

Future Harvest website

Visit our website at:

www.museum.vic.gov.au/futureharvest
for case studies, weblinks and further
information on the topic of sustainability.

References and further reading

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Sustainability views, news and clues

Sustainability is a complex issue. If you ask ten people what it means, you'll probably get as many different responses. Since an understanding of sustainability and how we all choose to live is a critical issue for our society's survival, it is worth exploring and coming to terms with it. But how do we do this? Further, how do we inspire each other to actively engage in this issue and encourage action? Here are some views, resources and ideas that will help you to be better armed to tackle this and provide stimulus for class discussion.

- John Clarke and Bryan Dawe (the comedians responsible for the satirical pieces at the end of *A Current Affair*) have a number of videos and CDs available from ABC shops. Particularly recommended are the two skits in which the 'Minister for the Environment' is interviewed, namely 'The Front Fell Off' and 'Global Warming'.
- The film *Silent Running* is available at video stores. The story revolves around a future Space Station which houses biosphere modules containing the last remnants of Earth's flora and fauna. Economic cutbacks mean that it has to shut down...
- *Reflections on Sustainability, Population Growth And The Environment* by Albert A. Bartlett, Department of Physics, University of Colorado. This book is available on the Internet at: <http://hills.ccsf.cc.ca.us:9878/~jdwall/SUST5.html>
- *EarthBook* edited by Larry Crenshaw (A.H. Cather Publishing Company: Birmingham, AL. 1994) discusses ideas and activities concerning sustainability and care of the Earth. An overview is provided on the Internet: <http://outwardbound.org/obearth.htm>
- Political parties have policies that involve sustainability. Compare these to views held by environmental organisations or large corporate companies like Shell. Guest speakers might be invited to the school to discuss their views.

Some useful quotes

- 'There are Four Laws of Ecology... Everything Is Connected To Everything Else, Everything Must Go Somewhere, Nature Knows Best and There Is No Such Thing as a Free Lunch.'
- Barry Commoner, *The Closing Circle: Nature, Man and Technology*, Alfred A. Knopf Inc., New York, 1971.
- 'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'
- United Nations World Commission on Environment and Development, the Bruntland Report, 1987.
- 'The agricultural systems that have been built up over the past few decades have contributed greatly to the alleviation of hunger and the raising of living standards. They have served their purposes up to a point. But they were for the purposes of a smaller, more fragmented world. New realities reveal their inherent contradictions. These realities require agricultural systems that focus as much attention on people as they do on technology, as much on resources as on production, as much on the long term as on the short term. Only such systems can meet the challenge of the future.'
- The World Commission on Environment and Development, 1987.

- ‘... our duty is not to turn our backs on economic development but to ensure that our use of resources is efficient, and that we provide future generations with the greatest range of options to satisfy their wants. This cannot be achieved without economic growth—which provides the savings and technological progress necessary to combine growth with high environmental standards. Poverty and poor economic performance are themselves toxic to the environment.’

Business Council of Australia, 1990

- ‘Sustainable development—requires a shift in the balance of the way economic progress is pursued. Environmental concerns must be properly integrated into economic policy. The environment must be seen as a valuable, frequently essential input to human well-being.’

Pearce et al., 1989 cited in Graham Dunkley, *The Greening of the Red: Sustainability, Socialism and the Environmental Crisis*, 1992, p.14

- ‘You are left... with something rather like the skeleton of a body wasted by disease; the rich soft soil has all run away leaving the land nothing but skin and bone.’

Plato in *Critias*, Penguin, 1965, p.132

- ‘The conflict is always between two lifestyles—a lifestyle where money is the only thing that is important and a sustainable lifestyle that will save water, forests, vegetation and soil for future generations. It is a lifestyle where people are independent, working with nature with no thought of conquering nature.’

Radha Bhatt, ‘Listen to the voice of the Indian Himalayas’, p.134, cited in *Story Earth: Native Voices on the Environment*, compiled by Interpress Service, Mercury House, San Francisco, California, 1993.

- ‘The health of the world’s harvest is even more dependant on genetic resources. Just three species—wheat, rice and maize —provide half the world’s food: another four—potato, barley, sweet potato and cassava—bring the total to three quarters. Such overwhelming dependence on a few crops is dangerous; disease can spread rapidly through monocultures —as it did through the Irish potato harvest in the 1840s, causing a fifth of the county’s people to die.’

Lean, Geoffrey et al, *WWF Atlas for the Environment*, Prentice Hall Press, New York, 1990, p.127

School environmental survey

Office and staff areas

- 1 Does the photocopier use recycled paper?
- 2 Does the computer printer use recycled paper?
- 3 Does the printer or photocopier toner cartridge get reused (refilled)?
- 4 Does the copier, printer or computer shut down (or go to a power save mode) automatically after a certain time if it is not being used?
- 5 Is there a paper recycling program? For example, are there trays and boxes in the area for collection or sorting of used paper? Is there a paper recycling bin next to the printer and/or copier?

In the classroom

- 1 Do you use two-sided photocopies, or are they always copied on just one side?
- 2 Is there enough light coming through the windows or is additional lighting needed? Are the lights switched off when the room is empty?
- 3 Are windows closed properly when heating/cooling is on? Are the windows shaded from the summer sun by trees or an awning?
- 4 Are there foam seals around the windows to stop draughts?
- 5 Is there a paper recycling bin in the room?

In the schoolyard

- 1 How are the school grounds watered? Are they watered during the cool times of the day? What system is used?
- 2 Are the garden beds heavily mulched to reduce water loss?
- 3 Are native plants and trees used that require less water? Is there a food or herb garden?
- 4 Do any of the trees provide shade or wind break for the buildings? Are there any shaded rest/play areas?
- 5 Are there separate bins for different sorts of 'waste', for example. glass, tins, papers, compost and waste.

In the canteen

- 1 Does the canteen buy food in bulk?
- 2 How is the prepared food wrapped? (For example, Gladwrap, waxed paper, bags?) Are there any items that have excess packaging?
- 3 Does the canteen prefer to buy local or Australian made foods?
- 4 Does the canteen sell a range of fresh foods, for example, fruit? Does the canteen avoid foods that are excessively processed, have additives and so on?
- 5 Does food 'waste' get composted?

Lifestyle environmental audit

For each item, tick one response only. Use your responses and the marking scheme at the end of this exercise to work out your Demonstrated Impact on Resources Temperament (DIRT) Index.

	Always	Usually	Sometimes	Rarely	Never
Eating and Drinking					
We buy locally produced food.					
We eat food that is in season.					
We prepare fresh food rather than purchase highly processed or prepared foods.					
We compost food scraps.					
We eat food low in the food chain.					
We use leftovers for food, pets or compost.					
We prefer water to manufactured drinks.					
We are frugal with water in food preparation.					
The Garden (If no garden or outdoor areas, omit questions marked * and tick Never for the others.)					
Our garden produces lots of food.					
We use our compost on the garden.					
Our garden encourages native birds and insects.					
Our garden provides shade and shelter.					
* Our garden has the smallest possible area of lawn.					
* Our garden is heavily mulched.					
* We choose plants suited to the climate.					
* Plants in our garden are grouped together according to similar water needs.					
* We water the garden in the morning/evening.					
* We use soaker hoses and drippers rather than sprinklers.					
* We avoid using pesticides, weed killers and synthetic fertilisers.					
Pets (Omit if no pets.)					
We control the breeding of our pets.					
Our cat wears a bell and is kept in at night.					
We prevent our pets from straying.					
Using appliances/technology					
I turn off lights, TV and appliances when I've finished using them.					
We suit our lighting to size of rooms and use low wattage for small rooms.					
We use fluorescent or energy efficient globes where they do not have to be switched on and off all the time.					
We don't heat or cool rooms that aren't being used.					
We close the doors of the rooms where the heater is on.					
Our windows have pelmets and curtains.					

	Always	Usually	Sometimes	Rarely	Never
We close curtains to conserve heat or cooling.					
We use lids on pots.					
We match pot size to size of burner.					
We minimise dish washing.					
We avoid leaving the refrigerator door open for long periods of time.					
We keep our refrigerator full.					
We walk/ride/catch public transport to school / work.					
We use a dual flush toilet.					
We avoid strong chemical cleaners.					
We use wind and sun to dry our clothes.					
Our washing powder is 'Phosphorus Free' (label should have NP on it).					
Our appliances have a high 'energy star' rating.					
Packaging					
We avoid disposable items such as paper plates and plastic cups.					
We avoid plastic bags.					
We reuse plastic bags.					
We avoid plastic wrap.					
We avoid paper towels.					
We buy in bulk.					
We refuse heavily packaged products.					
We buy products with packaging that can be recycled.					
We buy unbleached / recycled toilet paper.					
We take our own food when we go out.					
Recycling					
We sort and recycle:					
• glass					
• newspapers					
• office papers					
• aluminium					
• steel cans					
• plastic bottles and containers.					
We reuse office paper (for note-pads, computer print outs).					
We pass on unwanted items to those who can use them.					
Personal habits					
I prefer handkerchiefs to tissues.					
I take short showers (less than 5 minutes)					
I turn off the tap while brushing my teeth.					
My hairstyle is environmentally friendly (doesn't require hairdryer, mousse, dye, gel to keep it looking good).					
I wear warmer clothing indoors rather than turn on the heater.					
I prefer low impact recreation (eg avoid trail bikes, 4WD, jet skis, etc).					
I use rechargeable batteries for portable power.					

Analysing your results

- 1 Add up the ticks for each column on the table on pages 32 to 33.
- 2 Record the totals in the table below.
- 3 Multiply each category total by its Impact Factor.
 - Always X1
 - Usually X2
 - Sometimes X3
 - Rarely X4
 - Never X5
- 4 Record this in the table below.
- 5 Finally, add all these totals to find your personalised Demonstrated Impact on Resources Temperament (DIRT) Index!



Reduce **Reuse**
Recycle **Rethink**

	Always	Usually	Sometimes	Rarely	Never	
Total number of ticks (Cross check 66 questions)						
Multiply by Impact Factor	X1	X2	X3	X4	X5	Total
DIRT Index (Grand Total)						

Ratings:

60–100	Environmental Guru
101–140	Sustainable Spender
141–180	Conscious Consumer
181–220	Hungry Human
221+	Resource Guzzler

Further thoughts and activities

- How do you compare to other people surveyed?
- Graph the class results to show the distribution of categories.
- How many Gurus are there?
- What is the class norm?
- How could you or your class lower your own DIRT Index at home or at school?

Note: If you wish to increase the number of survey questions, make sure that you change the ratings accordingly.

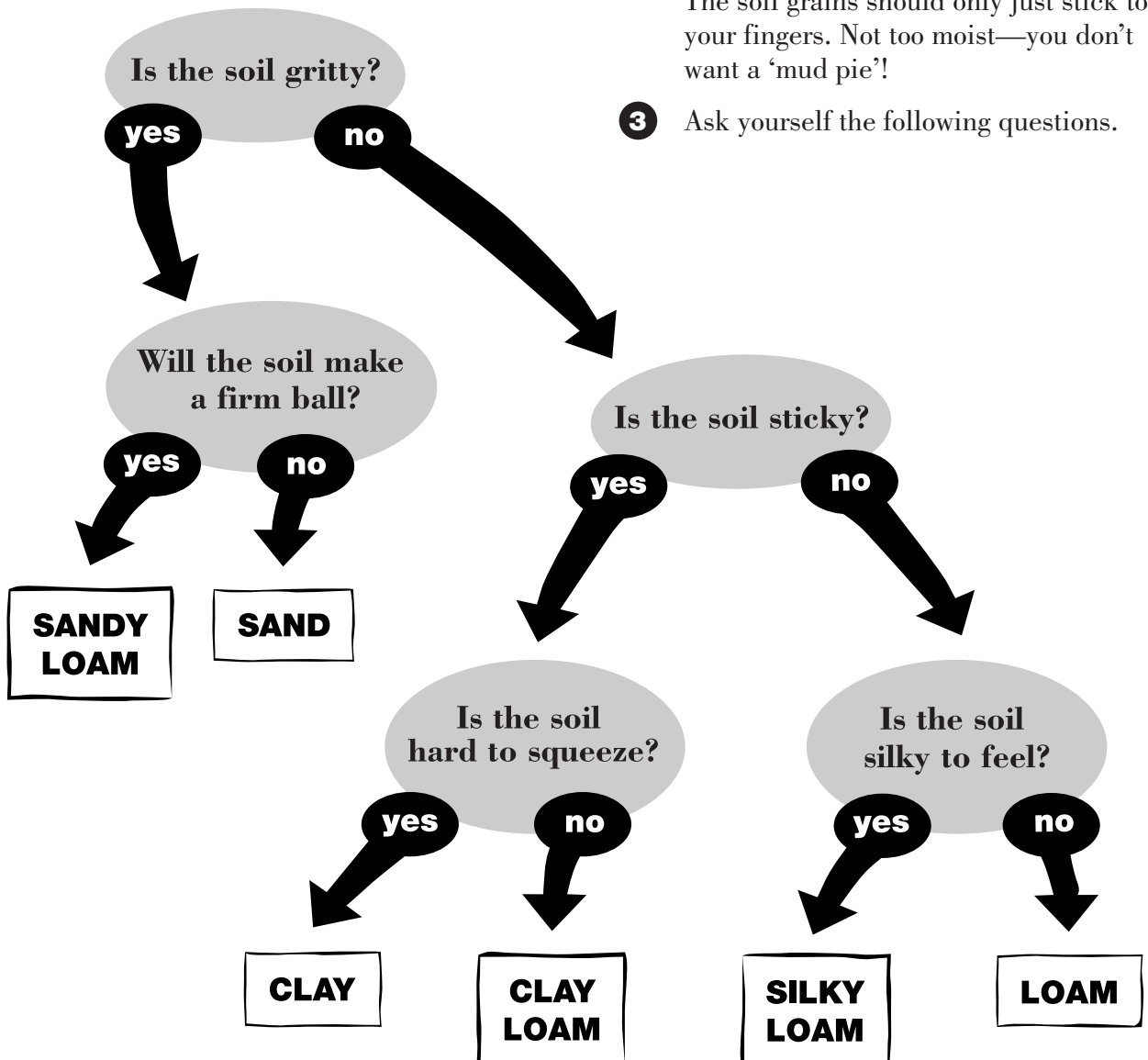
Identifying soil types

You will need

- a small sample of soil
- water

Method

- 1 Take a handful of soil and moisten it with water. Only use a little water at a time.
- 2 Roll the soil in your hand and continue to moisten it. Soon you will have a ball of soil which is moist all the way through. The soil grains should only just stick to your fingers. Not too moist—you don't want a 'mud pie'!
- 3 Ask yourself the following questions.



Native seed collection

Collection and treatment of seeds of native plants

Seeds should only be collected when they are mature. Most native plants with woody capsules hold their seeds for many years and only release seeds if the tree is burnt, blown over or damaged in some way. The capsules can be opened artificially by picking them and storing them in a warm place in a paper bag until the valves open and release the seeds.

Eucalypt capsules need to mature on the tree for at least a year until they turn brown.

Callistemons and *Melaleucas* (bottlebrush and paperbark) need to mature for several years so the lowest capsules on the bush should be collected. *Callistemons* put on new growth directly beyond the spent flowers so it is easy to count down the stem to older capsules.

Hakea and *Casuarina* (sheoak) readily open after collection and release winged seeds.

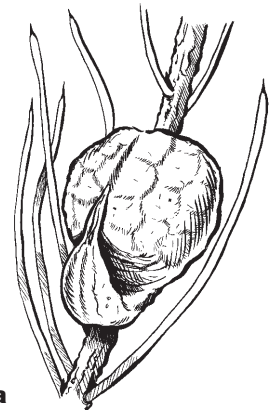
In natural populations, *Banksia* cones only open after a fire. This can be achieved artificially by heating the cones in an oven for about half an hour or charring them on a small fire. After several days the valves will begin to open and seeds will fall out or can be pried loose. There are two winged seeds in each valve. The cone may should be retreated if the valves do not open.

Seeds from *Acacia* (wattles) are contained in a pea-like pod which splits open when ripe and collection should be seasonally timed. *Acacia* seed needs treatment so that moisture can penetrate the hard seed coat. A fairly reliable method is to pour boiling water over the seeds and let them stand until they swell slightly (usually overnight). There is often a varied response from the seeds and some need retreatment. Rubbing with fine sandpaper before treatment can also assist the process.

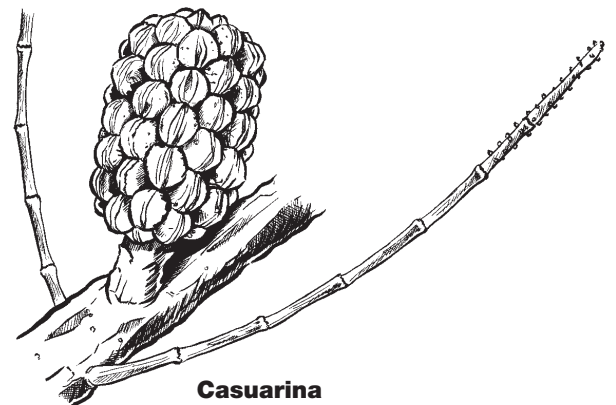
The seeds of *Anigozanthos* (Kangaroo paw) mature about a month after flowering and should be collected before they are shed from the plant.



Callistemons



Hakea



Casuarina



Banksia

Building a 'no-dig' garden

Sustainability starts in our own backyards. Many people consume vast amounts of time, money and resources on maintaining gardens which give relatively little, other than pleasure perhaps, in return. A 'no-dig' garden can be just as beautiful with herbs, flowers and fresh vegetables while using less resources and providing the freshest, healthiest food with the minimum of effort.

The table below outlines how to make a 'no-dig' garden bed. Starting from scratch, the bed can be laid down in about one and a half hours on lawn, an existing garden or even on concrete paths. To build a garden on concrete paths or driveways, start with step 3 by sprinkling the area with garden lime.

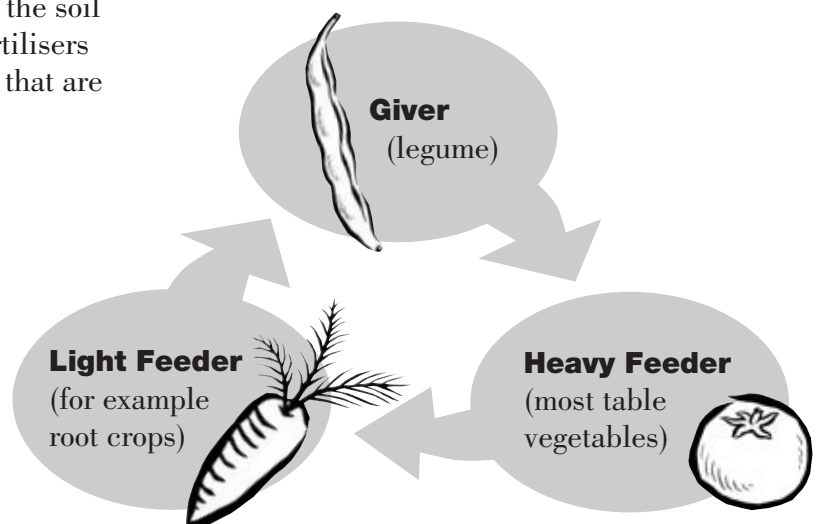
What To Do	Why
1 Cut grass and weeds. Leave in place.	Clippings decompose and add organic matter to the soil.
2 Wet whole area thoroughly.	Wet subsoil will help with the breakdown of nutrients.
3 Sprinkle area with some garden lime.	Helps bind any heavy metals as well as assisting with drainage by breaking down clay.
Soak newspaper or cardboard. Lay out overlapping sections (at least 1cm thick) over whole area. Avoid coloured print as much as possible. (A wheelbarrow filled with water and sections of paper layered-in makes handling easy.)	Acts as a weed barrier and eventually breaks down to add more organic matter. Wet paper won't blow around and is easier to lay out. Many coloured inks contain heavy metals.
5 Mark out paths and edges with bricks, rocks or timber.	Holds the garden in! Bricks fit snugly against each other and can be laid in any shape.
6 Add at least a 20 cm layer of hay, lucerne or pea straw. This will settle a lot so do not be mean in spreading it! A bale of straw will cover about 4-5 m ² .	Organic material will turn into humus. It also moderates soil temperatures and helps reduce water consumption. Lucerne and pea straw contain a lot of nitrogen.
7 Sprinkle area with blood and bone or dry poultry manure.	This will wash down into the straw and provide nutrients while helping the straw to break down and become humus.
8 Where seeds or seedlings are to be planted, open a hole in the straw, place a few handfuls of rich compost or potting mix with manure mixed in.	This gives plants a good start with an immediate source of nutrients.
9 If using 'soaker hose' for watering, lay this out now.	Think ahead and save water. Laying out now avoids damaging seedlings.
10 Plant and water in well with hose.	This gives the plants a good start but also holds the straw down so it is less likely that it will blow away before it settles properly.

Garden Design Ideas

Before laying out your ‘no-dig’ garden bed, it is a good idea to plan it all out first in order to ensure that it will continue to thrive with the minimum of effort in the long term. Here are some ideas to help your garden be more self-sustaining.

- Food gardens require lots of sunlight. Think about the location and aspect of your plot.
- Consider where the source of your water is and how watering will occur. Soaker hoses are made from recycled tyres and are the most efficient way to water vegetable gardens. Water timers are also recommended.
- Garden beds with curved edges look much better and have greater area to perimeter ratios. This means you can fit more plants in them and access them more easily. No plants should be further than an arm’s length from an edge. Use a ‘key-hole’ design which is very flexible. See below for an example.
- Soil and its resident plants and ‘beasties’ prefer constant, reliable conditions. Slow release fertilisers such as compost or manure add solid organic matter to the soil and are much better than liquid fertilisers which flood the area with nutrients that are more easily washed out.
- Plan your garden according to the frequency of harvesting, use and maintenance as well as the plants’ life expectancy, size, shape and requirements. For example, regularly cropped smaller plants are best planted near edges while taller plants should be further back (but no more than reaching distance from a path).
- Look-up a companion plant list and try to place companions near to each other so they can share soil nutrients and discourage pests. A rule of thumb is ‘Eat them together—plant them together’. Integrate herbs and flowers into your garden for the same reasons.
- Plant diverse species and varieties of species. In this way you will not lose all your crop through bad weather or pest, as well as lengthening harvest time.
- Avoid planting large beds of single crops. Interplant instead and make better use of the available nutrients and space (remember to make use of vertical space as well). For example, why not grow beans up a stake used to hold up a tomato? Where plants are planted in groups, it is important to rotate them to maintain the soil and avoid diseases.
- Even weeds are useful for hosting useful predatory insects or providing shelter to the soil. Only pull them out if they begin to compete too heavily.
- We can divide plants into three types
 - heavy feeders—heavy users of resources
 - light feeders—low resource use
 - giver—return resources to soil.

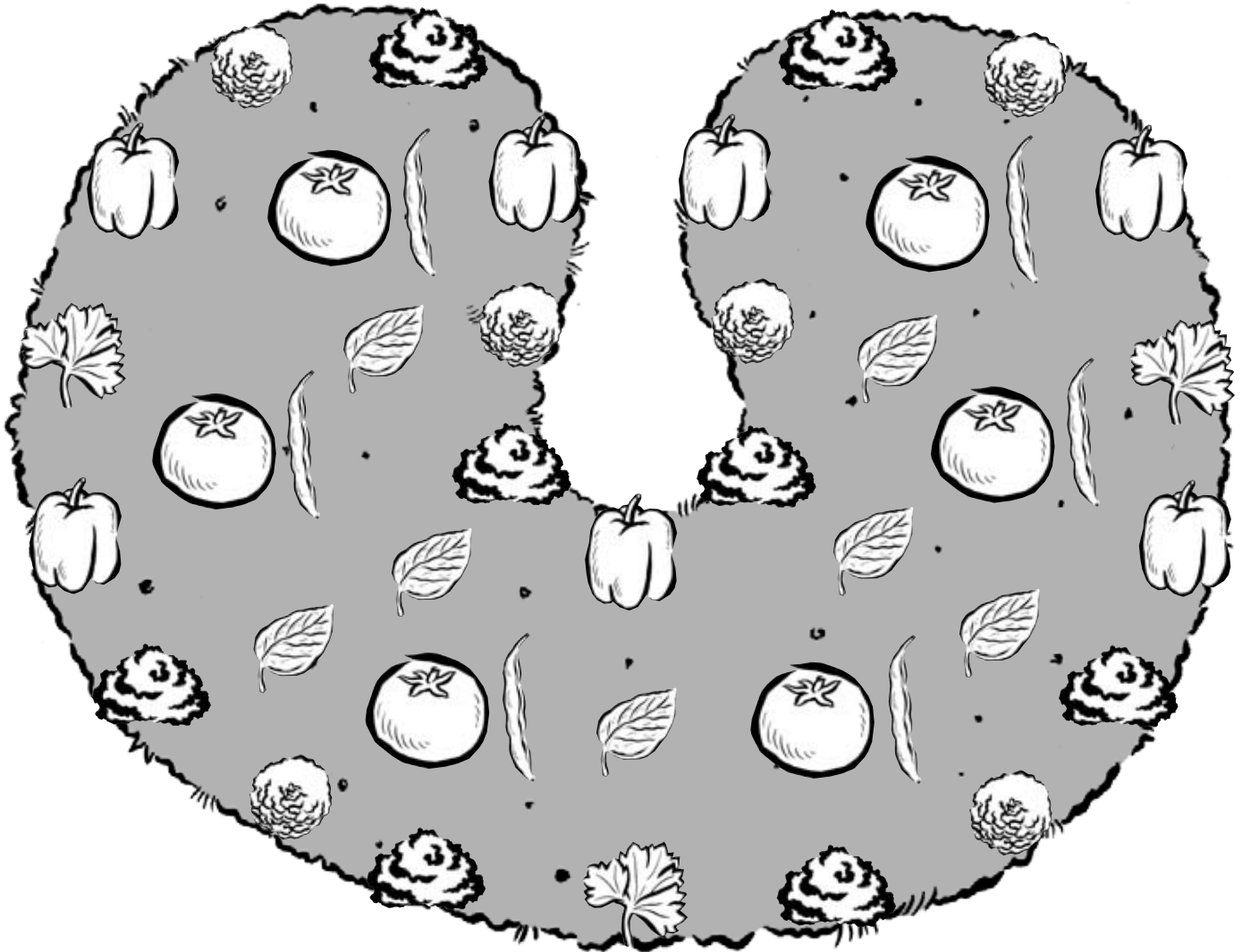
The general rule for crop rotation is shown below.



Sample key-hole garden

“The Pasta Patch”

Here is a sample key-hole garden for summer.
(Plant in spring.)



Key



Tomato



Basil



Lettuce



Capsicum / Chilli



Beans



Marigold



Parsley