

# Physics Syllabus (Draft)

## Instructor: Mr. Tomjack

### Contact Information

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### General Course Description

Physics is a year long course and is taught at to college preparatory standards, meaning that students are expected to do more than read and memorize facts and data. This course is a study of Isaac Newton's three Laws of Motion as well as an introduction to other physics disciplines which may include astronomy, wave energy, sound, and light. The course is accompanied by work in the mathematical solution of physical science problems as well as laboratory experimentation and analysis of data. This course is particularly recommended for students planning on attending college in a scientific or engineering.

The design of this course is such that students will actively participate in determining the direction and pacing of the curriculum. Once the three laws of motion have been mastered there will be several options regarding what chapters and topics the class may want to cover. In any event, students should expect a demanding daily homework load as well as projects, quizzes, tests, and laboratory write-ups. A high level of understanding in problem solving and the scientific methods is necessary for success in this course.

However, the course load will not be over-whelming. Students who encounter difficulties due to sports, illness, or other outside detractors are encouraged to speak with Mr Tomjack to avoid falling too far behind. If you are willing to do the work and make an honest effort, I am more than willing to meet you halfway.

**Prerequisites:** Biology and Pre-calculus, or with permission of the instructor based on grades and success in previous related classes.

### Daily Class Materials Needed

*Student Planner	*Physics textbook	*3 Ring Binder
* Notebook	*Pen/Pencil	*Calculator

### Grading Policy

Unit/Chapter Exams	50 points
Lab write-ups/Quizzes	25 points
Daily Work/Homework	10 points
Warm-up exercises:	1 point per day

The final grade is computed from the total points the student earns divided by the total points available.

This grading scale is a draft, and may be modified in any way that provides a more accurate reflection of student learning.

### Grading Scale

A+ 98-100	B+ 92-90	C+ 82-84	D+ 75-76
A 95-97	B 88-89	C 79-81	D 73-74
A- 93-94	B- 85-87	C- 77-78	D- 70-72

## Academic Assistance

It is my goal that every student be successful in this class and I am willing to offer as much academic assistance as necessary to achieve that goal. If students are in need of academic assistance, I will do my best to be available during the following times:

1. Before School (7:30 – 8:15 PM)
2. Home Room
3. Plan period (8<sup>TH</sup> Period)
4. After school

Please notify me ahead of time if you plan to come in for assistance during any of these times to ensure that I will be available to help you.

## Topics of Study - First Semester

### Unit 1 - Mechanics

Chapter 1	About Science
Chapter 2	Linear Motion
Chapter 3	Projectile Motion
Chapter 4	Newton's First Law of Motion - Inertia
Chapter 5	Newton's Second Law of Motion- Force and Acceleration
Chapter 6	Newton's Third Law of Motion - Action and Reaction
Chapter 7	Momentum
Chapter 8	Energy

### Topics of Study - 2<sup>ND</sup> Semester

Chapter 9	Circular Motion
Chapter 10	Center of Gravity
Chapter 11	Rotational Mechanics

Chapter 11 concludes the study force and motion, which is but one of many areas of study in the field of physics. Because the field of physics is so broad, it is impossible to study everything. Following Chapter 11, students will select the chapters that they will concentrate on from the following topics:

Chapters 12 - 14	Universal Gravitation, Gravitational Interactions, and Satellite moon
Chapters 15 and 16	Special Relativity - Space and Time and Special Relativity - Length, Momentum, and Energy

### Unit II - Properties of Matter

Chapters 17 - 20	The Atomic Nature of Matter, Solids, Liquids, and Gasses
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### Unit III - Heat

Chapter 21	Temperature, Heat, and Expansion
Chapter 22	Heat Transfer
Chapter 23	Change of Phase
Chapter 24	Thermodynamics

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### Unit IV - Sound and Light

Chapter 25	Vibrations and Waves
Chapter 26	Sound
Chapter 27	Light
Chapter 28	Color
Chapter 29	Reflection and Refraction
Chapter 30	Lenses
Chapter 31	Diffraction and Interference

### Unit V - Electricity and Magnetism

Chapter 32	Electrostatics
Chapter 33	Electric Fields and Potential
Chapter 34	Electric Current
Chapter 35	Electric Circuits
Chapter 36	Magnetism
Chapter 37	Electromagnetic Induction

### Unit VI - Atomic and Nuclear Physics

Chapter 38	The Atom and the Quantum
Chapter 39	The Atomic Nucleus and Radioactivity
Chapter 40	Nuclear Fission and Fusion

### South Dakota State Engineering Expo and Physics Competition

During second semester the physics class will conduct various hands-on activities based on different areas of physics. The intent of the activities will be to compete at the South Dakota State Engineering Exposition in April. The following competitions are a part of the exposition:

Human Wallpaper	Rocket Car II	The Scrambler	Impromptu Design
Hill Climber	Photovoltaic Cannon	Bridge Builder	Mathematics Competition
Physics Bowl			

More information and detailed competition rules can be viewed at [www.sdstate.edu/engr/camps/expo/index.cfm](http://www.sdstate.edu/engr/camps/expo/index.cfm)