Physics 40S Course Syllabus

Crocus Plains Regional Secondary School

Instructor: Joshua Baker
Course: Physics 40S (Grade 12 Physics)
Semester: Fall 2026

Welcome to Physics 40S

Physics 40S is a university-preparatory science course that explores how the physical world works through observation, experimentation, mathematical analysis, and scientific reasoning. Students will investigate motion, forces, energy, gravity, electricity, electromagnetism, and medical physics while developing problem-solving and inquiry skills. The course emphasizes laboratory investigations, real-world applications, communication, and evidence-based reasoning.

Course Goals

By the end of this course, students will be able to:

- Apply physics principles to explain natural phenomena.
- Develop and use mathematical models.
- Analyze and interpret experimental data.
- Design and conduct scientific investigations.
- Communicate scientific ideas effectively.
- Evaluate evidence and defend conclusions.
- Connect physics concepts to technology and society.
- Work safely and responsibly in laboratory environments.

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Course Units

Unit 1: Mechanics

Topics include:

- Kinematics
- Vectors
- Forces and Newton's Laws
- Friction
- Momentum and Impulse
- Projectile Motion
- Circular Motion
- Work and Energy
- Conservation of Energy

Sample Learning Activities

- Vector Addition in Motion & Navigation Stations
- Physics Courtroom Assignment
- Projectile Motion Investigation
- Amusement Park Centrifuge Investigation
- Momentum Conservation Lab
- Energy Conservation Investigation

Unit 2: Fields

Topics include:

- Space Exploration
- Universal Gravitation
- Kepler's Laws
- Satellite Motion
- Microgravity
- Electric Fields
- Coulomb's Law
- Electric Potential

Sample Learning Activities

- Space Exploration Research
- Satellite Systems Case Study
- Electric Field Mapping Lab
- Electromagnetic Technology Investigation

Unit 3: Electricity

Topics include:

- Electric Current
- Ohm's Law
- Resistance
- Circuit Analysis
- Electromagnetic Induction
- Generators
- Transformers
- Power Distribution

Sample Learning Activities

- Circuit Design Challenge
- Circuit Construction Lab
- Electromagnetic Induction Lab
- Transformer Investigation

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Unit 4: Medical Physics

Topics include:

- The Nuclear Model
- Radioactivity
- Half-Life
- Radiation
- Medical Imaging Technologies
- Radiation Risks and Benefits

Sample Learning Activities

- Half-Life Simulation Lab
- Radiation Detection Investigation
- Medical Imaging Research Project
- Radiation Risk Analysis

Essential Questions

Throughout the course we will explore questions such as:

- How can forces and motion be modeled mathematically?
- How do conservation laws help explain the universe?
- How does gravity shape motion in space?
- How can fields explain interactions between objects without contact?
- How is electricity generated and distributed?
- How does physics contribute to modern medicine?
- What role does evidence play in developing scientific understanding?

Assessment and Evaluation

Your final grade will be determined using the following categories:

Category	Weight
Laboratory Investigations & Scientific Inquiry	25%
Portfolios & Projects	25%
Conferences, Reflections & Scientific Communication	15%
Assignments & Problem Solving	15%
Unit Tests & Quizzes	10%
Final Exam or Culminating Project	10%
Total	**100%**

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Laboratory Expectations

Students will:

- Follow all safety procedures.
- Wear required safety equipment.
- Use equipment responsibly.
- Report accidents immediately.
- Participate actively in investigations.
- Maintain accurate records of observations and data.
- Demonstrate respectful and responsible behaviour in laboratory settings.

Failure to follow laboratory safety expectations may result in removal from an activity and alternative assignments.

Classroom Expectations

Students are expected to:

- Arrive prepared, and on time.
- Bring a charged device and required materials.
- Participate actively in class discussions and activities.
- Complete assignments by established deadlines.
- Respect classmates, equipment, and learning spaces.
- Demonstrate academic honesty on all assessments.
- Contribute positively to collaborative learning environments.

Technology Use

Microsoft 365 will be used extensively throughout the course for:

- Digital portfolios
- Assignment submission
- Research projects
- Class resources
- Communication
- Reflections and conferences

Responsible and appropriate use of technology is expected at all times.

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Late and Missing Work

- Students are expected to submit work on time.
- Extensions may be provided when communicated in advance.
- Evidence of learning will be collected through multiple opportunities.
- Students who miss assessments must make arrangements with the teacher as soon as possible.

Academic Integrity

Students must submit their own work and properly acknowledge information from outside sources. Academic dishonesty, plagiarism, unauthorized use of artificial intelligence tools, or cheating on assessments will be addressed according to school and divisional expectations.

Student Success Tips

Successful Physics 40S students:

- Practice problem solving regularly.
- Ask questions when concepts are unclear.
- Keep organized notes and formulas.
- Complete assignments consistently.
- Participate fully in labs and investigations.
- Seek feedback and use it to improve.
- Connect physics concepts to real-world situations.

Final Message

Success in this course does not require you to know all the answers immediately. It requires curiosity, effort, perseverance, and a willingness to learn from mistakes. Every challenge is an opportunity to grow as a learner and develop a deeper understanding of how the universe works.

Welcome to Physics 40S. Let's have a great semester of learning, discovery, and scientific thinking!