Southside High School
An International Baccalaureate High School
6630 Frontage @ White Horse Rd--Greenville, 29605 SC-- 864-355-8700
"Celebrating Diversity. United in Learning. **Fax 864-355-8798**

Course Syllabus

School Year: 2013-2014
Instructor: Mr. Rogers
Course: Honors Physics
Room #: 134
Phone: 355-8737
Email address: tkrogers@greenville.k12.sc.us
After school Extra-Help (Days/Time): Tues, Thursday, Fridays after school

General Course Description and Objectives:

The course should provide students with a qualitative and quantitave understanding of the physical world around them, including Newtonian mechanics, light and sound waves, and electricity and magnetism. This is an advanced science course, which will require the use of math skills such as algebra and trigonometry. The content for this class will be based on the South Carolina State Standards for Physics. This course will prepare students for a more advanced course in Physics at either the high school AP level, or an introductory course in college.

Course Outline

I. Unit Title: Introduction to the tools of physics
Begin and End Dates: 8/22 to 8/29
Chapters: 1

Specific Outcomes (Objectives/Standards):
Indicators
P-1.1 Apply established rules for significant digits, both in reading scientific instruments and in calculating derived quantities from measurement.
P-1.3 Use scientific instruments to record measurement data in appropriate metric units that reflect the precision and accuracy of each particular instrument.
P-1.4 Design a scientific investigation with appropriate methods of control to test a hypothesis (including independent and dependent variables), and evaluate the designs of sample investigations.
P-1.5 Organize and interpret the data from a controlled scientific investigation by using (including calculations in scientific notation, formulas, and dimensional analysis), graphs, tables, models, diagrams, and/or technology.
P-1.6 Evaluate the results of a controlled scientific investigation in terms of whether they refute or verify the hypothesis.
P-1.7 Evaluate conclusions based on qualitative and quantitative data (including the impact of parallax, instrument malfunction, or human error) on experimental results.

Ongoing:
P-1.2 Use appropriate laboratory apparatuses, technology, and techniques safely and accurately when conducting a scientific investigation.
P-1.8 Evaluate a technological design or product on the basis of designated criteria (including cost, time, and materials).
P-1.9 Communicate and defend a scientific argument or conclusion.
P-1.10 Use appropriate safety procedures when conducting investigations

Unit Assessment: Chapter 1 Test

II. Unit Title: Force and Motion
Begin and End Dates: 8/30 to 10/26
Chapters: 2-8

Specific Outcomes (Objectives/Standards)
Indicators
P-2.1 Represent vector quantities (including displacement, velocity, acceleration, and force) and use vector addition.
P-2.2 Apply formulas for velocity or speed and acceleration to one and two-dimensional problems.
P-2.3 Interpret the velocity or speed and acceleration of one and two-dimensional motion on distance-time, velocity-time or speed-time, and acceleration-time graphs.
P-2.4 Interpret the resulting motion of objects by applying Newton's three laws of motion: inertia; the relationship among net force, mass, and acceleration (using F = ma); and action and reaction forces.
P-2.5 Explain the factors that influence the dynamics of falling objects and projectiles.
P-2.6 Apply formulas for velocity and acceleration to solve problems related to projectile motion.
P-2.7 Use a free-body diagram to determine the net force and component forces acting upon an object.
P-2.8 Distinguish between static and kinetic friction and the factors that affect the motion of objects.
P-2.9 Explain how torque is affected by the magnitude, direction, and point of application of force.
P-2.10 Explain the relationships among speed, velocity, acceleration, and force in rotational systems.

Unit Assessment: Chap. 2-3, Chap.4, Chap.5-6, and Chap 7-8 Tests

III. Unit Title: Mechanical energy and momentum
Begin and End Dates: 10/27 to 12/7
Chapters: 9-13

Specific Outcomes (Objectives/Standards)
Indicators
P-3.1 Apply energy formulas to determine potential and kinetic energy and explain the transformation from one to the other.
P-3.2 Apply the law of conservation of energy to the transfer of mechanical energy through work.
P-3.3 Explain, both conceptually and quantitatively, how energy can transfer from one system to another (including work, power, and efficiency).
P-3.4 Explain, both conceptually and quantitatively, the factors that influence periodic motion.
P-3.5 Explain the factors involved in producing a change in momentum (including impulse and the law of conservation of momentum in both linear and rotary systems).
P-3.6 Compare elastic and inelastic collisions in terms of conservation laws.

Unit Assessment: Chap 9-11 Test

IV. Unit Title: Thermal energy
Begin and End Dates: 12/8 to 1/11
Chapters: 12 and 13

Specific Outcomes (Objectives/Standards)
Indicators
P-10.1 Summarize the first and second laws of thermodynamics.
P-10.2 Explain the relationship among internal energy, heat, and work.
P-10.3 Exemplify the concept of entropy.
P-10.4 Explain thermal expansion in solids, liquids, and gases in terms of kinetic theory and the unique behavior of water.
P-10.5 Differentiate heat and temperature in terms of molecular motion.
P-10.6 Summarize the concepts involved in phase change.
P-10.7 Apply the concepts of heat capacity, specific heat, and heat exchange to solve calorimetry problems.
P-10.8 Summarize the functioning of heat transfer mechanisms (including engines and refrigeration systems).

Unit Assessment: Chap 12 and 13 Test

V. Unit Title: Waves
Begin and End Dates: 1/12 to 2/1
Chapters: 14 and 19

Specific Outcomes (Objectives/Standards)
Indicators
P-5.1 Analyze the relationships among the properties of waves (including energy, frequency, amplitude, wavelength, period, phase, and speed).
P-5.2 Compare the properties of electromagnetic and mechanical waves.
P-5.3 Analyze wave behaviors (including reflection, refraction, diffraction, and constructive and destructive interference).
P-5.4 Distinguish the different properties of waves across the range of the electromagnetic spectrum.
P-5.5 Illustrate the interaction of light waves with optical lenses and mirrors by using Snell's law and ray diagrams.
P-5.6 Summarize the operation of lasers and compare them to incandescent light.

Unit Assessment: Chap14 and Chap 19 Tests

VI. Unit Title: Sound
Begin and End Dates: 2/2 to 2/15
Chapters: 15

Specific Outcomes (Objectives/Standards)
Indicators
P-6.1 Summarize the production of sound and its speed and transmission through various media.
P-6.2 Explain how frequency and intensity affect the parts of the sonic spectrum.
P-6.3 Explain pitch, loudness, and tonal quality in terms of wave characteristics that determine what is heard.
P-6.4 Compare intensity and loudness.
P-6.5 Apply formulas to determine the relative intensity of sound.
P-6.6 Apply formulas in order to solve for resonant wavelengths in problems involving open and closed tubes.
P-6.7 Explain the relationship among frequency, fundamental tones, and harmonics in producing music.
P-6.8 Explain how musical instruments produce resonance and standing waves.
P-6.9 Explain how the variables of length, width, tension, and density affect the resonant frequency, harmonics, and pitch of a vibrating string.

Unit Assessment: Ch 15 Test

VII. Unit Title: Light
Begin and End Dates: 2/16 to 3/15
Chapters: 16-18

Specific Outcomes (Objectives/Standards)
Indicators
P-7.1 Explain the particulate nature of light as evidenced in the photoelectric effect.
P-7.2 Use the inverse square law to determine the change in intensity of light with distance.
P-7.3 Illustrate the polarization of light.
P-7.4 Summarize the operation of fiber optics in terms of total internal reflection.
P-7.5 Summarize image formation in microscopes and telescopes (including reflecting and refracting).
P-7.6 Summarize the production of continuous, emission, or absorption spectra.
P-7.7 Compare color by transmission to color by reflection.
P-7.8 Compare color mixing in pigments to color mixing in light.
P-7.9 Illustrate the diffraction and interference of light.

P-7.10 Identify the parts of the eye and explain their function in image formation.

Unit Assessment: Chp 16 and Chap 17-18 Tests

VIII. Unit Title: Electricity and Magnetism
Begin and End Dates: 3/16 to 4/26
Chapters: 20-26

Specific Outcomes (Objectives/Standards)
Indicators
P-4.1 Recognize the characteristics of static charge and explain how a static charge is generated.
P-4.2 Use diagrams to illustrate an electric field (including point charges and electric field lines).
P-4.3 Summarize current, potential difference, and resistance in terms of electrons.
P-4.4 Compare how current, voltage, and resistance are measured in a series and in a parallel electric circuit and identify the appropriate units of measurement.
P-4.5 Analyze the relationships among voltage, resistance, and current in a complex circuit by using Ohm's law to calculate voltage, resistance, and current at each resistor, any branch, and the overall circuit.
P-4.6 Differentiate between alternating current (AC) and direct current (DC) in electrical circuits.
P-4.7 Carry out calculations for electric power and electric energy for circuits.
P-4.8 Summarize the function of electrical safety components (including fuses, surge protectors, and breakers).
P-4.9 Explain the effects of magnetic forces on the production of electrical currents and on current carrying wires and moving charges.
P-4.10 Distinguish between the function of motors and generators on the basis of the use of electricity and magnetism by each.
P-4.11 Predict the cost of operating an electrical device by determining the amount of electrical power and electrical energy in the circuit.

Unit Assessment: Chap 20-21, Chap 22-23,and Chap 25 Tests

IX. Unit Title: Nuclear Physics
Begin and End Dates: 4/27 to 5/17
Chapters: 27, 28, 30

Specific Outcomes (Objectives/Standards)
Indicators
P-8.1 Compare the strong and weak nuclear forces in terms of their roles in radioactivity.
P-8.2 Compare the nuclear binding energy to the energy released during a nuclear reaction, given the atomic masses of the constituent particles.
P-8.3 Predict the resulting isotope of a given alpha, beta, or gamma emission.
P-8.4 Apply appropriate procedures to balance nuclear equations (including fusion, fission, alpha decay, beta decay, and electron capture).
P-8.5 Interpret a representative nuclear decay series.
P-8.6 Explain the relationship between mass and energy that is represented in the equation E = mc2 according to Einstein's special theory of relativity.
P-8.7 Compare the value of time, length, and momentum in the reference frame of an object moving at relativistic velocity to those values measured in the reference frame of an observer by applying Einstein's special theory of relativity.

Unit Assessment: Chap 27, 28, and 30 Test

Text:

Physics: Principles and Problems", Glencoe Science

Materials Needed:

1. A USB thumb drive or other storage media for maintaining your electronic portfolio of physics assignments.We will attempt to be as close to a paperless classroom as possible.

2. A set of dry erase markers: You will frequently be working problems in class on a white board.

3. A package of 3x5 cards: Starting immediately, each student will, over the course of the year create a set of flash cards to use as a study aid.

4. A graphing calculator

Grading Policy and Assessments:

A = 93-100
B = 85-92
C = 77-84
D = 70-76
F = 0-69

Quarter:
Major Assessments: 60% (minimum 3-4)
Minor Assessments: 40% (minimum 12)

Minor assessments will consist of: Physics investigations, homework, quizzes

Major assessments will consist of: Tests

This course ___ is ___ is not an EOCEP Course. The S.C. State Department of Education mandates that an EOC exam counts as 20% of the yearly grade.

Attendance Policy:
School Policy: a student may not miss more than ten days from a year-long course. Those ten days include parent's notes, suspensions, unexcused absences, administrative, or late arrival notes. After ten absences, a doctor's note or administrative excuse must be provided or the student will not receive credit for the course.

What to do if you miss a class:

Excused Absence: If you have an excused absence, you will be allowed to make up any missing assignments, tests, and projects with no penalty. Quizzes cannot be made up but will not be counted against you. Provisions for make-up work is the student's responsibility and shall be worked out with the teacher at the earliest time possible. Students who miss one (1) to two (2) days will be provided with one (1) day grace period to make up the assignment after their return. Students who have three (3) or more consecutive absences, have five (5) school days to make up any missed assignments.

Unexcused Absence: Teachers are not required to accept makeup work or provided testing for students with unexcused absences.

Academic and Behavioral Expectation

Students are expected to conduct themselves in a manner which is conducive to a learning environment in which ALL students can be successful. All school rules and policies will be followed in my classroom.
Please refer to the student agenda discipline code for all rules and the consequences for breaking those rules.
Students are expected to follow all teacher instructions during instructional time. Student behavior that is disruptive to the learning process in my classroom will not be tolerated! I consider this behavior rude and disrespectful to not only me but to the other students in the classroom. I will warn students prior to calling home

to discuss this behavior with a parent. However, if the behavior continues to disrupt the learning process in my classroom, I will be forced to send the student to an administrator for disciplinary action