

Heat

Math Skills

Temperature and Thermal Equilibrium

1. The temperature at one of the Viking sites on Mars was found to vary daily from -90.0°F to -5.0°C . Convert these temperatures to Kelvin.

2. Mercury boils at 357°C and freezes at -38.9°C .

a. Convert these temperatures to Kelvin.

b. Can a mercury thermometer be used to measure temperatures between 500°C and 600°C ? between 100°C and 200°C ?

3. You walk out of a sauna at 45°C into a tub in which the water temperature is 309 K .

a. Is your skin initially in thermal equilibrium with the water?

b. Is your bath going to feel cold or warm?

4. Nitrogen becomes a liquid at -195.8°C under atmospheric pressure. Oxygen becomes a liquid at -183.0°C .

a. Convert these temperatures to Kelvin.

b. A sealed tank containing a mixture of nitrogen and oxygen is cooled to 82.8 K and maintained under atmospheric pressure. Are the contents now a liquid or a gas? Explain.
