

Higher Order Thinking: Planning teaching and learning activities with a thinking focus

Unit Name: Plant way of Life 2009

	Remembering	Understanding	Applying	Analysing	Evaluating	Creating
Uses of plants	List plants used by humans.		<i>Find an application of a plant for use in a traditional medicine capacity, e.g. Maori, Chinese and compare it's therapeutic qualities with a synthetic "double" (L14)</i>		<i>Compare different plant material for their use as a fuel. 'Combustibility vs plant material' (ready any time from L10)</i>	
Types of plants/groups		Make a dictionary(audio/written) to define common terms associated with plants and give examples of each term. (L2)		Identify plant groups which different plants belong to eg dicotyledons, monocotyledons, conifers, mosses, ferns, (L12)(WC) Design a key to place plants in different groups. (L12)	<i>Evaluate the benefits of landscaping the area outside the canteen with each of the following:</i> <ul style="list-style-type: none"> • <i>food crops or</i> • <i>flowering plants or</i> • <i>native plants</i> <i>(L14)</i>	Hannah Jenanne

<p>Plant structure & function</p>	<p>Sketch and label parts of a plant. Stem (L2) Leaves Root Root hairs Flower (WC)</p> <p>Sketch & label parts of a cell: Cell membrane, cell wall, nucleus, vacuole, chloroplasts (L3) Cytoplasm. (WC)</p>	<p>Explain the function of each plant part. (WC) (L2)</p>	<p><i>Compare the structure and function of flax leaves with the leaves of a cabbage. (L2)</i> Charlotte Meghan</p> <p><i>Write a story about 'If plants were able to uproot and move about'. (L2)</i> Tiari/Alex</p>	<p><i>Effectively summarise the structure and function of parts of a cactus, moss and native NZ tree. (L14)</i></p> <p><i>Research to find whether there are any plants that can live in both aquatic and a terrestrial environment(L14)</i> Kade/Sam</p>		<p><i>Create a 3D model of a plant to illustrate the plant structure. (L2)</i> Sophie/Amy</p>
<p>Plant processes- photosynthesis</p>	<p>Describe abiotic factors which can affect the rate of photosynthesis. (Teacher) (L4)</p> <p>Identify when plants photosynthesise. (L4)</p> <p>Label the cross section of a leaf.</p>	<p><i>Explain how and why plants photosynthesise. (L4)</i> Danny and Michael</p>	<p>Design an experiment to investigate any one factors effect on photosynthesis:- Light Chlorophyll Carbon dioxide (WC) (L4/5)</p>	<p><i>Analyse data showing the effect on photosynthesis of growing plants under different wavelengths of light and discuss the conclusion drawn from this. (L5)</i></p>		<p><i>Create an ideal environment to achieve optimal photosynthesis in a biodome. (L5)</i> Jake and George</p>

			<p><i>Design an experiment to measure plant growth using different wavelengths of light. (L5)</i></p> <p><i>Determine whether plants grow from the tip of the stem, or at all points along a stem. (L15)</i></p> <p><i>Determine whether seed size is related to growth height. (L15)</i></p> <p>Tom</p>	<p><i>Determine whether the green part of leaves is the only place where leaves make starch. (L5)</i></p>		
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<p>Plant processes-reproduction</p>	<p>Sketch & label parts of a seed. (Teacher) (L1)</p> <p>Describe the function of the parts of a seed. (Teacher) (L1)</p> <p>Label the reproductive parts of a flowering plant. (WC) (L13)</p>	<p>Explain the advantage of seeds containing a food store. (Teacher) (L1)</p> <p>Explain how each male and female plant reproductive organ is designed to achieve reproduction successfully. (WC) (L13)</p>	<p><i>Determine (L14) whether germination is related to temperature.</i></p> <p>Jackson/Sam J</p> <p>Study the (L15) structure and natural transport of different seeds, and explain how each seed is suited to its environment and method of dispersal. (video)</p> <p>Compare wind and insect (L13) pollinated flowers. (WC)</p> <p><i>Compare asexual and sexual reproductive methods in plants. (L13)</i></p>	<p><i>Analyse the structure of different flowers to determine whether the flower is designed for moths/bees/birds giving reasons for your conclusions. (L13)</i></p>		
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Respiration	Describe Respiration and identify when plants respire. (Teacher) (L6/7)			Analyse data showing plant respiration rates for night and day. (WC) (L6/7)		
Transport & transpiration	Label parts of a plant important for transport and transpiration.(WC) Describe transpiration & osmosis. (Teacher) (L10) Describe the function of xylem & phloem. (Teacher) (L10)	<i>Explain how and why transpiration rates increase in plants and how some plants are designed to reduce transpiration. (L10)</i>	<i>Compare the structure & function of xylem & phloem cells. (L10)</i>	<i>Design an (L10) experiment to test factors which affect transpiration. <u>AnnalieseClaudia</u> Make cross sections of plant stems and prepare slides to show what structures you can see. (WC)(L10)</i>		
Specialised plants	<i>Identify ways plants are adapted to suit environments such as:</i> <ul style="list-style-type: none"> • Hot & dry • Warm and moist (L14) Tori/Sarah	<i>Explain the use of native NZ plants for medicinal purposes, and include as much background as you can on the history of its use.(Nan Peka, Suzanne Aubert) (L14)</i> Dayarnn/Kathryn	<i>Find out why there are plants which capture and eat insects and identify the ways in which other plants protect (L14) themselves from being eaten.</i> ←	<i>Compare two different aquatic plants for specialised adaptations (L14)</i> Jonty/Josh Fergus/Karl	<i>Conclude what our life and our economy would be like if we were allowed to grow only edible plants. All flowers, house plants etc. would be forbidden.(L14)</i> ←	Kahleia/Hope

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Unit Name: Chemicals in Action

	Remembering	Understanding	Applying	Analysing	Evaluating	Creating
Atomic Structure	<p>Describe the structure of the atom, charges of sub atomic particles and electron arrangement</p> <p>Draw illustrations to show the atomic structure of the first 10 elements.</p>	<p>Make a dictionary to define common terms associated with atomic structure</p> <p>Explain atomic mass and atomic number</p>	<p>Predict the atomic mass and number of atoms with given protons/ neutrons /electrons.</p>			<p>Create a 3-D model of an atom with at least 5 electrons</p> <p>Predict what the human race will achieve in the future as our understanding of atomic theory changes.</p> <p>Create a powerpoint or video demonstrating the beauty of atoms and chemicals.</p>
Periodic table	<p>Draw the periodic table.</p>	<p>Explain why the periodic table is arranged as it is.</p>		<p>Compare characteristics of metals with non metals.</p>	<p>Select any element you believe is</p>	<p>Create a time line of historic events and</p>

	<p>Identify chemical symbols and formula</p> <p>Describe elements as metal or non-metal</p> <p>List elements found in common items eg. Iron in a car body</p>	<p>Explain why carbon can exist in TWO forms.</p>		<p>Compare groups in the table with each other in terms of atomic structure and chemical characteristics/reactivity.</p>	<p>significantly important to life and justify your selection.</p>	<p>scientists who have contributed to our understanding of atomic theory and the construction of the periodic table.</p> <p>Create a humorous study of the elements and present it to the class so that imaginations are fired up.</p> <p>Create a song or rap to help students remember elements and symbols.</p>
<p>Ions & ionic compounds</p>	<p>Describe what an ion is.</p> <p>Describe how the electrical charge of an</p>	<p>Explain why atoms form ions.</p> <p>Explain why the electrical charge changes when f</p>	<p>Predict what type of ion an atom will form.</p> <p>Design a tree</p>	<p>Compare covalent and ionic bonds.</p>		<p>Create a poster to help students work out the electrical charge on ions.</p>

Critical Thinking Activity Stem cells

Create a scenario whereby class members are going to research and present different perspectives on the issue of stem cell research. You will role play your perspective so dress up and put on your Actor's hat.

Then the class will **individually vote** for a world decision on whether stem cell research should be allowed. You may have to JUSTIFY your decision.

Perspective groups present to the class a presentation which clearly identifies their opinion on the issue. You will need to find out the groups views on the issue. It is to be backed up with evidence – identified as factual or opinion.

Groups:

1. Scientists who are developing stem cell technology. You will need to identify what it is, how it is obtained and where it is used, and why it should or shouldn't be continued.
2. Medical companies which will develop materials to be used in stem cell research.
3. Poor people who can not afford the technology even though they would benefit.
4. People with genetic diseases that may be cured by stem cell research eg. Parkinson's disease, Motor neurone disease.
5. Maori
6. Catholic church
7. Jewish religion
8. Legal profession
9. Anti abortion group/ pro life group
10. Church of England
11. Mr Bush & his government
12. Mr Blair & his government
13. NZ Government
14. Human fertility company

frankenstein

Learning Intentions

- Research from a variety of sources
- Gather relevant information together into a report or power point
- Learn about ethics in science and look at an issue from other points of view.
- Make a justified decision (the context is xenotransplants - are they the solution to replacing diseased or damaged body parts?)
- Research xenotransplantation.

Success Criteria

- I can research from a variety of sources
- I can write a report or produce a presentation which contains relevant information
- I can describe processes of xenotransplantation and the human need for them.
- I can discuss the ethics of xenotransplantation and form my own justified opinion on the need for it.

Question: Are xenotransplants the solution to replacing parts of the human body which are diseased or damaged?

Your task:

- In groups of three, or individually, you are to research from the web, journals, and texts to answer the above question
- You will present your research in the form of **a report or any creative presentation**
- You must provide a **record of sources of information** regardless of your mode of presentation.

Frankenstein Marking Rubric

Success Criteria	Beginning	Developing	Advanced	Exemplary
Xenotransplantation processes	<ul style="list-style-type: none"> Describes what xenotransplantation is Identifies organs and/or animals involved 	<ul style="list-style-type: none"> Describes processes involved in xenotransplantation 	<ul style="list-style-type: none"> Explains how and why xenotransplantation is carried out Explains concerns and challenges associated with the topic. Describes the human need for xenotransplants 	<ul style="list-style-type: none"> Discusses xenotransplants coherently which may include evaluating the technology, comparing and contrasting xeno to other alternative technologies or the implications of xenotransplants. Discusses how and why xenotransplants meet a human need
Ethics & opinion	<ul style="list-style-type: none"> Discusses simple ethics related to xenotransplants Forms an opinion 	<ul style="list-style-type: none"> Discusses some ethics related to xenotransplants. Uses their understanding of the issue to discuss an opinion and how it relates to xenotransplants. 	<ul style="list-style-type: none"> Debates ethics of xenotransplants Forms an opinion and justifies their view with reference to scientific information. 	<ul style="list-style-type: none"> Debates more complex ethics of xenotransplants using scientific understanding and evidence. A justified opinion with evidence is formed and tries to convince others to form the same opinion.

Earthquake marking rubric 10St

Student Name:

	Beginning	Developing	Accomplished	Exemplary
Questioning	Student(s) relied on teacher-generated questions or developed a question requiring little creative thought.	Student(s) constructed questions that lends themselves to readily available answers.	Student(s) posed focused questions involving them in challenging research..	Student(s) posed thoughtful, creative questions that engaged them in challenging or provocative research.
Creativity	Displays a simple presentation	Displays material with little variety or originality	Displays interesting material showing some originality with variety and good interpretation of the task. Includes visual links relevant to the text	Very original presentation of material showing flair and using the unexpected to catch the audience's attention
Gathering information	Student(s) gathered information that lacked relevance, quality, depth and balance.	Student(s) gathered information from a limited range of sources and displayed minimal effort in selecting quality resources.	Student(s) gathered information from a variety of relevant sources--print and electronic	Student(s) gathered information from a variety of quality electronic and print sources. Sources are relevant, balanced and include critical readings.

<p>Sometimes space shuttles carry science experiments and investigations designed by school students. Plan an investigation that you'd like to have carried out in space.</p>	<p>Devise your own astronomically named product. Write and illustrate an ad for the new product. Write a paragraph highlighting the virtues of this product with emphasis on astronomical terms and images.</p>	<p>You are a real estate agent selling a planet in our solar system. You want to advertise globally, so will need to create a web site. This web site will compete against other solar system realtors' web pages, so be creative!!</p>
<p>Virgin Galactic began space trips this year. SpaceShipOne showed it could be done. Spot the thrills and risks at each stage of its flight. Then storyboard an advert to encourage ticket sales.</p> <p style="text-align: center;">Or</p> <p>Create a children's story-book for a journey through the our solar system.</p>	<p>In teams design a city for the moon, mars or space using the internet as the primary research tool.</p> <p>Teams will need to create computer-aided models, physical models or drawings of their cities and present them to the class along with the answers to the questions below.</p>	<p>Research the conditions of a planet or astronomical body, including the physical and chemical conditions of the surface and atmosphere. Develop a new recipe for a cookie that represents the planet or astronomical body.</p>
<p>Create a game that illustrates some feature of space travel.</p> <p>e.g. Manned space flight timeline since 1960</p>	<p>This square is where you can choose an activity of your own to complete.</p> <p>You must conference with the teacher to get approval for your idea.</p>	<p>Create a monthly newsletter or newspaper for the residents of Mars. You are a resident there and it is the year 2050.</p>

Achievement Objective Level 5:

Investigate how natural events and human actions can affect conditions for living on Earth.

Students are to work in pairs to complete task in the centre, and then as an individual choose one or two activities from around the centre.

Information Technology

iwork application pages: – newspaper template

Google-sketch up: for design a city project

www.toondoo.com : for cartoon creation (story book)

Understanding World Hunger

1. Complete Causes of Hunger in the World exercise as a homework exercise prior to lesson. Bring along answers with reasons.

http://www.unesco.org/education/tlsf/TLSF/theme_c/mod14/mod14task05/mod14task05.htm

(The link for this will be on moodle)

2. Root causes of hunger. Look at the sheet “**Myths of world hunger**”. Discuss each of these then read the case studies on coffee and cocoa.

Answer the following questions:

3. ****Food first Fundamentals. Using the sheet **Myths of world hunger**, Complete the interactive exercise called **Food First Fundamentals** located at:**

http://www.unesco.org/education/tlsf/TLSF/theme_c/c_mod14.htm

and complete the Questions A and B on this page.

A: Identify one Food First Fundamental that you would like to see implemented in your country - and give your reason.

B: Identify one Food First Fundamental that you think would be very difficult to implement in your country - and give your reason.

4. ****Read through Activity 4 **Toward Food security for all**. Click on Sustainable Food Security and focus on the factors of People and Environment. Read through the **Strategies for ensuring food security**, and comment on Fair trade, Environmental protection, appropriate agriculture and the blue revolution.**

Sustainable Agriculture

1. Define sustainable agriculture.
2. Read through the sheet titled “significant costs” and summarise the impact each of these costs to sustainable agriculture has had under the headings people and environment.
3. Take a sheet titled “sustainable Agriculture”. With the sustainable practices sheet, place the 9 sustainable interventions into the diagram at the appropriate place where the intervention occurs.

4. Select one of the sustainable practices and research to find a ‘real’ example of the practice to share with the class outside of the case studies provided.
5. Heading “case study analysis”. Select two of the four countries provided and answer the following questions.

A. Describe (i) the types of agriculture being practiced in these case studies, and (ii) identify the principles that you think underlie these practices.

B. Make a list of principles that are shared by the farmers in the two case studies you selected.

(Identify the thinking tool or strategy you used in order to answer these questions)

Food shortages and increased prices

Using the supplement from the NZ Herald May 20 2008

1. Read the section on ‘causes’ to the food shortage and increased prices of food.
 - With a partner discuss which of the ‘**causes**’ you think is the most significant contributor to the food shortage and increased price problem.
 - Rate the ‘causes’ 1 to 5, with 1 = most significant and 5 = least significant.
2. Using the supplement read the “**possible solutions**” section, and create a table of solutions to the food problem showing the pros and cons of each. Include any other possible solutions to this problem.
3. Use the **picture of the shopping trolley** to answer the following questions.
 - Which foods will be affected by the rising price of grain?
 - Which food group is missing from this trolley?

Socio-scientific Issues

In a pair, you are to select one of the following topics and prepare an answer. It is vital you select the **‘audience’** before you begin researching and preparing a response.

This is a combined Science and Social Studies Research Assessment.
For Science it fulfils the following objective:

Develop and understanding of socio-scientific issues by gathering relevant scientific information in order to draw evidence-based conclusions and to take action where appropriate.

Topics

- As the world population increases the food production is more or less able to keep pace with this growth. Scientists believe that future consequences of current agricultural practices – soil erosion, pest control, will lead to severe issues of sustainability and pesticide pollution. What is the ecological impact of current agricultural practices and examine one solution to this problem.
- Research about a group of Nomads that exist today and how they move around to find food. Examine the problems they face now compared to the past and what issues will they have in the future?
- Despite producing more food, millions of people remain hungry and malnourished, while others are eating too much or eating the wrong sorts of foods. Wrong policies have had negative consequences for the environment, can anything be done to rectify this?
- What is the impact of the growing need to produce biofuels on the availability of crops to be used as a food source? What is the implication on third world populations? Is biofuels the answer?
- Choose a group of people who have had to migrate due to a lack of food supplies. Why did this problem occur and what effect (both positive and negative) did these people have on others? (Geographical impact)
- Compare and contrast at least two agricultural methods that are sustainable that will not only feed the world population but do not incur harm to the environment. Examples of possible methods include:
 - New productive elements
 - Intercropping
 - Zero tillage
 - Water harvesting

- New Zealand should allow people from Zimbabwe who are facing starvation due to lack of food resources to come to live in New Zealand.
- By 2050, the world will need to grow a large amount more food in order to avoid starvation for a large number of the population. Research and examine the geographic impact this will have on humans at this time, with an emphasis on migration factors.
- Are we facing another agricultural revolution now? Read the attached article and debate the quote “*Industrial agriculture has not produced more food. It has destroyed diverse sources of food, and it has stolen food from other species to bring larger quantities of specific commodities to the market, using huge quantities of fossil fuels and water and toxic chemicals in the process*”
- Agri-economist John Ikerd describes Knowledge-based agriculture as having decisions based on the Golden Rule. (Article titled *Next Agricultural Revolution: Revitalising Family-Based Agriculture and Rural Communities*) The article mentions farming that not only considers our neighbours but future generations of farmers who should have the same opportunities that we have enjoyed. Do you think that this is possible?
- Fair Trade Coffee – is it really Fair Trade?
- What is the impact of the ‘Green Revolution’ and the way we produce food on other species?
- Is organic farming really ‘sustainable agriculture’?

You will be given Research Assessment Criteria as well as a rubric for Thinking, where you will be assessed on the Creativity and Thinking Critically competencies within thinking.

Presentations will be to the whole class during Week 8.