**GRADE 7**

**SCIENCE**

**Unit 2: Chapter 4 Heat**

**Temperature:** Describes how hot or cold an object is.

SOME STANDARD TEMPERATURES

The human body temperature: 37 C

Boiling point of water : 100 C

Freezing Point of water : 0 C

Comfortable room temperature: 21-25 C

MEASURING TEMPERATURES

1. **Galileo’s Air Thermoscope**: As the air heats it expands and the liquids drops. When the air in the bulb cools it contracts and the liquid will rise to fill its space.

**2. Early Liquid Thermometer**: Liquid rising up the tube shows the temperature is rising. As the liquid heats up it expands and rises up the scale. Mercury was originally used in thermometers but replaced by alcohol which was safer.

TEMPERATURE SCALES are necessary for temperatures to be accurate and comparable.

3 commonly used scales are:

1. **FAHRENHEIT**: Developed by Daniel Fahrenheit. The first temperature scale to be widely used. It was based on the coldest thing in a lab at the time (salt, ice and water mixture) this was labeled (0oF) and body temperature was labeled (100 oF). The freezing point of water in Fahrenheit is 32 oF and the boiling point of water is 212 oF

2. **CELSIUS**: Developed by Anders Celsius. Based on the freezing and boiling points of water at standard atmospheric conditions near sea level. It is the most commonly used scale today.

3. **KELVIN:** Developed by William Thomson (Lord Kelvin). Scale starts that the coldest temperature possible – zero Kelvin or absolute zero (-273 °C) Absolute zero in theory is when particles stop moving thus it is the coldest possible temperature.

MEASURING DEVICES

1. **The Liquid-in-glass Thermometer**: As the liquid heats up it expands and moves up the scale. The lab thermometer now contains colored alcohol rather than mercury for safety.

2. **The Thermocouple**: Made of two wires of different metals. A temperature difference across the two junctions of wire causes a current to flow through the wires. This current is measured by a meter. Can measure higher temperatures than typical thermometers and is more durable.

3. **The Resistance Thermometer:** or (digital thermometer): This converts electrical resistance into a digital reading. Has replaced glass thermometers in hospitals and homes.

4. **Bimetallic Strip:** (ex. thermostat): Made of two different metals fused together. These metals expand and contract at different rates causing the strip to bend or coil when heated and cooled.

5**. Infrared Thermometer:** or (Thermogram) Converts infrared radiation into colors that can interpret a temperature difference. Can be used to measure heat loss in your home.

Terms:

Bimetallic strip

Calibrate

Celsius Scale

Fahrenheit Scale

Kelvin Scale

Thermocouple

Thermogram

Thermometer

Thermoscope

Review questions we answered in your notebooks in class:

1 Who invented the thermoscope?

2 Using the picture on page 122. Draw a thermoscope.

3 Describe what happens when the air in the upper “bulb” of a thermoscope is cooled.

4 Why was Galileo’s thermoscope not considered a thermometer? What could it show?

5 What two substances did Fahrenheit use to mark 0 and 100 on his thermometer?

6 Using the Fahrenheit scale, what is the freezing point of water? What is the boiling point of water?

**Review questions from Nov 27**

1 State **two** advantages of using a thermocouple instead of a laboratory thermometer?

2 State **two** differences between a thermoscope and a thermometer?

3 Define Temperature.

4 If the temperature in a freezer was -6 C, what might happen to the food inside? Why?

5 Describe Galileo’s first Thermoscope. What liquid was used in the Thermoscope?

6 What is the difference between the Celsius and Kelvin scale of temperatures?

7 Explain how a Thermogram is made.

8 Why was the Celsius scale named after Anders Celsius even though many others used 0 and 100 to calibrate thermometers?

9 Why was -273.15 C chosen for 0 on the Kelvin temperature scale?

10 Bimetalic strips and thermocouples are made from two different metals. What properties of the metals allow these devices to measure temperature?

11 Describe the difference between the independent and dependent variable. Which axis are they plotted on?

Student must know how to plot a labelled bar graph or line graph from a given experiment in which data has been collected. (See Scientific literacy assessment section of web page)