Investigating Science resource links

This supporting document is provided to assist you in starting your research and collating resources, including articles and websites, in preparing programs, units of work and lesson plans. They are only provided as a suggestion.

Although this document may contain links to third party websites and resources, the NSW Department of Education is not responsible for the condition or content of these sites or resources as they are not under the control of the department.

The first two pages are generalised links for undertaking scientific investigations, including observations, models and the scientific method.

## Observations in science

* [Scientific Observation](https://explorable.com/scientific-observation) (Collecting Empirical Evidence) – Explorable
* [The role of observation in science](https://www.sciencelearn.org.nz/resources/8-the-role-of-observation-in-science) – Science Learning Hub
* [Making observations](https://www.scienceteacherprogram.org/genscience/Kaszczak03.html) – Making and recording observations
* [Observation beyond our eyes](https://undsci.berkeley.edu/article/howscienceworks_05) – Understanding Science
* [How to make observations like a scientist](https://ideas.time.com/2012/05/02/how-to-incease-your-powers-of-observation/) – Time.com
* [Types of Observation in the Scientific Method – seattlepi](https://education.seattlepi.com/types-observation-scientific-method-5913.html)
* [Types of Observation in the Scientific Method – Sciencing](https://sciencing.com/types-observation-scientific-method-8295233.html).

## Inferences and generalisations

* [Deductive Reasoning vs Inductive Reasoning](https://www.livescience.com/21569-deduction-vs-induction.html) – Live Science
* [Observations vs Inferences](https://www.slideshare.net/mrmularella/observations-vs-inferences) – SlideShare
* [Inferring](https://elsaghirscience.weebly.com/inferring.html) – Science Process Skills
* [Inferences and observations](https://www.youtube.com/watch?v=CFmj_NY5tvg) (duration 6:00)
* [Teaching about how scientists make inferences (PDF 6 pages)](https://www.readingrockets.org/strategies/inference) – readingrockets.org (www.readingrockets.org/pdfs/inference-science-strategy-guide.pdf)
* [What is generalisation?](https://explorable.com/what-is-generalization) – Explorable
* [Induction, deduction and the scientific method](https://higherlogicdownload.s3.amazonaws.com/SSR/fbd87d69-d53f-458a-8220-829febdf990b/UploadedImages/Documents/rothchild_scimethod.pdf) – [Society for the Study of Reproduction](https://www.ssr.org/resources)

## Scientific investigations

* [What is Scientific Investigation?](https://study.com/academy/lesson/what-is-scientific-investigation-definition-steps-examples.html) – Study.com
* [Scientific investigation: Steps, Examples, Tips and exercise](https://www.youtube.com/watch?v=yi0hwFDQTSQ) (duration 8:38) - Sprouts
* [Scientific Investigation](https://www.ck12.org/book/ck-12-physical-science-for-middle-school/section/2.1/) – [CK-12](https://www.ck12.org/c/physical-science/)
* [Scientific Investigations (PDF 1 page)](https://www.education.vic.gov.au/Documents/school/teachers/teachingresources/discipline/science/continuum/sciinvestigate.pdf) – [Science concept map from Victoria DET](https://www.education.vic.gov.au/school/teachers/teachingresources/discipline/science/continuum/pages/conceptmaps.aspx)
* [Science and engineering practices](http://manoa.hawaii.edu/exploringourfluidearth/standards-alignment/next-generation-science-standards-ngss/science-and-engineering-practices) – Exploring our fluid earth
* [A blueprint for scientific investigations](https://undsci.berkeley.edu/article/_0_0/howscienceworks_03) – Understanding Science
* [KS2 – Science Investigation Resources](https://www.twinkl.com.au/resources/keystage2-ks2/ks2-science/ks2-science-investigation) – ideas (need subscription to use)
* [My Science Investigation Student Booklet (PDF 14 pages)](https://seaact.act.edu.au/) – ACT Science association (seaact.act.edu.au/wp-content/uploads/Science-investigation-booklet-1.pdf)

## The scientific method

* [Understanding and Using The Scientific Method](https://www.sciencemadesimple.com/scientific_method.html) – Science made simple
* [The scientific method](https://www.khanacademy.org/science/biology/intro-to-biology/science-of-biology/a/the-science-of-biology) – Khan Academy
* [The scientific method – video](https://www.khanacademy.org/science/biology/intro-to-biology/science-of-biology/v/the-scientific-method) (duration 11:48) – Khan Academy
* [Steps of the scientific method](https://www.sciencebuddies.org/science-fair-projects/science-fair/steps-of-the-scientific-method) – Science buddies
* [The Scientific Method – ScienceBob](https://sciencebob.com/science-fair-ideas/the-scientific-method/)
* [What are the steps of the scientific method](https://sciencebob.com/what-are-the-steps-to-the-scientific-method/) – ScienceBob
* [What is science](https://www.livescience.com/20896-science-scientific-method.html) and the scientific method – LiveScience
* [What is the Scientific Method?](https://explorable.com/what-is-the-scientific-method) – Explorable
* [Scientific Method](https://www.brainpop.com/science/scientificinquiry/scientificmethod/) (film clip) – BrainPOP
* [Reasoning in Science](http://www.biology4kids.com/files/studies_scimethod.html) – Biology4kids
* [Scientific Method: Steps, Terms and Examples](https://www.youtube.com/watch?v=BVfI1wat2y8) (duration 4:24)
* [The scientific method – Teacher’s Pet](https://www.youtube.com/watch?v=SMGRe824kak) (duration 4:05)

## Writing scientific reports

* [The Structure of Scientific Reports](https://unilearning.uow.edu.au/report/2b.html) – Uni Learning
* [Formatting science reports](https://writing.wisc.edu/handbook/assignments/sciencereport/) – UW-Madison
* [Writing a scientific report (PDF 2 pages)](https://aso-resources.une.edu.au/assignment-types/report-writing/scientific-reports-2/scientific-reports/) – Uni of New England

## Qualitative and quantitative data and observations

* [Difference between qualitative and quantitative data](http://www.differencebetween.net/science/mathematics-statistics/difference-between-qualitative-data-and-quantitative-data/) – Difference Between
* [Qualitative analysis](https://www.bbc.co.uk/bitesize/guides/zpstcwx/revision/3) – BBC
* [Data Scientist: Strike a balance between qualitative and quantitative data](https://www.ibmbigdatahub.com/blog/data-scientist-strike-balance-between-quantitative-qualitative-exploration)
* [Qualitative and quantitative observations](https://www.youtube.com/watch?v=0g9ugQqv7PA) (duration 1:13)
* [Qualitative vs Quantitative Research](https://www.youtube.com/watch?v=a-XtVF7Bofg) (duration 3:36)
* [Quantitative vs Qualitative Observations](https://prezi.com/efcgbjxl3buh/quantitative-vs-qualitative-observations/) – Prezi
* [Empirical Evidence: A Definition](https://www.livescience.com/21456-empirical-evidence-a-definition.html) – LiveScience

## Scientific models

* [Scientific models](https://www.education.vic.gov.au/school/teachers/teachingresources/discipline/science/continuum/Pages/scimodels.aspx) – Department of Education (Victoria)
* [Scientific modelling](https://www.sciencelearn.org.nz/resources/575-scientific-modelling) – Science Learning Hub
* [Modeling – Scientific Models](https://www.ck12.org/earth-science/modelling-in-earth-science/lesson/Scientific-Models-HS-ES/) – CK-12
* [Scientific models and theories](https://edu.rsc.org/feature/how-to-teach-scientific-models/3010560.article) – Royal Society of Chemistry
* [What is a scientific model? (PDF 4 pages)](http://climatechangeandforests.org/sites/default/files/files/Lesson_4_Scientific_Modeling6.4.15.pdf)
* [What is a model?](https://serc.carleton.edu/introgeo/models/WhatIsAModel.html) – Carlton College
* [Types of scientific models](https://texasgateway.org/resource/scientific-models) – Texas Gateway
* [Models](https://bio301d.com/scientific-decision-making/models/) are the building blocks of science

The following pages are based on content descriptors of the actual modules.

## Module 1 – Cause and Effect – Observing

### Websites

* [The Burning Candle](http://people.math.harvard.edu/~knill/pedagogy/waterexperiment/) – rising water experiment
* [Candle Burning Experiment](https://www.education.com/activity/article/candle-snuffing-contest/) – Education.com
* [Classic Candle Experiment](https://www.abc.net.au/science/surfingscientist/lessonplans/)  – Surfing Scientist ([abc.net.au/science/surfingscientist/pdf/lesson\_plan10.pdf](http://www.abc.net.au/science/surfingscientist/pdf/lesson_plan10.pdf))
* [Bernoulli effect demonstration](https://www.preproom.org/practicals/pr.aspx?prID=1082) – Preproom.org
* [Fun with Bernoulli](https://www.teachengineering.org/activities/view/cub_airplanes_lesson01_activity1) (Activity) – TeachEngineering.org
* [Eureka? Or buoyancy and Archimedes principle](https://www.teachengineering.org/activities/view/wsu_eureka_activity) – TeachEngineering.org
* Alexander Fleming [Discovery and Development of Penicillin](https://www.acs.org/content/acs/en/education/whatischemistry/landmarks/flemingpenicillin.html)
* [Proving a Sun-centred Solar system](http://solar-center.stanford.edu/activities/venus.html) – Stanford solar centre
* Our Solar System – [Galileo’s observation](https://solarsystem.nasa.gov/news/307/galileos-observations-of-the-moon-jupiter-venus-and-the-sun/) – NASA
* [Galileo and the Telescope](https://www.atnf.csiro.au/outreach/education/senior/astrophysics/galileo.html) – CSIRO
* [Competing Models – the Sun and its planets (PDF 19 pages)](http://burro.case.edu/Academics/Astr201/), CWRU, Astronomy department ([burro.case.edu/Academics/Astr201/Chap03c.pdf](http://burro.case.edu/Academics/Astr201/Chap03c.pdf))

It is strongly advised that teachers contact their local AECG and Land Council to gather information regarding Aboriginal and Torres Strait Islander protocols and cultures.

* [Fire-Stick Farmers](https://austhrutime.com/fire-stick_farmers.htm) – Australia: The Land Where Time Began
* [Fire and Indigenous culture](https://www.indigenous.gov.au/savanna-burning-a-cleaner-future)
* [The world’s best fire management system – The Conversation](https://theconversation.com/the-worlds-best-fire-management-system-is-in-northern-australia-and-its-led-by-indigenous-land-managers-133071)
* Khan Academy video – [Firestick farming](https://www.khanacademy.org/science/cosmology-and-astronomy/life-earth-universe/humanity-on-earth-tutorial/v/firestick-farming) (duration 6:37)
* [Top 10 Aboriginal bush medicines](https://www.australiangeographic.com.au/topics/history-culture/2011/02/top-10-aboriginal-bush-medicines/) – Australian Geographic
* [Aboriginal Medicine](http://www.wanowandthen.com/Aboriginal-Medicine.html) – Western Australia
* [Ethnobotanical study of indigenous knowledge on medicinal plant use](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3062575/)
* The [Cell Image Library](http://www.cellimagelibrary.org/home)
* [Astronomy: Astronomical Observation](http://www.visualdictionaryonline.com/astronomy/astronomical-observation.php) images
* [Methods of Observational Astronomy](http://earthguide.ucsd.edu/virtualmuseum/ita/06_1.shtml)
* [Observing the Universe](https://www.bbc.co.uk/bitesize/guides/zg638mn/revision/3)
* [Observatories Across the Electromagnetic Spectrum](https://imagine.gsfc.nasa.gov/science/toolbox/emspectrum_observatories1.html) – NASA
* [What is Infrared?](https://coolcosmos.ipac.caltech.edu/page/what_is_infrared) Cool Cosmos
* [Instruments used by Astronomers](https://sciencing.com/instruments-used-astronomers-6366902.html) – Sciencing
* [Analog and digital technology](https://www.explainthatstuff.com/analog-and-digital.html) – What’s the difference?
* [Analog vs Digital](https://www.diffen.com/difference/Analog_vs_Digital) – Difference and comparison

### YouTube

* [A Burning Candle in a Jar](https://www.youtube.com/watch?v=9RnYenXimSA) (duration 1:34)
* [Bernoulli’s Principle Experiments](https://www.youtube.com/watch?v=epesI-fWvrY) (duration 1:35)
* [Bernoulli’s principle – physics experiment](https://www.youtube.com/watch?v=P-xNXrELCmU) (duration 2:34)
* [Fluids, Buoyancy and Archimedes’ Principle](https://youtu.be/16HDJNoXQII) (duration 4:15)
* [Archimedes’ water displacement experiment](https://www.youtube.com/watch?v=qWrTKJaRE94) (duration 6:20)
* [Alexander Fleming’s Discovery of Penicillin](https://www.youtube.com/watch?v=5RGs-2eNnjM) (duration 4:41)
* [Alexander Fleming and the Accidental Mould Juice](https://www.youtube.com/watch?v=0ZWjzcsTd5M) (duration 1:43)
* [The discovery of penicillin](https://www.youtube.com/watch?v=7qeZLLhx5kU) (duration 11:44)
* [Galileo and Jupiter’s Moons](https://www.youtube.com/watch?v=NXOYqTUpkaM) (duration 5:33)
* [What instruments do astronomers use to collect evidence](https://www.youtube.com/watch?v=ROLm96ptHXw) (duration 3:46)
* [Difference between Analog and Digital](https://www.youtube.com/watch?v=WxJKXGugfh8) (duration 4:01)

## Module 2 – Cause and Effect – Inferences and Generalisations

It is strongly advised that teachers contact their local AECG and Land Council to gather information regarding Aboriginal and Torres Strait Islander protocols and cultures.

### Websites

* [Aboriginal toxic food processing methods](https://bushcraftoz.com/threads/aboriginal-toxic-food-processing-methods.2596/) – Bushcarft Oz
* [Food Preparation – Poison](https://austhrutime.com/food_preparation_poison.htm) – Australia: The Land Where Time Began
* [The Bush Tucker Survival Guide](https://www.survival.org.au/bush_tucker_survival_guide.php) – Bush Tucker Plant Food
* [Aboriginal Bush Foods and Medicine](https://www.tjapukai.com.au/aboriginal-cultural-village/experience/) – Tjapukai Aboriginal Cultural Park
* [Aboriginal people built water tunnels](http://www.abc.net.au/science/news/ancient/AncientRepublish_1590192.htm) ABC news in science
* Key facts – [Water supply](https://healthinfonet.ecu.edu.au/learn/determinants-of-health/environmental-health/water-supply/) – Indigenous environmental health department
* [Indigenous Freshwater Rights Topic guide](https://caepr.cass.anu.edu.au/research/publications/indigenous-legal-rights-freshwater-australia-international-context) – Centre for Aboriginal economic policy research
* [Water in the region](https://landscape.sa.gov.au/aw/water/water-in-the-region?responsive=false) – Natural Resources Alinytljara Wiluara
* [Indigenous Peoples and Water](https://humanrights.gov.au/our-work/native-title-report-2008-chapter-6) Australian Human Rights Commission
* [Animal Migration](https://www.nature.com/scitable/knowledge/library/animal-migration-13259533/) – Knowledge Project
* [Climate change impacts on animal migration](https://climatechangeresponses.biomedcentral.com/articles/10.1186/s40665-015-0013-9)
* [Why Do Animals Migrate?](https://www.livescience.com/10235-animals-migrate.html) – LiveScience
* [How and Why Animals Migrate](http://www.nhptv.org/natureworks/nwep4c.htm) – NatureWorks
* [What powers a comet?](https://spaceplace.nasa.gov/review/dr-marc-solar-system/comet-power.html) – NASA
* [Comets](http://www.stargazing.net/David/comets/index.html) – Stargazing.net
* [Asteroids and Comets: Information and Facts](https://www.nationalgeographic.com/science/space/solar-system/asteroids-comets/) – National Geographic
* [How snowflakes get their shape?](https://earthsky.org/earth/how-do-snowflakes-get-their-shape)
* [Snowflake Science](http://www.snowcrystals.com/science/science.html)
* [Auroras Australis](http://www.webexhibits.org/causesofcolor/4B.html)
* [Fractals in nature and applications](https://kluge.in-chemnitz.de/documents/fractal/node2.html)
* [17 Captivating Fractals Found in Nature](https://webecoist.momtastic.com/2008/09/07/17-amazing-examples-of-fractals-in-nature/)
* [Neuroscience: why do we see faces in everyday objects](https://www.bbc.com/future/article/20140730-why-do-we-see-faces-in-objects) (pareidolia) – BBC
* [Pareidolia: Seeing faces in Unusual places](https://www.livescience.com/25448-pareidolia.html) – LiveScience
* [Optical illusions](https://www.optics4kids.org/illusions) – Optics4kids
* [The Importance Of Outliers In Data](https://www.clearreturns.com/2013/06/27/the-importance-of-outliers-in-data/)
* [What are outliers in data?](https://www.itl.nist.gov/div898/handbook/prc/section1/prc16.htm)
* [The power of outliers](https://scholarworks.umass.edu/pare/vol9/iss1/6/)
* Points of significance: [Analysing outliers](https://www.nature.com/articles/nmeth.3812) – nature methods
* [Germ Theory](https://www.sciencemuseum.org.uk/objects-and-stories/medicine/hospital-infection) – Science Museum
* Open Collections Program: [Contagion](https://library.harvard.edu/collections/contagion-historical-views-diseases-and-epidemics), Germ theory
* [Infectious diseases](https://www.abpischools.org.uk/topic/infectiousdiseases-timeline/1/1) – timeline
* [Germ Theory](https://science.jrank.org/pages/3035/Germ-Theory.html) – Disease, Microorganisms, Pasteur and Diseases
* [Radioactivity](http://hyperphysics.phy-astr.gsu.edu/hbase/Nuclear/radact.html)
* [Radioisotopes – ANSTO](https://www.ansto.gov.au/education/nuclear-facts/what-are-radioisotopes)
* [Cloud chamber](https://sciencedemonstrations.fas.harvard.edu/presentations/cloud-chamber) ?
* [The Discovery of Radioactivity](https://www2.lbl.gov/abc/wallchart/chapters/03/4.html)
* [Henri Becquerel and the Discovery of Radioactivity](https://www.ans.org/news/article-879/henri-becquerels-discovery-of-radioactivity/#sthash.dKJmK1Jp.dpbs) – ANS
* [Discovery of Radioactivity – LibreTexts](https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Supplemental_Modules_(Physical_and_Theoretical_Chemistry)/Nuclear_Chemistry/Radioactivity/Discovery_of_Radioactivity)
* [Marie Curie and the Discovery of Radioactivity](http://large.stanford.edu/courses/2016/ph241/caballero2/)
* [Phlogiston – chemical theory](https://www.britannica.com/science/phlogiston) – Britannica
* [Phlogiston](https://creation.com/phlogiston) – creation.com
* [Phlogiston theory](http://encyclopedia.kids.net.au/page/ph/Phlogiston_theory) – kids.net.au
* [The Human Impact On Air Pollution](https://healthfully.com/the-human-impact-on-air-pollution-4965319.html)
* [Human Impact on the Earth’s Atmosphere](https://sciencing.com/human-impact-earths-atmosphere-3677.html) – Sciencing
* [Effect of Human Activities on the Environment](https://education.seattlepi.com/effect-human-activities-environment-3653.html) – seattlepi.com
* [Accelerators for Research and Development](http://www.accelerators-for-society.org/research/index.php?id=5) – Accelerators for Society
* [How Particle Accelerators Work](https://www.energy.gov/articles/how-particle-accelerators-work) – energy.gov
* [Development of the periodic table](https://www.rsc.org/periodic-table/history/about) – rsc.org
* [Development of the periodic table – Science Learning Hub](https://www.sciencelearn.org.nz/resources/1804-development-of-the-periodic-table)
* [What does the periodic table tell us](https://www.bbc.co.uk/bitesize/guides/ztv797h/revision/1) – BBC Bitesize
* [When chemistry became biology](https://newsroom.unsw.edu.au/news/science-tech/when-chemistry-became-biology-looking-origins-life-hot-springs) – UNSW Australian Centre for Astrobiology
* [Astrobiology: The Study of the Living Universe (PDF 46 pages)](https://www.semanticscholar.org/paper/Astrobiology%3A-The-Study-of-the-Living-Universe-Chyba-Hand/aac2f142db989ca4478bf591327bde6824b0390e)
* [Uniformitarianism](https://www.britannica.com/science/uniformitarianism) – Britannica
* [Uniformitarianism: Charles Lyell](https://evolution.berkeley.edu/evolibrary/article/history_12) – Understanding Evolution
* [Uniformitarianism – The Foundation of Modern Geology](https://publish.illinois.edu/foundationofmoderngeology/uniformitarianism/)
* [Is Feynmanium the last chemical element that can physically exist?](https://www.quora.com/Is-Feynmanium-the-last-chemical-element-that-can-physically-exist-What-are-the-chemical-consequences-of-having-an-element-with-an-atomic-number-above-137-whose-1s-electrons-must-travel-faster-than-the-speed-of-light)

### YouTube

* [Indigenous preparation of Djitama](https://www.youtube.com/watch?v=2wgeBcWXMo0) (bush yam) – (duration 8:43)
* [The Greatest Animal Migration](https://www.youtube.com/watch?v=t0zwP3xt-xo) (duration 43:10)
* [Animal Migration](https://www.youtube.com/watch?v=XpJp2R0GTR8) (duration 12:52)
* [Comet ISON](https://youtu.be/obBLxuSALr4) – its movement in the sky from New Zealand (duration 1:22)
* [The Science of Snowflakes](https://www.youtube.com/watch?v=fUot7XSX8uA) (duration 5:59)
* [Southern lights – Auroras Australis](https://www.youtube.com/watch?v=A8H3GJCeejo) (duration 3:05)
* [Auroras Australis – 17 March 2015](https://www.youtube.com/watch?v=_tlMIiFp9SY) (duration 0:32)
* [Patterns in Nature – Symmetry, Fractals, Tessellations](https://www.youtube.com/watch?v=4Mfl2QbSMYY) (duration 14:37)
* [Patterns in nature](https://www.youtube.com/watch?v=IGKLZ3NO9Qk) (duration 5:59)
* [What is Pareidolia?](https://www.youtube.com/watch?v=Af1kWzTbIjo) (duration 5:44)
* [Science Bytes: Pareidolia](https://www.youtube.com/watch?v=6l8ByKUQMf4) (duration 3:01)
* [10 Optical Illusions that will melt your mind](https://www.youtube.com/watch?v=Rhw9BxBDvzk) (duration 3:03)
* [Identifying Outliers in a Data Set](https://www.youtube.com/watch?v=vBpIpG3CShk) (duration 4:32)
* [Louis Pasteur Documentary The Father of Germ Theory](https://www.youtube.com/watch?v=jR_2Zyc--SQ) (duration 40:06)
* [The Germ Theory of Disease](https://www.youtube.com/watch?v=VQy0tJ1yu9w) (duration 49:12)
* [Radioactivity – Henri Becquerel, Marie and Pierre Curie](https://www.youtube.com/watch?v=azwesgfZ1b8) (duration 14:50)
* [Henri Becquerel’s Contribution to Radioactivity](https://www.youtube.com/watch?v=zkfu3K5RjMI) (duration 0:40)
* [Marie Curie: Great Minds](https://www.youtube.com/watch?v=r4jCTiGSuwU) (duration 9:42)
* [Discovery of Radioactivity](https://www.youtube.com/watch?v=Zbwl_9fCEwo) (duration 20:16)
* [Phlogiston](https://www.youtube.com/watch?v=_OeMNzLg5K0) (duration 5:57)
* [Human impact on air pollution](https://www.youtube.com/watch?v=GVigQyo7uL8) (duration 1:04)
* [How particle accelerators work](https://www.youtube.com/watch?v=ZEc7r3rjNlk) (duration 6:09)
* [What is the Future of Particle Accelerators?](https://www.youtube.com/watch?v=YR66Z54mRaQ) (duration 42:51)
* [A Brief History of the Periodic Table](https://www.youtube.com/watch?v=OGUOmV33P9I) (duration 6:00)
* [Astrobiology](https://youtu.be/SOzZnVxIgsc) (duration 5:05)
* [Why extremophiles bode well for life beyond Earth](https://ed.ted.com/lessons/why-extremophiles-bode-well-for-life-beyond-earth-louisa-preston)- TEDEd (duration 3:59)
* [What is Astrobiology](https://www.youtube.com/watch?v=3EEfg-T7WoM) (duration 3:34)
* [Catastrophism or Uniformitarianism](https://www.youtube.com/watch?v=zKBLp3AffRg) (duration 8:47)
* [Uniformitarianism](https://www.youtube.com/watch?v=BCbAo7R8M4E) (duration 15:32)
* [Geology and Uniformitarianism](https://www.youtube.com/watch?v=rSgWfrdDf1E) (duration 3:27)
* [Feynmanium?](https://www.youtube.com/watch?v=BKEEi8JThps) (duration 9:23)

## Module 3 – Scientific Models

* [Basic concepts of Epidemic models](https://www.ucl.ac.uk/silva/statistics/research/statistics-health-economics/workshop_infectious)
* [Climate models](https://www.climatechangeinaustralia.gov.au/en/climate-campus/modelling-and-projections/climate-models/) – Climate change in Australia
* [How does a climate model work?](https://www.climatechangeinaustralia.gov.au/en/climate-campus/modelling-and-projections/climate-models/theory-and-physics/) – Climate change in Australia
* [Scientific modelling](https://www.britannica.com/science/scientific-modeling) – britannica
* [Science uses models to explain aspects of the real world](https://scienceornot.net/2012/01/17/science-uses-models-to-explain-aspects-of-the-real-world/) – Science or not?
* [Scientific modelling – Science Learning Hub](https://www.sciencelearn.org.nz/resources/575-scientific-modelling)

## Module 4 – Theories and Laws

### Websites

* [Conservation of Mass](https://www.bbc.co.uk/bitesize/guides/z2ty97h/revision/4) – BBC Bitesize
* [Conservation of matter lab (PDF 5 pages)](https://www.troup.org/) – TCSS ([https://www.troup.org/userfiles/929/My%20Files/Science/MS%20Science/8th%20Science/Matter/conservation\_matter/conservation\_mass\_lab2.pdf?id=8053www.troup.org/userfiles/929/My%20Files/Science/MS%20Science/8th%20Science/Matter/conservation\_matter/conservation\_mass\_lab2.pdf?id=8053w](https://www.troup.org/userfiles/929/My%20Files/Science/MS%20Science/8th%20Science/Matter/conservation_matter/conservation_mass_lab2.pdf?id=8053www.troup.org/userfiles/929/My%20Files/Science/MS%20Science/8th%20Science/Matter/conservation_matter/conservation_mass_lab2.pdf?id=8053))
* [Plate Tectonics](http://scienceweb.asta.edu.au/years-9-10/unit2/overview/yr910-unit2-overview.html) – ScienceWeb
* [Science sample unit: Evidence is everything (PDF 15 pages)](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/science/science-7-10-2018) – Stage 5 – NESA
* [Scientific Laws and Theories](https://creately.com/diagram/example/h6f6h4v71/Scientific%20Laws%20and%20Theories) (Venn Diagram)
* [What’s the difference between a scientific law and theory](https://blog.ed.ted.com/2016/06/07/whats-the-difference-between-a-scientific-law-and-theory-in-ted-ed-gifs/) – TEDEdlesson
* [Scientific Hypothesis, Theory or Law](https://futurism.com/hypothesis-theory-or-law)
* [The Chemical Revolution of Antoine-Laurent Lavoisier](https://www.acs.org/content/acs/en/education/whatischemistry/landmarks/lavoisier.html)
* [What Is The Geocentric Model Of The Universe?](https://www.universetoday.com/32607/geocentric-model/) – Universe Today
* [Ideas of the Solar System](https://www.bbc.co.uk/bitesize/guides/zg638mn/revision/3) – BBC Bitesize
* [Geocentricity: Face the Facts](https://amazingdiscoveries.org/C-deception-geocentric-evolution-solar_system) – AD
* [Why we believe Darwin](https://necsi.edu/why-we-believe-darwin) (Evolution)
* [The Problem of Genetics](http://www.darwinismrefuted.com/short_history_03.html)
* [Darwin’s theory of evolution](https://www.bbc.co.uk/bitesize/guides/zt4f8mn/revision/4) – BBC Bitesize
* [Year 12 Investigating Science Workbook (PDF 1:38MB)](https://www.ansto.gov.au/education/secondary/workbooks) – ANSTO
* [Dalton’s atomic theory – Khan Academy](https://www.khanacademy.org/science/chemistry/electronic-structure-of-atoms/history-of-atomic-structure/a/daltons-atomic-theory-version-2)
* [Steady State Theory in Cosmology](https://www.thoughtco.com/steady-state-theory-2699310) – ThoughtCo
* [The Steady State Theory](https://explainingscience.org/2015/07/25/the-steady-state-theory/) – Explaining Science
* [Steady State Theory – Arguments For And Against](https://science.jrank.org/pages/6476/Steady-State-Theory-Arguments-against-steady-state-theory.html)
* [Newton’s Second Law](https://www.physicsclassroom.com/class/newtlaws/Lesson-3/Newton-s-Second-Law) – The Physics Classroom
* [What is Newton’s second law](https://www.khanacademy.org/science/physics/forces-newtons-laws/newtons-laws-of-motion/a/what-is-newtons-second-law) – Khan Academy
* Video – [What is Newton’s second law of motion](https://www.khanacademy.org/science/physics/forces-newtons-laws/newtons-laws-of-motion/v/newton-s-second-law-of-motion) (duration 7:13) – Khan Academy
* [Video – Avogadro’s law](https://www.khanacademy.org/test-prep/mcat/physical-processes/gas-phase/v/avogadros-law) (duration 8:11) – Khan Academy
* [Avogadro’s Law – Avogadro’s Theory](http://www.chemistry.co.nz/avogadro)
* Fossils, Rocks and Time: [Rocks and Layers](https://pubs.usgs.gov/gip/fossils/rocks-layers.html)
* [Video – Law of Superposition](http://www.bozemanscience.com/law-of-superposition/) (duration 6:21) – Bozemanscience
* [Mendel’s Laws](https://www.ck12.org/biology/mendels-laws/) – cK-12
* [Ohm’s Law](https://www.physicsclassroom.com/class/circuits/Lesson-3/Ohm-s-Law) – The Physics Classroom
* [Voltage, Current, Resistance and Ohm’s Law](https://learn.sparkfun.com/tutorials/voltage-current-resistance-and-ohms-law)
* [What is conservation of energy](https://www.khanacademy.org/science/physics/work-and-energy/work-and-energy-tutorial/a/what-is-conservation-of-energy)? – Khan Academy
* Video – [Conservation of Energy – chemistry](https://www.brightstorm.com/science/chemistry/thermochemistry/conservation-of-energy/) (duration 4:58) – brightstorm
* Video – [Conservation of energy – physics](https://www.khanacademy.org/science/physics/work-and-energy/work-and-energy-tutorial/v/conservation-of-energy) (duration 10:06) – Khan Academy
* [Conservation of Energy](https://youtu.be/kP7q28wQ2P8) (duration 2:20)
* [Conservation of Energy](https://courses.lumenlearning.com/boundless-physics/chapter/conservation-of-energy/) – boundless.com
* [The laws of thermodynamics](https://www.khanacademy.org/science/biology/energy-and-enzymes/the-laws-of-thermodynamics/a/the-laws-of-thermodynamics) – biology – Khan Academy
* [Laws of Thermodynamics as Related to Biology](https://www.thoughtco.com/laws-of-thermodynamics-373307) – ThoughtCo
* [Bohr’s quantum theory revised](https://phys.org/news/2017-02-bohr-quantum-theory.html)
* [Unified Field Theory: Tying It All Together](https://www.livescience.com/58861-unified-field-theory.html) – LiveScience
* [Unified theory of evolution](https://intmassmedia.com/2017/01/04/unified-theory-of-evolution-darwins-theory-of-evolution-by-natural-selection-is-incomplete-without-the-contribution-of-the-anti-hero-of-lamarck/)
* [The Big Bang Theory](https://www.world-mysteries.com/science-mysteries/universe/the-big-bang-theory/) – World-Mysteries
* [Plate Tectonic Theory And The Unification Of The Earth Sciences](https://www.encyclopedia.com/science/encyclopedias-almanacs-transcripts-and-maps/plate-tectonic-theory-and-unification-earth-sciences)
* [Plate Tectonics: The Grand Unifying Theory of Geology](https://www.yumpu.com/en/document/read/17433693/plate-tectonics-the-grand-unifying-theory-of-geology)
* [Nuclear fusion reactions violate the law of conservation of mass](https://chemistry.stackexchange.com/questions/6251/nuclear-fusion-reactions-violate-law-of-conservation-of-mass-but-it-has-not-yet)

### YouTube

* [Law of Conservation of Mass Experiment](https://www.youtube.com/watch?v=FZwHH7Sm4hI) (duration 6:21)
* [What is the difference between a scientific law and theory?](https://www.youtube.com/watch?v=GyN2RhbhiEU) (duration 5:11)
* [Oxygen Combustion Theory](https://www.youtube.com/watch?v=jv3qMxhfjwE) (duration 1:03)
* [Antoine Lavoisier](https://www.youtube.com/watch?v=dxyq8YI2_mM) (duration 34:32)
* [John Dalton’s Atomic Theory](https://www.youtube.com/watch?v=wsYDL6EjV4k) (duration 2:56)
* [Dalton’s Atomic Theory](https://www.youtube.com/watch?v=IdSUqsq1yY8) (duration 5:31)
* [Newton’s Second Law of Motion](https://www.youtube.com/watch?v=ZvPrn3aBQG8) (duration 5:04)
* [Avogadro’s Law](https://www.youtube.com/watch?v=i-vA9uLSf7Y) (duration 14:47)
* [Law of Superposition](https://www.youtube.com/watch?v=EadTLGMu3LI) (duration 6:21)
* [Mendel’s Law of Dominance](https://www.youtube.com/watch?v=MH3bWUkJ8Vo) (duration 5:29)
* [Mendel’s Law of Dominance – Lecture](https://www.youtube.com/watch?v=OiZEfMe8NJk) (duration 11:23)
* [Ohm’s Law explained](https://www.youtube.com/watch?v=CztiI0re5Eo) (duration 11:47)
* [What is the Law of Conservation of Energy](https://www.youtube.com/watch?v=6AtOubec428) (duration 4:52)
* [Conservation of Energy – Is this a violation?](https://www.youtube.com/watch?v=hwvNbfsyHlM) (duration 2:58)

## Module 5 – Scientific Investigations

* [1998 – Professor Barry Marshall and Professor Robin Warren](https://aips.net.au/florey-award/the-florey-medal/2002-professor-barry-marshall-professor-robin-warren/)
* [Press Release: The 2005 Nobel Prize in Physiology or Medicine](https://www.nobelprize.org/prizes/medicine/2005/press-release/)
* YouTube – [Professor Barry Marshall](https://www.youtube.com/watch?v=fPwwi-t-QT4) (duration 10:26)
* [Video Clip: Van Helmont’s experiments on plant growth](http://www.saps.org.uk/secondary/teaching-resources/797-video-clip-van-helmont) (duration
* [Photosynthesis](https://www.ck12.org/section/photosynthesis-%3A%3Aof%3A%3A-ms-cell-functions-%3A%3Aof%3A%3A-ck-12-life-science-for-middle-school/) – cK-12
* [The Amazing True Story of How the Microwave Was Invented](https://www.popularmechanics.com/technology/gadgets/a19567/how-the-microwave-was-invented-by-accident/)
* [Percy Spencer: Microwave inventor](https://invention.si.edu/recognize-unusual/p/431-percy-spencer-microwave-inventor)
* YouTube – [Invention of Microwave Oven](https://www.youtube.com/watch?v=pam3_Bu1R7Q) (duration 2:45)
* [How a microwave oven works](https://youtu.be/kp33ZprO0Ck) –Youtube (duration 5:11)
* [Eratosthenes’ Calculation of Earth’s Circumference](https://www.windows2universe.org/?page=/citizen_science/myw/w2u_eratosthenes_calc_earth_size.html)
* [Eratosthenes of Cyrene](https://www.khanacademy.org/humanities/big-history-project/solar-system-and-earth/knowing-solar-system-earth/a/eratosthenes-of-cyrene) – Khan Academy
* YouTube – [How Eratosthenes calculated the Earth’s circumference](https://www.youtube.com/watch?v=Mw30CgaXiQw) (duration 2:01)
* YouTube – [How did Eratosthenes calculate the circumference of the Earth?](https://www.youtube.com/watch?v=Cce1XJ3BCxg) (duration 1:35)
* [The Doppler Effect](https://www.physicsclassroom.com/class/waves/Lesson-3/The-Doppler-Effect) – The Physics Classroom
* YouTube – [The Doppler Effect: what does motion do to waves?](https://www.youtube.com/watch?v=h4OnBYrbCjY) (duration 3:02)
* [Joseph Priestley, Discoverer of Oxygen (PDF 13 pages)](https://www.acs.org/content/acs/en/education/whatischemistry/landmarks/lesson-plans/joseph-priestley-discoverer-of-oxygen.html) – ACS
* YouTube – [Joseph Priestley Discovers Oxygen](https://www.youtube.com/watch?v=T1vGBFIw7I0) (duration 2:30)
* YouTube – [Joseph Priestley and his discovery of oxygen](https://www.youtube.com/watch?v=_wUVhO_rVXo) (duration 14:29)
* [The Discovery of Oxygen and Joseph Priestley](https://www.thoughtco.com/joseph-priestley-profile-1992342) – ThoughtCo

## Module 6 – Technologies

### Websites

* [Measuring rates](https://www.bbc.co.uk/bitesize/guides/zpkp7p3/revision/1) – BBC Bitesize
* [Methods of measuring reaction rates](http://nobel.scas.bcit.ca/wiki/index.php/Methods_of_measuring_reaction_rates)
* [Reaction Rates](https://rogerfrost.com/exp/rates_t.htm)
* [Temperature and gas calculations](https://www.bbc.co.uk/bitesize/guides/zc4xsbk/revision/3) – BBC Bitesize
* [Travel Through Deep Time With This Interactive Earth](https://www.smithsonianmag.com/science-nature/travel-through-deep-time-interactive-earth-180952886/)
* [Geologic Time](https://serc.carleton.edu/NAGTWorkshops/time/visualizations/geotime.html)
* [Layered Earth Geology Simulation](https://layeredearth.com/layered-earth-geology-earth-science-simulation-software-curriculum-education-middle-school-high-school.html) – Earth Science
* [Plate Tectonic Animation](http://earthguide.ucsd.edu/eoc/teachers/t_tectonics/t_tectonics.html) – earthguide online classroom
* [Structure of DNA](http://ib.bioninja.com.au/higher-level/topic-7-nucleic-acids/71-dna-structure-and-replic/structure-of-dna.html) – BioNinja
* [Discovery of the structure of DNA](https://www.khanacademy.org/science/biology/dna-as-the-genetic-material/dna-discovery-and-structure/a/discovery-of-the-structure-of-dna) – Khan Academy
* [Rutherford’s Nuclear World](https://history.aip.org/exhibits/rutherford/sections/alpha-particles-atom.html) – the Story of the Discovery of the Nucleus
* [The Higgs boson](https://home.cern/science/physics/higgs-boson) – CERN
* [How the Higgs Boson Was found](https://www.smithsonianmag.com/science-nature/how-the-higgs-boson-was-found-4723520/)
* [Molecular Expressions: Science, Optics and You](https://micro.magnet.fsu.edu/optics/timeline/people/)
* [Dawn](https://dawn.jpl.nasa.gov/DawnCommunity/flashbacks/fb_03b.pdf) – NASA
* [ABC’s of Nuclear Science](http://www2.lbl.gov/abc/Basic.html)
* [Radioactivity](https://spark.iop.org/collections/teaching-radioactivity#gref) – Institute of Physics
* [Half-life](http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_gateway/radiation/radioactivityrev1.shtml) – BBC Bitesize
* [Radiation: Effects and Sources (PDF 68 pages)](http://large.stanford.edu/courses/2017/ph241/kwan2/) – UNEP
* [Radioactive Fallout](http://www.atomicarchive.com/Docs/Effects/wenw_chp2.shtml) – Worldwide Effects of Nuclear War
* [Genetically Modified Organisms](https://www.nature.com/scitable/topicpage/genetically-modified-organisms-gmos-transgenic-crops-and-732) (GMOs)
* [Recombinant DNA Technology and Transgenic Animals](https://www.nature.com/scitable/topicpage/recombinant-dna-technology-and-transgenic-animals-34513)
* [DNA double helix: discovery that led to 60 years of biological revolution](https://www.theguardian.com/science/2013/apr/25/dna-double-helix-60-years-biological-revolution)
* [Modern Biotechnology](https://www.sciencelearn.org.nz/resources/1206-modern-biotechnology) – Science Learning Hub
* [Earthquake-proof Buildings](http://imaginationstationtoledo.org/educator/activities/can-you-build-an-earthquake-proof-building) – imagination station
* [Faultline](https://www.exploratorium.edu/faultline/damage/building.html) – Earthquake Engineering
* [10 Technologies That Help Buildings Resist Earthquakes](http://science.howstuffworks.com/innovation/science-questions/10-technologies-that-help-buildings-resist-earthquakes.htm)
* [How to Make Buildings and Structures Earthquake Proof](http://www.reidsteel.com/steel-buildings/resilient-steel-structures/earthquake-resistant-building/)

It is strongly advised that teachers contact their local AECG and Land Council to gather information regarding Aboriginal and Torres Strait Islander protocols and cultures.

* [Indigenous Australian use of plants for food and medicine](http://aiatsis.gov.au/publications/products/subject-guide-indigenous-australian-use-plants-food-and-medicine)
* [Aboriginal and Torres Strait Islander histories and cultures resources (PDF 18 pages)](https://www.qcaa.qld.edu.au/about/k-12-policies/aboriginal-torres-strait-islander-perspectives/resources/cross-curriculum-priority) – QCAA ([ww.qcaa.qld.edu.au/downloads/aust\_curric/ac\_ccp\_atsi\_cultures\_science.pdf](https://www.qcaa.qld.edu.au/downloads/aust_curric/ac_ccp_atsi_cultures_science.pdf))

### YouTube

* [Effect of temperature on reaction rates](https://www.youtube.com/watch?v=y8Tn3b-m_b4) (duration 1:38)
* [The Rate of Reactions](https://www.youtube.com/watch?v=6mAqX31RRJU) (duration 6:24)
* [Plate Tectonics in action](https://www.youtube.com/watch?v=Cm5giPd5Uro) (duration 2:30)
* [Diffraction of Light and the Discovery of DNA Structure](https://www.youtube.com/watch?v=fsYZqiaDsSY) (duration 5:34)
* [Development of Atomic Theory: Radioactivity](https://youtu.be/nQjkOy7OgMo) (duration 18:02)
* [4 Discoveries Made by the Large Hadron Collider](https://www.youtube.com/watch?v=83FbDC3jcmE) (duration 5:32)
* [The Higgs Boson Simplified Through Animation](https://www.youtube.com/watch?v=L6AN6UwTTjU) (duration 3:01)
* [The Large Hadron Collider Project](https://www.youtube.com/watch?v=2PI7spY1bPg) (duration 57:21)
* [DNA – Playing God](https://youtu.be/Y5r5UzheO-o) (duration 53:00)

## Module 7 – Fact or Fallacy

* [Nutrition content claims and health claims](http://www.foodstandards.gov.au/consumer/labelling/nutrition/Pages/default.aspx) – Food Standards Australia
* [Getting your claims right (PDF 2.7MB)](https://www.foodstandards.gov.au/publications/Pages/gettingyourclaimsright.aspx) – Food Standards Australia
* [Emotional Marketing Examples Scientifically Proven To Sway Buyers](https://instapage.com/blog/emotional-marketing)
* [Using Advertising Market Research to Create Effective Advertising](https://erisstrategy.com.au/using-advertising-market-research-to-create-effective-advertising/)
* [Product Efficacy and Marketing Claim Support](http://www.accugenlabs.com/Product%20Efficacy%20&%20Marketing%20Claim%20Support.html)
* [Product Claims](http://www.evalulab.com/en/clinical-testing/services/)
* [Clinical Testing for Efficacy](http://www.princetonconsumer.com/clinical-efficacy-testing/) (clinical trials to prove claims)
* [The Ethics of Placebo-controlled Trials: Methodological Justifications](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3844122/)
* [Placebo in clinical trials](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3601706/)
* [Double Blind Experiment](https://explorable.com/double-blind-experiment) (avoiding bias)
* [Human Experimentation: An Introduction to the Ethical Issues](http://www.pcrm.org/research/healthcare-professionals/research-compendium/human-experimentation-an-introduction-to-the)
* [Teaching secondary school students about double blind trials](http://www.testingtreatments.org/a-great-free-resource-for-teaching-secondary-school-students-about-double-blind-trials/?nabm=1&utm_referrer=https%3A%2F%2Fwww.google.com.au%2F)
* [Scientific Control Group](https://explorable.com/scientific-control-group) (experimental research)
* [Understanding controlled trials](http://www.bmj.com/content/316/7126/201): Why are randomised controlled trials important
* [Societal Impacts](https://www.ncdc.noaa.gov/societal-impacts/) – National Climatic Data Centre
* [The Hawthorne effect](http://www.economist.com/node/12510632)
* [Hawthorne Effect](https://explorable.com/hawthorne-effect) (observation bias)
* [Estrogen, hormonal replacement therapy and cardiovascular disease](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3123884/)
* [Hormone Therapy and Heart Disease](https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2013/06/hormone-therapy-and-heart-disease)
* [Fact or Fiction?: Babies Exposed to Classical Music End Up Smarter](https://www.scientificamerican.com/article/fact-or-fiction-babies-ex/)
* [The Mozart Effect, multiple intelligences and emotional intelligence](https://www.researchgate.net/publication/255061722_Multiple_Intelligences_the_Mozart_Effect_and_Emotional_Intelligence_A_Critical_Reviewl)
* [The Mozart Effect: Fact or Fiction?](https://childdevelopmentinfo.com/development/the-mozart-effect-fact-or-fiction/#.WW7lPISGNQI)
* [Science Opinions](http://www.debate.org/opinions/science)
* [What is the difference between cholarly journals and popular magazines?](https://answers.library.gsu.edu/faq/79054)
* [Why the Halo Effect Influences How We Perceive Others](https://www.verywell.com/what-is-the-halo-effect-2795906)
* [The halo effect](http://www.economist.com/node/14299211)
* [Link between smoking and cancer](http://wiki.cancer.org.au/policy/Tobacco_control/Link_between_smoking_and_cancer) – National Cancer Control Policy
* [How does smoking cause cancer?](http://www.cancerresearchuk.org/about-cancer/causes-of-cancer/smoking-and-cancer/smoking-facts-and-evidence) – Cancer Research UK
* [Tobacco Smoking and Lung Cancer](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3749017/)
* [How Do We Know that Humans Are the Major Cause of Global Warming?](http://www.ucsusa.org/global_warming/science_and_impacts/science/human-contribution-to-gw-faq.html#.WW7o34SGNQI)
* [The Causes of Climate Change](https://climate.nasa.gov/causes/) – NASA
* [Link between fossil fuels and Great Barrier Reef bleaching](https://www.theguardian.com/environment/planet-oz/2016/mar/30/link-between-fossil-fuels-and-great-barrier-reef-bleaching-clear-and-incontrovertible-say-scientists)
* [Climate Change Facts](http://www.climateactionreserve.org/resources/climate-change-facts/) – Climate Action Reserve
* [Asbestos: mining exposure, health effects and policy implications](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2323486/)
* [Occupational exposure to asbestos and lung cancer in men](https://bmccancer.biomedcentral.com/articles/10.1186/1471-2407-12-595)
* [Chrysotile Asbestos (PDF 52 pages)](https://www.who.int/ipcs/assessment/public_health/asbestos/en/) – World Health Organisation public health ([apps.who.int/iris/bitstream/handle/10665/143649/9789241564816\_eng.pdf?sequence=1http://www.who.int/ipcs/assessment/public\_health/chrysotile\_asbestos\_summary.pdf](https://apps.who.int/iris/bitstream/handle/10665/143649/9789241564816_eng.pdf?sequence=1http://www.who.int/ipcs/assessment/public_health/chrysotile_asbestos_summary.pdf))
* [Asbestos and Cancer Risk](https://www.cancer.org/cancer/cancer-causes/asbestos.html) – American Cancer Society
* [Distinguishing Science and Pseudoscience](https://www.quackwatch.org/01QuackeryRelatedTopics/pseudo.html)
* [Is Astrology a Pseudoscience?](https://www.thoughtco.com/astrology-is-astrology-a-pseudoscience-4079973)
* [Astrology: Is it scientific?](http://undsci.berkeley.edu/article/astrology_checklist)
* [Numerology: another pseudo-science](http://sujaiblog.blogspot.com.au/2009/04/numerology-another-pseudo-science.html)
* [Iridology](https://sciencebasedmedicine.org/iridology/) – Science-Based Medicine
* [Cold fusion: A case study for scientific behavior](http://undsci.berkeley.edu/article/cold_fusion_01)
* [Participants in science behave scientifically](https://undsci.berkeley.edu/article/0_0_0/whatisscience_09)
* [Fleischmann-Pons effect studies (PDF 8 pages)](https://www.rle.mit.edu/media-content/archive-progress-report/progress-report-151/) – rLe (www.rle.mit.edu/media/pr151/34.pdf)
* YouTube – [Pons and Fleischmann Interview](https://www.youtube.com/watch?v=xM64uxo1sPA) (duration 24:09)
* YouTube – [Cold Fusion: Evidence of Fraud?](https://www.youtube.com/watch?v=cFv56jjHieQ) (duration 6:50)
* [NIST Simpulates Fast, Accurate DNA Sequencing](https://www.nist.gov/news-events/news/2016/01/nist-simulates-fast-accurate-dna-sequencing-through-graphene-nanopore)
* [Maggie Simpson and Edna Krabappel Are Publishing Scienctific Papers Now](http://www.slate.com/blogs/future_tense/2014/12/08/engineer_alex_smolyanitsky_submitted_fake_papers_to_two_for_profit_scientific.html)
* [A Study by Maggie Simpson And Edna Krabappel Has Been Accepted](https://www.sciencealert.com/two-scientific-journals-have-accepted-a-study-by-maggie-simpson-and-edna-krabappel)

## Module 8 – Science and Society

* [What happens during a nuclear meltdown?](https://www.scientificamerican.com/article/nuclear-energy-primer/)
* [How does a nuclear meltdown work?](https://phys.org/news/2011-03-nuclear-meltdown-video.html)
* [Nuclear power faces public-image battle](https://www.cbc.ca/news/canada/nuclear-power-faces-public-image-battle-1.1038606)
* [Fukushima report: Key points in nuclear disaster report](https://www.bbc.com/news/world-asia-18718486)
* Public Perception – [Nuclear Energy](https://sites.google.com/a/ncsu.edu/nuclear-energy/public-perception)
* [The Public and the Smallpox Threat](https://www.nejm.org/doi/full/10.1056/NEJMsa023184#t=article)
* [Edward Jenner and the history of smallpox and vaccination](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1200696/)
* [Air travel attitudes and behaviours: The development of environment-based segments](https://www.sciencedirect.com/science/article/pii/S0969699713001518)
* [Impacts of Dams on Rivers](http://www.fao.org/3/y3994e/y3994e0i.htm)
* [Hydropower Industry](https://www.internationalrivers.org/issues/corporate-accountability/hydropower-industry/)
* [To dam or not to dam?](https://www.australiangeographic.com.au/topics/science-environment/2011/01/to-dam-or-not-to-dam/) Australian Geographic
* [Genetic Variation](https://www.bbc.co.uk/bitesize/guides/zsswgdm/revision/1) – BBC bitesize
* [Genetic modification and cloning](https://www.bbc.co.uk/bitesize/guides/zx6g87h/revision/1) – BBC bitesize
* [Gene therapy and genetic engineering](https://www.bbc.co.uk/bitesize/guides/zmqxvcw/revision/1)
* [Genetic engineering and biological weapons](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1326447/)
* [Genetically engineered Bioweapons](https://sites.dartmouth.edu/dujs/#.WW7ykYSGNQI)
* [Biological warfare (PDF 18 pages)](https://biotech.law.lsu.edu/blaw/doc_list.htm) – [Climate Change Law and Policy Project, LSU Law Centre](https://biotech.law.lsu.edu/index.htm), (biotech.law.lsu.edu/blaw/DOD/biotech96.pdf)
* [Pharmaceutical Quality Control Testing](https://www.lucideon.com/healthcare/pharmaceuticals/pharmaceutical-quality-control-testing)
* [NRC: Uses of Radiation](https://www.nrc.gov/about-nrc/radiation/around-us/uses-radiation.html)
* [What is nuclear science](https://www.ansto.gov.au/education/nuclear-facts/what-is-nuclear-science#content-the-benefits) – ANSTO
* [Beyond electricity](https://www.nei.org/fundamentals/beyond-electricity)– Nuclear Energy Institute
* [Establishing a 2020 Vision for Genomics](https://www.genome.gov/about-nhgri/strategic-plan)
* [Ethical Issues in Mining Industry](https://www.scribd.com/presentation/201622352/Ethical-Issues-in-Mining-Industry)
* [Impacts of Mining](https://www.oxfam.org.au/what-we-do/mining/impacts-of-mining/) – Oxfam
* [Connecting global Priorities: Biodiversity and Human Health](https://apps.who.int/iris/bitstream/handle/10665/174012/9789241508537_eng.pdf;jsessionid=ADEF0C8959FA677E7130B6CF30E800AF?sequence=1) – World Health Organisation, Chapter 11 Traditional medicine (Bioprospecting)
* YouTube – [What is Bioprospecting?](https://www.youtube.com/watch?v=-4a9QYr486k) (duration 4:45)
* [Human Cloning and Human Dignity: an ethical enquiry](https://bioethicsarchive.georgetown.edu/pcbe/reports/cloningreport/children.html)
* [Australian Code for the Responsible Conduct of Research](https://www.nhmrc.gov.au/about-us/publications/australian-code-responsible-conduct-research-2007)
* [Ethical Guidelines on the use of Assisted Reproductive Technology (PDF 1.04MB)](https://www.nhmrc.gov.au/about-us/publications/ethical-guidelines-use-assisted-reproductive-technology#block-views-block-file-attachments-content-block-1)
* [2016 Guidelines (PDF 37 pages)](https://www.isscr.org/news-publicationsss/isscr-news-articles/article-listing/2016/05/12/isscr-releases-updated-guidelines-for-stem-cell-research-and-clinical-translation) – International Society for Stem Cell Research
* [National Institutes of Health Guidelines on Human Stem Cell Research](https://stemcells.nih.gov/policy/2009-guidelines.htm)
* [Ethical Issues in Stem Cell Research](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2726839/)
* [Code of Ethics](http://www.cellmedicinesociety.org/icms-guidelines/code-of-ethics) – International Cellular Medicine Society
* [Code of Ethics](https://www.surrogatetherapy.org/ipsa-mission/code-of-ethics/) – International Professional Surrogates Association
* [The Ethical Issues of Surrogacy](http://www.modernfamilysurrogacy.com/the-ethical-issues-of-surrogacy)
* [Safety Assessment of GM Foods](https://www.foodstandards.gov.au/consumer/gmfood/safety/Pages/default.aspx)
* [Queensland Biotechnology Code of Ethics](https://www.publications.qld.gov.au/dataset/qld-biotechnology-ethics)
* [Genetically Modified Foods and Ethical Eating](https://onlinelibrary.wiley.com/doi/pdf/10.1111/1750-3841.13191)
* [Ethical guidelines for organ transplantation (PDF 1.08MB)](https://www.nhmrc.gov.au/about-us/publications/ethical-guidelines-organ-transplantation-deceased-donors)
* [Ethics of Organ Transplantation (PDF 48 pages)](https://conservancy.umn.edu/handle/11299/947)
* [Forbes – The Cost of Space Exploration](https://www.forbes.com/2009/07/16/apollo-moon-landing-anniversary-opinions-contributors-cost-money.html#38f653d01d04)
* [Is Space research worth the cost?](https://www.tes.com/teaching-resource/is-space-research-worth-the-cost-information-sheet-11066062)
* [Space Exploration, At What Cost?](https://www.seeker.com/space-exploration-at-what-cost-1765208928.html)
* [The Real Cost of NASA Missions](https://www.popsci.com/real-cost-nasa-missions/)
* [Cooperation in Nuclear Power](https://www.world-nuclear.org/information-library/current-and-future-generation/cooperation-in-nuclear-power.aspx) – World Nuclear Association
* [Nuclear Energy for the Developing World](https://www.technologyreview.com/2007/02/27/226620/nuclear-energy-for-the-developing-world/)
* [Nuclear Energy for the Developing World](https://issues.org/abdulla/) – Issues in Science and Technology
* [Antibiotic Resistance: Implications for Global Health and Novel Intervention Strategies: Workshop Summary.](https://www.ncbi.nlm.nih.gov/books/NBK54257/)
* [The Antibiotic Resistance Crisis](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4378521/)
* [Interventions and Strategies to improve the use of antimicrobials in developing countries (PDF 319KB)](https://apps.who.int/iris/handle/10665/66839)
* [New antimicrobial drugs:why we need them and how we can get them – Download Lay Summary (PDF 8 pages)](https://easac.eu/publications/details/antimicrobial-drug-discovery-greater-steps-ahead/) – easac reports, 2014.
* [Petroleum industry facts, information, pictures](https://www.encyclopedia.com/social-sciences-and-law/economics-business-and-labor/businesses-and-occupations/petroleum-industry)
* EIA Energy Kids – [Oil (petroleum)](https://www.eia.gov/kids/energy-sources/oil/)
* [How does Oil Impact the Environment?](http://environment-ecology.com/energy-and-environment/92-how-does-oil-impact-the-environment.html)
* [How drones can improve the healthcare delivery in developing countries?](https://theconversation.com/how-drones-can-improve-healthcare-delivery-in-developing-countries-49917)
* [Farmers of the future will utilise drones, robots and GPS](https://theconversation.com/farmers-of-the-future-will-utilize-drones-robots-and-gps-37739)
* [Humanitarian efforts aided by drones](https://www.mitacs.ca/en/impact/humanitarian-efforts-aided-drones)
* [The Impact of Facility Design on Patient Safety](https://www.ncbi.nlm.nih.gov/books/NBK2633/)
* [Patient Care Technology and Safety](https://www.ncbi.nlm.nih.gov/books/NBK2686/)
* [Australian industry capabilities - Health and Wellbeing](https://www.austrade.gov.au/International/Buy/Australian-industry-capabilities/Health-and-Wellbeing)
* [Social and economic impacts of water purification](https://www.appropedia.org/Social_and_economic_impacts_of_water_purification)
* [Water, health and ecosystems](https://www.who.int/heli/risks/water/water/en/) – World Health Organisation
* [Water purification](https://www.sciencedaily.com/terms/water_purification.htm) – ScienceDaily
* [The Importance of Clean Water](https://www.watercalculator.org/footprint/importance-of-clean-water/?cid=2382)
* [Australian Drinking Water Guidelines](https://www.clearwatervic.com.au/resource-library/guidelines-and-strategy/australian-drinking-water-guidelines-2011-adwg.php) Clearwater Program, Melbourne Water
* [Water quality and filtration](https://www.sydneywater.com.au/SW/education/drinking-water/Water-quality-filtration/index.htm) – Sydney Water
* [Who benefits from vaccines?](https://www.science.org.au/learning/general-audience/science-booklets/science-immunisation/3-who-benefits-vaccines) Australian Academy of Science
* [Immunisation](http://www.abc.net.au/health/library/stories/2003/05/22/1918384.htm) – ABC Health and Wellbeing
* [Cost Effectiveness of Vaccines](https://www.jhsph.edu/ivac/wp-content/uploads/2018/04/Vaccines_Cost-effectiveness_Infographic.jpg) (infographic) – JHSPH international vaccine access centre
* [Advances in Vaccine Technology and their Impact on Managed Care](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2730064/) - NCBI
* [Facts](http://vaccinate.initiatives.qld.gov.au/facts/) – Queensland Government Vaccination matters
* Australian Government Department of Health – [Factors influencing vaccination uptake](https://www1.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-cdi-2000-cdi2403-cdi2403c.htm)