1. How many Earths could fit across the Sun? How many across a sunspot?
The Sun’s diameter is about 100 times that of the Earth (page 260). Sunspots are about the size of the Earth (page 268).

2. What is the central temperature of the Sun? What is the surface (photosphere) temperature?
The temperature in the Solar core is about 15 million Kelvin (page 262). The temperature of the photosphere (where the light that we see comes from) is 5800 K (Table 10.1).

3. Mad Professor X assumes superhuman powers and squeezes the Sun’s core. Circle what happens next:

   The core compresses and **heats up** / cools down. This leads to **higher** / lower nuclear speeds at the center and therefore a **higher** / lower rate of energy generation. The consequent **increase** / **decrease** in thermal pressure **expands** / contracts the core. Hence, as MPX squeezes the Sun’s core, **it acts to resist further compression** / it contracts even more, leading to catastrophic implosion.

This is how the Solar thermostat works (page 264). A compressed gas heats up – think of a bike pump. Higher temperatures mean faster speeds at the atomic level so the nuclei are moving faster which results in more frequent interactions and the nuclear reaction rate therefore increases. This increases the temperature yet more and the thermal pressure goes up, resisting the initial compression. That is, the core acts to restore itself to its original state, like a thermostat controlling the temperature in a room. Later we shall see that when the hydrogen runs out, this safety valve no longer exists and the star collapses catastrophically.