

## COURSE OUTLINE

### THE PHYSICAL WORLD

The course will cover the basic principles of scientific inquiry, and the fundamental concepts of Physics. The emphasis will be upon students developing an understanding of the ideas and languages of scientific thought.

The course will begin by considering the way in which Physics describes the everyday world: in Mathematics and English and through the use of models. This will give a good grounding in classical mechanics and develop students' problem solving abilities. Later we shall consider the way probability, relativity and quantum mechanics differ from the Newtonian ideal.

We shall also spend some time considering the historical and philosophical foundations of inquiry in Physics. During the four weeks students will prepare a presentation in an area of Physics that interests them.

#### Week One

##### **The Physics of Punting (and other pursuits)**

We shall cover most of the Principles of Mechanics up to and including Newton's Laws of Motion. Then by considering this traditional form of Oxford water transport we shall endeavour to look at: forces (linear and rotational); density and floating; stability; fluid flow.

#### Week Two

##### **How Physics Progresses**

Investigation is at the heart of Physics. During the week we shall be looking at some of the principles of experimentation, the importance of intuition and creativity, and how one evaluates scientific progress. We shall consider the debate about what constitutes scientific method and gain some appreciation of the contributions of Archimedes, Galileo and Newton. There will be a short test on Mechanics at the end of the week.

#### Week Three

##### **The Physics of the Big, the Small and the Fuzzy**

Although most of what we see is described by Newtonian Physics, other paradigms have a major impact on our lives. Probability is at the centre of radioactivity and the study of the universe uses ideas from relativity and quantum mechanics. Students will be introduced to the basic ideas of these paradigms.

#### Week Four

##### **The Presentations**

A time to clear up lingering problems, and an opportunity for students to share with each other, through their presentations, various facets of Physics.

#### Recommended Reading

William Rankin *Introduction to Newton and Classical Physics* ISBN: 978-1840461589

If you are unable to obtain books locally, they may be ordered from

<http://bookshop.blackwell.co.uk>

or

[www.amazon.co.uk](http://www.amazon.co.uk)