
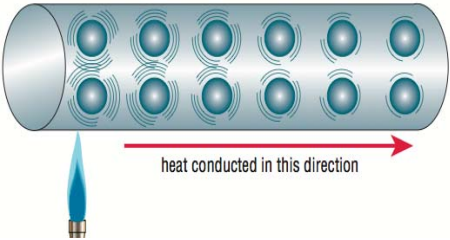
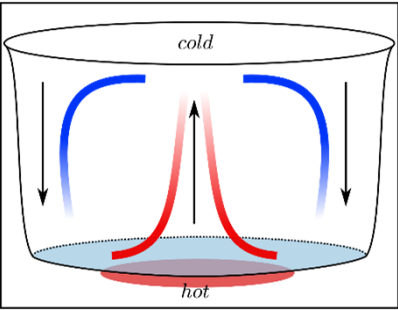



## Y8 - Knowledge organiser – 8.4 – Work & Heating and Cooling

<p><b>Work</b> <span style="float: right;"><u>1</u></span></p> <ul style="list-style-type: none"> <li>• Work is done when a <b>force</b> moves an object.</li> <li>• The bigger the force the greater the work.</li> <li>• The bigger the <b>distance</b>, the greater the distance.</li> <li>• Machines (like <u>levers</u>) reduce the force needed so make work easier.</li> </ul>	<p><b>Equation</b> <span style="float: right;"><u>2</u></span></p> <div style="text-align: center;">  </div> <ul style="list-style-type: none"> <li>• Work done is measured in <b>joules, J</b></li> <li>• Force is measured in <b>Newtons, N</b></li> <li>• Distance moved is measured in m</li> </ul>	<p><b>Keywords</b> <span style="float: right;"><u>3</u></span></p> <ul style="list-style-type: none"> <li>• <b>Input force</b>: the force you apply to a machine</li> <li>• <b>Output force</b>: the force that is applied to an object moved by a machine.</li> <li>• <b>Displacement</b>: the distance an object moves</li> <li>• <b>Deformation</b>: when an elastic object is stretched or squashed.</li> </ul>	<p><b>Thermal Energy</b> <span style="float: right;"><u>4</u></span></p> <ul style="list-style-type: none"> <li>• <b>Thermal energy</b> depends on <b>mass</b>, <b>temperature</b> and what the material is made of.</li> <li>• When there is a temperature difference, heat moves from the hot object to the cold one.</li> </ul>
<p><b>Conductors and Insulators</b> <span style="float: right;"><u>5</u></span></p> <ul style="list-style-type: none"> <li>• <b>Thermal conductor</b>: material that allows heat to move quickly through it.</li> <li>• <b>Thermal insulator</b>: material that only allows heat to travel slowly through it.</li> <li>• <b>Temperature</b>: the amount of energy stored due to vibration of an objects particles.</li> </ul>	<p><b>Conduction</b> <span style="float: right;"><u>6</u></span></p> <ul style="list-style-type: none"> <li>• Transfer of heat energy by the vibration of particles that make up the object.</li> <li>• Most common in solids.</li> </ul> <div style="text-align: center;">  </div>	<p><b>Convection</b> <span style="float: right;"><u>7</u></span></p> <ul style="list-style-type: none"> <li>• <b>Convection</b>: Transfer of heat energy when particles in a heated <b>fluid</b> rise.</li> <li>• Happens in fluids, which are liquids and gases.</li> </ul> <div style="text-align: center;">  </div>	<p><b>Radiation</b> <span style="float: right;"><u>8</u></span></p> <ul style="list-style-type: none"> <li>• <b>Radiation</b>: transfer of heat energy as a wave.</li> <li>• Can happen in a <b>vacuum</b> – no particles are needed.</li> </ul> <div style="text-align: center;">  <p style="text-align: center;"><b>Radiation</b></p> </div>

# Knowledge organiser test

1. What 2 things does thermal energy depend on?
2. What direction does heat move in?
3. What is a thermal conductor?
4. What is a thermal insulator?
5. What is temperature a measure of?
6. What state of matter does conduction happen in?
7. What happens to particles in a solid when you heat them up?
8. How does conduction work?
9. What happens to the thermal energy of an object when it cools down?
10. Which has more thermal energy; a cup of coffee at 80° or a bathtub of water at 40°?

# Knowledge organiser quiz

1. What is the equation for work done?
2. What is the unit of work done?
3. What is the unit of force?
4. What is meant by displacement?
5. What is meant by input force?
6. What happens to work done when you increase the force?
7. What happens to the force required to move an object when you increase the length of a lever?
8. What is work done?
9. What effect does increasing the distance have on the work done?
10. If you wanted to make a nut easier to unscrew what could you do to the length of a spanner?

# Answers

1.  $W = F \times D$
2. Joules (J)
3. Newtons (N)
4. The distance an object moves
5. The force you apply to a machine
6. It increases
7. It decreases
8. The energy transferred
9. Increases the work done
10. Increase the length of the spanner