

# Answers to the Physics of the Microwave Oven

1. Microwaves.
2. Microwaves are transverse electromagnetic waves.
3. Microwave radiation transfers energy to the food, increasing its thermal energy.
4. Water molecules absorb microwaves and vibrate more, heating the food.
5. Microwaves penetrate into the food, so energy is transferred below the surface.
6. 3.5 A.
7. 1150 W.
8. 180 s.
9. 162000 J.
10. 180 s.
11. 0.12 m.
12.  $2.5 \times 10^9$  Hz.
13. The metal walls reflect microwaves back into the oven so more energy is absorbed by the food.
14. Metal reflects microwaves and can cause sparks.
15.  $1.2 \times 10^3$  J each second, or 1200 W.
16.  $2.88 \times 10^5$  J.
17. a)  $7.2 \times 10^5$  J  
b) 720 kJ  
c) 0.2 kWh.