

# YEAR 9/10 SCIENCE

## Physical Sciences

- Unit Outline -



### Course Description:

In this unit students will learn that the motion of objects can be described and predicted using laws of Physics, as well as how to explain energy transfer in a system.

This will be achieved through the use and application of Newton's Laws and relevant formulae so that the students can practise describing motion and predict how force/s may affect an object. Following on from this, the students will then explore energy transfer, the Law of Conservation of Energy and ultimately, that although energy is conserved, the process of energy transfer and transformation reduces the total usable energy and the system is not 100% efficient.

### Course Outcomes:

By the end of this unit you should be able to:

- Use relevant formulae to calculate speed, velocity, displacement, acceleration and force of objects in motion.
- Manipulate formulae to calculate a variable.
- Describe what forces are acting on a stationary object or a moving object and understand that these forces are balanced.
- Use Newton's Laws to describe and predict how a force will affect the movement of an object.
- Use models to describe how energy is transferred and transformed within systems.
- Recognise that although the Law of Conservation of Energy explains that the total energy is maintained, just transformed and transferred, but as a result, the total useable energy is reduced and no system is 100% efficient.

### Course Organisation:

The organisation of the unit will be:

- The students are presented with both theoretical and practical work to develop their knowledge and skills.

Student's activities will include:

- Developing a knowledge base using notes, questions, bookwork/worksheets.
- Conduct practical activities to explore and visualise theoretical concepts.
- Practice using terminology and language in oral and written activities.

### Course Timeline:

| Wk  | Activity  | Assessment                            |
|-----|---|---------------------------------------|
| 1-2 | <b>Newton's Law's and Formulae</b> <ul style="list-style-type: none"><li>• Speed and Velocity</li><li>• Distance and Displacement</li><li>• Acceleration (and gravitational acceleration)</li></ul> | Quiz at the end of Wk 2.              |
| 3-5 | <b>Work, Power and Energy</b> <ul style="list-style-type: none"><li>• Kinetic energy</li><li>• Potential energy</li></ul>   | Quiz at end of Wk 4.<br>Exam in Wk 5. |

|      |   |                          |
|------|---|--------------------------|
|      | <ul style="list-style-type: none"> <li>• Power</li> <li>• Energy transformation and efficiency</li> </ul>   |                          |
| 6-10 | <b>Liquids and Gases</b> <ul style="list-style-type: none"> <li>• Density and pressure</li> <li>• Boyle's Law</li> <li>• Charles' Law and Kelvin temperature</li> </ul> | Quiz at the end of Wk 7. |

**Course Vocabulary:**

- Scalar
- Vector
- Speed
- Velocity
- Acceleration
- Newton
- Displacement
- Distance
- Kinetic energy
- Potential energy
- Work
- Power
- Energy transfer
- Energy transformation
- Heat
- Density
- Pressure

## - Assessment Outline -

**Course Assessment:**

| Wk  | Assessment type  | Weighting | Marks achieved | Your Total |
|-----|--|-----------|----------------|------------|
| 1-7 | Class Quizzes  | 50%       |                |            |
| 5   | Exam   | 20%       |                |            |
| 1-9 | Behaviour/participation in class and practical activities. | 30%       |                |            |

\*specific marks to be advised

**Specific Equipment required for each lesson:**

- File/book to write in
- Pens, ruler, calculator