

Hastings Cave and Thermal Springs



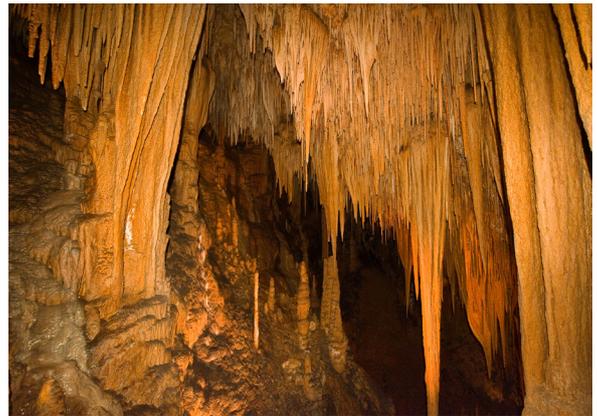
Focus Topic: Measuring the Cave Environment (7-10)

Introduction

The environment in deep caves is unlike anything in the outside world. This unit is designed to introduce students to a qualitative and quantitative examination of the biotic and abiotic factors that make up the cave environment.

Students also learn about ways in which humans are impacting on the cave, both inside and out, and the most recent changes that are occurring in the cave environment.

It is recommended that students also include Focus Topics **Cave Development** and **Cave Biodiversity** in their program.



Summary of Cave Visit Program

Focus topic core	Measuring the cave environment – Hastings Cave	Assessment for learning	Time
<p>Measuring abiotic and biotic factors</p> <ul style="list-style-type: none"> conducting a site investigation data collection and reporting 	<p>Some possible activities:</p> <ul style="list-style-type: none"> Brainstorm and measure the factors that make up the environment outside the cave. Do a walking linear transect survey into the cave with the Guide, measuring the abiotic factors in the various zones. Do a walking linear transect survey into the cave with the Guide, measuring the biotic factors in the various zones. Collect evidence (e.g. digital photos) of human impact on the environment. Discuss the need for cave reserves. 	<p>Assess students' ability to :</p> <ul style="list-style-type: none"> work as part of a team to conduct a site visit collect, record and interpret data 	<p>One-day field trip</p>



Topic Reference

Standard	4–5
Stages	10–15
Year level(s)	7–10
Curriculum areas	Science
Strand(s)	<ol style="list-style-type: none"> 1. Scientific inquiry (SI) 2. Scientific communication(SC) 3. Science as a body of knowledge(SBK) 4. Energy and force(EF)
Understanding goals	<ol style="list-style-type: none"> 1. Students will understand how to record and communicate the results of a site investigation. (SI, SC) 2. Students will understand the inter-relationship between the various components of the cave environment. (SBK – EF) 3. Students will understand the effect of recent climatic changes and humans' impact on the cave environment. (SBK – EF)

Links to the Science Strands and Substrands

Strand/substrand	Possible key questions
Science as a human endeavour (SHE)	<ul style="list-style-type: none"> • How does human activity affect the cave environment?
Scientific inquiry (SI)	<ul style="list-style-type: none"> • How do measured environmental factors change in the various zones of the cave? • How do we make qualitative and quantitative measurements and record them?
Scientific communication (SC)	<ul style="list-style-type: none"> • How can we present qualitative and quantitative information and draw conclusions? • How can we communicate our findings in similar ways to scientists?
Energy and force (EF)	<ul style="list-style-type: none"> • What are the energy inputs into the cave environment? • What natural cycles affect the cave environment? • What impacts can humans have on the availability of energy in the cave in the short term and long term?

Suggested Topic Plan

Pre-visit

- What makes up an environment – abiotic and biotic factors.
- Review cycles in the environment – diurnal, annual and long-term climatic fluctuations.
- Understand how weather changes and the importance of air pressure.
- Understand qualitative and quantitative measuring.
- How to read scales and use simple measuring equipment.



Hastings Cave

- Visit to the Hastings Cave to conduct site investigation: measuring the cave abiotic factors, e.g. temperature, humidity, substrates and light inside and outside the cave.
- Review the various biotic influences on the cave e.g. human impacts.
- Record ways the environment inside the cave is changing in various zones.



Post-visit follow-up

- Discuss ways of presenting qualitative and quantitative information and drawing conclusions.
- Compare the cave environment with other typical terrestrial environments.
- Review human impact in the short term and long term, including inside and outside.
- Undertake investigations.
- Review why cave reserves are important, globally and in Tasmania.
- Prepare presentation of work using multimedia (Facebook, PowerPoint, video, photos, artwork and written reports).

Suggested Pre- and Post-visit Teaching Plan

Pre-visit <ul style="list-style-type: none"> concepts/main ideas 	Optional learning opportunities	Assessment and Teacher Notes	Time
Environmental factors <ul style="list-style-type: none"> Introduction to components of environment and how they interact Basic understanding of weather and climate 	<ol style="list-style-type: none"> Groups look at: <ul style="list-style-type: none"> what makes up an 'environment'; divide components into abiotic and biotic factors various terrestrial environments; discuss how parts of environment interact (review) cycles in the environment – diurnal, annual and long-term climatic fluctuations. Weather and climate <ul style="list-style-type: none"> Understand the difference between weather and climate. Understand how weather changes and the importance of air pressure. Each group chooses a method of sharing their information with the rest of the class and reports back to the class (possibly as a PowerPoint or photo story). 	Assessment for learning Assess students' understanding of: <ul style="list-style-type: none"> climate, weather and air pressure components of environment and their interaction cave zonation 	Two x 50min lessons
2. Measuring the environment <ul style="list-style-type: none"> Investigations into abiotic and biotic factors 	<ol style="list-style-type: none"> Series of investigations into: <ul style="list-style-type: none"> what we mean by qualitative and quantitative measuring reading scales and using simple measuring equipment what humidity is and how we measure it. 	Assessment for learning Assess students' skills in: <ul style="list-style-type: none"> conducting laboratory investigations 	One x 50min lesson
3.Optional: guest speaker – researcher <ul style="list-style-type: none"> How cave scientists work 	Invite a guest speaker from Southern Tasmanian Caverneers (http://www.lmrs.com.au/stc/) , Parks and Wildlife (http://www.parks.tas.gov.au/) or Forestry Tasmania (http://www.forestrytas.com.au/) to come and talk about their work.	Assessment for learning Assess students' understanding of: <ul style="list-style-type: none"> the role of guide, forester, scientist 	One x 50min lesson

Post-visit follow-up	Optional learning opportunities	Assessment and Teacher Notes	Time
I. Presentation of environmental report	<ol style="list-style-type: none"> 1. Develop a multimedia (Facebook, PowerPoint, video, photos, artwork and written reports) report on the environment of a cave, using graphical, pictorial and written evidence. 2. Review human impact in the short/long term, including inside and outside, on abiotic and biotic factors. 3. Discuss long-term environmental changes, including predictions of possible change, in view of changing world climate. 4. Discuss why cave reserves are important, globally and in Tasmania, and how global warming is likely to affect them. 5. Undertake an individual investigation from Additional Activities. 	<p>Assessment for and of learning</p> <p>Assess students' ability to:</p> <ul style="list-style-type: none"> • collect data that will allow them to answer the question they posed. • communicate their scientific information • undertake an investigation 	<p>Two x 50min lessons</p>

Possible Web Resources

<http://waitomocaves.com/newwebpages/EDlessons.htm>

<http://www.reec.nsw.edu.au/geo/cave/caves/textcave/10cavewb.htm> (worksheet)

<http://www.reec.nsw.edu.au/geo/cave/caves/textcave/3acavecl.htm> (climates in caves)

http://www.blm.gov/wo/st/en/res/Education_in_BLM/Learning_Landscapes/For_Teachers/science_and_children/caves/index.html

(good American information on caves)

http://www.jenolancaves.org.au/jenolan_facts.php

(Jenolan Caves, NSW)

<http://www.goodearthgraphics.com/virtcave/> (Virtual Cave – good selection of photos etc)

<http://www.capricorncaves.com.au/pdf/schoolprogram.pdf> (Capricorn Caves, Qld)

<http://www.howecaverns.com/live-in-the-cave> (Howe Caverns, USA, educational information)

http://www.marengocave.com/schools/cave_map.php (Marengo Cave, USA, G1-5 materials)

http://www.caves.org/committee/education/science_topics.htm#hydro (National Speleological Society, USA – lots of topics and useful links)

<http://cavingintro.net/science.html> (Provides many links to cave-related sites)