

the **sustainable** mandurah home



An Education Package for Schools

Education Package

This section is designed for teachers. It includes resources and information to assist in the organisation of excursions and classroom learning experiences.

Visiting the Sustainable Mandurah Home

To organise a class visit contact the City of Mandurah and arrange a suitable time:

City of Mandurah
Ph: (08) 9550 3777
Fax: (08) 9550 3888
E-mail: council@mandurah.wa.gov.au

The address of the home is:

18 Grandmere Parade
Meadow Springs
Mandurah WA 6210

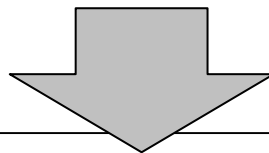


Curriculum Links

The Sustainable Mandurah Home Education Package is designed as a resource for schools. Below is an outline of the intended learning outcomes as recognised by the [Curriculum Framework](#) developed by the Curriculum Council of Western Australia. This section highlights Intended Phases of Development, Target Overarching Learning Outcomes, Values and Learning Area Outcomes.

Intended Phase of Development

This education package is designed for use in upper primary and lower secondary grades. It includes a variety of activities, printable worksheets and electronic templates that allow you to tailor the learning experiences to best suit your program, resources and the needs of your class.



K

12

Early Childhood	Middle Childhood	Early Adolescence	Late Adolescence
The focus is mainly on development of the processes and skills that will underpin future learning. Literacy, numeracy, social-emotional and physical development are key emphases. Conceptual outcomes are mainly included as contexts for the development of processes. Teachers select these outcomes according to the needs of children.	Students continue to require learning experiences that support them in acquiring processes. The application of processes becomes a greater focus, as does acquisition of learning area concepts. Conceptual outcomes begin to be targeted more systematically.	The focus shifts to the application of processes in the acquisition of knowledge. The scope and depth to which content is learned broadens and there is increased focus on the development and application of understandings. Learning programs usually provide opportunities to achieve outcomes across all learning areas.	Content becomes more specialised and diverse. Learning programs may not provide learning opportunities across the full range of outcomes of the Curriculum Framework. They focus on those outcomes that underpin courses reflecting students' interests and aspirations for post-school destinations.

[Curriculum Framework Curriculum Guides, Curriculum Council WA 2005](#)

Overarching Learning Outcomes

1	Students use language to understand, develop and communicate ideas and information and interact with others.
2	Students select, integrate and apply numerical and spatial concepts and techniques.
3	Students recognise when and what information is needed, locate and obtain it from a range of sources and evaluate, use and share it with others.
4	Students select, use and adapt technologies.
5	Students describe and reason about patterns, structures and relationships in order to understand, interpret, justify and make predictions.
6	Students visualise consequences, think laterally, recognise opportunity and potential and are prepared to test options.
7	Students understand and appreciate the physical, biological and technological world and have the knowledge and skills to make decisions in relation to it.
10	Students participate in creative activity of their own and understand and engage with the artistic, cultural and intellectual work of others.
12	Students are self-motivated and confident in their approach to learning and are able to work individually and collaboratively.
13	Students recognise that everyone has the right to feel valued and be safe, and, in this regard, understand their rights and obligations and behave responsibly.

Curriculum Framework, Curriculum Council WA 2005

Values

1	A pursuit of knowledge and a commitment to achievement of potential
4	Social and civic responsibility
5	Environmental responsibility

Learning Area Outcomes

Science

Earth and Beyond

Students understand how the physical environment on Earth and its position in the universe impact on the way we live.

Energy and Change

Students understand the scientific concept of energy and explain that energy is vital to our existence and to our quality of life.

Life and Living

Students understand their own biology and that of other living things, and recognize the interdependence of life.

Natural and Processed Materials

Students understand that the structure of materials determines their properties and that the processing of raw materials results in new materials with different properties and uses.

Society and Environment

Place and Space

Students understand that the interaction people have with places in which they live is shaped by the location, patterns and processes associated with natural and built features.

Resources

Students understand that people attempt to meet their needs and wants by making optimum use of limited resources in enterprising ways.

Active Citizenship

Students demonstrate active citizenship through their behaviours and practices in the school environment, in accordance with the principles and values associated with the democratic process, social justice and ecological sustainability.

Learning Area Outcomes Continued...

Technology

Technology Process

Students apply a technology process to create or modify products, processes, systems, services or environments to meet human needs and realise opportunities.

Information

Students design, adapt, use and present information that is appropriate to achieving solutions to technology challenges.

Enterprise

Students pursue and realise opportunities through the development of innovative strategies designed to meet human needs.

Technology In Society

Students understand how cultural beliefs, values, abilities and ethical positions are interconnected in the development and use of technology and enterprise.

Mathematics

Working Mathematically

Students use mathematical thinking processes and skills in interpreting and dealing with mathematical and non-mathematical situations.

Number

Students use numbers and operations and the relationships between them efficiently and flexibly.

Measurement

Students use direct and indirect measurement and estimation skills to describe, compare, evaluate, plan and construct.

Chance And Data

Students use their knowledge of chance and data handling processes in dealing with data and with situations in which uncertainty is involved.

Space

Students describe and analyse mathematically the spatial features of objects, environments and movements.

English

Processes And Strategies

4. Students select from a repertoire of processes and strategies when listening, viewing, reading, speaking and writing by reflecting on their understanding of the way language works for a variety of purposes in a range of contexts.

Listening

5. Students listen with purpose, understanding and critical awareness in a wide range of situations.

Speaking

6. Students speak with purpose and effect in a wide range of contexts.

Reading

8. Students read a wide range of texts with purpose, understanding and critical awareness.

Writing

9. Students write for a range of purposes and in a range of forms using conventions appropriate to audience, purpose and context.

Activities

The activities are designed as a sequential series of learning experiences. They can also be used as individual activities to support your existing program.

You can choose to assemble the activities into a printed booklet or they can be used in their electronic form.

Order of Activities

- Title Page
- Home Energy Survey
- Creating a Sustainable Home
- Current Environmental Impact of Your Home
- Energy Information Sheet
- Energy
- Water Information Sheet
- Water
- Waste Information Sheet
- Waste
- Impact on the Environment
- Design Information Sheet
- Orientation Information Sheet
- Materials Information Sheet
- Gardens Information Sheet
- Visit the Sustainable Mandurah Home
- Re-design your house
- Predict Environmental Impact
- Prepare a Brief Report
- Searching for Sustainability
- Extension
- Certificate of Completion

the **sustainable** mandurah home



Creating a Sustainable Home

This booklet belongs to:

www.sustainablemandurah.com.au

Home Energy Survey

Identify the variety of appliances in your home and the energy types they require.

Heating Appliances

Appliance	Energy Type	What does it heat?	Number
Hot water system	Gas	Water	
		Total:	

Cleaning Appliances

Appliance	Energy Type	What does it clean?	Number
Vacuum cleaner	Electricity	Carpets, floors	
		Total:	

Cutting Appliances

Appliance	Energy Type	What does it cut?	Number
Electric drill	Electricity	Wood, metal, plastic	
		Total:	

Cooling Appliances

Appliance	Energy Type	What does it cool?	Number
Refrigerator / Freezer	Electricity	Food	
		Total:	

Entertainment Appliances

Appliance	Energy Type	What does it do?	Number
TV	Electricity	Displays TV signal	
		Total:	

Other Appliances

Appliance	Energy Type	What does it do?	Number
Lights	Electricity	Provide artificial light	
		Total:	

Construct a chart showing the number of appliances you have for each category.

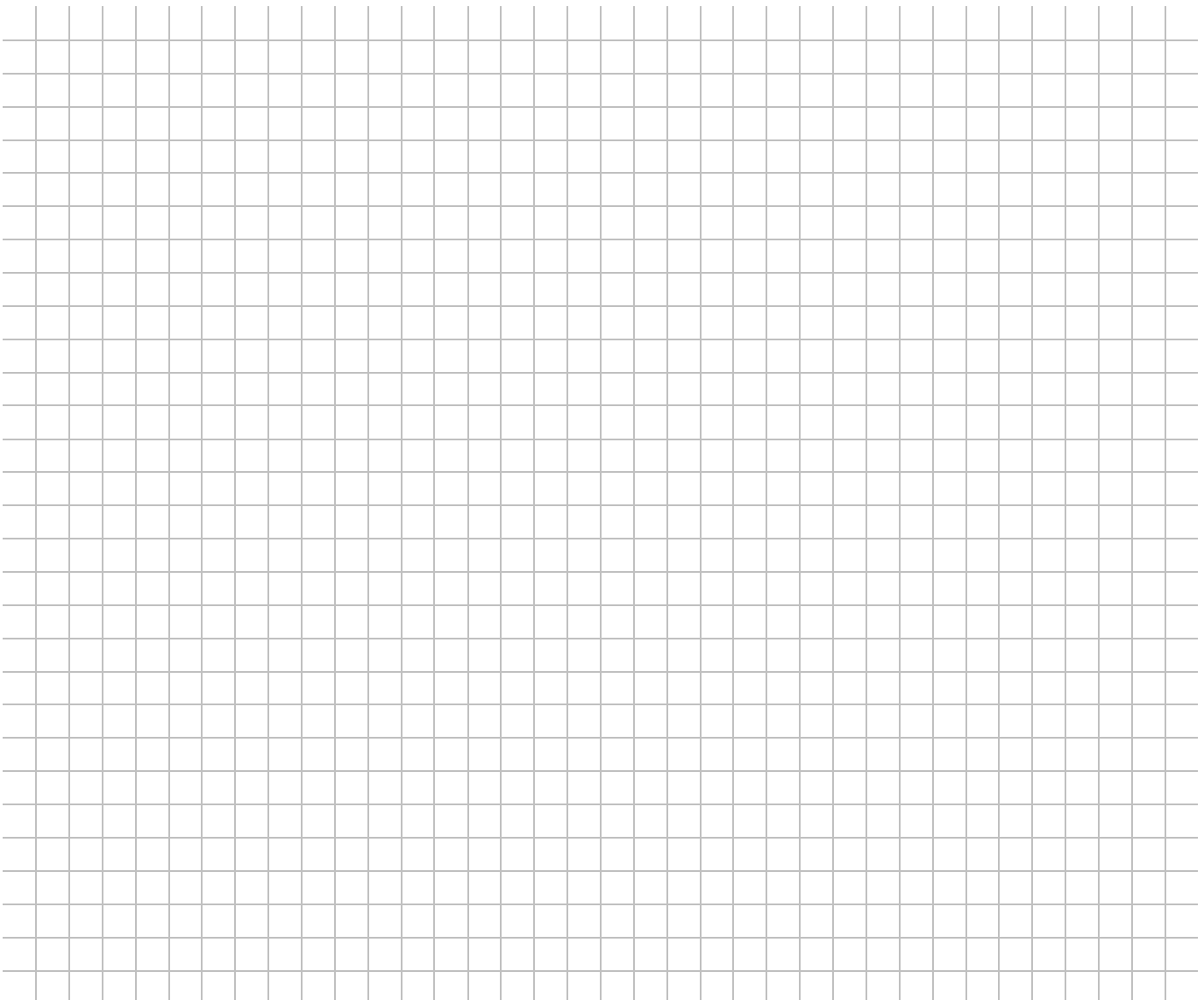
Construct another chart to illustrate the energy types used.

Can you find an alternative to the electrical appliances in your home?

Creating a Sustainable Home

Using an Excel spreadsheet or some graph paper, create a copy of the floor plan of your house and garden. Your parents may be able to show you the original plans drawn up by an architect. You could also try viewing aerial photographs using www.earth.google.com. If you do not have access to original plans, measure or estimate the main dimensions of your house and add in details as best you can.

Extra challenge: Carefully consider the orientation and the scale that you will use in your plan, eg 1 square = 1m² or 1cm = 1m. If using graph paper, make sure that your house block will fit before you settle on the scale you will use. Add appropriate labels, headings, co-ordinates and a legend.



Current Environmental Impact of Your Home

Conduct a simple survey to measure the current environmental impact of your home. With your classmates and teacher, discuss possible methods for conducting your survey. Then at home, with the help of an adult, measure the following:

Energy

Calculate electricity used at your home in a one week period. Clearly show how you made your calculations. What mathematical techniques did you use? *Hint: Look at previous electricity bills or take readings from the electricity meter at your house.*

Water

Calculate water usage in a one week period. Clearly show how you made your calculations. What mathematical techniques did you use? *Hint: Look at previous water bills, take readings from the water meter at your house or devise your own method to measure water usage.*

Waste

Calculate the volume of household waste accumulated by your household in one week. Clearly show how you made your calculations. What mathematical techniques did you use? *Hint: Measure the volume of rubbish in your household bin, trailer etc.*

Energy Information Sheet

Every year Australia's 7 million homes contribute over 20 percent of Australia's climate changing greenhouse gas emissions. That's over 15 tonnes of greenhouse gas per home per year. Greenhouse gases are produced from activities such as heating, cooling, cooking, lighting, driving a car, running appliances and rubbish disposal. Further emissions are created in the building and furnishing of our homes.

Our household emissions are contributing towards global climate change which has the potential to dramatically change local and global weather patterns, creating widespread social, economic and environmental impacts. In the south west of WA for example, rainfall has been below average for the last 28 years.

What climate change means for WA:

- Average temperature to increase by 1.3°C by 2030 and 2 to 4.5°C by 2100
- Winter rainfall to reduce by 4-8% by 2030 and 10-30% by 2100
- Increased bushfire risk
- Cyclones travel and/or form further south and will be up to 20% more intense
- Increased evaporation rates
- Increased heat stress on cattle and reduced milk production from dairy cattle
- Extinction of 3 frog and 15 mammal species with just a 0.5°C temperature rise
- Extinction of 119 Dryandra and Acacia species with a 2°C rise

With over 18,000 occupied homes in Mandurah our residential community is producing more than 270,000 tonnes of greenhouse gases every year. Each unit of electricity you use produces 1.053 kg of greenhouse gases. Each unit of natural gas you use produces 0.2kg of greenhouse gases. This means that:

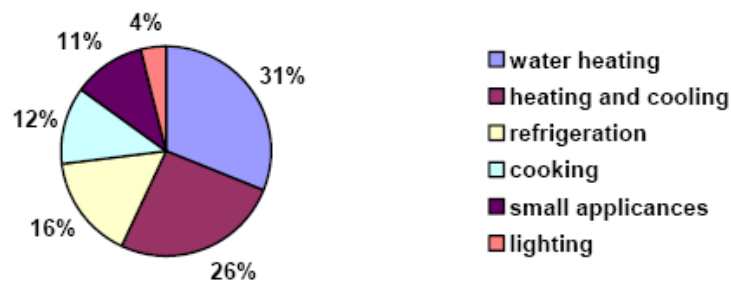
- A medium-sized 3 star fridge will produce 624kg of greenhouse gases a year
- A top-loading washing machine will produce over 648kg of greenhouse gases a year, and
- A large electric bar heater will produce 1kg of greenhouse gases every hour it is used

Energy consumption in the home

Unless we find ways to be more careful and efficient with our energy use the emissions from Mandurah residents are likely to more than double in the next 10 years. So the choices you make about using energy in your home will make a difference. To make the most impact on your household emissions and energy bills you need to target water heating and house heating and cooling as these are the big energy guzzlers:

Energy Information Sheet *Continued...*

Energy consumption in the home



Source: SEDO, 2001

The amount of energy your house uses does depend on how many people you have in your home and its structural characteristics e.g. insulation and orientation. A significant amount also depends on the behavioural choices you make in your home. Simple behavioural changes will make a difference to your energy consumption, the amount of greenhouse gases you produce and your energy bills.

You can save energy and money:

- Minimise the amount you heat and cool your home by designing it to work with rather than against the climate.
- Adapt your habits and behaviours to save unnecessary energy expenditure in the home.
- Buy energy-efficient appliances with maximum star ratings.
- Turn down the thermostat setting, insulate the pipes on your hot water system and wash your clothes in cold water whenever possible.
- Switch to greenhouse-neutral renewable (from solar, wind) energy sources either through home power generation e.g. solar hot water systems or through Western Power's Green Power scheme called Natural Power.

For further information on what you can do, visit www.sedo.energy.wa.gov.au .

Source: Living Smart, Action Guide for a Sustainable Community www.livingsmart.org.au .
Your Home - Design for Lifestyle and the Future, technical manual, (a joint initiative of the Australian Government and the building and design industries)

Energy

Read the 'Energy' information sheet (available from www.sustainablemandurah.com.au).

What are you currently doing at home to reduce the amount of energy used?

What could you do to further reduce the amount of energy currently used in your home?

How could you alter the design of your house to reduce the energy required?

Water Information Sheet

We live in the driest inhabited continent on the planet. Yet water use in our homes has increased by 55 percent since 1982. About half of this water is poured onto our gardens, it's used in our bathrooms and toilets, for clothes and dish-washing, in swimming pools and is lost through leaking pipes and plumbing fixtures. Less rainfall in the Southwest Region of WA coupled with our growing population and careless use of water is leading to severe water shortages that are likely to threaten the health of ecosystems and, as new water resources are accessed, could increase the price of water to the average West Australian household.

Facts about our water:

- Only 3% of the world's water is fresh and only 0.3% is available to humans
- The average West Australian household uses 1259 litres every day, that's enough water to fill ten swimming pools each year
- Just one flush of an inefficient toilet can use up to 11 litres of water
- By the year 2031, Perth is expected to need an extra 150 gigalitres of water
- In 2001, the Perth dams experienced their lowest stream inflow over a 12 month period on record. This was 80% below the longterm average
- A running tap will use up to 15 litres of water a minute
- A running hose uses 1000 litres of water every hour
- Having a bore does not give you licence to use as much water as you want as bore water does affect the level of the water table.
- Bores are not appropriate in many parts of Mandurah. For further information on installing a bore in your home, contact the Water and Rivers Commission.

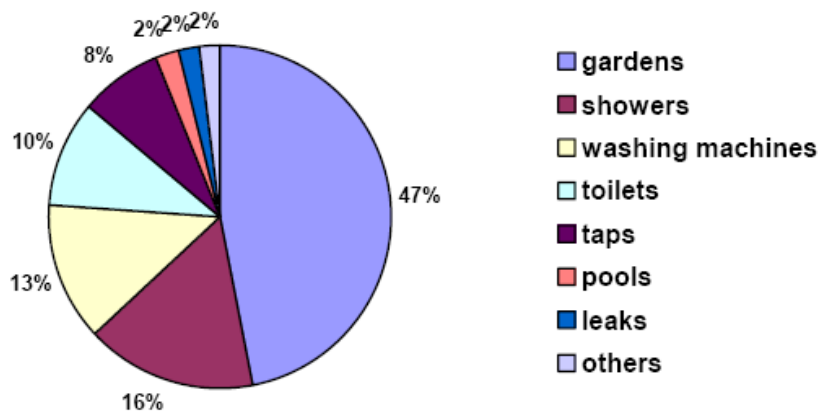
With over 18,000 occupied homes in Mandurah our residential community is using more than 22.6 million litres of water every day.

Water consumption in the home

Unless we find ways to be more careful and efficient with our precious water the levels of water required to support our existing lifestyle in Mandurah will become untenable. So the choices you make about using water in your home and garden will make a difference. To make the most impact on your household water use you need to target garden watering (which is by far, the greatest single drain on water at 47 percent of total water use) followed by bathroom and washing use:

Water Information Sheet *Continued...*

Water consumption in the home



Source: Living Smart, 2005

The amount of water you use does depend on how many people you have in your home and the structural characteristics of your home e.g., rainwater gathering and grey-water recycling systems. A significant amount also depends on the behavioural choices you make in your home. Simple behavioural changes will make a difference to your water consumption the amount of greenhouse gases you produce and your water bills.

You can save water:

- Install a low flow shower head, have shorter showers and turn off the tap whilst brushing your teeth
- Only run full loads in dishwashers and washing machines
- Minimise water use in the garden
- Install or make a dual-flush toilet
- Reuse grey water on the garden

For further information on what you can do, visit www.watercorporation.com.au or www.savewater.com.au

Source: Living Smart, Action Guide for a Sustainable Community www.livingsmart.org.au

Water

Read the 'Water' information sheet (available from www.sustainablemandurah.com.au).

What are you currently doing at home to reduce the amount of water used?

What could you do to further reduce the amount of water currently used in your home?

How could you alter the design of your house to reduce the water required?

Waste Information Sheet

Australians generate almost 14 million tonnes of rubbish every year at a cost to taxpayers in excess of \$1.25 billion. All of this rubbish, whether it is made from steel, aluminium, paper, glass or plastic comes from raw materials from the natural environment. Precious resources such as water and energy are used to make our products that become waste, creating further greenhouse gases as by-products.

In WA the rate of rubbish disposed per person is much higher than the national average at 1.4 tonnes per person every year! In addition to domestic rubbish, further waste comes from the materials used or discarded during the building of your home and in manufacturing processes. All waste in Australia that is not recycled ends up in landfill. Landfills are not only unpleasant and unsightly; they also emit potent greenhouse gases, contaminate groundwater and soil and attract vermin which can spread disease.

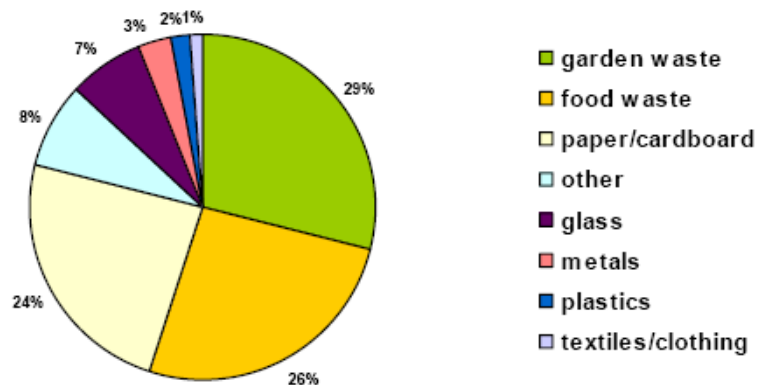
Facts about waste

- About 280,000 tonnes of paper-derived products are used in WA each year. Much of this could be recycled. Each tonne of recycled paper saves 1 hectare of trees and uses 50% less energy and water to produce
- Australians use 6 billion plastic bags a year, if these were tied together they would stretch around the world 37 times
- It is estimated that 7 billion tonnes of solid waste enters the world's oceans annually. Over 100,000 whales, birds, seals and turtles are killed each year worldwide by plastic rubbish
- Perth throws out 100,000 tonnes of organic matter each year, all of which could be composted and used in our gardens
- A variety of hazardous wastes are generated by Australian households, 86% of households use their regular waste collection to dispose of their hazardous material

Each resident in Mandurah produces on average 0.9 tonnes of waste every year. With over 54,000 people we are adding over 76,000 tonnes of rubbish to our landfill sites every year. Unless we manage our waste more efficiently and effectively in the future, in the next ten years this will increase substantially. So the choices you make about waste in your home and garden will make a difference. To make the most impact on your household waste you need to target green waste, from food scraps and gardens. Through recycling green waste alone you could cut your contribution to landfill by more than half:

Waste Information Sheet *continued...*

Breakdown of WA households' rubbish



Source: Department of Environmental Protection

Minimising and managing waste through simple behaviour changes is probably one of the easiest and most cost-effective changes that you can make to conserve valuable resources, save money and reduce the environmental impact of your lifestyle and home.

The 3R's – reduce, reuse, recycle

The 3R's are a simple guide to help everyone minimise waste at home, school and work. When trying to cut your waste, remember that the 3R's are in order of importance: first reduce, then reuse and finally, recycle what's left.

Reduce simply means to live more carefully so that you have less rubbish to get rid of later.

Reuse means to use the same item more than once, preferably many times, rather than throwing it out after one use. It saves money, energy and resources that would otherwise have been used to make a new product and means that the product does not go to landfill.

Recycling means to return a waste product to a factory where it is remade either into the same product or something different. Recycling saves landfill space, rescues the resources that went into the original item and saves energy.

For more information on minimising waste in your home visit www.wastewise.wa.gov.au

Source: Department of Environmental Protection, Living Smart, Action Guide for a Sustainable Community.

Waste

Read the 'Waste' information sheet (available from www.sustainablemandurah.com.au).

What are you currently doing at home to reduce the amount of household waste generated?

What could you do to further reduce the amount of household waste?

How could you alter the design of your house to reduce household waste?

Solar Passive Design Information Sheet

What is solar passive design?

In the South West we enjoy the best climate in Australia. Our climate is defined as a temperate climate, meaning that we have four distinct seasons, with mild to cool winters with low humidity and hot to very hot summers with moderate humidity. Passive design simply makes the most of these conditions to make your home more comfortable while reducing your bills. Passive design should cost no more when included at the planning stage when careful attention should be paid to orientation, shade, ventilation, materials, insulation and which rooms should go where to maximise the passive design efficiency.

How does it work?

Good passive design uses natural heat from the sun and natural night-time cooling to keep your home at a comfortable temperature year round. It can eliminate or reduce the need for expensive mechanical heating or cooling. Most of the passive heating and cooling occurs through your windows. Northerly orientation, eaves and simple shading features can keep out summer sun and allow in winter sun.

Key design principles

- Use passive solar principles
- Use thermal mass solutions
- Use high insulation levels, especially to thermal mass
- Maximise north facing walls and glazing, especially in living areas with passive solar access
- Minimise all east and west glazing. Use adjustable shading
- Use heavy drapes with sealed pelmets to insulate windows
- Minimise external wall areas (especially E&W)
- Use cross ventilation and passive cooling in summer
- Encourage convective ventilation in heat circulation
- Site new homes for solar access, exposure to cooling breezes and protection from cold winds
- Draught seal thoroughly and use entry airlocks
- Use reflective insulation to keep out summer heat
- Use bulk insulation to keep heat in during winter. Bulk insulate walls, ceilings and exposed floors

For further information on solar passive design, visit <http://www.solardwellings.com.au>

Source: Your Home – Design for Lifestyle and the Future technical manual (a joint initiative of the Australian Government and the building and design industries)

Orientation Information Sheet

What is orientation?

Orientation is about the position of your site, and your home, in relation to the things around it including the street, neighbouring buildings and of course, the angle of the sun and the wind that will be used to heat and cool your home.

How does good orientation help?

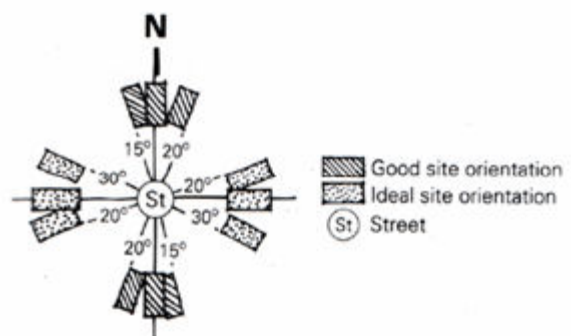
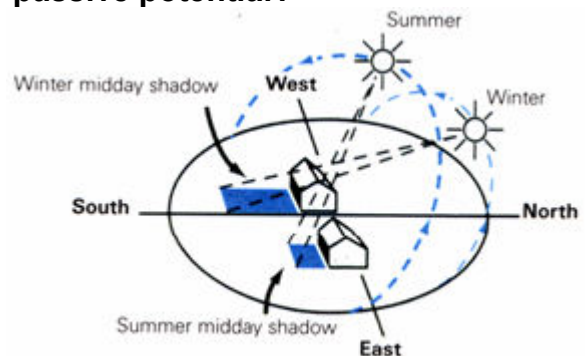
Good orientation that works with the climate rather than against it is the cornerstone of efficient passive solar design. You can achieve good solar performance at minimal cost if your site has the right characteristics.

To help you to decide what those characteristics should be you should first prioritise your heating and cooling needs by understanding the key features of the climate. In the South West we need a combination of passive cooling in the summer and passive heating in the winter. Knowledge of prevailing winds is also useful to maximise ventilation. You should also observe the impact of adjacent buildings and existing landscape and weather patterns on your site.

What orientation is ideal for maximising solar passive potential?

Permanent solar access is likely to be achieved on a north-south block that receives good access to northern sun with minimum potential for overshadowing by neighbouring houses. If north is to the street, your living areas will face the street for solar access. The ideal orientation for living areas is within the range 15°W-15°E of true or 'solar' north. (20°W-30°E of true north is considered acceptable).

This allows standard eave overhangs to admit winter sun to heat the building and exclude summer sun, with no effort from the occupants and no additional cost. A north-facing slope (sloping away and down from the house to the north) increases the potential for access to northern sun and is ideal for higher housing densities.



Orientation Information Sheet *continued...*

Where possible, choose a site that can accommodate north-facing daytime living areas and outdoor spaces. Views to the north are also an advantage, as north is the best direction to locate windows.

What if my block does not have ideal orientation?

On narrow blocks, on sites with poor orientation or with limited solar access, as is often the case in higher density urban areas, an energy efficient home is still achievable with careful attention to design. A larger budget may be required. Use of advanced glazing systems and shading can achieve net winter solar gains from windows facing almost any direction while limiting summer heat gain to a manageable level.

Sites running E-W should be wide enough to accommodate north-facing outdoor space whilst not being overshadowed by your northern neighbour.

A south-facing slope increases the potential for over-shadowing. If the view is to the south avoid large areas of glass to minimise winter heat loss.

Anything else?

If you are unsure about the orientation of your site you should enlist the help of an expert as the implications of buying a site with the wrong orientation could be very costly. Ask your designer or architect to pay a visit to your proposed site to check the suitability of its orientation. This service may be included as part of the project fee.

Work with the City of Mandurah at the planning stage to check the planning controls governing your site. For example, building setbacks from boundaries and height limits, as they may affect how you build on your site

It is also important to check whether your building block was previously used for land fill, farming or industrial activities that may have left harmful residues and waste. The City of Mandurah should be able to provide this information plus advise you of any other special requirements applying to your site.

Ensure you carefully examine the placement of your home, the materials used, and the overall design to mitigate the potential effects of natural disasters. If your land is subject to flooding or bushfire threats contact the City of Mandurah for advice.

Source: Your Home – Design for lifestyle and the Future technical manual (a joint initiative of the Australian Government and the building and design industries)

Materials Information Sheet

Why do materials matter?

The materials used to build our homes can have significant health and environmental impacts. These often extend far beyond the end-use for which the materials are designed. Usually the impact of a given material is dictated by the processes used to extract, process and transport it to the site. These are not always obvious.

What should I consider when selecting the materials for my house to minimise my environmental impact?

Materials should be strong and long lasting. They should be low maintenance and free of toxins that could affect your indoor air quality.

Life-cycle

Inferior materials often have a short life and require on-going maintenance or replacement. Select materials with the total life cycle of your home in mind. Most homes are built to last for at least 50 years, the best homes last for hundreds of years. Some commonly used materials may last for only 10 to 15 years. They will need replacing or repairing at least two to three times in the life of your home, at great cost to you and the environment.

Embodied energy

Energy is required to make all building materials, but some require less energy than others. The energy used to collect raw materials and manufacture products is called embodied energy. Low embodied energy materials are preferable in many cases.

Recycling

Can you reuse materials like timber, bricks or windows that are recycled from other buildings? Encourage or even help your builder to sort and recycle the waste materials from your building site. It can save you money and help the environment.

Buy local

Try to find building materials made and sold locally. Long distance transportation is expensive and wastes energy.

Materials Information Sheet *continued...*

Using low impact materials in your home

Informed decisions about materials and constructions systems can reduce the environmental impact of a home without adding to the cost. Consider the following points when you speak to your designer or builder about the materials to be used in your home:

- Make more efficient use of existing materials
- Minimise the amount of on-site waste
- Use materials with the least environmental impact
- Consider both operational and whole lifecycle performance of materials and designs
- Use fully recycled materials or materials with recycled content
- Re-use whole buildings or parts thereof to minimise consumption of new materials
- Choose materials with a lifespan equivalent to the projected life of the building
- Design to extend building lifespan (current average is 50 years - aim for 100)
- Design and build for de-construction, re-use, adaptation, modification and recycling
- Encourage development of new-efficient, low impact materials and applications by creating demand
- Consider how and where the materials are sourced and the impacts this causes
- Minimise the energy used to transport materials by using locally produced material. Use of lightweight material where appropriate also reduces transportation energy
- Minimise the energy used to heat and cool the building by using materials that effectively modify climate extremes
- Understand how chemicals used in the manufacture of some materials might affect your health
- Minimise or eliminate emissions during use and manufacture

Source: Your Home Design for Lifestyle and the Future, technical manual (a joint initiative of the Australian Government and the building and design industries)

Gardens Information Sheet

More sustainable gardening means using less water, fewer fertilisers and planting vegetation more suited to the local climate. Here are the major principles for you to assess the sustainability of your garden.

Principle One:

The garden is designed to take account of local climate, site features and soils. Only by carefully working out the different characteristics of your own site can you be in a position to “put the right plants and features in the right place for the right reasons”. You may find, for instance, that you have sandy soils over the whole site, 5 different ‘microclimates’ on the property and constraints such as a long narrow boundary, shady area in front of the house and large west facing wall. All these factors when carefully considered can help you ensure that the garden works because your choices and gardening decisions are well informed and based on solid information.

Principle Two:

The garden should have all plants grouped according to ‘hydrozones’. ‘Hydrozones’ are the various areas of your garden that require different watering regimes. For instance you would group all of your ‘water guzzlers’ together and in a protected area, so that they can have their own more intensive and effective watering system. Drought-tolerant plants would dominate the garden and would be grouped together with their own less intensive watering system.

Principle Three:

The garden should be dominated by water-wise/drought tolerant plants, or is being transformed into one that is.

This is an essential component of a sustainable garden. There are so many wonderful plants available that fit within this category and if carefully chosen and managed will, within one year, be virtually beyond the need for summer watering! It will be important to ensure that any non-native water wise plants chosen, have been screened to ensure they have minimal weed potential. This means choosing hybrids and ensuring that the nursery the plants are purchased from is accredited with the NGIWA (<http://www.ngiwa.com.au>) and the Water Corporation (<http://www.watercorp.com.au>)

Principle Four:

The garden has the latest water efficient irrigation and at least some subsurface irrigation. Your garden will be a model for water-efficient irrigation. It will have little or no evidence of watering, no runoff and will be controlled so that it only comes on when the soil moisture level indicated watering is necessary. ‘Grey water’ will be an important component of this system and will provide valuable summer/autumn water supplies.

Gardens Information Sheet *continued...*

Principle Five:

Gardens will use and incorporate mulch into all garden beds. The garden will display the best quality (and the cheapest) mulch – e.g. street tree pruning. These will be carefully added to all beds at least once a year to maintain soil health, reduce evaporation and suppress winter weeds. Wherever possible, garden and kitchen waste will be recycled and turned into compost for the garden.

Principle Six:

The lawn areas will be minimised and will only be put in when they serve a purpose for the household. All lawn areas will be carefully managed to minimise water and fertiliser use and will be maintained through the use of organic management principles wherever possible. Lawn areas will be:

- Sown or laid with drought-tolerant species such as velvet buffalo and lippia
- Soil will be amended first with sand remedy and slow release organic additives to ensure it holds on to water and nutrients more effectively
- Lawn or lawn alternatives will be set up and maintained using slow or controlled release, broad spectrum fertiliser, applied at the recommended rates and when the plants are actively growing
- Lawns should be irrigated wherever possible with sub-surface systems and at all times, and from all sources, watering regimes must follow the water restriction guidelines
- Once established, lawns should be maintained using phosphorus-free fertiliser, they should be de-thatched, de-compacted at least once every two years and high quality wetting agents should be applied (if needed) at least 4 times a year

Principle Seven:

Integrated pest, weed and disease management strategies (IPM) will be adopted in the garden. This will mean that any problems in the garden will be controlled by ensuring that:

- Through organic management of the soil, planting of a range of local plants and increasing garden diversity the biodiversity of the garden improves, thus helping to provide 'natural control'
- A range of control and management measures will be used providing an integrated management system, this will be based wherever possible on a sound understanding of the life cycle and causes of the particular problem
- Wherever possible low toxic, environmentally friendly chemicals will be used
- Toxic chemicals will be an absolute last resort.

For further information on what you can do visit <http://www.greatgardens.info>.

Source: Great Gardens

Visit the Sustainable Mandurah Home

Visit the Sustainable Mandurah Home or view the photo gallery at www.sustainablemandurah.com.au.

Use the following headings to identify features of the house and garden that support sustainability:

Design and orientation

Energy

Water

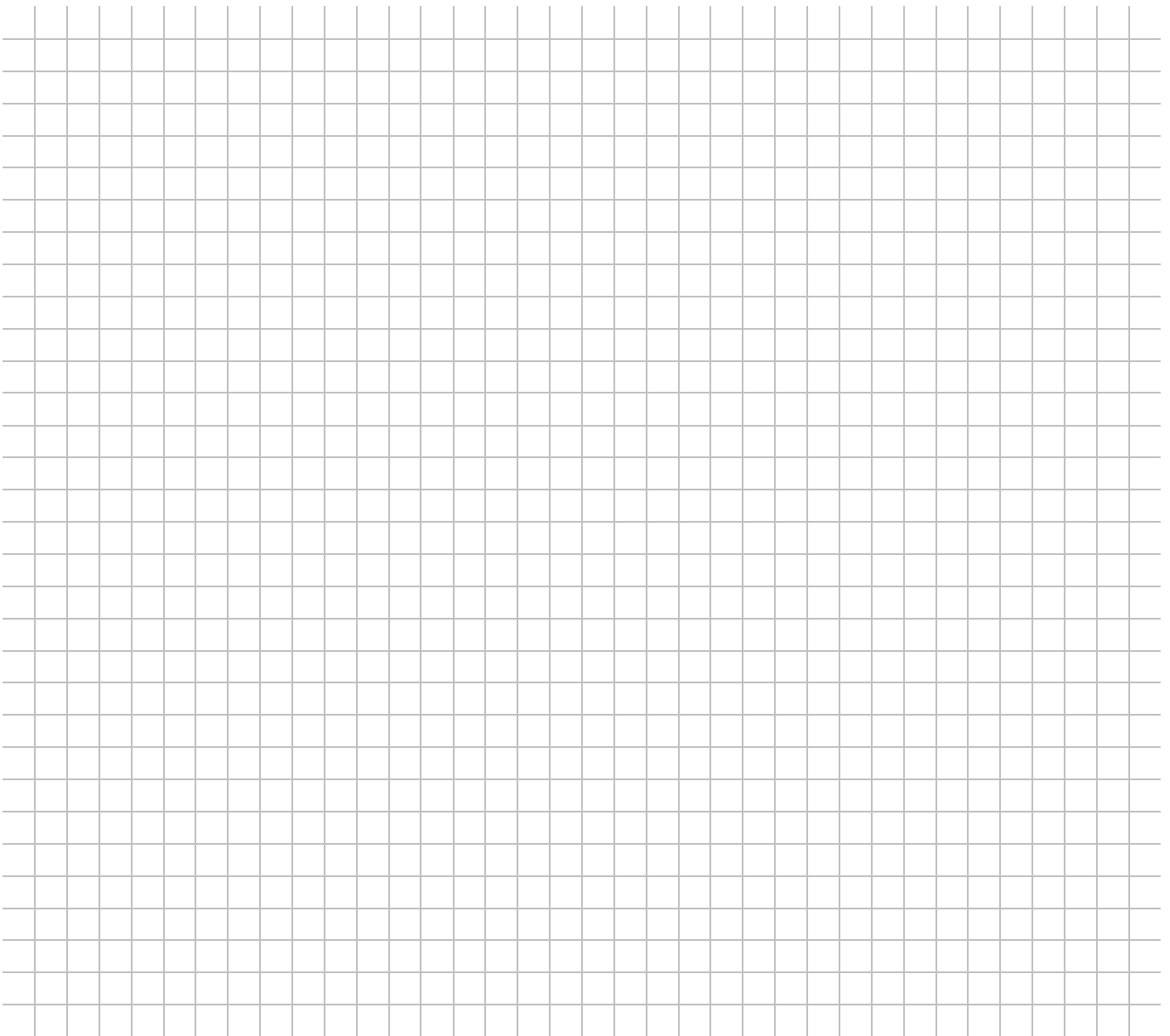
Materials

Waste

Other

Re-design Your House

Now you will have developed an understanding of concepts relating to sustainable housing. Refer back to your notes and use them to help you re-design your house and garden. Use new colours to highlight your improvements relating to energy, water and waste. Can you invent and add your own sustainable housing ideas?



Predict Environmental Impact

Predict the environmental impact of your re-designed home. This section will be challenging, work with your teacher and classmates to identify possible methods to calculate and estimate each prediction.

Energy

Predict the quantity of electricity required for a one week period. Clearly show how you made your calculations. Compare this with your results from the survey you conducted at home.

Water

Predict the quantity of water required for a one week period. Clearly show how you made your calculations. Compare this with the results from the survey you conducted at home.

Waste

Predict the volume of household waste accumulated in one week. Clearly show how you made your calculations. Compare this with the results from the survey you conducted at home.

Prepare a Brief Report

Use all of the information and learning you have gathered so far to help you present your new house design to your peers. Consider using charts or percentages to illustrate reductions of environmental impact. Highlight any sustainable housing ideas that you have invented. Have you been able to create a more sustainable house?

With your family, discuss some goals that you can strive for to reduce the current environmental impact of your home. See if you can agree on a positive reward system to celebrate progress.

Searching for Sustainability



CONSUMPTION

EFFICIENT

FRIENDLY

INSULATE

RECYCLE

REUSE

SMART

WASTE

DESIGN

ENERGY

GARDEN

MATERIALS

REDUCE

SAVE

SOLAR

WATER TANK

ECOLOGICAL

ENVIRONMENT

IMPACT

ORIENTATION

RENEWABLE

SENSITIVE

SUSTAINABILITY

WATERWISE

the **sustainable** mandurah home

Extension

- Design a sustainable school
- Design a poster or pamphlet to promote sustainable housing
- Calculate possible savings over a period of one year
- Create your own method of sustainable house technology
- Build a model of a sustainable house
- Design and construct a solar oven
- Organise to take your family to visit the Sustainable Mandurah Home

Visiting the Sustainable Mandurah Home with your Family

The Sustainable Mandurah Home is open every:

Saturday and Sunday from 1- 5pm, and
Monday and Wednesday from 2 - 4.30pm

The address is:

18 Grandmere Parade
Meadow Springs
Mandurah WA 6210



You don't need to make an appointment at these times. Whether you are planning to build or buy a new home, make renovations to your existing home or if you want more information on sustainable living, simply drop in and take a look around. We will be happy to help you with any information about the features of the Home.

If you would like to bring a community or school group to the Home at any other time please contact:

The City of Mandurah ph: 9550 3777
or email council@mandurah.wa.gov.au.

We will be happy arrange a guided tour tailored specifically to suit your group's needs.

www.sustainablemandurah.com.au

Creating a Sustainable Home

Certificate of Completion

This is to certify that

has successfully completed the tasks required.

Teacher:

Date:

the **sustainable** mandurah home

Credits and Contacts

The Sustainable Mandurah Home education package was made possible by sponsorship from the City of Mandurah. The City of Mandurah would like to acknowledge the support and financial contributions of the Australian Greenhouse Office, Peel Development Commission and Lotterywest in the development of the Education Program.



Australian Government
Department of the Environment and Heritage
Australian Greenhouse Office



Peel Development Commission
Government of Western Australia



Feedback

We would appreciate your feedback to improve this site as a resource for residents and educators. Please email suggestions to ottopd@iinet.net.au

The project is a team effort but with particular contributions from:

Nathan Ducker - Educational content
Email: nathanducker@hotmail.com

Shannon Ducker – Web/graphic design
Email: online@freshwebmedia.com.au
Web: www.freshwebmedia.com.au

Mandy Bamford - Editor
Email: ottopd@iinet.net.au

Thanks to the following people for their information, help and advice:

Craig Perry (Sustainability Officer, City of Mandurah), Fiona Thompson, Louise Horner, Helen Hepworth and Chris Hurst. This education package has been compiled using information from the Department of Environmental Protection (now Department of Environment), the Living Smart Action Guide for a Sustainable Community, the 'Your Home – Design for a Lifestyle and the Future Technical Manual' (a joint initiative of the Australian Government and the Building and Design industries).

Created in 2005 by Bamford Consulting Ecologists.

Text and photographs are copyright and may be reproduced for educational, non-commercial purposes only.