LESSON 5 Measuring in Science: Importance of Precision

Grade Level: 7-8

1. Grades 7-8

2. Overview Children will soon find out that using their senses alone will not always give precise information. Whereas it is possible to estimate distance, the actual length is obtained from measurement. Measurement translates qualitative information into quantitative information. Different kinds of measurements are carried out in science.

3. Purpose This lesson will make it possible for children to see the need to measure quantities in science. They will start with simple measurements and then go on to measure complicated things. In most cases, they will see the need to use measuring instruments.

4. Objectives Students will be able to:

i. Discuss the history of some measuring instruments
ii. Take a decision on when to use a measuring instrument
iii. Describe some measuring instruments
iv. Use correctly at least three measuring instruments.

5. Resources/materials Various simple measuring instruments:

- Tape rule and metre rule
- Measuring cylinders
- Clocks/watches
- Thermometers
- Weighing equipment

6. Activities and Procedures In the study of science, it has been found that we cannot always rely on our senses to give us accurate information. When scientists pass on instructions and information, the instructions must be very accurate so that other scientists can repeat the experiments exactly. Because the senses do not usually give exact information, scientists use aids to help them. These aids are called **measuring instruments. The teacher should show the students the measuring instruments available**. Here the teacher should then give the students an assignment to find out what used to happen in defining quantities before measuring instruments were introduced.

The teacher should draw the attention of the students to the fact that the use of a measuring instrument implies that the user understands how to interpret the measures. Each type of instrument is done in a special unit, set as a standard to be used by other people. It is here then necessary to draw attention to what is now referred to as the International System of Units [S.I. Units]. Before any measuring instrument is used, the calibrations on it should be studied.

Now the teacher should give the students the opportunity to practise and use simple measuring instruments beginning with the very simple ruler and metre rule, measuring cylinders, clocks and watches, and weighing instruments. The teacher should continue to stress the correct use of each of the instruments.

7. Tying it all together It is important for the teacher to draw the attention of the students to the general agreement on standards to be adopted in measuring instruments. Here is a good example of the universality of scientific practices all over the world. A unit of measure is referred to a standard. The teacher should make the students realise the amount of confusion that can arise if there is no agreement on for instance what a kilometre measure actually is. If each country has its own measure of a kilometre, then a lot of problem will arise if reference is made to that measure. It will be similar to "trusting our senses" which we know varies.

8. Assessment The teacher should compare how accurate the students' measures are with those taken by the teacher. A number of things should be measured using the available measuring instruments.

9. Author(s) S. T. Bajah. stan@alpha.linkserve.com

10. References Ministry of Education and Culture (2000). **Step Ahead New Secondary Science Student's Book 1 Zimsci** Harare: Longman Zimbabwe (Pvt) Ltd.