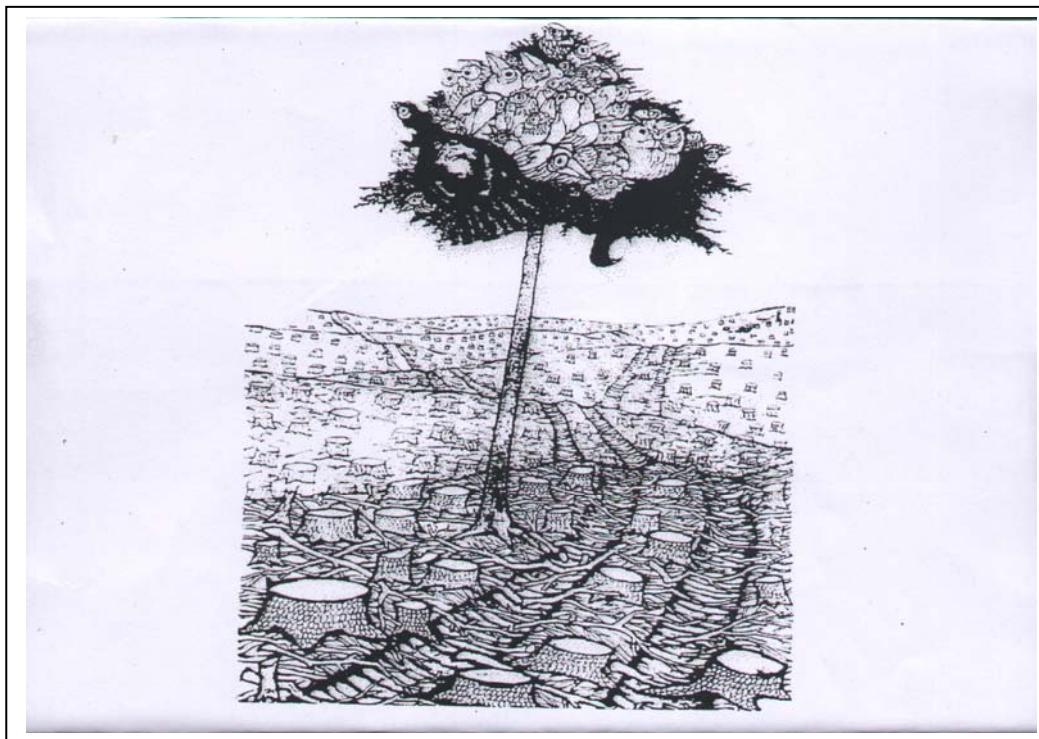




Birmingham Botanical Gardens Study Centre



Education for Sustainable
Development

Activities to Support Education for Sustainable Development

Botanic gardens as centres for the conservation of endangered species are an ideal location for exploring some of the issues relating to sustainable development by highlighting the interaction between plants, people and places.

Organising frameworks

The Development Compass Rose is a good starting point to raise questions about plants and consider not only environmental issues but take into account the implications of social, economic and political factors. The seven key concepts provide a way of looking at how work carried out illustrates the meaning of sustainable development.

The value of plants

The importance of plants in our daily lives is a good starting point for raising issues. This can be done through “Starting the Day” which explores plant based products used when we get up, wash, dress and have breakfast. A basket of products is available at the Centre to introduce the topic along with background information and recording sheets. Further ideas can be found in “Waking Up” published by the Development Education Centre. A similar approach can be taken with “The Family Medicine Chest” which looks at commonly used medicines from plants.

The Wotangu - where next?

In the Cameroons, Western pharmaceutical companies have discovered that a traditionally used tree has medicinal properties which help cure prostate problems. At present, the tree is being used and not replaced - a situation from which nobody gains in years to come. This role-play encourages groups to discuss various viewpoints and hopefully reach a solution which benefits all parties. A pack is available containing statements from different stakeholders and background information.

Biodiversity

This can be explored at two levels:

The four glasshouse climates (tropical, sub tropical, Mediterranean, desert) and outdoor areas such as the alpine garden offer opportunities to explore the diversity and interrelationships of components making up an ecosystem along with their adaptations. This can be followed up by considering the implications on the whole ecosystem of removing certain components.

The plant collections contain many examples of variation between members of the same species and their value as a gene pool. This can be investigated by observing differences or by counting/measuring particular characteristics such as pickles on holly leaves. An activity available at the Centre to illustrate the importance of variation at species level is “The Perfect Carrot”.

PULLING THE THREADS TOGETHER

PAST

GLOBAL

Celebrating:

Our close links with the wide diversity of plants, economically, culturally, aesthetically.

Our cultural diversity in the Midlands and promote cross-cultural understanding.

Illustrating:

Erosion of peoples relationship with plants.

LOCAL

Celebrating:

The traditional relationship of rural people with plants.

Illustrating:

How our local communities have responded to urban development.



MILLENNIUM 2000

Awareness and understanding:

Of the complex issues relating to the use of finite resources.

Offering:

Inspiration and courage to ensure the world survives through sustainable plant resource management.

Awareness and Understanding:

Of the way green spaces and our links with the land have eroded within the cities.

Offering:

The means for positive action to improve our urban neighbourhoods.

The horticultural skills required to move towards a self sustainable future.



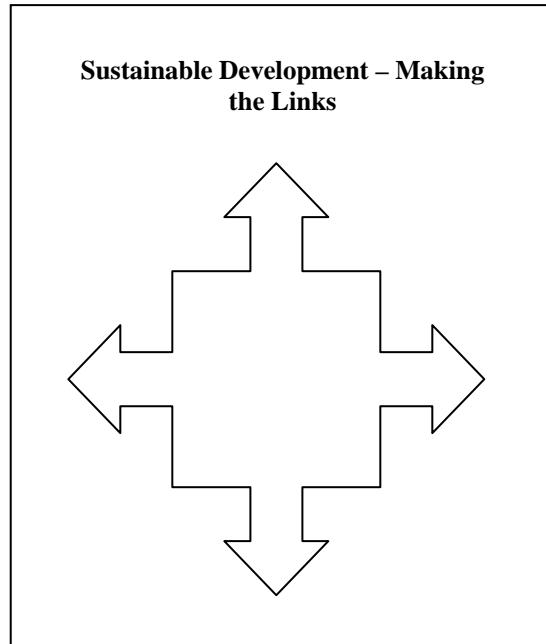
Natural

These are questions about the environment—the land, the sea, living things, and their relationship to each other.

These questions are about the built as well as the ‘natural’ environment.

Who decides? (Political)

These are questions about power, who make choices and decides what is to happen; who benefits and loses as a result of these decisions and at what cost.



Economic

These are questions about money, trading, aid, ownership, buying and selling.

Social

These are questions about people, their relationships, their traditions, culture and the way they live. They include questions about how, for example, gender, race, disability, class and age affect social relations.

What are your questions?

Seven Key Concepts of Sustainability

1. Interdependence

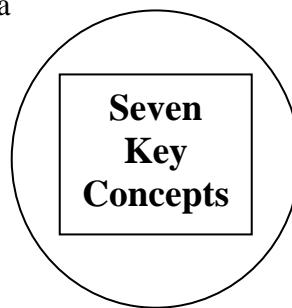
Understanding how people, the environment and the economy are inextricably linked to all levels from local to global.

2. Citizenship and Stewardship

Recognising the importance of taking individual responsibility and action to ensure the world is a better place.

7. Uncertainty and Precaution

Acknowledging that there is a range of possible approaches to sustainability and that situations are constantly changing, indicating a need for flexibility and lifelong learning.



3. Needs and rights of future generations

Understanding our own basic needs and the implications for the needs of future generations of actions taken today.

6. Sustainable Change

Understanding that resources are finite and that has implications for people's lifestyles, and for commerce and industry.

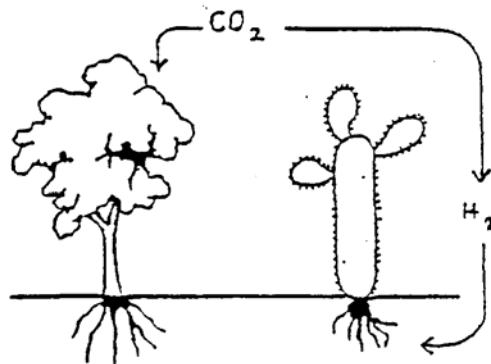
4. Diversity

Respecting and valuing both human diversity – cultural, social and economic and biodiversity.

5. Quality of Life

Acknowledging that global equity and justice are essential elements of sustainability and that basic needs must be met universally.

THE VALUE OF PLANTS



Cultural

Recognition of plants in our lives reflected through religion, festivals and story-telling.



Habitat

Plants can provide living spaces for many species of animal as well as other plants.



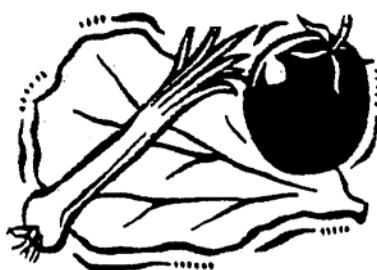
Decorative

Beautiful plants enhance our lives.



Raw Materials

Plants provide us with industrial materials and chemicals.



Food

Plants provide many different foods for humans as well as other animals.

Life Support

Plants provide oxygen, protect soils and regulate water cycles in all environments from dry desert to wetlands.

Genetic Store

Cultivated varieties can be improved by breeding with wild varieties



Medicines

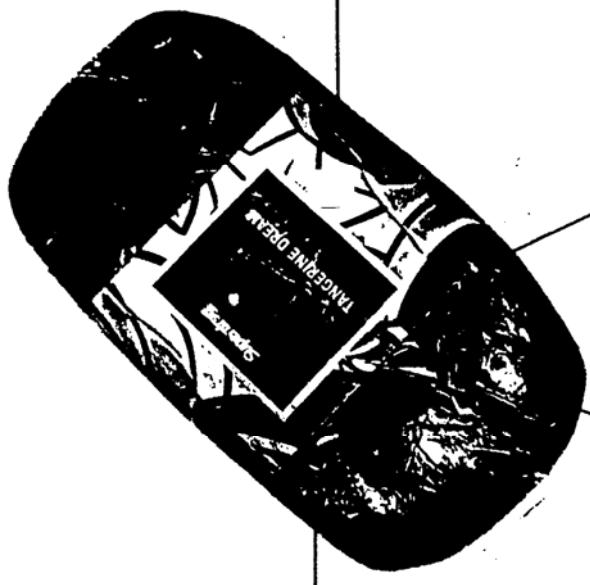
'Green' medicine has been used for thousands of years.

Getting Dressed

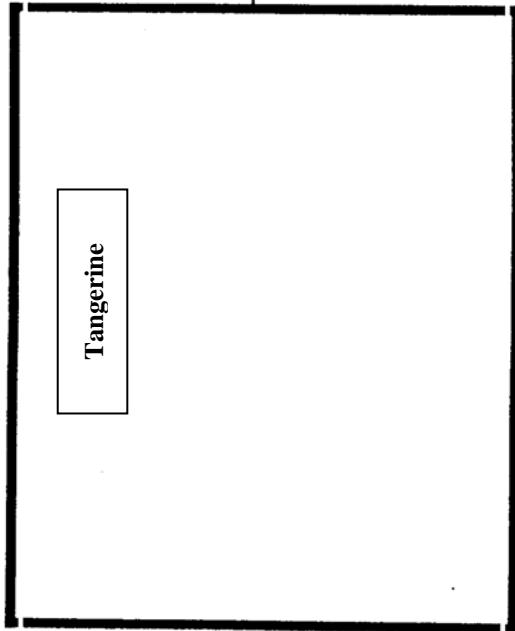
- Shirt or blouse
- fabric using natural fibres from cotton (tropical house) or using artificial fibres made from wood pulp e.g. eucalyptus (subtropical house)
 - size using starch from taro and cassava (tropical house)
 - natural dyes e.g. yellow from oak (cottage garden) and blue from woad (herb garden)

Breakfast

- Spreads
- oils from palm (tropical and subtropical house) and olive (Mediterranean house)
 - yellow colour using dye from annato (tropical house)
- Marmalade
- orange, lemon and lime (Mediterranean house)
- Grapefruit
- grapefruit (Mediterranean house)
- Drinks
- citrus juice e.g. orange (Mediterranean house)
 - tropical juice e.g. pineapple (tropical house)
 - coffee (tropical house)
 - tea (subtropical house)
- Coco-pops
- rice and cocoa (tropical house)
 - sugar from sugar cane (tropical house)



Olive



Tangerine

Palm

Eucalyptus (cellophane wrapping)

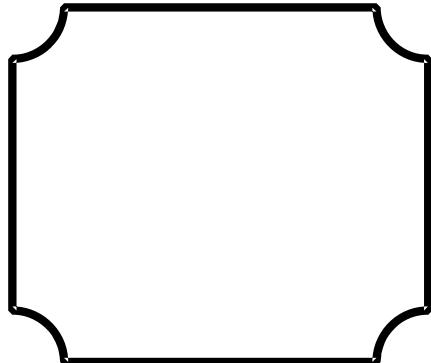
Starting the Day the Botanical Way



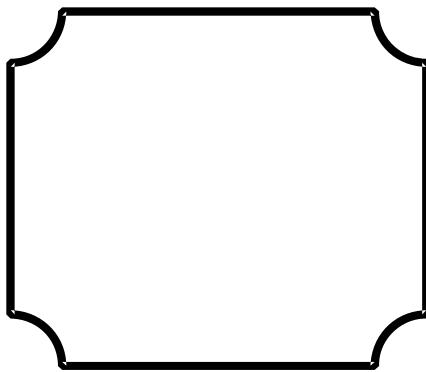
The Birmingham Botanical Gardens

Did you know that in the time between getting up and going to school you use many plants without even knowing it!

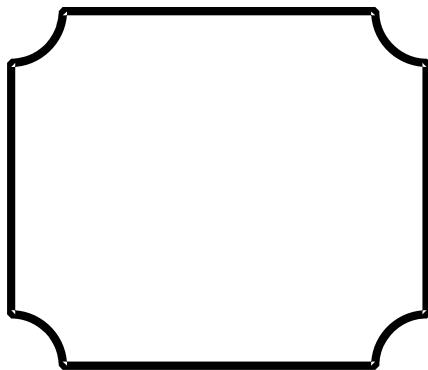
Go and explore the glasshouses and see if you can find and draw:



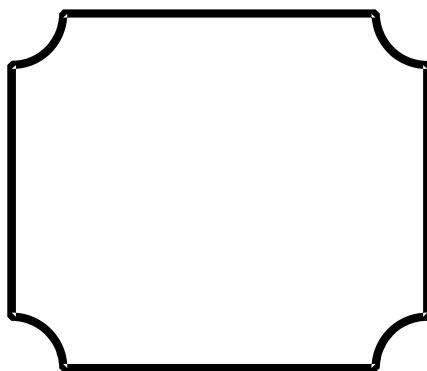
A plant we use to wash ourselves with



A plant we eat for breakfast



A plant we drink for breakfast



A plant we wear to school

The Family Medicine Chest

Cuts

Swab	Cotton (tropical house)
Bandages	Cotton (tropical house)
Plasters	Fabric from cotton (tropical house) Adhesive using rubber latex from rubber tree (tropical house) and rosin from pine trees (pinetum)
Antiseptic	Wych hazel (China Wilson border) Pine oils from pine trees (pinetum) Aloe vera (desert house)

Coughs, Colds and Headaches

Coughing	Oils from Eucalyptus which also helps with breathing (subtropical house) Cinnamon (palm house), thyme as thymol, mint as menthol, Liquorice (Mediterranean house)
Headaches	Aspirin from willow but now artificially made (children's garden) Codeine from poppy Pill binding agents such as gum arabic from acacia, coconut oils and palm oils (tropical and subtropical houses)
Flu	Allicin from garlic (herb garden)
Migraine	Feverfew (herb garden)

Constipation

Laxatives	Senna (subtropical house) Oils from castor (terrace in summer)
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Allergies

Eczema	Oils from evening primrose (herb garden) Hydrocortisone from yams (tropical house) Skin steroids from sisal (desert house)
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Asthma Ephedrine from Ephedra species (subtropical house)
 Theophylline from tea (subtropical house)

Travel Sickness

Alkaloids, atropine and hyoscine from deadly nightshade
(rhododendron walk)
Hyoscine from thornapple (Mediterranean house and terrace in summer)

Heart complaints

Thrombosis Bromelain from pineapple (tropical house)

Regulating heartbeat Digitalis from foxglove (herbaceous border)
 Atropine from deadly nightshade (rhododendron walk)

Contraception

Diosgenin from yams (tropical house)
Glssypol from cotton (tropical house) being tested as a male contraceptive

Cancers

Leukemia Vinblastine and vincristine from rosy periwinkle (tropical house)

Breast, ovarian cervical cancer Taxol from yew (by Study Centre)

Cancerous cells Ricin from castor oil (terrace in summer)

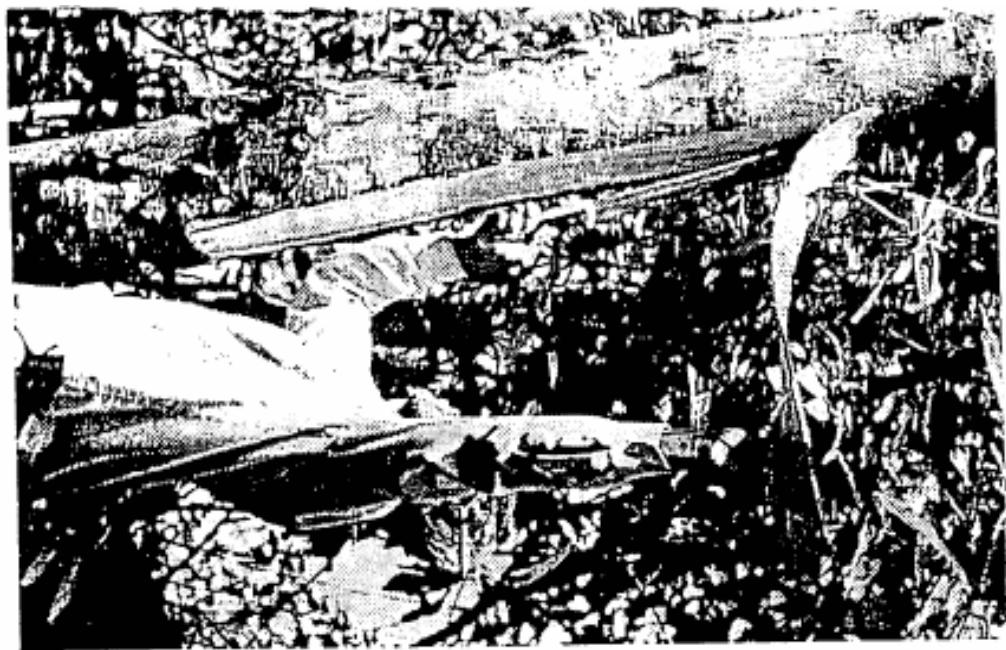
Research Colchicine from meadow saffron (herb garden)

Aids

Research Extracts from Moreton Bay chestnut (tropical house)

Surgery

Pain relief Hyoscine from thornapple (Mediterranean and terrace in summer)



Stripping of *Prunus africana* bark from one or two opposing quarters of the trunk



Bark harvester with 50 to 60 kg of *Prunus africana* bark



Prunus africana felled for total bark removal, Mount Oku forest reserve

The Drug Company

One of our scientists has been asking local people about the plant medicines they use. He found out that the bark of one of the trees can be used to treat various illnesses.

Back at our research laboratories in Europe, we discovered that an extract from the bark has great potential as a medicine. This new treatment is selling well especially in the USA.

We import the bark at a competitive price which ensures a good profit margin. However, we are concerned by rumours that this level of demand cannot be maintained. If we cannot obtain the bark it will affect our market share in such treatments and reduce profitability.

Variation

Look around at the people on your group. Do they all look the same? No, they vary. They will all have different weights, heights, skin colouring and hair. However, they are all members of the same species.

Variation can be described as:

“Differences in features between species or between members of the same species”

As well as humans, different plants of the same species have small variations between them.

Think of a holly bush. Have you ever noticed that each leaf is slightly different from another?

How could you measure and record their differences?

You could look at:

- the length of each leaf
- the number of prickles
- the colour
- whether it has berries
- how far it is from the ground

Use the next page to record your ideas and findings



Can you think of reasons why the leaves might be different?

Variation: Recording Page

Variation	Measurements

Any ideas?

The Perfect Carrot?

1960

The supermarket carrot was created by mixing the best features from five varieties of carrot.

Which varieties do you think were used? Give reasons for your choice.

1980

Weevils attack the supermarket carrot when growing in the farmers fields spoiling it for sale.

Which carrot variety could you use to add a new feature to the supermarket carrot making it resistant to weevils?

1990

Nobody wants to eat carrots which are not dark orange.

Farmers stop growing these varieties so remove them from your pile.

2000

Shoppers complain that their carrots look nice but have no taste.

What can you do to improve the supermarket carrot?