

Design Technology

International Baccalaureate Organization (IBO)



Topic 12 Sustainable Development (12 hours approx. 9 lessons)

Name:

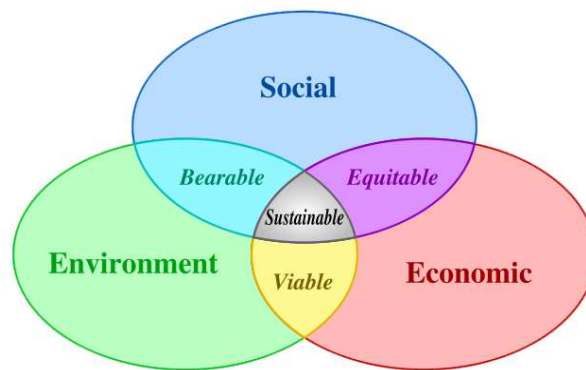
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12.1 Appropriate technology and sustainable development

Introduction

Resources for this unit can be found at www.msc-technology.wikispaces.com
<https://msc-technology.wikispaces.com/Sustainable+Development>

Sustainable development - Our way of life is placing an increasing burden on the planet - this cannot be sustained. Current developments which meet the needs of the present must do so without compromising the ability of future generations to meet their own needs. Sustainable development policies encompass three general policy areas: economic, environmental and social. Within this topic you will examine in greater detail sustainable development and the appropriate technologies which tackle these areas.



1 Appropriate Technology

Resources: Topic 12 – Appropriate Technology.ppt

Video YouTube: Sustainable development

In the introduction to this topic, there is a broad description of what sustainable development means, however there are many descriptions and meanings, read page 227 - Resistant Materials Technology

Define the following terms; using the internet to find 3 good descriptions for each (cite each website you use)

- Sustainable development
- Appropriate technology
- Triple bottom line sustainability

Examining **appropriate technologies** more closely, list 4 main characteristics:

- 1
- 2
- 3
- 4



Examples of appropriate technologies include:

- Solar cooking *Resources Video YouTube: Solar Cookers*
- Hybrid vehicles *Resources Video YouTube: Hybrid Car – Prius*
- Wind-up torches *Resources Video YouTube: Plug in Hybrid Car*

Identify the three main characteristics of **triple bottom line sustainability**:

- 1
- 2
- 3

Practical Task

Working in groups of 5-6, you are going to research, design and make a solar cooker/oven, it will be tested and evaluated upon completion.

- Working in groups of 5/6 student (combination of graphics and food students). You are going to research design, and make a solar cooker, and finally test and evaluate its success at boiling water and cooking a savory dish
- You will be given a basic set of materials to start with, which you can adapt and develop
- You are to allocate roles within the group and delegate tasks. Recording, research, ideas, decisions, etc.
- Use video and photography to record your work and create a visual diary of making, with notes and annotation (video, PowerPoint, sketchbook)

2 Global Strategies for Sustainable Development

*Resources: Read Lovins and Lovins Natural Capitalism (PDF file)
Video YouTube: The Bigger Picture
Video YouTube: Natural Capitalism, Lovins
2 Video YouTube: CNN Reports
Topic 12 - Global Strategies.ppt
Video/DVD: Al Gore – An Inconvenient Truth*

Global Conferences provide a platform for the development of global strategies for sustainable development.

- Explain how conferences such as Rio de Janeiro, and Johannesburg help the development of global strategies for sustainable development and how discuss the successfulness / unsuccessfulness of these conferences

- What are the key features and points of the Kyoto Protocol?
 - 1.
 - 2.
 - 3.
 - 4.

- Examine the conference held recently in Bali (December 2007), consider who (Which countries and people) are the key players
 - 1.
 - 2.
 - 3.
 - 4.
 - 5.
- And what are the main themes and goals?
 - 1.
 - 2.
 - 3.
 - 4.
 - 5.

Homework task

Working in pairs/small groups, make a presentation which highlight and explain the ongoing challenges facing the achievement of a consensus on a strategy for sustainable development. This is to be presented at the following lesson

3 Bellagio Principles

Resources: **Topic 12 – Bellagio Principles.ppt**
 'The Sustainable Report' 2006-07.pdf
 Video YouTube: Ubeng

Outline the main features of the Bellagio Principles:

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-
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Explain current day thinking of how progress towards sustainable development might be assessed using the Bellagio principles.

"In 1996 the International Institute for Sustainable Development developed general guidelines for practical assessment of progress towards sustainable development – the Bellagio principles. These identify common patterns in sustainable development-related assessments"

4 Society, Manufacturers and Governments

Topic 12 Society, Manufacturers and Governments.ppt

Resources: Education for Sustainable Development Cure or Placebo.ppt

International Institute for Sustainable Development.ppt

Video YouTube: Wall Mart

PDF: Government's Business: Enabling corporate sustainability

Task

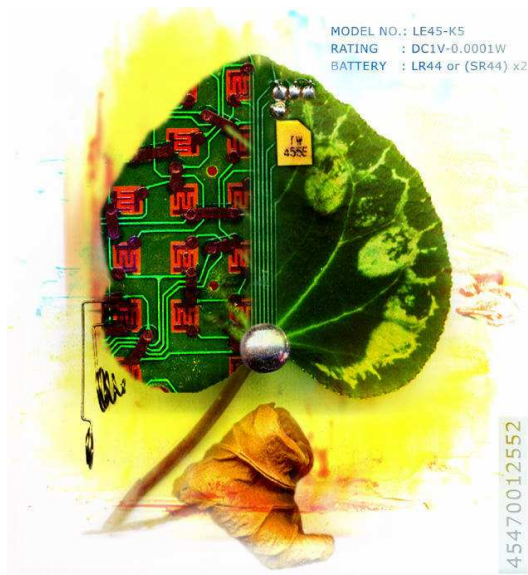
Below in the space make notes, and list sources of information, and consider each of the points, you are going to make an A3/2 informational poster, working individually, you are going to demonstrate your understanding of the issues, giving examples which demonstrate clearly each point.

1. Explain why sustainable development requires systems-level changes in industry and society

2. Explain how sustainable development requires close cooperation between manufacturers and government

3. Explain how a close relationship between manufacturers and government can be difficult to achieve because the two parties may have very different perspectives on sustainability and timescales

4. Outline three reasons why it is difficult for governments to introduce legislation to cover all aspects of sustainability



12.2 Sustainable building design

Introduction – Objectives of Sustainable Buildings

Resources: Topic 12 Sustainable Building Design.ppt

Video YouTube: The Bigger Picture

Video YouTube: Sustainable Buildings

Video/DVD: Smart Car – Smartville

The objectives of sustainable buildings are:

- Resource efficient
- Energy efficient
- Pollution prevention (including indoor air quality and noise abatement)
- Harmonization with the environment (including environmental assessment)
- Integrated and systemic approaches (including environmental management systems)

Lifecycle

The lifecycle of a building can be optimized by the ways in which the materials are use. Give some examples

- 1.
- 2.
- 3.
- 4.

Waste Management

Identify waste management strategies appropriate for sustainable buildings

- 1.
- 2.
- 3.
- 4.

Task

Resources: Sustainable building design.ppt

Video YouTube: The Bigger Picture

Video YouTube: Sustainable Buildings

Working in pairs (each pair covering 1 or 2 terms), you are going to make a PowerPoint, video, or Pod cast presentation create defining and explaining each of the following in detail:

1. Intelligent Building

- Explain the benefits of intelligent buildings to sustainable design

2. Living building

- Outline the key features of living buildings and explain how they impact on the environment
- Explain how landscaping can contribute to reductions in energy consumption for buildings

3. Grey water

4. Black water

- Explain how grey water and black water differ, and how they are treated
- Identify ways in which water consumption can be optimized through reduction of water consumption and recycling

5. Building envelope

- Explain how the building envelope contributes to the amount of energy a building uses during its operation
- Identify the key considerations to take into account when selecting materials for the building envelope

6. U value

- Explain how the selection of different construction materials with different U values can contribute to heat loss or gain from a building
- Explain how the U value of a material is calculated
- Calculate heat loss or gain through a building envelope comprising different materials
- What are the building regulations for the U value in Hong Kong, and are they comparable with the UK (Europe), USA and Australia

7. Passive solar design

- Explain the steps taken to design buildings which harnesses the sun's energy and how passive solar design can contribute to passive solar heating and/or cooling and reduces energy consumption in buildings
- Identify ways in which passive solar design can be achieved.

8. Daylighting

- Explain how the use of natural daylight can contribute to the reduction in the energy consumption of a building
- Identify ways in which the indoor environment of buildings can be optimized

9. Active solar collection

- Explain how active solar collection can contribute to reductions in energy consumption for buildings
- Identify a range of technology and applications of active solar collection

