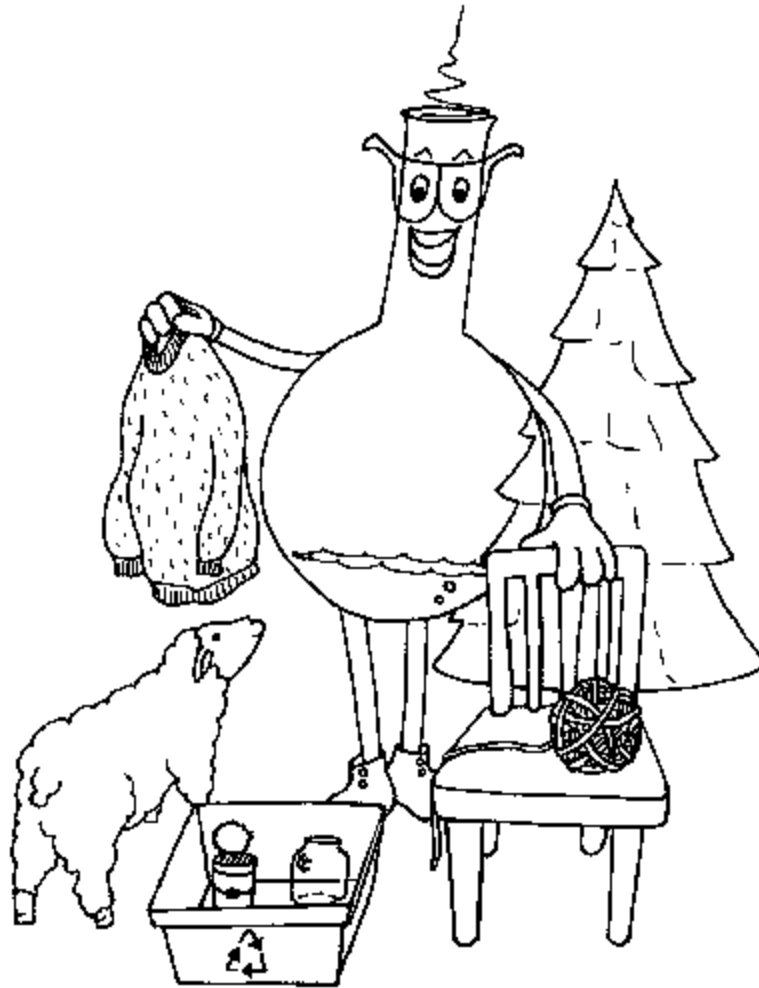


**Professor Beaker's**  
**Characteristics of Objects**  
**and**  
**Properties of Materials**



**Designed for Grade 1**

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ISBN 1-894120-48-5

# Educator's Background about Objects and Materials

## What is a Material?

A material is a substance that has very specific properties. The properties of the material are defined by the arrangement of the atoms or molecules in the substance. A raw material is a material that comes directly from nature in an unprocessed form. Raw materials include clay, wood, wool fleece, and some metals. Processed materials have gone through some level of manufacturing or processing to modify their natural form, but not their properties. Processed materials include bricks (processed clay), lumber (processed wood), paper (processed wood), yarn (processed wool fleece), steel (processed iron).

## What is an Object?

An object is an item that has been designed, processed or manufactured to serve a specific purpose, function or task. An object is constructed of one or more materials. The material, which makes up the object, is selected to meet the specific requirements of the object and its function.

Examples of objects include: pencils (manufactured out of wood and graphite to function as a writing tool), chairs (manufactured out of wood, metal, or plastic to function as a sitting 'tool'), shoes (manufactured out of leather, cotton, plastic, or rubber to function as footwear), blackboard chalk (manufactured out of natural chalk to function as a writing tool) and plastic spoons (manufactured out of plastic to function as a soup-serving tool).

The object, plastic spoon, is designed for the specific task of serving soup. The material, plastic, has special properties that are desirable for the task of the object, spoon:

- smooth surface;
- non-porous surface;
- flexible structure;
- strong structure as compared to wool.

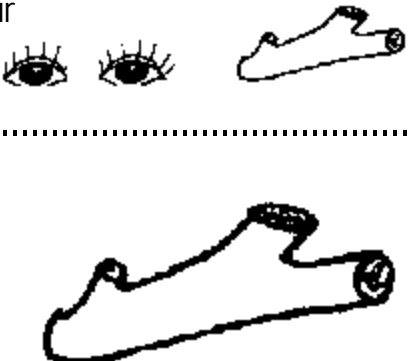
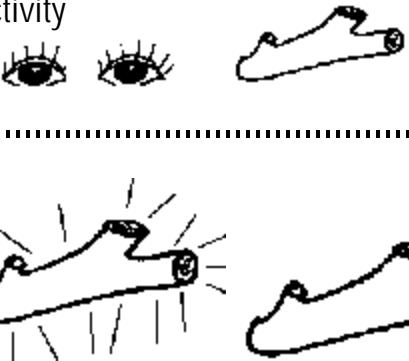
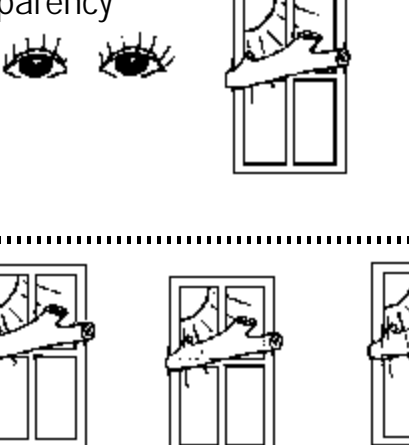
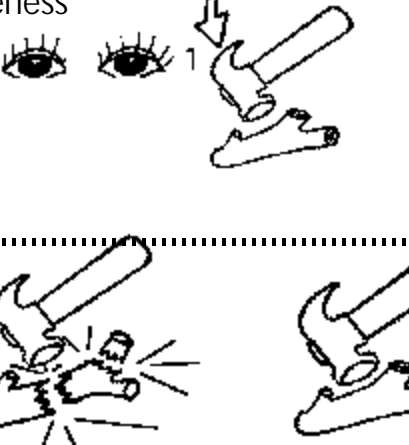
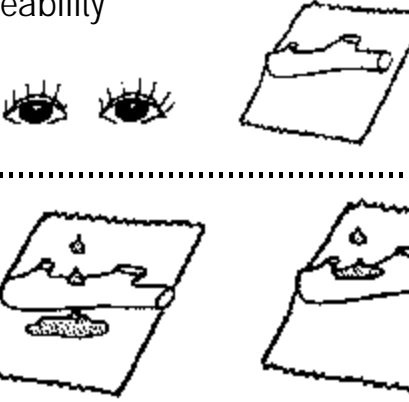
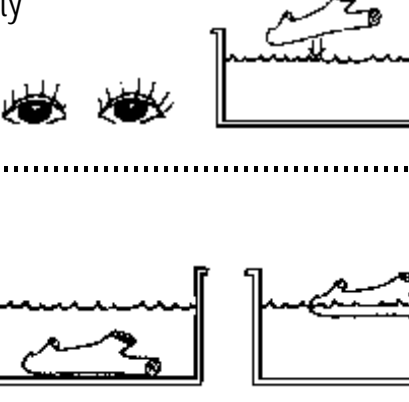
Because plastic is processed from petroleum, plastic is also relatively cheap to manufacture. The material, plastic, has no specific purpose unless shaped into the object, spoon.

## When a Material is an Object

Sometimes it is difficult to determine whether an item is an object or a material. If the item is used to create an object, then the item is a material. However, if the item undergoes no further manipulation and is used as it is, it is an object. For example, a piece of paper is an object when used specifically for writing or wrapping. Paper is a material when used to create another object such as a paper hat. Similarly, a piece of yarn is an object when used to tie something, but yarn is a material when used to knit a sweater, which is an object. Processed materials may be considered to be objects, depending on the degree of processing.

Two or more objects may be combined to make another, more complex or compound object. For example, a sweater consists of yarn, made from processed wool fleece (material), buttons

# Investigating the Properties of Wood (part 1)

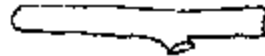
<p>colour</p>  <p>.....</p>	<p>reflectivity</p>  <p>.....</p> <p>shiny                      dull</p>
<p>transparency</p>  <p>.....</p> <p>opaque                      translucent                      transparent</p>	<p>brittleness</p>  <p>.....</p> <p>brittle                      not brittle</p>
<p>permeability</p>  <p>.....</p> <p>permeable                      impermeable</p>	<p>density</p>  <p>.....</p> <p>more dense                      less dense</p>

## Flexible or Rigid Materials

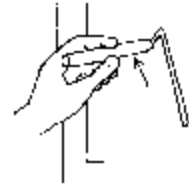
Circle the materials that are flexible. Underline the materials that are rigid.



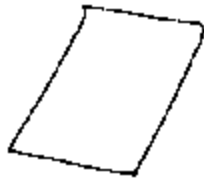
wool yarn



wooden stick



chalk



paper



fur



feather



rock



cotton



clay



leather



glass

name: \_\_\_\_\_

work page A-a

## Design Process

1. What is the object that you will design? \_\_\_\_\_



yes



not sure



no

2. Do you know the key design requirements?



yes



not sure



no

3. Did you draw a picture of your design?



yes



not sure



no

4. Does your design appear to meet the key design requirements?

5. List or draw all the materials you can use when making your object.

\_\_\_\_\_

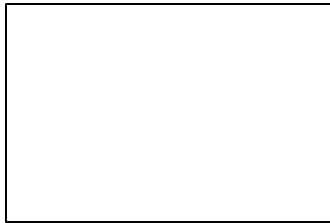
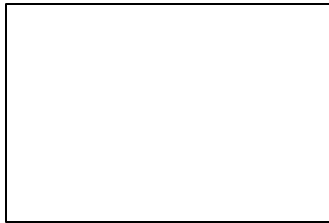
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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6. Circle the material(s) above that you will use when building your object.