Year 10 Skills Set 1:

Section 1: Observations and Inferences

OBSERVATIONS LEAD TO INFERENCES

We often try to **explain** what we observe. Whatever you think after you make an observation is called an inference. An inference is one possible explanation for what you observe. An inference may or may not be reasonable.

Worked example
You go to water your favourite pot plant.

OBSERVATION — some leaves have holes in them or parts missing.
INFERENCE — an insect has been eating it.

It is very important that you can tell the difference between something that is an observation and something that is an inference.

Figure 1.6

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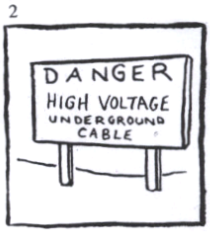
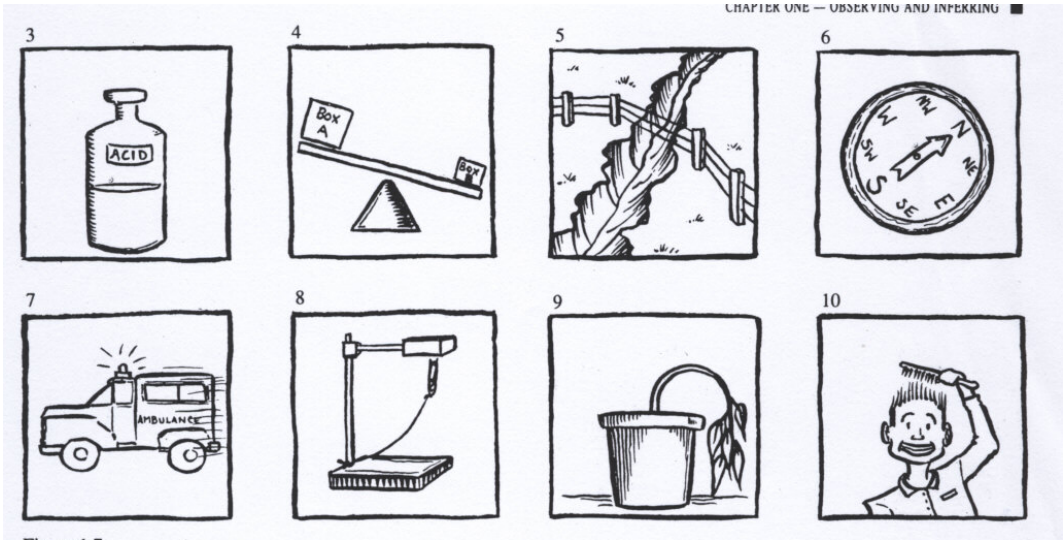
1 Look at diagrams 1 to 10. In your science workbook write one observation and one inference for each diagram.
2 Compare your answers with those of another person. Out of 10, how many observations were the same or similar? Out of 10, how many inferences were the same or similar?

1

2





Section 2: Independent and Dependent Variables

For each of the problems described below write down:

- The independent variable – what was changed.
- The dependent variable – what was measured.
- All the variables that should be controlled in order to make a fair test.

A) A student is trying to find out which brand of liquid paper dries the quickest. He brushes each brand of liquid paper onto a surface and times how long it takes to dry to the point where it can be written on.

B) A fabric company wants to test which type of thread is stronger, cotton or polyester. Lengths of each thread are tied to metal bars that are attached to two retort stands and then 10g weights are added to each thread until the thread breaks.

C) A hairdresser wants to determine which brand of shampoo contains the most water. Each brand of shampoo is placed in an evaporating basin and placed in a drying oven for several days and then weighed again.

Section 3: Drawing and Interpreting Tables

- Always use a ruler
- Tables must have borders on each side
- Each column must have a heading and units in brackets.

Question A) Arrange the following information into a table and then answer the question provided.

A group of students carried out a survey in their school. They looked at various food items and recorded the amount of caffeine they contained. Here is a report of their findings:

> In one can of Coles Cola, there was 35 mg of caffeine and in one can of Pepsi, there was 55 mg of caffeine. The amount of caffeine in one cup of instant and brewed coffee was 60 mg and 85 mg respectively. This was compared to one cup of weak and strong tea, which were 30 mg and 80 mg respectively.
>
> Then we looked at chocolate. In most chocolate bars, there was 20 – 60 mg of chocolate in the whole bar. In a chocolate milk drink, there was only 7.5 mg of caffeine.

Some experts recommend that students consume no more than 200 mg of caffeine each day. How many cups of instant coffee would it be safe to drink?

Question B) Modern society relies heavily on metals. More than 60 metals are extracted from the Earth and used for all sorts of purposes. Each metal has its own properties such as density, strength, resistance to corrosion, hardness, conduction of heat and electricity and so on.

Even though new metals ores are being discovered, they are beginning to run out. There are two important ways that we can deal with this problem:

- Use recycled metals
- Find substitute materials

The table below gives some information about specific metals.

Metal	*Atomic symbol*	*World production* (thousands of tonnes per year)	*Density* ($g\ mL^{-1}$)	*Chemical activity*	*Estimated time known reserves will last* (years)
magnesium	Mg	300	1.7	Most active ↑	500+
aluminium	Al	15 700	2.7		260
zinc	Zn	9 000	7.1		150
chromium	Cr	6 000	7.1		100
iron	Fe	750 000	7.9		200
tin	Sn	800	7.3		100
lead	Pb	5 000	11.3		150
copper	Cu	12 000	8.9		40
silver	Ag	10	10.5	↓ Least active	150
gold	Au	2	19.3		25

a) Ignoring cost and using only the information provided:
   i) Give a disadvantage of making a car out of gold.
   ii) Explain an advantage of making a car out of gold

b) Aluminum is the most abundant metal in the Earth's crust. Despite its abundance, aluminum is one of the more expensive to obtain. Using only the information provided, suggest a reason for this.

c) Using the information given or your knowledge, to answer the following:
   i) Name a property of metals that is difficult to find a substitute material for. Explain your answer.
   ii) Suggest one reason why most of the copper that we use is recycled
   iii) Suggest one reason why less than half of the iron that we use is NOT recycled
   iv) The world reserves of copper are predicted to run out in 40 years. Suggest one way that this may affect people.