**536**

**Materials Recycling**

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**Acknowledgement**

Mr John Gibson is a highly regarded educator and engineer. John taught Industrial Arts at a number of high schools before taking a position at Sydney Teachers’ College, then University of Sydney. He had an engineering education consultancy and has extensive experiencing working with NESA on Engineering Studies syllabus development and the HSC examination committee. The STEM Industry School Partnerships (SISP) Program asked John for his responses to the iTeachSTEM topic discussion questions. SISP is grateful to John for submitting these example discussion responses.

# Describe the difficulties with recycling.

* collecting same/similar materials from demolition sites, ready to recycle
* separating like/common materials
* storing and cataloguing recycled material ready for re-distribution
* the need to develop special equipment to treat the recycled material
* awareness of the difficulty to recycle liquids
* pollution of rivers, lakes, waterways, etc.

1. **Considering the magnitude and variety of industrial materials that our community demand, discuss alternative systems.**

Alternatives systems could include:

* burning relevant material to generate electricity from the process
* reuse/refurbish parts to be rebuilt into second-hand, functional items
* use electronic parts to safely repair and reuse faulty electronic items

1. **List items/materials in a civil structure that could be recycled if the structure was demolished.**

* timber products
* cement/concrete products
* bricks and tiles
* reinforcing steel bars
* wall cladding – gyprock
* roofing steel

1. **Discuss how a product life-cycle is determined in engineering.**

The consumer needs of the modern world demands that vast numbers of products be designed and manufactured from a large array of different materials.

Products are not necessarily designed to have long-lasting function for the consumer, often made to deteriorate and subsequently be discarded in what we call tips, or garbage dumps.

As the extensive range of items continue to be produced, discarded items increase substantially, leading our society to a point where re-use and recycling are becoming a vital and essential part of consumer life.

The life-cycle of an engineering product for consumer-use and potential recycling, should be considered from the beginning of the conception and design process, well before the production phase.

The materials to be used, the operating mechanisms, and the structures within the item need to be sourced and applied in ways that promote a clear future plan for recycling. Waste generated during the production process should be directed to a recycled phase.

The process could be:

* design (awareness of need to recycle)
* manufacture (with waste recycled)
* packaging/storage (reuse as much as possible)
* education regarding the need for a more sustainable environment