EESC1150

Planet Earth

Session 2, In person-scheduled-weekday, North Ryde 2026

School of Natural Sciences

Contents

General Information

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Credit points
10

Prerequisites

Corequisites

Co-badged status

Unit description
We invite you to meet our planet Earth and discover the processes which influence every aspect of our society, from the distribution of habitable environments, natural hazards and critical resources for our renewable future. Immerse yourself in and explore things that happened millions to billions of years ago and are recorded in the vast time capsules of Earth - its rocks. This introductory unit is suitable for all students including those wanting to try a natural science. It explores the composition and structure of our planet and the dynamic processes that change our environment. The unit provides a strong background for further studies in earth and environmental sciences as well as biology, chemistry, physics and archaeology. This unit pairs well with ENVS1017 The Living Environment and EESC1160 Blue Planet: Climate, Oceans and Life.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals (UNSDGs) Quality Education; Climate Action; Life on Land; Life Below Water

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: synthesise knowledge of how our planet works to draw meaningful conclusions about Earth processes.

ULO2: apply skills in map reading and analysis to draw cross-sections and interpret Earth history.

ULO3: demonstrate mineral identification skills in field and laboratory settings to define rock types and understand their tectonic context.

ULO4: draw on Earth and Environmental knowledge by evaluating possible solutions to complex problems and justifying the selected best solution.

ULO5: display independent, team and communication skills, to actively engage in learning.

General Assessment Information

Requirements to Pass this Unit

To pass this unit, you must: (1) attempt all assessments; (2) achieve a total mark greater than or equal to 50%.

We strongly encourage all students to actively participate in all learning activities in order to

achieve a mark >50%. Regular engagement is crucial for your success in this unit as these activities provide opportunities to deepen your understanding of the material, collaborate with peers, and receive valuable feedback from instructors to assist in completing the unit assessments. Your active participation not only enhances your own learning experience but also contributes to a vibrant and dynamic learning environment for everyone.

Planning your time to Complete Assessments

Full details and instructions for the two major assessments are provided on iLearn. You need to plan your study time well in advance to complete and submit these on time. You will develop skills and gain an understanding of the core concepts through the lectures and practical classes, which will help you with your assessment tasks. Please let us know if you are having any problems in advance, or as soon as possible. We are here to support you!

Submission of Assessments

The first assessment is skills-based, completed on paper and submitted as hard copy. The second assessment must be submitted online through Turnitin (link available on iLearn). The final exam will be held on-campus during the formal examination period.

Late Assessment Submission Policy

Penalties apply for late submission of assessments: 5% penalty per day: If you submit your assessment late, 5% of the total possible marks will be deducted for each day (including weekends), up to 7 days.

- Example 1 (out of 100): If you score 85/100 but submit 20 hours late, you will lose 5 marks and receive 80/100.
- Example 2 (out of 30):If you score 27/30 but submit 1 day late, you will lose 1.5 marks and receive 25.5/30.

After 7 days: Submissions more than 7 days late will receive a mark of 0.

Extensions: Automatic short extension: Some assessments are eligible for automatic short extension. You can only apply for an automatic short extension before the due date. Special Consideration: If you need more time due to serious issues and for any assessments that are not eligible for Short Extension, you must apply for Special Consideration. Need help? Review the Special Consideration page HERE

Assessments where Late Submissions will be accepted: In this unit, late submissions will accepted for all assessments following the standard late penalties described above. The dates for submission of assessment tasks are listed on the schedule. ***Students must keep a photocopy of their reports.***

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Skills Development	20%	No	24/08/2026	Individual	Yes	Open

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Case Study 1	30%	No	19/10/2026	Individual	Yes	Open
Final Exam	50%	No	TBD in exam period 9–27 Nov. 2026	Individual	No	Observed

Skills Development

Assessment Type [1]: Practice-based task
Indicative Time on Task [2]: 20 hours
Due: **24/08/2026**
Weighting: **20%**
Groupwork/Individual: Individual
Short extension [3]: Yes
AI Approach: Open

Students will apply skills in map reading and analysis to draw cross-sections and interpret Earth history.

On successful completion you will be able to:

- apply skills in map reading and analysis to draw cross-sections and interpret Earth history.
- draw on Earth and Environmental knowledge by evaluating possible solutions to complex problems and justifying the selected best solution.

Case Study 1

Assessment Type [1]: Written Submission
Indicative Time on Task [2]: 35 hours
Due: **19/10/2026**
Weighting: **30%**
Groupwork/Individual: Individual
Short extension [3]: Yes
AI Approach: Open

The case study links theoretical concepts and practical situations using real-world scenarios and problems. Students will analyse, evaluate and relate ideas to the case and propose a solution to the problem posed. See iLearn for details of the case study.

On successful completion you will be able to:

- synthesise knowledge of how our planet works to draw meaningful conclusions about Earth processes.

- apply skills in map reading and analysis to draw cross-sections and interpret Earth history.
- demonstrate mineral identification skills in field and laboratory settings to define rock types and understand their tectonic context.
- draw on Earth and Environmental knowledge by evaluating possible solutions to complex problems and justifying the selected best solution.
- display independent, team and communication skills, to actively engage in learning.

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 20 hours
Due: **TBD in exam period 9–27 Nov. 2026**
Weighting: **50%**
Groupwork/Individual: Individual
Short extension [3]: No
AI Approach: Observed

You will undertake a final examination during the formal examination period.

On successful completion you will be able to:

- apply skills in map reading and analysis to draw cross-sections and interpret Earth history.
- demonstrate mineral identification skills in field and laboratory settings to define rock types and understand their tectonic context.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- Academic Success for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation.

[3] An automatic short extension is available for some assessments. Apply through the Service Connect Portal.

Delivery and Resources

Week 1 class: EESC1150 runs both a Workshop (2hr) and Practical (2hr) in week 1, i.e., you must attend both classes in week 1.

Methods of communication: We will communicate with you via your university email (if

personal) and through announcements on iLearn. Queries to convenors must be placed on the iLearn discussion board (if not personal) or sent to the unit convenor via the contact email on iLearn (if personal).

Introduction: Planet Earth is a hands on unit of study, that sets out to acquaint you with the essential features of the materials that constitute the Earth, processes that shape the Earth's surface, and the interaction of people and the geologic environment. The unit is an **introduction to geology** and not only forms the vital stepping stone for future studies in Earth and Environmental Science, but also sets out to give students from other disciplines a basic understanding of the physical Earth that will be helpful in studies and careers in environmental science, geomorphology, biology, geodesy, gemology and economics.

We aim to help you develop the skills necessary for study of the physical Earth. By the end of the unit, you should have the skills to:

- Make critical observations of geology for yourself
- Identify minerals and rocks
- Determine geometric relationships between rock units, as depicted on simple geological maps
- Use geological information to better understand the physical Earth

These different threads come together via an understanding of the cyclic nature of rock-forming and rock degrading processes of our planet, in terms of the Plate Tectonic Theory.

Geology is a vital, living science that touches our everyday lives. For example, materials such as diamonds, natural resources and energy are essential to our modern civilisation, and precious stones add to our appreciation of nature's beauty. Processes such as volcanism, earthquakes, landslides and erosion may dramatically affect our well being. Knowledge you gain of these materials and processes, based on scientific approaches of observation, testing and evaluation, will assist you towards a better understanding of this planet, Earth.

STUDY PROGRAM

Students coming into this unit have a variety of backgrounds, since there are no set pre-requisites. Some of you will have no geology or physical geography at all in your previous studies, others will have taken Earth and Environmental Science at HSC level. However, previous studies in geology and related subjects are not necessary and in terms of your geological knowledge, by the end of this unit it should not matter what background you had before you started. In spite of this, inevitably in the early stages some of you might find many more new concepts to come to grips with than others. DO NOT BE DISCOURAGED, as by persevering into the unit of study, you will gain the satisfaction of seeing how the pieces of the overall Earth puzzle start to come together.

This unit concentrates on five major themes that will be explored and revisited in various ways throughout the unit. These themes include:

- Deep time (prehistorical and ancient geological past)
- Plate tectonics

- The rock cycle
- Geological skills e.g. mapping and mineral/rock recognition
- How geoscience can be used to solve some of the problems of the 21st century

There are three modules that investigate different aspects of geoscience. The main ideas and objectives for the modules are:

Module 1: Tools of Geoscience (approximately one-third of the unit)

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

- Understand that the rocks we see today have undergone change through geologic time and are still undergoing change (this is known as the rock-cycle)
- Recognise that there are 3 main groups of rocks (igneous, sedimentary and metamorphic) and be able to distinguish typical hand specimen examples of each type (Note: this skill will be reinforced throughout the unit)
- Understand the basic concepts of the plate tectonic theory and appreciate that it is the major unifying idea of geoscience
- Describe the main tools of geoscience and give examples of how they are used: e.g. mapping, satellite imagery, air photos, geophysical investigations, Geographic Information Systems (GIS)
- Read and interpret topographic maps, and understand how contours are constructed and how to interpret them
- Use geological maps including legends, scales, grid references, etc. to solve simple problems and navigate
- Understand that maps are two dimensional representations of a three dimensional world, and the graphical techniques that are used to illustrate what is under the surface (e.g. making and interpreting geological cross sections)
- Explain the sequence of events that led to the geological configuration of an area (geological history)

Module 2: Hot Rocks (approximately one-third of the unit)

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

- Analyse volcanic processes, the landforms produced, and volcanic hazards
- Account for differences between volcanoes in terms of lava type (chemistry, appearance, explosiveness, etc) and their geographic position in relation to plate tectonic theory (e.g. boundary, intra-plate, etc)
- Examine intrusive igneous processes (e.g. magma composition and behaviour), and the features these processes produce

- Recognise common volcanic and intrusive igneous rocks and be able to use a classification scheme to identify them; interpret the origin of igneous rocks from hand specimens and field relations
- Describe and appreciate the significance of deeper Earth processes (e.g. mantle plumes)
- Understand the impact of plate tectonic theory on igneous processes
- Identify the main silicate rock-forming minerals
- Comprehend the basic chemical structure of the main groups of minerals (e.g. silica tetrahedra) and how this structure determines their appearance and physical properties
- Illustrate how knowledge of igneous processes can be useful to people (e.g. natural resources and energy; building materials)

Module 3: Rocks Under Stress and Deep Earth (approximately one-third of the unit)

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

- Comprehend that metamorphism causes change to existing rocks by the application of heat and pressure
- Comprehend that rocks slowly change form and shape under the application of forces
- Match parent rocks with metamorphosed equivalents
- Establish that rock microstructure and the existence of particular minerals indicate that rocks have undergone change
- Discern the difference between contact and regional metamorphism and be able to distinguish this difference in hand specimens showing a visible difference
- Understand the concept of metamorphic grade
- Use and interpret geological maps with intrusive rock bodies and simple structural features
- Describe how knowledge of metamorphic processes can be of benefit to people
- Understand the relationship between metamorphism, deformation and plate tectonic theory
- Understand how geophysics is used to understand the deep Earth and to monitor geological hazards

STUDENT LEARNING EXPERIENCES

This unit can be seen as two interconnected streams. A lecture/workshop stream involving short presentations and hands on activities that will give a broad overview of the topic, provide background information and introduce new ideas and concepts that link in with the other stream. Parallel to the lecture/workshop stream are a series of laboratory practical classes, field-based activities and case study assignment.

FIELD TRIPS (on campus and virtual)

During this unit of study you will be required to participate in two field trips: one on-campus (in-person during the practical class) and one virtual (option to do this on campus with the help of a tutor during the session break or in your own time). These excursions form an essential part of the unit and give you an introduction to field geology. You should take special note of the following:

Equipment: The basic requirements are a hand lens, magnet, and some method of testing mineral hardness (e.g. a pocket knife, copper coin, etc.). We will provide some to share among those students who do not have their own.

TEXTS AND REFERENCES

'Handouts' (to be printed by yourself)

These are available through iLearn and include downloads for the lecture/workshop activities, laboratory practicals and case study assignments. These are essential for you to have to follow the unit and are best used in a printed format as you need to draw on the pages. You must print this yourself. The completed worksheets are invaluable as an aid during revision for the examination.

Textbook

The recommended text is:

Tarbuck, E.J., Lutgens, F.K. and Tasa, D. (2016). Earth: An introduction to Physical Geology (12th Global). Pearson . ISBN 9781292161839

This gives more background information, often written from a different perspective from the workshops and practical class notes. It also contains photographs and diagrams for use in the workshops and laboratory exercises. In the library you may find several other basic textbooks on Physical Geology that will be of use to you. The other text mentioned is Merali, Z. and Skinner B.J. Visualizing Earth Science. Wiley. ISBN 978-0-471-74705-5.

Reading List

You may find the following books helpful for reference. They should provide useful supportive material to the workshops, case studies and laboratory exercises, and supplement the prescribed textbook and the Unit of Study booklet.

Dynamic Earth is a subject relying heavily on observation, so it will be of great help to look at a variety of illustrations of the features that are covered in the unit of study. The books listed below are generally well illustrated, with striking colour photographs and diagrams.

** indicates a book in Special Reserve in the Library; * indicates a book on 3-day loan.

**Branagan, D.F. and Packham, G.H., 2000. Field geology of NSW. NSW Dept of Mineral Resources. Sydney. QE45.B7

*Busch, R.M., Tarbuck, E.J. and Lutgens, F.K, 1993. A study guide to accompany "The earth — an introduction to physical geology". Merrill. QE28.2.T37

*Cattermole, P., 2000. Building Planet Earth. Cambridge University Press. QE26.2.C384

*Hamblin, W.K. 1998. Earth's Dynamic Systems. Macmillan (8th Ed.) QE28.2.H35

*Hamblin, W.K. and Howard, J.D. 1995. Exercises in Physical Geology. QE28.2.H36

**Herbert, C. and Helby, R., 1980. A Guide to the Sydney Basin. Geological Survey of NSW Bulletin 26. QE341.N4

**Kimberley, M.M and Kimberley, S.J. 1995. Study guide to Skinner/Porter's The Dynamic Earth: an introduction to physical geology. Third Edition. Wiley (3rd Ed) QE28.2K56

*Merritts, D.J., De Wet, A., and Menking, K., 1998. Environmental Geology: an earth system science approach. Freeman, New York. QE38.M47

*Monroe, J.S. and Wicander, R. 1992 Physical Geology — exploring the earth. Harper Educational Publ.; West Publ. Co St. Paul. QE28.2.M655

*Montgomery, C.W., 1993. Physical Geology. Wm C. Brown (3rd Ed.) QE28.2.M66

*Morrison, R., 1988. Voyage of the Great Southern Ark. Ure Smith Press. QE340.M67

*Morton, R.D., 1995. Student’s Companion to Skinner and Porter’s The Dynamic Earth; an introduction to Physical Geology, Third Edition. Wiley QE28.2.S552

*Murck, B.W., Skinner, B.J. and Porter, S.C., 1996. Environmental Geology. Wiley and Sons, New York. QE38.M87/1996

*Plummer, C.C. and McGeary, D., 1999. Physical Geology. Wm C. Brown Publ., Iowa (8th Ed.). QE28.2.P58

*Press, F. and Siever, R. 1998. Understanding Earth. Freeman, New York (2nd Ed.) (replaces Earth, 4th Ed.). QE28.P9

**Scheibner, E., 1999. The geological evolution of New South Wales. Dept of Mineral Resources. QE341.S296

**Skinner, B.J. and Porter, S.C., 2000. The Dynamic Earth: an introduction to physical geology. Wiley , 4th Ed. QE28.2.S55

**Skinner, B.J., Porter, S.C. and Botkin, D.B., 1999. The Blue Planet. Wiley , 2nd Ed. QB631.S57

*Smith, D.G., 1981. The Cambridge Encyclopedia of Earth Sciences Cambridge Univ. Press, Cambridge. QE26.2.C35

*Stanley, S.M., 1989. Earth and life through time. W.H. Freeman and Company, N.Y. QE28.3.S73

*Tarbuck, E.J., Lutgens, F.K. and Tasa, D. (2016). Earth: An introduction to Physical Geology (12th Global). Pearson . ISBN 9781292161839

**Van Andel, T.H., 1994. New views of an old planet: continental drift and the history of the earth. Cambridge Univ. Press, Cambridge (2nd Ed.). QE26.2.V36

*Veevers, J.J., 2000. Billion-year earth history of Australia and neighbours in Gondwanaland.

GEMOC Press, Sydney. QE340.B55

CD-ROMS

**Dunning, J and Onesti, L.J., 1998. Earth Matters. Freeman and Co., New York. QE38.D8

**Tasa, D., 1999. Illustrated dictionary of earth science. Tasa Graphic Arts. QE5.I45

Library Loans

The Library at Macquarie will have provided you with information on library loans. The procedures differ for metropolitan and country students. Please familiarise yourself with the procedures appropriate in your case. If you have any enquiries contact the Library on (02) 9850-7500.

Unit Schedule

The schedule is available in iLearn.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be

made available in eStudent. For more information visit connect.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Academic Success

Academic Success provides resources to develop your English language proficiency, academic writing, and communication skills.

- Ask a Study Coach
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via the Service Connect Portal, or contact Service Connect.

IT Help

For help with University computer systems and technology, visit https://students.mq.edu.au/support/technology/service-desk.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Changes from Previous Offering

Two key messages: (1) lecture/workshops will be face-to-face from week 1 and (2) the field trip is virtual.

Swapping traditional lectures for novel two-hour workshops has seen a dramatic improvement in first year geology students' engagement, depth of learning and final grades. The lecture/workshops—which involve 10 to 15 minute 'mini-lectures' interspersed with object-based and active learning exercises—are conducted in the new active learning spaces at Macquarie. First year geology is ideal for object-based and active learning as it is strongly skills-based with students learning how to identify minerals and rock types, think in three dimensions and understand geophysical principles. Our goal is to deliver new information that advances the students' learning, while including a process of immediate feedback on the effectiveness of their learning during the activities. We found that since the changes were implemented in 2018, the object-based and active learning stimulated discussion, group work and lateral thinking at each table, along with excellent engagement with the workshop leader and the teaching team. The objects enhanced the delivery of unit-specific knowledge while also improving students' generic skills such as communication, teamwork, and observational and drawing ability. The results from recent years showed the success of the new format. The failure rate dropped from around 20 per cent to less than ten per cent of the cohort, and the percentage of students scoring a distinction or high distinction jumped from approximately a quarter to more than one-third of the class.

Unit information based on version 2026.02 of the Handbook