

Why a Metal Spoon Warms in Soup

Name _____

Date _____

Fill in the gaps so that the text makes sense.

When a cool metal spoon is placed in hot soup, the submerged end gains thermal energy from the liquid. Fast-moving molecules in the soup collide with atoms at the spoon's surface and transfer some energy to them.

Within the metal, neighbouring atoms vibrate and pass energy onwards. Mobile electrons also carry energy rapidly through the solid. This process is called _____ : the transfer of thermal energy through a material without the material moving as a whole. Metals conduct well because their mobile electrons help spread energy more quickly than in materials such as wood or plastic. Stirring keeps bringing hotter soup into contact with the submerged metal, so the transfer continues efficiently.

As energy travels along the spoon, the _____ warms, although it is not directly immersed. This part is the end held by the hand, rather than the spoon as a whole. It usually remains cooler than the submerged part because energy is lost from its exposed surface to the surrounding air.

The warming rate depends on the metal, spoon thickness and temperature difference. If both were left together long enough in an insulated container, they would approach thermal _____ : a state in which they have the same temperature and no net energy is transferred between them. In an ordinary bowl, however, energy also escapes, so the soup cools as the spoon warms.