**Regular Physics Syllabus**

4.0 Level

Pre-Reqs:

Open to Grades 11/12

Concurrent Enrollment in or the Completion of Algebra, and Biology or Chemistry with “C” or better

Overall G.P.A. of 2.0 or better

This course is designed for the 4 year college-bound student who is planning a career in a field other than science or engineering. Physics is the study of the relationship between matter and energy. It includes the study of forces and motion, energy and momentum, wave motion, light, electricity and magnetism, atomic structure and nuclear energy and relativity. The course involves appropriate and fundamental mathematics, demonstrations, and laboratory experiments. The course will prepare the student with a good foundation for taking an initial general physics course at the college level. Students will improve their analytic and problem-solving skills and be provided with the opportunity to use and apply mathematics. This course will challenge and enlighten those students who wish to prepare themselves for the challenge of the college science curriculum.

Textbook:

Physics: Principles and Problems, Glencoe Science, 2005

Topics covered:

1. Newtonian Mechanics
   1. Speed/Reference frames/units
   2. Average and instantaneous velocity/displacement
   3. Acceleration
   4. Free fall and vectors
   5. Galileo’s relationships
   6. Graphs
   7. Projectiles
   8. Force/mass
   9. Newton’s Laws
   10. Weight/force of gravity/normal force
   11. Friction
   12. Incline planes
   13. Gravitation
   14. Circular motion
   15. Work/Gravitational energy
   16. Kinetic energy
   17. Elastic Energy
   18. Conservation of energy
   19. Conservation of momentum
   20. Collisions and impulse
   21. Conservation of energy and momentum in collisions
   22. Elastic collisions in two dimensions
   23. Center of mass
   24. Kinematics for rotation
   25. Torque
   26. Rotational inertia
2. Vibrations and waves
   1. Simple Harmonic motion
   2. Simple Pendulum
   3. Hooke’s Law
   4. Resonance
   5. Wave properties (reflection, refraction, interference, diffraction)
   6. Standing waves
   7. Vibrating strings
   8. Vibrations in tubes
   9. Intensity of sound
   10. Doppler Effect
3. Electrostatics
   1. Origination of charge
   2. Methods of charging
   3. Coulomb’s Law
4. Electricity
   1. Electric field
   2. Electric potential energy
   3. Voltage/current resistance
   4. Resistor readings (color code)
   5. Resistors in series, parallel and parallel/series combination
   6. Capacitors in series and parallel
   7. Batteries in series and parallel
5. Optics
   1. Light/Reflection (Plane Mirrors)
   2. Electromagnetic spectrum
   3. Refraction/Index of refraction
   4. Snell’s Law
   5. Curved Mirrors
   6. Lenses
6. Atomic and Nuclear Physics
   1. Alpha particle scattering
   2. Photoelectric effect
   3. Bohr model and energy levels
   4. Wave Particle duality
   5. Radioactivity and half life
   6. Nuclear reactions (conservation of mass number and charge)
7. Relativity
   1. Postulates of Special Relativity
   2. Spacetime
   3. Time Dilation
   4. Length Contraction
   5. E=mc^2
   6. Bending of Light
   7. Gravity and Time and Space

Laboratories and Activities to include but not limited to:

1. Interactive Physics Computer Simulations
2. Matching Motion
3. Amass a Penny
4. Tin Pan Alley
5. Split Second
6. Vectors
7. Inertial Balance
8. Motion of a Pendulum
9. Determine the Acceleration of Gravity
10. Friction
11. H2o Rocket
12. Air Car
13. Bull’s Eye
14. Catapult
15. Motion of an Arrow
16. Poppers
17. Power House
18. Point of No Return
19. Shot from Behind
20. Giant Slide
21. Egg Drop
22. Centripetal Force
23. Weight a Moment
24. Torque
25. Balloon Rockets
26. Electroscopes
27. Mapping Electric Field
28. Basic Circuits
29. Half Life of an M&M
30. Reflection
31. Refraction
32. Converging Lens
33. Convex Lens
34. Color
35. Polarization
36. Laser Challenge
37. Hooke’s Law
38. Speed of Sound
39. Tuning Forks Revealed

**Evaluation**

Your performance in this class will be evaluated using the following percentages:Quarter Grades:

45 % Tests

10% Quiz

25 % Labs

10 % Homework

10 % Work Habits

Semester Grades:

40 % 1st Quarter

40 % 2nd Quarter

20 % Comp. Semester Final Exam

Grade Scale:

90 – 100 A

80 – 89 B

70 – 79 C

60 – 69 D

< 60 F

Please note that 50 % of your grade is test dependant. No notes will be allowed on tests. Anyone who scores less than 74 % may retake a test for a high grade of 82 %. You will only be allowed to retake a test if you make corrections on the original test and show them to the instructor.

Since ample time is given to complete lab write-ups, late reports will not be accepted. Lab reports must always be turned in on or before the due date. If you are absent the day a report is due, get a friend to bring the report to school and turn it in to the instructor.

Homework is due on the day it is assigned to be turned in. It will be checked for credit and solutions will be posted. Homework will be checked for completeness and effort. A “+” score will be given for work 100 % complete, carefully and neatly done. A “ /” score will be given for work that has been strongly attempted. A “–“ score is given for sloppy and incomplete work. These scores equate to 100%, 78%, and 65% respectively. Online Homework needs to be submitted before the date and time scheduled. Plenty of time will be allowed for posting. Quizzes are given randomly and are similar to the homework.

It is always your responsibility to find out about missed work and assignments. If you are absent for any extended period of time, you should always check with a friend in class to get the notes given in class and find out the assignments. You should also check with your instructor upon your return to school to determine what will nee to be made up and when. The Semester Final covers all the work that semester.

EXPECTATIONS

**Tardies & Cuts**

I consider tardies to be a sign of disrespect towards the TEACHER, the COURSE, and most importantly, your FELLOW STUDENTS.

Every tardy will result in a 1% reduction in the Quarter Grade per JHS Student Handbook. (eg...6 tardies will reduce your quarter grade by 6%, nine tardies will reduce the grade by 9%, etc....)

You must be in your assigned seat ready to start class when the bell rings to not be counted tardy. If you are coming late from a class you MUST have a signed pass from that teacher.

**Eating or Drinking in Class**

JHS rules will be followed in my classroom. There will be NO eating or drinking in Room 118, EXCEPT water.

**Restroom Break**

Students are NOT allowed to leave my classroom for ANY reason, other than a request from the Office. Restroom breaks are NOT allowed. If, however, there is an emergency, the student may tend to that need, but will be given a TARDY for having left the room.

This course is a college-prep offering, and as such I expect that each student will act with the degree of respect that is expected of this level of student. The key to one's behavior in my course is to be respectful of me, as your teacher, and of other students. The old adage of "Do unto others as you would have them do unto you" would serve you well in my course. I will certainly adhere to the same expectation in relating to each of you.

**Assignments**

All assignments for the course will be provided in the course outlines. You will be EXPECTED to complete the entire assigned material by the beginning of the class period for which that material is assigned. (E.g. ...If Chapter Fifty Two is due to be read on September 10, then I will expect you to have read the entire chapter by the beginning of class on September 10). Quizzes will be randomly given to insure that you have done the required material.

**Participation**

All students will be required to participate in class discussions, debates, and other activities which are part of the course curriculum. I prefer open free flowing discussions where there is a give and take from student to teacher and vice versa. Unfortunately, there is occasionally a student who can not be responsible for his or her actions and I must step in. The 5-Step program at JHS will be used. 1st a warning, 2nd a meeting, 3rd call home, etc. No one has the right to interfere with a students opportunity to learn!

Some behaviors (Not all) that will start this process: Disrespect to the teacher or another student, “horse play”, bad attitude, not doing required work, inappropriate use of materials, etc.

**Galileo’s Gifts**

You will be given six “gifts” in honor of Galileo Galilee. These can be used to go to the restroom, get an assignment from your locker, etc. or instead of taking a quiz or having an assignment checked.

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| To one **FREE**:   * Tardy * Quiz * Homework   Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour:\_\_\_\_\_\_\_\_\_ Number:\_\_\_**1**\_\_\_ | To one **FREE**:   * Tardy * Quiz * Homework   Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour:\_\_\_\_\_\_\_\_\_ Number:\_\_\_**2**\_\_\_ |
| To one **FREE**:   * Tardy * Quiz * Homework   Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour:\_\_\_\_\_\_\_\_\_ Number:\_\_\_**3**\_\_\_ | To one **FREE**:   * Tardy * Quiz * Homework   Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour:\_\_\_\_\_\_\_\_\_ Number:\_\_\_**4**\_\_\_ |
| To one **FREE**:   * Tardy * Quiz * Homework   Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour:\_\_\_\_\_\_\_\_\_ Number:\_\_\_**5**\_\_\_ | To one **FREE**:   * Tardy * Quiz * Homework   Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour:\_\_\_\_\_\_\_\_\_ Number:\_\_\_**6**\_\_\_ |