

NATS 0008 FUNDAMENTALS OF SCIENCE (WSTC)

Credit Points 10

Legacy Code 900105

Coordinator Phillip Newman ([https://directory.westernsydney.edu.au/search/name/Phillip Newman/](https://directory.westernsydney.edu.au/search/name/Phillip%20Newman/))

Description In its broadest sense, science is an evolving body of skills, theories and knowledge about the nature of the world, based on observation, measurement and experiment. In order to begin participating in tertiary science studies, students require a fundamental toolkit of scientific literacy that includes key concepts, language, and skills. This subject provides an overview of, and grounding in, fundamental scientific concepts including the nature of matter and energy, and the flow of energy and cycling of matter through key processes in the biosphere. Integrating these concepts within a framework of a contemporary issue, climate change, enables students to build skills in applying scientific concepts, methods and problem-solving techniques, as well as furthering an understanding of interrelationships between science and other aspects of society. The subject imparts a basic body of essential scientific knowledge, as well as facilitating skills in collecting and analysing information and writing coherent explanations within a scientific framework.

School Western Sydney The College

Discipline Natural and Physical Sciences, Not Elsewhere Classified.

Student Contribution Band HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 0 Preparatory subject

Equivalent Subjects NATS 0007 - Fundamentals of Science (UWSCFS)

Restrictions

Students must be enrolled at The College in a Foundation Studies program.

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Solve real life problems involving mathematical concepts and construct appropriate graphs, charts and tables and interpret them.
2. Extract information from written text, graphs and tables and critically evaluate this information and evidence.
3. Describe the structure of the atom and relate this to the formation of molecules and ions.
4. Identify chemical compounds which make up organisms and classify organic molecules according to the arrangement of the chemical bonds
5. Describe energy changes in chemical reactions and identify and explain chemical reactions important in the environment.
6. Explain the role of living systems in the cycling of matter and flow of energy
7. Apply the principles of the Scientific Method to solving problems in science and assesses conclusions in relation to evidence and sources.

8. Describe energy changes in chemical reactions and identify and explain chemical reactions important in the environment.

Subject Content

Topic 1 Basic Mathematical Operations and Data Handling

Basic mathematical operations with whole numbers, decimals and fractions

Ratio, rates and percentages

Graphing and Data handling

Basic Statistics

Topic 2 Simple and Complex Substances

Atomic structure and the periodic table

Molecules and Ions

Solutions

Topic 3 Biologically Important Molecules

Organic molecules and functional groups

Carbohydrates, lipids, nucleic acids and proteins

Acids, Bases, Salts and Buffers

Topic 4 Chemical Reactions and Energy

Types of reactions- acid/base, redox, combustion

Energy changes and stability

Enthalpy, bond energy and Hess's Law

Topic 5 Biochemical Reactions and Energy

Living systems as open systems: flow of energy and cycling of matter in the biosphere

Uphill or downhill? Energy-consuming and energy-producing reactions

ATP as the link between energy-consuming and energy-producing reactions

Two great global cycles: photosynthesis and cellular respiration

Topic 6 Applying Concepts: Global

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

| Type | Length | Percent | Threshold | Individual/Group Task |
|---------------------|---------------------------------|---------|-----------|-----------------------|
| Intra-session exam | 1 hr | 10 | N | Individual |
| Short Answer | 1.5 hrs | 20 | N | Individual |
| Portfolio | 1500 words (completed in class) | 40 | N | Individual |
| End of Session Exam | 2 hrs and 20 mins | 30 | N | Individual |

Prescribed Texts

- The College Fundamentals of Science Student Workbook
- The College Fundamentals of Science Laboratory Manual

Teaching Periods