Aim

The aim of the revision activity is to provide support for students who need to progress from *developing* to *secure* for the core National Curriculum statements.

The aim of the extension activity is to provide extension for students who have already achieved *secure*. The activity is also suitable for higher ability or older students in need of further extension work.

Revision activity notes

The revision activity asks students to work through a number of tasks to help them move towards demonstrating a secure grasp of key concepts from this chapter. Suggestions are given in the Teacher Handbook of how you can support students in making progress for each outcome.

Additional notes:

- The revision sheet should be appropriate for students achieving less than 61 % in the Checkpoint assessment.
- You can review students' answers to questions in the Checkpoint assessment in Kerboodle. You may decide not to cover all tasks in the revision sheet, based on students' performance on specific questions.
- An index of which task covers which outcome is given in the Teacher Handbook.
- Students should be given a chance to see some of the experiments discussed in the tasks as demonstrations or as mini-experiments to reinforce their understanding of key concepts. This is particularly true for Task 5, where students will benefit from seeing how equipment that is left on uses more energy despite a constant power rating using an energy monitor.
- This sheet could also be used as a revision sheet for all students.

Revision activity answers

Task 1

1 Petrol – highest energy value per kilogram.

2 **a** Leon = 12 400 kJ, James = 8700 J.

b Leon should eat foods with higher energy content, for example, cheese (dairy) and bread (carbohydrate).

James should eat foods with lower energy content, for example lettuce (vegetable).

Task 2

1 Energy cannot be created or destroyed, only transferred.

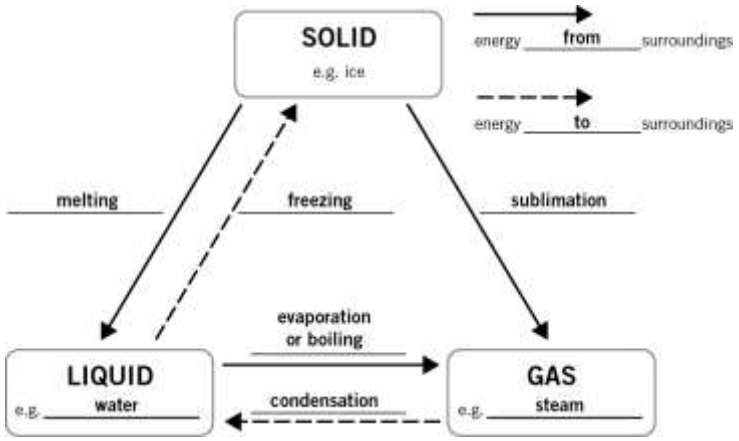
2 Before the coal is burnt, there is more energy in the chemical store and less energy in the thermal store. Afterwards, there is less energy in the chemical store and more energy in the thermal store.

3 simple machine, pivot, force, bigger, force, force multiplier, distance, smaller, distance

Task 3

1 Energy – a measure associated with changes in temperature or with work, measured in joules.
Temperature – a measure of hot or cold something is, measured in degrees Celsius.

2



3 Hot objects cool down so energy is transferred from a hot object to a cooler object. This happens until both objects are at the same temperature – they have reached equilibrium.

4 **a** Arrow from the cup to the surroundings.

b Particles are heated by the contents of the cup and vibrate more. These particles transfer energy by colliding with other particles further away from the hot liquid. Energy is transferred until the two surfaces are at the same temperature (equilibrium).

c Credit suitable choice of insulators because these are poor conductors of energy as they do not have delocalised electrons. This slows down the energy transfer and keeps the drink hot for longer. This also avoids burning the person who is holding the drink.

5 **a** the Sun, a lamp, a fire

b All sources of infrared radiation are hot objects.

c Energy is transferred as waves. Particles are not needed for radiation.

Task 4

1 Wood is a renewable source of energy because the supply of wood will not run out. Trees can be planted that grow relatively quickly. Coal is a type of fossil fuel that will eventually run out and so is a non-renewable source of energy.

2 burns the fuel, heats water to steam, spins the generator, generates electricity

Task 5

1 Energy – joule, increases
Power – watt, stays the same

2 **a** energy of incandescent light bulb = 0.04 kW × 10 h = 0.4 kWh
energy of energy-saving light bulb = 0.012 kW × 10 h = 0.12 kWh

b The incandescent light bulb has a much higher power and will cost more to run. More fuel will be required to generate the energy required for the incandescent bulb to work for 10 hours compared to the energy-saving light bulb.

3 **a** work done = 20 N × 0.5 m = 10 J

b 40 J – 30 J = 10 J

Extension activity notes

Students work as consultants to produce a report to present the best method of electricity generation to local councils at three different sites across England, Scotland, and Wales.

Additional notes:

- It is recommended that this activity is only given to students achieving 61 % or more in the Checkpoint assessment.
- Students will use their literacy skills to explain the different methods of electricity generation, including at least one advantage and one disadvantage of using each method.
- This activity could also be used as extension material for older students, as a recap on energy resources and electricity generation.

Extension marking guidance

The report should include the following points:

- a list energy resources used to generate electricity. For example, fossil fuels, wave power, hydroelectricity, wind power, biomass, solar cells, and geothermal sources.
- at least one advantage and one disadvantage of each method, chosen from this list as appropriate: availability, amount of energy transferred per kilogram of fuel, greenhouse gas emissions, and cost.
- other resources needed for each method, for example: access to large supplies of coal, oil, or gas, access to nuclear fuels, landscape with mountains or fast flowing rivers, waves, or tides, high levels of sunlight, and windy exposed areas.

Students should end their reports with a conclusion on the most appropriate method of electricity generation for each area, justifying their answers. For example:

- City in England on flat land

  Thermal (fossil fuel) power station because a large number of people require a constant supply of electricity.

- Windy town in Scotland in a mountainous region

  Hydroelectricity or wind power because there will be fast flowing rivers/exposed windy sites. These are also renewable energy sources.

- Several small groups of houses in coastal Wales

  Wind power as each home may require its own energy supply. Alternatively wave/tidal energy as there is access to the sea. These are also renewable energy resources.