

# IONA PREP

## COURSE SYLLABUS

### PHYSICS HONORS 2013-2014

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**EXTRA HELP SCHEDULE: 3:00-3:45 PM; BY APT.**

**Course description:** In this Honors Physics class, we will investigate the physical laws of nature, matter and energy. The focus will be on developing an understanding of the qualitative and quantitative aspects of physics. Throughout this course, emphasis will be placed on observation, interpretation, and reasoning. We will use these understandings to model physical interactions using algebra, geometry, and trigonometry. This is a lab based course, and many of the objectives are aligned with the New York State Physical Settings / Physics Core Curriculum.

#### LEARNING GOALS

After a successful completion of this course, a student will be able to:

- Understand how to successfully complete a laboratory investigation
- Analyze experimental data, noting trends and comparing with expected results
- Understand the general nature of science and identify a good hypothesis
- Understand how motion is relative, describe different types of motion (1-d, 2-d, free-fall, etc)
- Explain how graphs can be used to interpret motion
- Distinguish between vector quantities and scalar quantities
- Calculate components of vectors
- Describe horizontal and vertical components of projectile motion
- State and apply Newton's Laws of Motion
- Understand and describe the role friction plays in the interaction of materials
- State and apply the law of conservation of momentum
- Describe work, power, energy and efficiency
- State and apply the law of conservation of momentum
- Understand how objects behave when their motion is in a circular path
- Describe and model gravitational interactions
- Compare and contrast phases of matter and physical properties
- Describe and model waves
- Understand the properties of sound and factor which effect its velocity
- Describe characteristics of light and light interactions

- Understand the concept of electric charges and the flow of electricity
- Understand simple electric circuits and the relationship of voltage, current, resistance and power
- Describe magnetic and electromagnetic interactions, and forces associated with them
- Describe the quantum nature of the atom
- Predict and give examples of radioactive decay
- Explain the uses of radioactive isotopes
- Understand chain reactions and uses of radioactive substances (fission/fusion)
- Understand mass-energy equivalence
- Predict behavior of objects moving at relativistic speeds

## TEXTS & MATERIALS

### Required Text

*Walker, Physics, Pearson, 2014*

### Materials

Notebook

Binder for returned and current paperwork

Scientific calculator

Ruler

Protractor

Pencils and black Pens

## QUARTER 1

*Reading assignments will come from the text and selected sources. Your text should be left at home, other readings will be provided.*

| <b>Text or Article.....</b>                | <b>Pages to be Read</b> |
|--|-------------------------|
| <b>Chapter 1 – Introduction to Physics</b> | <b>2-34</b>             |
| <b>Chapter 2 – Introduction to Motion</b>  | <b>43-65</b>            |
| <b>Chapter 3 – Acceleration</b>            | <b>73-101</b>           |
| <b>Chapter 4 - Vectors</b>                 | <b>113-140</b>          |
| <b>Chapter 5 – Newton’s Laws</b>           | <b>151-176</b>          |
| <b>Chapter 6 – Work and Energy</b>         | <b>198 – 216</b>        |
|  |                         |

## QUARTER 2

| <b>Text or Article.....</b>                         | <b>Pages to be Read</b> |
|---|-------------------------|
| <b>Chapter 7 - Linear Momentum &amp; Collisions</b> | <b>229-256</b>          |
| <b>Chapter 8 – Rotation and Equilibrium</b>         | <b>267-296</b>          |
| <b>Chapter 9 – Gravity and Circular Motion</b>      | <b>307-332</b>          |
| <b>Chapter 10 – Temperature and Heat</b>            | <b>343-374</b>          |
| <b>Chapter 11 – Thermodynamics *</b>                | <b>385-406</b>          |

## QUARTER 3

| <b>Text or Article.....</b>                      | <b>Pages to be Read</b> |
|--|-------------------------|
| <b>Chapter 13 - Oscillations and Waves</b>       | <b>453-482</b>          |
| <b>Chapter 14 – Sound</b>                        | <b>493-518</b>          |
| <b>Chapter 15 – Light</b>                        | <b>529-553</b>          |
| <b>Chapter 16 - Reflection and Mirrors</b>       | <b>565-586</b>          |
| <b>Chapter 17 - Refraction and Lenses</b>        | <b>597-627</b>          |
| <b>Chapter 18 - Interference and Diffraction</b> | <b>637-664</b>          |

## QUARTER 4

| <b>Text or Article.....</b>                           | <b>Pages to be Read</b> |
|---|-------------------------|
| <b>Chapter 19 – Electric Charges and Forces</b>       | <b>675-694</b>          |
| <b>Chapter 20 – Electric Field and Energy</b>         | <b>705-734</b>          |
| <b>Chapter 21 – Electric Current and Circuits</b>     | <b>745-770</b>          |
| <b>Chapters 22,23 – Magnetism and EM Induction *</b>  | <b>Parts of 783-840</b> |
| <b>Chapters 24-27 - Quantum Theory and The Atom *</b> | <b>Parts of 851-966</b> |

\*Optional topics, will be covered as time permits

## ASSESSMENT

Students at Iona Prep are to be prepared for class each and every day. Formative assessment takes place and may include a quiz, a “Do Now” activity, or the collection and correction of homework. In addition, each marking period includes summative assessment which may include unit tests, projects, presentations, or longer writing projects. During each quarter the following summative assessments are planned:

| # of | Assessment.....                   | % of the Quarter Grade |
|------|-----------------------------------|------------------------|
| 3-4  | <i>Tests</i>                      | 50%                    |
|      | <i>Quizzes, Homework and Labs</i> | 50%                    |
|      |                                   | <b>100%</b>            |

### **CHEATING ON EXAMS AND PLAGIARISM**

Plagiarism is the “use or close imitation of the language and thoughts of another author and the representation of them as one’s own original work.” Don’t do it. Work deemed as plagiarism will receive zero credit. See student handbook for full details on plagiarism.

### **RUBRIC**

Generally, assignments (homework, labs and projects) are graded with three factors: completeness, accuracy, and neatness. An assignment may have a specific, individualized rubric.

|              | <b>Beginning<br/>1</b>                     | <b>Developing<br/>2</b>  | <b>Accomplished<br/>3</b>   | <b>Exemplary<br/>4</b>  |
|--------------|--|--|---|---|
| Completeness | Most tasks were not completed              | Less than 50% of lab tasks / write up completed                            | Most of tasks completed   | All tasks completed, no omissions   |
| Accuracy     | Presents illogical explanation of findings | Presents an illogical explanation for findings and addresses few questions | Presents a logical explanation for findings and accurately addresses some questions | Presents a logical explanation for findings and accurately addresses most questions |
| Neatness     | Illegible writing, loose items             | Legible writing / typed, many typos  | Legible writing / typed, few typos, charts and pictures provided                    | Extreme care taken. All elements correctly placed and well thought out              |

### **ATTENDANCE AND LATE WORK**

In order to be successful in this class regular attendance is mandatory. Missing class time makes it much more difficult for the student to keep up with the material. It is the responsibility and expectation of the student to check edline for assignments and to complete assignments on time. No credit will be allowed for late assignments. In the case of an absence, work is due the day the student returns to school.