

St. Nathy's College
Subject Plan for Physics
Year:
2010-2011

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Mission Statement:

St. Nathy's College was established to act as a Centre of Learning. We strive to achieve this within a fostered Christian environment which equally provides for the faith and personal development of each student. All of our school endeavours and activities are directed towards these objectives.

Subject Aims:

The aims of the syllabus, common to both levels, are:

- to give students an understanding of the fundamental principles of physics and their application to everyday life and technology
- to develop an appreciation of physics as a human endeavour, thereby enriching the students' experience of life
- to provide a reasonably broad perspective of physics, thus developing an understanding of the physical environment and of how human beings interact with it
- to provide a general education in physics for all students, whether or not they proceed to further studies in physics
- to develop the ability to observe, to think logically, and to communicate effectively
- to develop an understanding of the scientific method
- to develop an appreciation of physics as a creative activity, using informed intuition and imagination to create an understanding of the beauty, simplicity and symmetry in nature.

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Subject Objectives:

A. Ordinary Level Syllabus Objectives

Ordinary level physics provides an introduction to, and an

overview of, physics. Students are expected to develop an appreciation of the fundamental laws and principles and their application to everyday life.

The objectives of the syllabus are:

1. Knowledge

Students should know

- basic physical principles, terminology, facts, and methods
- that physics is fundamental to many technological developments
- that physics contributes to the social, historical, environmental, technological and economic life of society

2. Understanding

Students should understand

- basic physical principles
- how physical problems can be solved
- how the scientific method contributes to physics
- how physics relates to everyday life.

3. Skills

Students should be able to

- measure physical quantities in the appropriate SI units
- work safely in a laboratory
- follow instructions
- use scientific equipment appropriately
- use experimental data appropriately

4. Competence

Students should be able to

- present information in tabular, graphical, written and diagrammatic form, as appropriate
- report concisely on experimental procedures and results
- use calculators

- solve numerical problems
- read popular science writing
- relate scientific concepts to issues in everyday life
- explain the science underlying familiar facts, observations, and phenomena.

5. Attitudes

Students should appreciate

- the contribution of physics to the social and economic development of society
- the relationship between physics and technology
- that a knowledge of physics has many vocational applications.

B. Higher Level Syllabus Objectives

Higher level physics provides a deeper, more quantitative treatment of physics. Students are expected to develop an understanding of the fundamental laws and principles and their application to everyday life.

The objectives of the syllabus are:

1. Knowledge

Students should know

- basic physical principles, terminology, facts, and methods
- how physics is fundamental to many technological developments
- how physics contributes to the social, historical, environmental, technological and economic life of society.

2. Understanding

Students should understand

- basic physical principles

- how physical problems can be solved
- how the scientific method contributes to physics
- how physics relates to everyday life
- the limitations and constraints on physics.

3. Skills

Students should be able to

- measure physical quantities in the appropriate SI units
- work safely in a laboratory
- follow instructions
- use scientific equipment appropriately
- plan and design experiments
- use experimental data appropriately
- apply physical principles to solving problems
- analyse and evaluate experimental results.

4. Competence

Students should be able to

- present information in tabular, graphical, written and diagrammatic form, as appropriate
- report on experimental procedures and results concisely, accurately, and comprehensively

- use calculators
- solve numerical problems
- read scientific prose
- relate scientific concepts to issues in everyday life
- explain the science underlying familiar facts, observations, and phenomena
- suggest scientific explanations for unfamiliar facts, etc.
- make decisions based on the examination of evidence and arguments.

5. Attitudes

Students should appreciate

- the contribution of physics to the social and economic development of society
- the relationship between physics and technology
- that a knowledge of physics has many vocational applications.

Subject Convenor:

Oliver Brady

Subject Teachers:

Oliver Brady

Time allocation:

5th Year: 5 periods, including one double

6th Year: 5 periods, including one double

Options Structure:

An information night on subject choice is held for 3rd/4th Years

prior to their Leaving Certificate subject selections. Students can avail of the support and guidance of the guidance counsellor and Junior Science teachers before choosing their subjects. Their choices are then used to create a 'best-fit' model for Leaving Certificate. All students may study Chemistry, Physics, Physics & Chemistry (combined), Applied Maths and Biology for Leaving Certificate.

Timetabling:

5 classes per week.

3 singles and one double. Timetabled to co-incide with Phys-Chem. to allow any needed crossover.

Grouping of pupils (Mixed ability, Streaming, Banding):

Mixed ability

Student access to subject / level:

All students may study Physics.

All Classes cater for Higher and Ordinary levels students.

Class organisation: (seating/order/attendance)

Seating arrangements are decided by the teacher.

Student attendance is taken at the beginning of every class.

Planning for students with special needs:

All teachers are given information on each student with special needs within their classes. Teachers may then consult the special needs co-ordinator for advice on best practice methods for teaching and helping students with special needs.

Cross-curricular planning:

Informal co-operation occurs between the Physics teacher and other teachers such as Geography / Engineering & Construction teachers. More formal faculty meetings take

place several times a year with teachers of Chemistry Agricultural Science & Biology.

Range/variety of resources:

Three well-resourced Science Laboratories with two preparation rooms and 2 chemical storage areas which can be accessed from the laboratories.

Availability/Use of ICT facilities:

Each laboratory has a computer, printer and data projector. The whole school is networked to 100mb Broadband. Data logging equipment for Science, Chemistry, Physics and Biology is available. A variety of Physics videos are also available.

Provision for Health and Safety requirements:

- (a) All Laboratories have Safety Rules clearly displayed.
- (b) All rules are explained to students at the start of the school year.
- (c) All teachers are given health and safety talks on a regular basis by a consultant who visits the laboratories pointing out potential hazards.
- (d) The school has a health and safety officer (a science teacher) while the Science Department has its own health and safety representative.
- (e) The school arranges for a Health and Safety Consultant to come in and talk to the staff on issues of concern. Subject Department Teachers are then taken on a tour of their classrooms/laboratories and potential hazards highlighted and discussed. The Principal is informed immediately on the results of such discussions and remedial action is taken asap.

SUBJECT: Physics Curriculum – Long-Term Planning Year 5

Subject-Physics

Long Term Plan

5th Year

Pre-Christmas 2010-Light, Sound and Heat.

Schedule	Class Content	Homework	Assessment
Week 1-6	Optics- covering Geometrical Optics, Reflection, Refraction and Lenses with a focus on the practical side and on carrying out mathematical operations.(Ch 1-5)	Concept questions to encourage logical thinking. Questions from the end of chapter. Experimental write ups.	Assessment is imperative to any learning process. Methods will include: Homework- both learning of theory and written.
Week 7-11	Heat- Difference between heat and temperature, nature of heat, heat capacity and specific heat capacity, concept of Latent heat and what it means to change state.(CH14-15)	Simple experiments to be carried out at home. Questions from the end of chapter. Experimental write-ups.	Experiments- as a key concept is learned an experiment will be done to assess the knowledge of the students. This will require a detailed, concise write up.
Week 12-15	Waves- What are waves and what phenomena do we associate with them. Longitudinal vs Transverse, Sound as a wave, Light as a wave. Young's experiment and the equation: $n\lambda = d.\sin\theta$ (Ch 16-18)	Past examination paper questions plus questions from the end of the chapter. Experimental write-ups.	Testing- frequent class tests including a larger test in week 9 and a Christmas test in week 16.

Post-Christmas 2011-Classical Mechanics + Electricity

Schedule	Class Content	Homework	Assessment
Week 1-5	Speed, velocity, Acceleration, vectors and scalars and the u, v, a, s, t equations Including the derivations and definitions of each and the experiments that are associated(Ch 6-8)	Concept questions to encourage logical thinking. Questions from the end of chapter. Experimental write ups.	Assessment is imperative to any learning process. Methods will include: Homework- both learning of theory and written.
Week 6-10	Force, Work, Power, Moments, Gravity, Momentum, Pressure and Boyles Law including the designated experiments on Newtons Laws and Archimedes principal(CH9-11)	Simple experiments to be carried out at home. Questions from the end of chapter. Experimental write-ups.	Experiments- as a key concept is learned an experiment will be done to assess the knowledge of the students. This will require a detailed, concise write up.
Week 11-14	A new Concept- Circular motion and Simple Harmonic Motion. Radically different from the previous set of chapters (Ch 12-13)	Past examination paper questions plus questions from the end of the chapter. Experimental write-ups.	Testing- frequent class tests including a larger test in week 8.
Week 15-17	Static Electricity + Potential Difference(Ch 19-20)	An introduction to new concepts and skills.	In Week 18 a test on everything since week 1.

SUBJECT: Physics Curriculum – Long-Term Planning Year 6

Pre-Christmas 2011-Classical and Modern Electricity

Schedule	Class Content	Homework	Assessment
Week 1-6	Current and Charge, EMF and Voltage, Resistance and Resistivity and Domestic electricity including the effects of an electric current. A continuation of the end of last year(Ch 21-24)	Concept questions to encourage logical thinking. Questions from the end of chapter. Experimental write ups. (Revision Ch 1-5))	Assessment is imperative to any learning process. Methods will include: Homework- both learning of theory and written. Experiments- as a key concept is learned an experiment will be done to assess the knowledge of the students. This will require a detailed, concise write up.
Week 7-11	Semiconductors, Magnets and Magnetic fields and the concept of forces connecting Electricity and Magnetism. The importance of Faraday to modern electricity(CH24-27)	Simple experiments to be carried out at home. Questions from the end of chapter. Experimental write-ups. Past Examination Questions (Revision Ch 14-19)	Testing- frequent class tests including a larger test in week 7 and a Christmas test in week 16 covering everything since September.
Week 12-15	Electromagnetic induction and the Electron. Bringing Electricity into the modern age with the advent of X-rays and Microwaves and their effect on Science (Ch 28-29)	Past examination paper questions plus questions from the end of the chapter. Experimental write-ups. (Revision Ch 6-12)	

Post-Christmas 2012-Nuclear and Particle Physics + Revision

Schedule	Class Content	Homework	Assessment
Week 1-4	Physics has reached a new age- Einstein and Nuclear Energy. The history leading to the momentous discoveries in the early 20 th century and the consequences. (Ch 30-31)	Concept questions to encourage logical thinking. Questions from the end of chapter. Experimental write ups. Revision (Ch 12-13)	Assessment is imperative to any learning process. Methods will include: Homework- both learning of theory and written. Experiments- There are two sections to the Leaving Cert Paper. Section 1 is purely experiments and as such much emphasis will be placed on them here. Mock Exams take place in the school during week 8.
Week 5-8 (Mocks)	Particle Physics- this is one of the two options available on the course and only a pre-requisite for honours students. An in-depth treatment of the “Particle zoo” and the science behind the discoveries (CH32)	Simple experiments to be carried out at home. Questions from the end of chapter. (Revision Ch 19-24)	
Week 9-19	Intense revision of every chapter and in particular the experiments. Special Emphasis will be placed on studying the “most” likely questions to come up (Ch 1-32)	Past examination paper questions plus questions from the end of the chapter. Experimental Questions.	

Record Keeping Procedures:

Individual teachers keep their own records on students' attendance, behaviour and examination results.

Each student has a School Journal which he/she must be able to produce at all times. Teachers communicate with parents through this, which must be signed by the Parent/Guardian at the end of each week or each evening if required to do so. Results of Christmas, Summer and State Examinations are kept on file at the main school office.

Reporting Procedures:

Teachers communicate with parents through the School Journal which must be signed by the Parent/guardian at the end of each week or more frequently if necessary. Parents may make an appointment to meet a teacher.

Frequent Parent/Teacher Meetings are arranged.

Each Year Head communicates with parents on school business which concerns students.

Examination results are sent home at Christmas and Summer in addition to Exam student Mock results at Easter.

Teachers give their own regular assessments and request that parents sign the results.

TEACHER PROFESSIONAL DEVELOPMENT:

1. Courses Attended:

All relevant inservice from the SLSS attended over the past number of years.

ii) External provider/s of required professional development:

Frequent update advice on Health and Safety.

3. Subject Department Teacher Support / Induction / Mentoring:

With seven Science teachers, considerable expertise is available so that teachers can interchange their experience / knowledge /

methods that work with each other. This is also particularly true in the case of new and temporary members of staff.