



## Rochester Community Schools

### *Physics Credit By Exam*

*Preparation for taking the Physics exam*

**GRADE:** 10 - 12

**PREREQUISITE:** Physical Science, Algebra 2 strongly recommended  
(Algebra 2 may be taken concurrently)

*This course is recommended for students who wish to enter technical areas of study such as engineering, architecture and medicine. Basic topics include motion, forces, energy, electricity, magnetism and waves. The course emphasizes the development of analytical thinking skills.*

To prepare for the Credit by Exam (CBE) for this course, you will need to do the following:

**The following concepts will be covered on this assessment.**

- Describing Motion: Acceleration, Speed, Displacement, Distance, Elapsed Time, Frame of reference, motion graphs, motion diagrams, velocity
- Linear Motion: Acceleration, drag, free-body diagrams, forces, projectile motion, two-dimensional motion, vectors, velocity, Newton's Laws of motion, non-contact forces, weight
- Circular Motion: centripetal acceleration and force, elliptical motion, kinetic energy, law of universal gravitation, net force, periodic motion, potential energy, rotational motion, revolution, uniform circular motion
- Mechanical Energy and Work: air resistance, conservation of energy, energy transfer, energy transformation, friction, kinetic energy, mechanical energy, pendulum, potential energy, thermal energy, work, velocity
- Momentum: change in momentum, collision, conservation of momentum, elastic collision, impact force, impact time, impulse, inelastic collision, recoil
- Electrical Forces and Interactions: charged object, conductor, Coulomb's Law, electric charge, electric force, electric generator, electrical current, electromagnetic force, electromagnetic wave, electron, electroscope, induction, inverse square law, opposite charge, proton and electron, static charge, Van de Graff generator
- Electric Current: ampere, circuits, electrical current (AC & DC), electrical power, fuse, load, Ohm's law, resistance, potential difference, voltage, watt
- Magnetism: magnetic fields, magnetic forces, electromagnetic induction, Faraday's Law, Lens Law

- Mechanical Waves: wave properties, types of waves (longitudinal, mechanical, compression, seismic, transverse, water), vibrations, energy transfer, media, propagation, source, pulse

**The following skills/concepts should be understood/reviewed and students will need to apply them within the assessment and their writing task:**

- Interpret and analyze data tables and graphs
- Evaluate models of scientific concepts
- Evaluate effectiveness of experimental setups
- Calculate variables associated with concepts (formula sheet will be provided)
- Analyze lab techniques and procedures to determine appropriate materials, steps to follow, and error analysis

### **Michigan K-12 Science Standards**

- |            |            |            |             |
|------------|------------|------------|-------------|
| • HS-PS2-1 | • HS-PS3-1 | • HS-PS4-1 | • HS-ESS1-1 |
| • HS-PS2-2 | • HS-PS3-2 | • HS-PS4-2 | • HS-ESS1-2 |
| • HS-PS2-3 | • HS-PS3-3 | • HS-PS4-3 | • HS-ESS1-3 |
| • HS-PS2-4 | • HS-PS3-4 | • HS-PS4-4 |             |
| • HS-PS2-5 | • HS-PS3-5 | • HS-PS4-5 |             |
| • HS-PS2-6 |            |            |             |
| • HS-PS1-7 |            |            |             |