The 'cooking an egg using least energy' challenge

- Your task

Your school has been challenged by the promoters of "Energy-Saving" week in your local area to cook an egg over a nightlight, using a tripod and aluminium foil. They want to see which group uses the least energy to cook their egg.

Based on a suggestion by S. Lindley.

Time

30-60 minutes depending on the group.

Group size

2–3.

Equipment & materials

Eye protection.

Per group
A tripod, kitchen foil (limited to about 0.25 square metre at most), a nightlight or candle, heatproof mats, matches, spoons, an empty tin. A top pan balance.

An egg, sodium chloride (flavouring!).

Health & Safety notes

This is an open-ended problem solving activity, so the guidance given here is necessarily incomplete. Teachers need to be particularly vigilant, and a higher degree of supervision is needed than in activities which have more closed outcomes. Students must be encouraged to take a responsible attitude towards safety, both their own and that of others. In planning an activity students should always include safety as a factor to be considered. Plans should be checked by the teacher before implementing them.

You must always comply with your employer's procedures and in some cases may decide that a particular activity is inappropriate in your situation. Further information on Health and Safety should be obtained from reputable sources such as CLEAPSS [*http://science.cleapss.org.uk/*] in England, Wales and Northern Ireland and, in Scotland, SSERC [*https://www.sserc.org.uk/*].

It would be best to use eggs with a lion stamp, as these should be salmonella free. Consider the safety aspects of eating in the lab.

Eye protection is advisable when heating anything using a flame.

It is the responsibility of the teacher to carry out a suitable risk assessment.

Curriculum links

Energy, insulation.

Possible approaches

Students are given little information about the factors which will affect the speed of cooking. They usually realise surrounding the flame with aluminium foil conserves energy. **NB** By doing so it is fairly

easy to prevent oxygen getting to the flame so that it goes out! Covering the egg with foil decreases cooking time significantly. Eggs cook much faster if they are scrambled (mixed) first. If this experiment could be done in the Home 'Eggonomics' department students could actually eat their results (experiment has cross-curricular possibilities) – the results are often surprisingly edible. If the foil splits the reaction gets messy and smelly.

Evaluation of solution

The mass of the nighlight is measured before and after the experiment to see which group has used least energy.

Suggested write-up

Students could produce a poster for display at the 'Energy-Saving' week, showing the steps they took to produce their cooked egg. They might also include some of the actual materials they used.

Credits

Health & safety checked May 2018

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