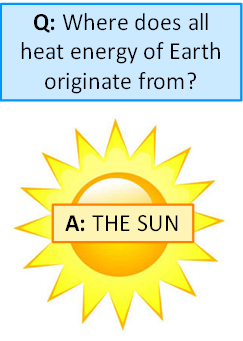
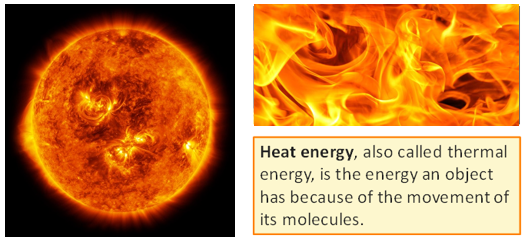
|  |  |
| --- | --- |
| **YEAR 8** | **Heat (Thermal) Energy** |

|  |  |  |
| --- | --- | --- |
| **Learning Intentions** | | **Success Criteria** |
| Understand heat (thermal) energy. | * Describe thermal energy. * Describe the effects of adding/removing thermal energy to objects, in terms if:   + Change of temperature   + Change of state   + Movement of particles   + Distance between particles * Recognise and list examples of useful and wasted heat energy. | |

**READ:** *Heat Energy*



<https://www.quantamagazine.org/what-is-the-sun-made-of-and-when-will-it-die-20180705/>

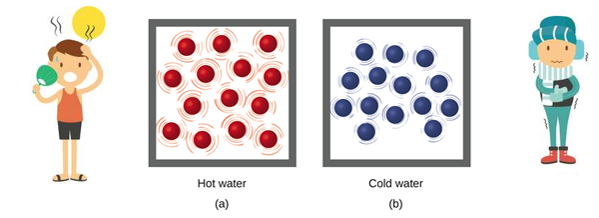
<https://www.moreechampion.com.au/story/5179605/pilliga-forest-fire-continues-to-burn/>

**ACTIVITY 1:** *Useful & Non-Useful Heat Energy*

Most heat energy is not useful and considered wasted energy. List examples of heat energy that is useful and another list of heat energy that is not useful.

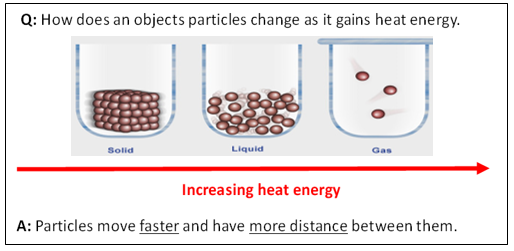
|  |  |
| --- | --- |
| **Useful heat energy** | **Wasted heat energy** |
| *e.g. Hair dryer* | *e.g. heat from laptop* |

**READ:** *Heat, Thermal Energy & Temperature*



<https://www.123rf.com/photo_99938899_stock-vector-opposite-english-words-cold-and-hot-vector-illustration.html>

<https://courses.lumenlearning.com/suny-chem-atoms-first/chapter/energy-basics/>

* **Hotter substances** have particles that are moving **faster** and are **further apart**.
* **Colder substances** have particles that are moving **slower** and are **closer together.**

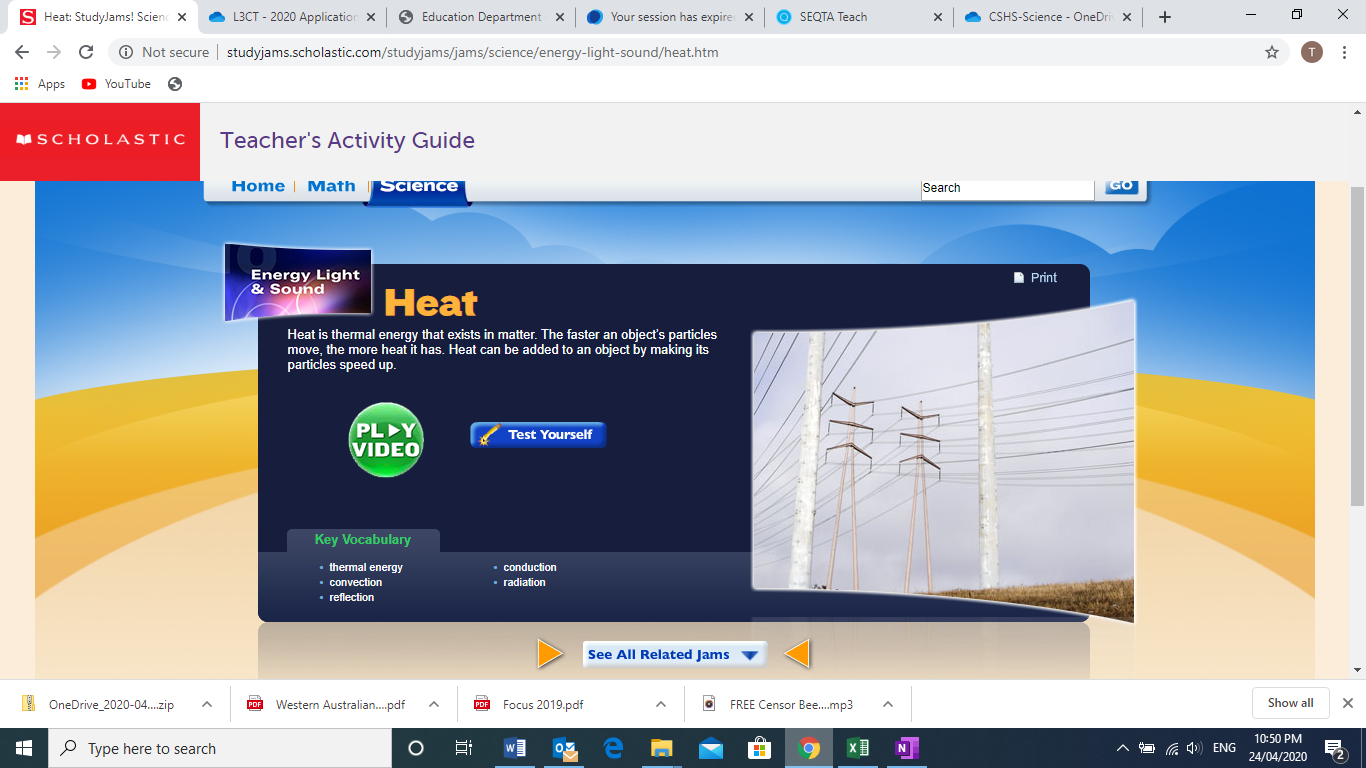
<https://www.abc.net.au/science/articles/2010/03/16/2840402.htm>

 **Heat energy**can be transferred from one object to another.

The transfer or flow due to the difference in temperature between the two objects is called**heat.  
  
Heat Energy Transfer:** Objects with a higher temperature will transfer heat to lower temperature objects.

<http://www.brooklyn.cuny.edu/bc/ahp/MBG/MBG4/BE.SL.02.html>

**ACTIVITY 2:** *Heat on Scholastic*



**Image:** <http://studyjams.scholastic.com/studyjams/jams/science/energy-light-sound/heat.htm>

**YOUR TASK:**

1. GO TO: <http://studyjams.scholastic.com/studyjams/jams/science/energy-light-sound/heat.htm>
2. Watch the video about heat from “Scholastic Study Jams”
3. Complete the “Test Yourself” activity provided.

**ACTIVITY 3:** *Thermal Energy Transfer*

**GO TO:** <http://pbslm-contrib.s3.amazonaws.com/WGBH/conv16/conv16-int-thermalenergy/index.html#/intro>

**YOUR TASK:** Work through the interactive and answer the questions provided.

**BIG QUESTIONS:**

1. What makes something hot or cold?

|  |
| --- |
|  |
|  |

1. How do things get warmer or cooler?

|  |
| --- |
|  |
|  |

**THE SUN WARMS EARTH:**

1. What keeps our planet at a temperature that can support life?

|  |
| --- |
|  |
|  |

1. Why are some parts of the planet warmer than others?

|  |
| --- |
|  |
|  |

1. How does transfer of thermal energy relate to earthquakes and volcanoes?

|  |
| --- |
|  |
|  |

**AROUND A CAMPFIRE:**

Picture yourself at a campfire. What do you notice?

1. Why might you feel warmer?

|  |
| --- |
|  |

1. What causes the marshmallow to melt?

|  |
| --- |
|  |

1. What should you use to hold the marshmallow over the fire?

|  |
| --- |
|  |

1. Why does smoke rise from the fire?

|  |
| --- |
|  |

**STAYING COOL ON A HOT DAY:**

1. What kinds of floor surfaces feel more comfortable?

|  |
| --- |
|  |

1. How does your body react to the heat?

|  |
| --- |
|  |

1. Where can you go to cool off?

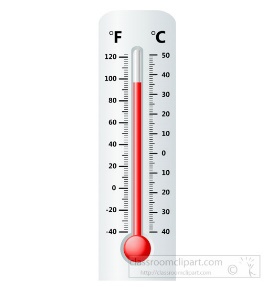
|  |
| --- |
|  |

**SOLAR ENERGY IN YOUR HOME:**

1. How can your house be designed to take advantage of the ways that thermal energy is transferred?

|  |
| --- |
|  |

**ACTIVITY 4:** *Heat vs. Temperature*

**YOUR TASK:** Learn about heat vs. temperature by reading the text below and using the word bank to fill in the missing information.

Heat and temperature are not the same! Temperature is a measure of how \_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_ something is. It is measured in degrees \_\_\_\_\_\_\_\_\_\_\_\_ (oC) .For example: the temperature of \_\_\_\_\_\_\_\_\_\_\_\_ water is 100oC and the temperature that water \_\_\_\_\_\_\_\_\_\_\_\_\_ at is 0oC.

 Heat is the amount of \_\_\_\_\_\_\_\_ energy something has. It is measured in \_\_\_\_\_\_\_ (J). The amount of thermal energy depends on the \_\_\_\_\_\_\_\_ energy of its particles. The faster the \_\_\_\_\_\_\_\_\_ move the more thermal energy it has.

Heat vs Temperature of a sparkler

* The tiny sparks are at a very high \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .
* Each particle in the spark is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a lot because it is very hot.
* But as there are not many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the total amount of heat energy is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

Heat vs temperature of a warm bath  
The water is at a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ temperature than the sparkler but it contains more heat \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This is because it contains more \_\_\_\_\_\_\_\_\_\_\_. Each particle is vibrating \_\_\_\_\_\_\_\_\_\_\_\_ as it is at a lower temperature BUT because there are so \_\_\_\_\_\_\_\_\_\_\_\_\_\_ - there is more \_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy.

Images: <https://classroomclipart.com>

***WORD BANK:***

***celsius lower thermal joules many freezes***

***particles kinetic less cold smaller boiling***

***energy vibrating temperature hot***

**END OF WEEK TEST:** *Heat (Thermal)**Energy*  
**Question 1**List five examples of heat (thermal) energy.

|  |  |
| --- | --- |
| **1** |  |
| **2** |  |
| **3** |  |
| **4** |  |
| **5** |  |

**Question 2**Some sound energy is useful. Some sound energy is not useful and considered wasted energy. List five (5) examples of sound energy that is useful and another five (5) examples of sound energy that is not useful.

|  |  |  |
| --- | --- | --- |
|  | **Useful heat energy** | **Wasted heat energy** |
| **E.g.** | *The radio in a car* | *The engine sound in a car* |
| **1** |  |  |
| **2** |  |  |
| **3** |  |  |
| **4** |  |  |
| **5** |  |  |

**Question 3**

Jason’s mum has always told him*, “Close the door – you are letting the cold air in”.* Is Jason’s mum’s statement correct or incorrect in terms of heat transfer? Explain your answer.

|  |
| --- |
|  |

Rate your understanding of heat (thermal) energy:  
 