

NATS 0007 FUNDAMENTALS OF SCIENCE (WSTC PREP)

Credit Points 10

Legacy Code 700231

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

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 fees via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 0 Preparatory subject

Equivalent Subjects NATS 0008 - Fundamentals of Science (WSTC)

Restrictions

Students must be enrolled at Western Sydney University, The College.

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.

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 Climate Change

- Regulation of average global temperature by greenhouse gases

- Planetary homeostasis: the role of living systems in global temperature regulation

- Carbon and hydrological cycle

- Evidence for and impacts of human-induced global warming

- Reconstructing the past: The Permian extinction event

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 Climate Change

-

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	Mandatory
Short Answer	1 hour	10	N	Individual	N
Short Answer	1 hour and 30 minutes	20	N	Individual	N
Portfolio	1,500 words	40	N	Individual	N
End-of-session Exam	2 hours and 20 minutes	30	N	Individual	N

Prescribed Texts

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

Teaching Periods

Term 3 (2024)

Nirimba Education Precinct

On-site

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

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=NATS0007_24-T3_BL_1#subjects)