

# Skills Handbook

The Skills Handbook is a student reference tool that provides background and practical activities to support skill development. The handbook emphasizes inquiry and design skills, communication skills, and skills related to the use of tools, materials, and equipment, as outlined in the curriculum expectations.

## 6 Observing and Recording Data

### 6A Obtaining Qualitative Data

#### Qualitative Observations

An observation is information that you get through your senses. Scientific questions and technological problems are usually based on observations. For instance, watching waves wash up onto a beach might make you wonder about the cause of tides or how to prevent soil erosion. When you describe the qualities of objects, events, or processes, the observations are qualitative (Figure 1).

**Figure 1**  
The shape, the space available for sitting, and the colour of the chair are qualitative observations.



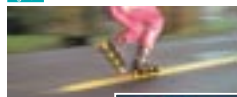
Making observations is a critical step in the process of scientific inquiry (see 6 "Process of Scientific Inquiry," Step 6). Making observations is also critical to the process of design. Evaluating a prototype according to its design criteria requires careful observation (see 6 "The Problem-Solving Cycle," Step 5). Both scientists and technologists have grouped qualitative observations into categories, based on the kind of qualities displayed and the purpose of the investigation.

#### Qualitative Observations in the Process of Scientific Inquiry

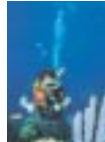
Common categories of qualitative observations used in the process of scientific inquiry appear below:

**State of Matter:** All substances can be classified as solid, liquid, or gas (Figure 2).

**Figure 2**



Roller blades are solid.



Water is a liquid.



Air is a gas.

**Colour:** Objects can be described as being any colour or any shade of colour (Figure 3). Materials that have no colour should be described as colourless.

**Figure 3**

This leaf appears green because it reflects green light back to your eyes.



**Smell:** Also known as odour. There are many words to describe smells, including pungent, strong (Figure 4), spicy, sweet, and odourless.

**Figure 4**

Skunks can produce a very strong odour.



**Texture:** The surfaces of objects can have a variety of textures, including smooth, rough, prickly, fine, and coarse (Figure 5).

**Figure 5**

These cereal flakes have a coarse texture.



**Taste:** Objects can taste sweet, sour, bitter, or salty (Figure 6). Other tastes are combinations of these basic tastes. Objects that have no taste can be described as tasteless.

**Figure 6**

Black olives give this pizza a salty taste.



**Shininess:** Also known as lustre. Objects with very smooth surfaces that reflect light easily, like mirrors, are said to be shiny or lustrous

(Figure 7). Kitchen taps, mirrors, even well polished desktops can be described as lustrous. Objects with dull surfaces are said to be non-lustrous.

**Figure 7**

Most metals, such as copper and silver, appear shiny.



**Clarity:** Some substances let so much light through that letters can be read through them. These substances are said to be clear or transparent. Other substances that allow light through, but not in a way that allows you to see through them, are translucent. Objects that do not let light through are opaque (Figure 8).

**Figure 8**

Clarity ranges from transparent to opaque.



Other qualitative descriptions include form (the shape of a substance), hardness, brittleness (how easily the substance breaks), malleability (the ability of the object to be changed into another shape), and viscosity (a liquid's resistance to flow). Another important characteristic that can be described qualitatively is the ability of substances to combine with each other.

**Try This**  
A *Try This* activity is included in each section of the handbook to offer students skill development.