

# A project English and Science

## Step 1: What do we need energy for?

 What do we need energy for? Talk in groups and make clusters.



## Step 2: Find out about energy changes

a) Read this page from an English Science book:

A stone is thrown ...      ... and falls.

energy stored in muscles

stone moves through the air

stone at highest point

stone falls

stone hits wall

chemical energy → kinetic energy → potential energy → kinetic energy → thermal energy

To do work, you have to spend energy. But, like money, energy doesn't disappear when you spend it. It goes somewhere else! People talk about 'using energy', but energy is never used up. It just changes into different forms.

The pictures above show a sequence of energy changes. The last one is from kinetic to thermal energy. When the stone hits the wall, it makes the atoms and molecules in the stone and the wall move faster, so the materials get hotter. During each change, the amount of energy stays the same.

adapted from: *Complete Physics* – by Stephen Pople

b) Which energy is it? Use the information in the pictures and the text.

1. ... energy is another word for 'heat'.
2. ... energy is the energy stored in food, fuels and batteries (and muscles!)
3. ... energy is the energy in objects that move.
4. ... energy is the energy stored in objects that have been raised.

kinetic

thermal

potential

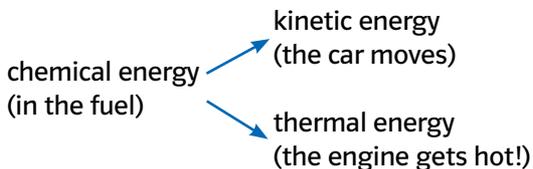
chemical

stored [stɔ:d] – *gespeichert*, muscle ['mʌsl] – *Muskel*, chemical ['kemɪkl], kinetic [kɪ'netɪk], potential [pə'ɒtənʃl], thermal ['θɜ:ml], to spend [spend] – *einsetzen*, to disappear [dɪsə'piə] *verschwinden*, to use up [ju:z'ʌp] – *aufbrauchen*, sequence ['si:kwents] – *Abfolge*, atom ['ætəm], molecule ['mɒlɪkjʊ:l], material [mə'tɪəriəl] – *Stoff*, amount [ə'maʊnt] – *Menge*, heat [hi:t] – *Hitze*, fuel ['fju:əl] – *Treibstoff*; to raise [reɪz] – *hochheben*

### Step 3: Energy changes

Energy changes happen all around us, every day.

*Example:* When a car is driven ...



Use the example as a model. Show the energy changes that happen ...

1. ... in a light bulb, when the light is switched on.
2. ... in a campfire.

chemical energy

electrical energy

thermal energy

light

### Step 4: An experiment with thermal energy

Thermal energy is 'lost' every day, for example when warm water cools down. (But remember: energy that is 'lost' like this does not disappear. It just spreads out so thinly that it becomes very difficult to do anything with the energy.)

- a) *How can you keep a liter of warm water warmer longer? Try out the three methods in the picture. Measure the temperature of the water at the beginning and the end of the experiment. Which method was best?*



bottle

bottle in a bag

thermos flask

- b) *Write a report about the experiment. Use the tips below.*

#### WRITING SKILLS

1. **Hypothesis.** What did you think would happen before you did the experiment? (We wanted to show that ... We expected ... because ...)
2. Give a list of the **equipment** you used.
3. Describe your **method**. (First we ... Then we ...)
4. Give your **results**. You can show the results in a table/in a list ...
5. Write your **conclusion**. What do the results tell you? (We were right. The results show that ... We were not right. We expected that ... but ...)

- \* c) *Think about how you could use the results of this experiment to save energy at home and at school.*

engine [ˈendʒɪn] – *Motor*, to cool down [ku:l 'daʊn] – *abkühlen*, to spread out [sprɛd 'aʊt] – *sich verteilen*, liter ['li:tə] – *Liter*, method ['meθəd] – *Methode*, to measure [ˈmeʃə] – *messen*, temperature [ˈtemprətʃə] – *Temperatur*, thermos flask [ˈθɜ:mɒs ˌflɑ:sk] – *Thermoskanne*, hypothesis [haɪ'pɒθəsɪs] – *Hypothese, Annahme*, conclusion [kən'klu:ʒən] – *Schlussfolgerung*