



ISS Course Syllabus

Teacher: Peter
Course Title: Physical Science

Grade:

Course Description:

The earth science course connects the study of the Earth's composition, structure, processes and history; its atmosphere, fresh water and oceans; and its environment in space. The standards emphasise historical contributions in the development of scientific thought about the Earth and space. The standards stress the interpretation of maps, charts, tables and profiles; the use of technology to collect, analyse and report data and science skills in systematic investigation. Problem solving and decision making are an integral part of the standards, especially as they relate to the costs and benefits of utilizing the Earth's resources. Major topics of study include plate tectonics, the rock cycle, earth history, the oceans, the atmosphere, weather and climate, and the solar system and the universe.

Course Contents:

Unit 1: The Nature of Science (10 hours)

Week	Main topics
1	Scientific method; safety in the lab
2	Metric system and SI units; levels of accuracy
3	Calculating volume, mass and density and equations; measurement tools
4	Exploring the microscopic world, exploring the universe

Unit 2: Matter: Building Blocks of the Universe (20 hours)

Week	Main topics
1	Phases of matter; changes of phases; (solids, liquids, gases)
2	Chemical properties and changes; classes of matter; mixtures and elements; solutions and solubility, solvent, solutes
3	Chemical symbols; compounds; molecules, chemical formulae and equations
4	Models of the atom, structure of the atom; subatomic particles, mass number, atomic mass, isotopes
5	The periodic table; rows and columns of the table; properties of metals, non-metals and metalloids

Unit 3: Chemistry of Matter (20 hours)

Week	Main topics
1	Bonding; covalent bonding; ionic bonding; metallic bonding
2	Nature of reactions, types of reactions, chemical equations
3	Energy involved in chemical reactions; rates of chemical reactions, catalysts
4	Solution chemistry; acids and bases, pH; neutralisation
5	Hydrocarbons, substituted hydrocarbons, petroleum and products

Unit 4: Heat Energy (10 hours)

Week	Main topics
1	What is the heat energy, temperature and heat, conduction, convection and radiation
2	Measuring heat, units, heat and phase changes
3	Thermal expansion, heating systems and how they work
4	Insulation, what makes a good insulator, cooling systems
5	Heat engines and how they work, thermal pollution

Unit 5: Sound and Light (24 hours)

Week	Main topics
1	Nature and characteristics of waves, types of waves, speed of waves; amplitude, frequency, wavelength
2	Interactions of waves, nodes and antinodes, properties of sound, interactions of sound waves
3	Quality and sound, feedback, applications of sound, how you hear, structure of the ear
4	Electromagnetic waves and the electromagnetic spectrum, visible light, ray model of light
5	Reflection of light, mirrors, refraction of light, lenses – convex and concave, color, mixing colors
6	How you see, structure of the eye, optical instruments and how they work, lasers

Unit 6 outline: Forces, Motion and Energy (24 hours)

Week	Main topics
1	Linear motion, measuring motion, speed, velocity and changes in velocity, acceleration
2	Momentum, what is a force?, friction, reducing friction, air resistance, Newton's laws of motion
3	Gravity, acceleration due to gravity, terminal velocity, centres of gravity
4	Fluid pressure, hydraulics and systems, pressure and gravity, air pressure
5	Buoyancy, fluids in motion, measuring density of irregular objects, Archimedes principle
6	Work, power, machines, simple and compound, nature of energy
7	Kinetic energy and potential energy, energy conversions, energy conservation, physics and energy

Unit 7: Electricity and Magnetism (22 hours)

Week	Main topics
1	Electric charges, nature of electrons, static electricity and causes
2	Flow of electricity, electrical circuits – series and parallel, electrical power, current and voltage
3	Nature of magnets, poles, fields of force, magnetism in action, earth as a magnet, poles
4	Magnetism from electricity, making magnets, electricity from magnets, electromagnetic induction, simple motors
5	Electronic devices, microelectronics and circuits, transmission of sound
6	Transmitting pictures, how television work, computers and how they work

Resources:**Prentice Hall Textbooks**

Unit 1: The Nature of Science

Unit 2: Matter: Building Blocks of the Universe

Unit 3: Chemistry of Matter

Unit 4: Heat Energy

Unit 5: Sound and Light

Unit 6: Forces, Motion and Energy

Unit 7: Electricity and Magnetism

Evaluation System:

Component	%	Comments
Tests		Unit tests
Labs and assignments		<ul style="list-style-type: none">• Formal Lab reports as well as informal write-ups• Oral Presentations• Projects• Posters
Daily work		Homework, in-class assignments
Notebooks		Neatness, accuracy and completion
Total		A maximum of 100 % is available

Progress marks will be calculated and reported quarterly. Marks do not close until the final exam has been written.

Additional Comments:**Teaching Strategies and Instructional Methods**Direct Teaching Strategies

- Lectures
- Demonstrations
- Directed problem-solving
- Note taking
- Portfolios
- Posters
- Teacher led review
- Work and Task Sheets

Indirect Teaching Strategies

- Science Experiments
- Oral Presentations
- Drawings

Interactive Teaching Strategies

- Small group cooperative group work
- Small group discussions