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| Name | Physical property based upon | How it operates | Range (◦C) | Usage | Advantages | Disadvantages |
| Liquid in glass   * Alcohol | Liquid expansion | When the liquid in the bore is heated, it expands moving up the bore of the thermometer | -20 - 50 | \*Walk-in freezers  \*Artic conditions | \*Cheap  \*Lightweight  \*Portable  \* Easy to use  \*High expansion  - thick bore  \* Low freezing point | \* Colorless- difficult to see (dyed red)  \*Sticks to bore  (adhesive with glass)  \*Not a “remote sensing device”  \* Cannot measure high temperatures |
| Liquid in glass   * Mercury   (Laboratory) | Liquid expansion | When the liquid in the bore is heated, it expands moving up the bore of the thermometer | -10 - 110 | \*Laboratory | \*Cheap  \*Lightweight  \*Portable  \* Easy to use  \*Low expansion  - thin bore  \* High freezing point | \* Cannot measure low temperatures  \*Not a “remote sensing device” |
| Liquid in glass   * Mercury   (Clinical) | Liquid expansion | When the liquid in the bore is heated, it expands moving up the bore of the thermometer | 35 - 42 | \*Medical | \*Cheap  \*Lightweight  \*Portable  \* Easy to use  \*Sensitive (reads down to 0.1◦C)  \*Constriction “holds” reading | \*Not a “remote sensing device” |
| Bimetallic strip thermometer | Solid expansion | Two metals of different linear expansivity are melded together and shaped into a coil. One end is fixed and the other attached to a pointer. As it expands it curves such that the metal of greater expansivity will be on the outer arc. | -100 - 550 | \*Cooking thermometers  - Oven  - Meat  - Candy | \*Cheap  \*Lightweight  \*Portable  \* Easy to use  \* Rugged  \* Large range | \*Low accuracy  \*Not a “remote sensing device” |
| Constant volume gas thermometer | Gas pressure increases with temperature | Under conditions of constant volume, gas pressure is directly proportional to temperature | -200 - 800 | \* “Gas” Laboratories  \*Calibrating thermometers | \*Very high accuracy  \* Large range | \*Expensive  \*Bulky  \*Very difficult to use  \*Too responsive |
| Name | Physical property based upon | How it operates | Range (◦C) | Usage | Advantages | Disadvantages |
| Thermocouple | Thermoelectric effect | If the junctions of two different metals are held at different temperatures a current is produced that is proportional to the temperature difference at the junctions | -200 - 1500 | \* Car temperature gauge  \* Industry | \* Very responsive  \* Remote reading  \* Large range  \* Not expensive  \* Rugged | \*Not easily portable |
| Thermister | The resistance of a semiconductor decreases with increasing temperature | The resistance of the semiconductor is proportional to the temperature | -200 - 1500 | Industry | \* Very responsive  \* Remote reading  \* Large range  \* Not expensive  \* Rugged | \*Not easily portable |
| Platinum resistance thermometer | The resistance of a metal increases with increasing temperature | The resistance of the metal is proportional to the temperature | -200 - 1500 | Industry | \* Very responsive  \* Remote reading  \* Large range  \* Not expensive  \* Rugged | \*Not easily portable |