Grade 7 Natural Science Worksheet

Assessment Task: Physical Sciences: measurements, temperature

Measurement of temperature

What is the temperature in your class at different times of the day?

You will need:

- A glass bottle
- Food dye
- Bowl
- Water
- Drinking straw
- Lump of playdough or Prestik
- Strip of cardboard
- Marking pen
- Sticky tape

What to do:

1. Fill the glass bottle with water and add some drops of food dye. Then top the bottle up with water till it overflows.
2. Roll some playdough or Prestik around the straw about 10cm from the top. Don't crush the straw as you do this.
3. Put the straw in the bottle. Push the playdough/Prestik around the bottle top to make an airtight-watertight seal. Water should rise up the straw.
4. Stand the bottle in a bowl of cold water for a while (or put it in the fridge). The water in the straw should fall.
5. While the bottle is cooling, mark a cardboard strip with gradations at 1cm intervals. Start at 1 and move up to 10 cm. Stick this cardboard strip to the straw.
6. Place your thermometer on a windowsill in the classroom to measure the temperature.

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7. Wait until the water rises up the straw and then remains at a constant level. Note your cardboard reading.
8. Take regular readings throughout the day. Draw up a table to record the temperature and the circumstances (e.g. early morning, after break, etc.).

Answer the following questions:

1. Does your reading of the temperature mean anything in terms of °C? Explain. [4]
2. How would you make your readings meaningful in terms of °C? [7]
3. What is happening to the particles present in that solution as the temperature rises? [4]

Your teacher will also award up to 5 marks for the manner in which you constructed your thermometer. Take care that you followed all the instructions and you will do well! [5]

[Total: 20 marks]

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Suggested Solutions

Question number	Possible marks	Solution
1	4	The reading does not mean anything in terms of °C. ✓✓ This is because the scale is a randomly chosen scale, and the thermometer is not a standard instrument for measuring temperature. ✓✓ It is very similar to the situation that would arise if you decided to measure the length of your bathroom and instead of using metres you used your thumb length as a unit of measurement!
2	7	In order to make the readings meaningful, you would have to calibrate ✓✓ the thermometer. You could get a real thermometer and measure temperature on the thermometer learners made and each time compare ✓ it to the temperature reading on the real thermometer. ✓✓ After numerous readings, you should see a pattern emerging. E.g. whenever the real thermometer reads 28°C, the homemade thermometer reads 5. You can safely say, after a number of tests that 5 = 28°C, etc. ✓✓
3	4	When the temperature rises ✓✓, the kinetic energy of the particles in solution has increased. ✓✓
Construction	5	Award marks for the way in which the learner constructed the thermometer.