

P1 – Infra-red and Kinetic Energy Quiz

1. Why is it best to paint the outside of a metal cooking pot black?

Because black is a good absorber of heat. The heat will be used to cook the food.

2. Why does a cooking pot have a lid?

To reduce energy loss by convection.

3. Why is a car radiator painted black?

Black is a good emitter of heat, the heat is emitted to the surroundings to keep the engine cool.

4. Explain why thermal imaging cameras work better at night than during the day.

At night the surroundings are cooler so the surroundings emit less IR radiation than the warm body and this gives a clearer image.

5. What is the name given to heat transfer from particle to particle?

Conduction

6. What name is given to the heat transfer by the movement of hot liquids?

Convection

7. Why is the outside of a fire fighter's suit shiny?

To reflect heat away from the fire fighter.

8. How is heat transferred through a metal?

Free electrons inside the metal gain kinetic energy and collide with the metal ions.

9. Why are radiators painted white and not black?

If they were painted black, they would transfer heat too quickly and the water temperature inside the radiator would drop too quickly. The next radiator would then stay cold.

10. How does the Sun transfer heat?

Radiation

11. A bag is filled with water and placed in the Sun. What colour should the bag be so that the water can be warmed?

Black, as black surfaces are good absorbers and emitters of thermal energy. Heat from the Sun is absorbed and used to heat the water.

12. Which methods of heat transfer are reduced by a vacuum?

Convection and conduction as both require particles.

13. Which method of heat transfer is reduced by silver surfaces?

Radiation; heat is reflected

14. Which methods of heat transfer are reduced by plastic caps?

Conduction as plastics are good insulators & convection

15. Why does a fridge have a white shiny surface?

A white shiny surface is a poor absorber of heat and reduces heat transfer into the fridge. The heat is reflected instead.

16. How is energy transferred from the base of a sauce pan to the water inside the pan?

Water particles at the bottom gain energy and move faster; the density of water decreases; hot water rises and is replaced by cold water

17. What is thermal radiation?

infra-red radiation

18. Why does warm water freeze quicker inside a freezer than cold water?

The rate of heat transfer is greater with warm water.

19. Why does 1kg of a gas have a larger volume than 1 kg of a solid?

There are strong forces of attraction between the particles in a solid holding the particles close together. In a gas the forces are very small so the particles can spread out.

20. Why does the temperature of a liquid decrease as the liquid evaporates?

The particles with most energy leave the liquid and the mean energy of the remaining particles decreases so the temperature goes down.

21. Why does sweating cool you down?

To evaporate the sweat requires energy which is taken from the skin/body.

22. How can you speed up evaporation?

Increase the surface area; use wind/draughts to allow particles with high energy to escape from the liquid

23. Describe the arrangement of particles in solids, liquids and gases.

In solids, particles vibrate around fixed positions. In liquids they are arranged in a pattern, in gases they move at high speed in any direction.

24. What is the ideal weather for drying clothes outside?

Warm/sunny and windy