

CURRICULUM GUIDE

NAME OF COURSE PHYSICAL SCIENCE

COURSE NUMBER: 42

WRITTEN / REVISED: AUGUST, 2007

LEVEL OF COURSE: Special Education Replacement **NUMBER OF CREDITS:** SIX (6)

PREREQUISITES: NONE

GRADE LEVELS OFFERED TO: 11-12

COURSE DESCRIPTION:

This course is centered on project based learning and assessment. The students will work cooperatively and individually to solve problems and construct models that demonstrate various principals of physics, focusing on the concepts of motion, forces, and energy. In addition to project construction, students will use internet research, demonstrations, journaling, and mathematical modeling to demonstrate proficiency

COURSE OBJECTIVES:

When this Physics course has been completed successfully, students should be able to:

1. Contribute to the general intellectual development of their fellow students.
2. Be a problem solver, developing analytic skills.
3. Be given opportunity to reason, to learn to express their thoughts clearly, and to be able to follow the development of ideas presented, whether orally or written.
4. Analyze results and to distinguish between the essential and peripheral.
5. Sharpen the students' skills as observers and experimenters.
6. Develop the student's aesthetic sense and understanding of the basic laws of physics.

EACH UNIT IS BASED ON THE FOLLOWING GOAL:

The student will gain an understanding of and apply the concepts indicated in the behavioral objectives via problem solving experiments and completing scenario challenges.

CORE CONTENT STANDARDS ADDRESSED:

- 5.1 - Scientific Process** – Habits of Mind, Inquiry and Problem Solving, Safety
- 5.2 - Science and Society** – Cultural Contributions, Historical Perspectives
- 5.3 - Mathematics Application** – Numerical Operations, Geometry and Measurement Patterns and Algebra, Data Analysis and Probability
- 5.4 - Nature and Process of Technology** – Science and Technology, Nature of Technology, Technological Design
- 5.7 - Physical Science – Physics** – Motion and Forces, Energy Transformations

SPECIFIC BEHAVIORAL OBJECTIVES/PROFICIENCIES AND TIME LINES:

Unit # 1 Rocketry and Flight

Time = 40 days

Objectives:

1. Describe the relationship of speed, distance and time
2. Differentiate between average and instantaneous speed
3. Use data as basis for prediction
4. Describe kinetic energy
5. Calculate acceleration
6. Identify frictional forces
7. Differentiate between speed and velocity
8. Describe projectile motion
9. Understand the effect of gravity on motion
10. Describe the law of conservation of energy
11. Identify the relationship between changing variables and differences in outcome

Lab Experiences:

1. Chemically Powered Rockets Teacher Generated
2. Film Canister Rockets Teacher Generated

Evaluation:

1. Construction evaluation
2. Homework
3. Journal
4. Quizzes
5. Written lab procedure

Unit # 2 Simple machines

Time = 40 days

Objectives:

1. Identify each of the types of simple machines and common environmental examples
2. Describe compound machines
3. Identify the relationship between input effort, output effort, and fulcrum
4. Explain calculate efficiency
5. Calculate work
6. Calculate power
7. Apply simple machines to solving daily living problems.
8. Describe the relationship between potential and kinetic energy

Lab Experiences:

1. Simple Machine Project Teacher Generated
2. Webquest
3. CatapultsTeacher Generated

Evaluation:

1. Machine Evaluation
2. Catapult Construction and Usage
3. Homework

4. Journal
5. Quizzes
6. Written lab procedure

Unit # 3 Sound and Light

Time=30 days

Objectives:

1. Recognize factors that affect the speed of sound
2. relate loudness and pitch to properties of sound waves
3. Identify physical properties of musical instruments that allow for quality sound production
4. Explain how sonar and ultrasound work
5. Describe the function of the ear.
6. Recognize that light has both wave and particle characteristics.
7. Describe the parts of the electromagnetic spectrum
8. Explain EM waves are used in industry.
9. Explain why objects appear to be different colors
10. Explain the law of reflection
11. Describe how colors may be added or subtracted
12. Identify the function of the eye

Lab Experiences:

1. Instrument Lab Teacher Generated
2. Sound Webquest
3. Science Meets Art -Possible Collaborative Activity with Art Department

Evaluation:

Machine Evaluation

1. Catapult Construction and Usage
2. Homework
3. Journal
4. Quizzes

Unit # 4 Electricity and Magnetism

Time=10 days

Objectives:

1. Identify the attracting and repelling charges
2. Describe the components needed to construct and electromagnet
3. Explain the factors that affect the strength of electric force
4. Distinguish between conductors, superconductors, semiconductors, and insulators
5. Define resistance
6. Describe the difference between parallel and series circuits
7. Explain the function of fuses and circuit breakers

Lab Experience

1. Circuit Construction Teacher Generated
2. Electromagnet Construction Teacher generated

Evaluation:

1. Catapult and magnet Construction
2. Homework

3. Journal
4. Quizzes

Unit # 5 Water

Time=15 days

1. Describe the properties of water
2. Identify the chemical composition of water in the local watershed
3. Calculate stream flow
4. Identify factor that affect erosion and deposition in local stream beds.
5. Identify factors that affect water quality in the local watershed
6. Describe factors that affect freshwater marine life

Lab Experience

1. Streambed Calculations teacher Generated
2. Ongoing water quality testing in classroom
3. 3. Trout In The Classroom To be developed With Trout Unlimited

Evaluation:

1. Streambed lab
2. TU acclivity
3. Homework
4. Journal
5. Quizzes

Unit # 6 Sap Science

Time =15 days

1. Identify chemical composition and density of local maple sap
2. Describe conditions related to temperature and pressure necessary for sap to rise
3. Explain the concept of thermal efficiency
4. Distinguish between efficient and inefficient combustible fuel sources
5. Describe conditions needed for matter to change phases
6. Describe the relationship between mass, volume, and density

Lab Experience

4. Evaporator Design Teacher Generated
5. Chemical Analysis Lab Teacher Generated
6. Syrup evaporation Lab Teacher Generated

Evaluation:

6. Evaporator Design and Lab
7. Chemical Analysis Lab
8. Homework
9. Journal
10. Quizzes

Unit # 7 Student Generated

Time=20 days

Final Unit will be jointly developed with student participation. Topics and activities will be cultivated from student experience, interest, and potential vocations. Each student will have the opportunity to develop a personalized unit and will be given the equivalent of an independent study. Topics and activities will be submitted to Jennifer DeSaye for approval prior to the beginning of the unit of study.

MATERIALS / RESOURCES:

1. Text: Conceptual Integrated Science - Addison and Wesley, 2007
2. Text: Conceptual Physics, Hewitt -- -- Addison and Wesley, 1997

EVALUATION:

A. STUDENT PROGRESS:

1. Projects/lab	50%
2. Homework/Journal	10%
3. Tests and quizzes	30%
4. Class Participation	10%

The mid-term and final examinations are each 10% of the yearly grade.

PERIODIC EVALUATION OF OBJECTIVES AND GUIDE:

This curriculum will be evaluated in summer 2008, upon completion of the courses' introductory year.

High Point Regional High School's curriculum and instruction are aligned to the State's Core Curriculum Content Standards and address the elimination of discrimination by narrowing the achievement gap, by providing equity in educational programs and by providing opportunities for students to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectionate or sexual orientation, gender, religion, disability or socioeconomic status