

**PHYSICS 2**

1. COURSE DESCRIPTION

The **Physics 2** course provides students with a modern view of the fundamental concepts of physics and is designed for students who are planning to major in the sciences, medicine, or engineering in college. The major topics covered in **Physics** are energy, electricity and magnetism, waves, and modern physics. This class includes extensive laboratory work and written lab reports. This course is a laboratory science course that provides understanding of many of the scientific principles we meet in our lives. This course helps to develop reasoning power and critical thinking by exposing students to problem solving laboratory situation. Students investigate physics concepts through an inquiry-based approach.

1. COURSE OBJECTIVES

At the end of this course the students will be able to:

* Discuss science as a body of knowledge and an investigative process.
* Understand that science is a way of knowing and that technology is a way of adapting
* Conduct scientific investigations systematically.
* Organize and interpret Graphs and Tables to express patterns and relationships.
* Apply appropriate units, significant figures and algebraic expressions in measurements and calculations.
* Understand the role, place, and interactions of matter and energy in the universe.
* Understand the characteristics that are unique to energy, electricity, magnetism, and atomic phenomena.
* Use written and oral communication skills to explain scientific phenomena and concepts in an appropriate manner.

The following topics will be covered in approximately the following order:

|  |  |
| --- | --- |
| Unit | **Topics to be covered** |
| 1 | **Work, Energy, and Power**: potential and kinetic energy, elastic potential energy, work-energy theorem |
| 2 | **Electrostatics**: elementary charge, electric fields, potential difference, conservation of charge, atomic structure |
| 3 | **Current and Electricity**: electric current, resistance of a conductor, Ohm’s Law, electric power and energy |
| 4 | Circuit: series and parallel circuits |
| 5 | Magnetism: magnetic fields, electromagnetism |
| 6 | Wave Characteristics: mechanical/electromagnetic waves, transverse/longitudinal waves, period, wavelength, amplitude, light/sound |
| 7 | Waves Behaviors: reflection, refraction, dispersion, diffraction, Doppler Effect, interference, standing waves, resonance |
| 8 | Modern Physics: quantum physics, models of atom, hydrogen/mercury, energy level |

A more comprehensive description of each topic can be found in the textbook.

1. MATERIALS
   * Textbooks
     1. Physics: Principles and Problems (2005). Columbus, OH: McGraw Hill Glencoe. (This is the Red & Black textbook which will be used during class).
     2. Cook, B.H. (2009). Prentice Hall Brief Review for the New York Regents Exam. Physics: The Physical Setting. Lebanon, ID: Pearson. (This is the Blue, soft covered review book).
     3. Welcher, Sharon H. (2011). High Marks: Regents Physics Made Easy, The Physical Setting. Forest Hill, NY. (This is the White book which you brought home and will be used for homework assignments.
     4. Supplementary material will also be used.
   * Castle Learning: Each student should check their Castle Learning account for weekly Regents Review assignments.
   * Each student should bring to class, every day, the following items:
     1. Notebook (preferably a three ring binder) with paper
     2. Pen or pencil
2. EXPECTATIONS
3. All students are expected to complete all assigned work – homework and class work.
4. You will be assigned homework three nights per week.
5. You will have one quiz per topic and one benchmark assessment (exam) per unit. If a unit is very long there may be two tests to cover it. There may be an essay on each test
6. All assignments and test must be completed in blue/black ink or pencil only.
7. Being an inquiry-based class, weekly laboratory investigations are required. Lab reports are to be submitted no later than 1 week after the investigation.
8. Make up work is your responsibility. All weekly handouts are put in the daily folders located on the wall. If you are absent, then get the notes from another student. Upon your return to school, you must make an appointment to make up the work you have missed.
9. GRAPHING: All graphs for this class must be hand drawn on real graph paper. Graphs which don't meet this requirement will earn no credit.

1. GRADING

**The following is the Engrade weighted assignment category model:**

* Exams: 10%
* Quizzes: 10%
* Projects: 25%
* Class work: 20%
* Homework: 10%
* Labs Reports: 10%
* Science Notebook: 10%
* Class Participation: 5%

Please read and have your parents read this carefully. Please sign and have a parent sign in the appropriate places below.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Student’s Signature

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Parent’s Signature

February

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|  |  |  | 1 | 2 | 3 | 4 |
|  |  |  | **Unit 1**: Energy, Work & Power | High Marks: READ: p 2:1 – 2:10; HW: Qs 1 – 25 on p. 2:49-51 | **Work & Power Lab**: Work & Power while walking up stairs  Castle Learning: Work & Power Qs |  |
|  |  |  |  |  |  |  |
|  | Potential/Kinetic Energy  High Marks: read p. 2:28 – 2:38 | High Marks: READ: p 2:10 – 2:18; HW Qs 26 – 31 on p. 2:51-53 | Hooke’s Law  HW: High Marks read p. 2:18-2:23 Qs 32 – 43 on p. 2:53-55 | **Spring Constant Lab** | Period of Pendulum  Castle Learning: Energy in a Spring | HW: High Marks: READ: p. 2:39 – 2:48  Castle Learning: Spring & Pendulum |
|  |  |  |  |  |  |  |
|  | **Pendulum Lab** | **Pendulum Lab** | **UNIT 1 BENCHMARK ASSESSMENT** | **Unit 2**: Electrostatics – Atomic Structure | High Marks: READ p. 3:1 – 6; Qs 6 – 12 on p. 3:127 - 128 | HW: High Marks: READ p. 3:7 – 3:20  Castle Learning: Electrostatic charge |
|  |  |  |  |  |  |  |
|  | **MIDWINTER BREAK** | **MIDWINTER BREAK** | **MIDWINTER BREAK** | **MIDWINTER BREAK** | **MIDWINTER BREAK** |  |
| 26 | 27 | 28 | 29 |  |  |  |
|  | Law of Conservation of Charge/Coulomb’s Law | **Electrostatics Lab** | **Electrostatics Lab** |  |  |  |

March

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|  |  |  |  | 1 | 2 | 3 |
|  |  |  |  |  | Electric Field  High Marks: READ p. 3:20 – 3:29 | Castle Learning: Electrostatics |
|  |  |  |  |  |  |  |
|  | **Electric Field Lab** | **Electric Field Lab** | **Unit 3**: Potential Difference  HW: High Marks: READ: p. 3:29 – 3:35; Qs. 46 – 59, p. 3:133- -134 | Conductivity & Electric Current & Resistance, Ohm’s Law | **Electricity Lab** | Castle Learning: Electricity: Current & Resistance |
|  |  |  |  |  |  |  |
|  | **Electricity Lab** | **Unit 4**: Circuits  High Marks: READ p. 3:57 – 3:73; Qs 73 – 77 on p. 3:136; Qs 88-90 on p. 3:138 | Series/Parallel Circuits | Parallel Circuits | **Circuits Lab** | HW: Complete Circuits Lab |
|  |  |  |  |  |  |  |
|  | **Circuits Lab** | Conservation of Charge  High Marks: READ p. 3:101 – 104 | Power  High Marks: READ p. 3:104 – 3:110 | Work  High Marks: READ p. 3:111 – 114 | **UNITS 3 & 4 BENCHMARK ASSESSMENT** |  |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|  | **Unit 5**: Magnetism  High Marks: READ p.3:114 – 3:120; Qs 138 – 142 on p. 3:143-144 | Magnetic Field Strength & Electromagnets | **Electromagnets Lab** | **Electromagnets Lab**  Castle Learning: Magnetism | **UNIT 5 BENCHMARK ASSESSMENT** |  |

April

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|  | **Unit 6**: Wave Characteristics  High Marks: READ p. 4:1 – 4:9 |  | **Waves Lab** | **Waves Lab** | **SPRING RECESS** | Castle Learning: Waves Characteristics |
|  |  |  |  |  |  |  |
|  | **SPRING RECESS** | **SPRING RECESS** | **SPRING RECESS** | **SPRING RECESS** | **SPRING RECESS** |  |
|  |  |  |  |  |  |  |
|  | **Unit 6**: Wave Characteristics:  High Marks: READ p. 4:9 – 4:17 | **Unit 6**: Wave Characteristics: | **UNIT 6 BENCHMARK ASSESSMENT** | **Unit 7**: Wave Behaviors (properties)  High Mark: READ p. 4:17 – 4:25 | **Wave Lab** |  |
|  |  |  |  |  |  |  |
|  | **Wave Lab** | **Unit 7**: Wave Behaviors (properties): Doppler Effect  High Marks: READ p. 4:17 – 4:20 | **Unit 7**: Wave Behaviors (properties): Interference  READ p. 4:23-25 | **Unit 7**: Wave Behaviors (properties): Pulses  High Marks: READ p. 4:28 – 4:33 | Standing Waves | Castle Learning: Waves |
| 29 | 30 |  |  |  |  |  |
|  | **Unit 7**: Resonance  READ p. 4:33-35  Qs 64-70 p. 4:150 |  |  |  |  |  |

May

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|  |  | 1 | 2 | 3 | 4 | 5 |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  | **Unit 7**: Diffraction  READ p. 4:35-36  Qs 71-80 p. 4:91-93 | **Unit 7**: Reflection  READ p. 4:36-39 | **Reflection/Refraction Lab** | **Reflection/Refraction Lab** | Castle Learning: Diffraction/Reflection/Refraction |
|  |  |  |  |  |  |  |
|  | **Unit 7**: Velocity & Wavelength  READ p. 4:44-48  Qs 89-97 p. 4;94-96 | **Unit 7**: Index of Refraction; Snell’s Law  RAED p. 4:53-72 | **Unit 7**: Electromagnetic Spectrum  READ p.4:73-80; Qs 121-131 on p. 4:165 | **Electromagnetic Spectrum Lab** | **Electromagnetic Spectrum Lab** | Castle Learning: Electromagnetic Spectrum |
|  |  |  |  |  |  |  |
|  | **UNIT 7 BENCHMARK** | **Unit 8**: Modern Physics | Wave and Particle Theory of Light | Quantum Theory  READ p. 5:1-5:8  Qs 1-6 on p. 5:44-5:45 |  |  |
| 27 | 28 | 29 | 30 | 31 |  |  |
|  | **MEMORIAL DAY** | **Quantum Theory Lab** |  |  |  |  |

June

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|  |  |  |  |  | 1 | 2 |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  | Models of the Atom |  | Energy Levels of Hydrogen  READ: p. 5:10-5:28  Qs 23-27 p. 5:47 | **BROOKLYN-QUEENS DAY** | **Half-Life Lab** | Castle Learning: Quantum Mechanics |
|  |  |  |  |  |  |  |
|  | Standard Model Of Particle Physics  READ: 5:37-5:44  Qs 34-35 on p. 5:48 & Qs 61-65 on p. 5:50­­­ |  |  |  | **Spectral Analysis Lab** |  |
|  |  |  |  |  |  |  |
|  | **REGENTS REVIEW** | **REGENTS REVIEW** | **REGENTS REVIEW** | **REGENTS REVIEW** | **REGENTS EXAMS** |  |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|  | **REGENTS EXAMS** | **REGENTS EXAMS** | **REGENTS EXAMS** |  |  |  |