- 2) How are the characteristics of waves affected by the type of medium?
- 3) How are wavelengths detected by the human eye?
- 4) How do you determine the velocity of a wave?

Competency	Vocabulary	Strategy	Resource
Perform laboratory procedures to show an understanding of wave characteristics.	Standing waves, nodes, antinodes, reflection, refraction, wavelength, amplitude, crest, trough, rarefaction, longitudinal wave, transverse, interference	Notes, example problems, labs, readings, homework, online simulations, formative assessment, summative assessment, differentiated instructions, cooperative learning.	<i>Conceptual Physics</i> . 2015. Pearson. Simulation Websites Labs Online Demos and Videos

Unit Title: Electricity and Magnetism

Suggested time frame: If time permits

Standards: 3.2.P.B1-7, CC.3.6.11-12.B, CC.3.5.11-12.C, CC.3.5.11-12.D, CC.3.5.11-12.H

Essential Questions:

- 1) How is electricity used to create heat, sound, light, and motion?
- 2) What types of materials are conductors of electricity and what materials are not conductors (insulators)?
- 3) How do magnets interact with each other and other objects?
- 4) How does the size and strength of a magnet affect its ability to push and pull?

Competency	Vocabulary	Strategy	Resource
Perform laboratory procedures applying knowledge of simple circuits and the relationships between voltage, current, power, and quonons.	Electricity, charge, current, voltage, resistance, electric field, capacitance, inductance, ohm's law, coulomb's law, circuit, source, load, power	Notes, example problems, labs, readings, homework, online simulations, formative assessment, summative assessment, differentiated instructions, cooperative learning.	<i>Conceptual Physics</i> . 2015. Pearson. Simulation Websites Labs Online Demos and Videos