Mini-unit Outline

Name of mini-unit : Mould and other microbes **Year level:** 5/6 **Duration:** 5 sessions **Content area:** Science	**SKILLS** • Designing • Explaining • Hypothesising • Inferring • Observing • Predicting • Questioning • Reflecting • Reporting • Responding to others' work
Key learning outcomes: - students develop skills in scientific investigation and experiment design - students develop understanding of mould – what it is, how it grows, what its effects can be (positive and negative) - students develop terminology to talk and write about science	
Rationale This mini-unit aligns with the Australian Science curriculum. It is designed for 5 lessons, but could easily be expanded over a term focus. This mini-unit is planned according the 5E model. Each lesson has a key 5E focus, but there are also elements of the progression within each lesson.	

Australian Curriculum Outcomes	*AC Strand:- Discipline-based learning || Domain:- Science || Dimension:- Science Understanding || Level:- 6* *Outcome Statement:-* Biological Sciences: The growth and survival of living things are affected by the physical conditions of their environment (ACSSU094) Chemical Sciences: Changes to materials can be reversible, such as melting, freezing, evaporating; or irreversible, such as burning and rusting (ACSSU095) *Dimension:-Science As A Human Endeavour || Level:- 5/6* *Outcome Statement:-* Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena (ACSHE081) (ACSHE098) Important contributions to the advancement of science have been made by people from a range of cultures (ACSHE082) (ACSHE099) Scientific understandings, discoveries and inventions are used to solve problems that directly affect peoples' lives (ACSHE083) (ACSHE100) *Dimension:-Science Inquiry Skills || Level:- 5/6* *Outcome Statement:-* With guidance, pose questions to clarify practical problems or inform a scientific investigation, and predict what the findings of an investigation might be (ACSIS231) (ACSIS232) With guidance, plan appropriate investigation methods to answer questions or solve problems (ACSIS086) (ACSIS103) Decide which variable should be changed and measured in fair tests and accurately observe, measure and record data, using digital technologies as appropriate (ACSIS087) (ACSIS104) Use equipment and materials safely, identifying potential risks (ACSIS088) (ACSIS105)	
Assessment	**Students' self-assessment** *3-2-1 Reflection activity* • Three things I learned • Two (best) connections I made • One thing I would like to investigate further	**Teacher assessment** Students' notebooks assessed: • Compare P.O.E. activities from first and second experiments – check for growth in understanding • Students' experiment design – understanding "fair tests"; appropriate method and research question • Student discussions • Understanding of relevant terminology
Resources	**Experiment resources** • Bread • Water • Ziplock bags • Other foods (student-directed) • Scientist's notebook x 28 (see Appendix 2)	**Learning resources** – Other books could be used • *Disgusting food invaders* (Owen) • *Our Living World – Fungi* (Tesar) • *Nature Close Up – Slime, Moulds & Fungi* (Pascoe) • *Zoom in on… House of Horrors* (Spilsbury) • *Howard Florey: Miracle Maker* (Murray) • *Micro Mania* (Brown) • YouTube videos (decomposition; mould growth)

E5 session focus	Lesson outline
Engage	**Lesson 1: What do we know about mould and other microbes?** This lesson introduces the ideas of mould and microbes to the students. Through some provoking questions in a written form of 'Think Pair Share', students' prior knowledge on this subject will be investigated. Inquiry questions: - What is mould? - What is bacteria? - What does mould do? - Where do we find mould? - Are there "good" and "bad" micro-organisms? Explain your answer. With guidance, students set up mould growth experiment – place bread in zip-lock bag with a small amount of water, store in a dark place. Students introduced to "Predict-Observe-Explain" (POE), and complete "predict" component. "Making Connections" and "Wonderings and Questions" section of student notebook also introduced to provide a framework for student inquiry.
Explore/Explain	**Lesson 2: What happened in our experiment?** This lesson follows up the bread-mould experiments set up the first lesson. Children will be equipped to explore resources so that they can develop an understanding of how and why the results occurred. Students observe and draw results in their Scientist's notebook ("observe" component of POE). Show two YouTube videos with a zoomed in depiction of mould growth to help students conceptualise what has happened. Students to undertake brief research into why their bread went mouldy, and record at least one "fact". Use of index and note-taking skills to be briefly modelled by teacher. YouTube videos http://www.youtube.com/watch?v=FXuRcEeKZOg http://www.youtube.com/watch?v=JsQHWj2RfXg (up to 1:12)
Elaborate	**Lesson 3: What else can we find out about mould?** This lesson extends the ideas that have been investigated in the first two lessons. Students will set up an experiment to elaborate on their new understanding about mould. Using the ideas of 'working scientifically', students will be supported to set up their own further investigation. They can use different foods (e.g. compare bread brands, compare bread with fruit) or different variables (e.g. moisture vs. dryness, light vs. dark etc.). This will be brainstormed in experiment pairs, then shared and checked for its feasibility by the teacher. Method and "Prediction" (second POE) recorded in the Scientist's Notebook. YouTube video of decomposition: http://www.youtube.com/watch?v=c0En-_BVbGc
Explore/Explain	**Lesson 4: Working scientifically, and investigating "good moulds"** This lesson follows up on the previous experiments to help students develop a framework for scientific investigations. The concepts of scientific investigation to be revised and recorded – "How do we work scientifically?" A key part will be the construction of an anchor chart as a group. Student understanding of mould will also be extended beyond our own bread mould growth with a mini-research into the question of "why might mould and decomposition be helpful?" It helps students make connections between what we have studied and the role of mould in systems and society.
Evaluate	**Lesson 5: What did we learn about mould?** This final lesson in the mini-unit brings together the unit and encourages students to reflect on what has been covered. Students complete "Predict-Observe-Explain" section for their second (comparative) experiment. Encourage observations and explanations to link with their predictions, and use scientific terminology. Students discuss and complete the reflection section in their Scientist's notebook: - 3 things I learned - 2 connections I made - 1 thing I would like to investigate further As a class, we will explore the story of Howard Florey (penicillin scientist), as an application of students' understanding about mould that has been developed throughout the unit.