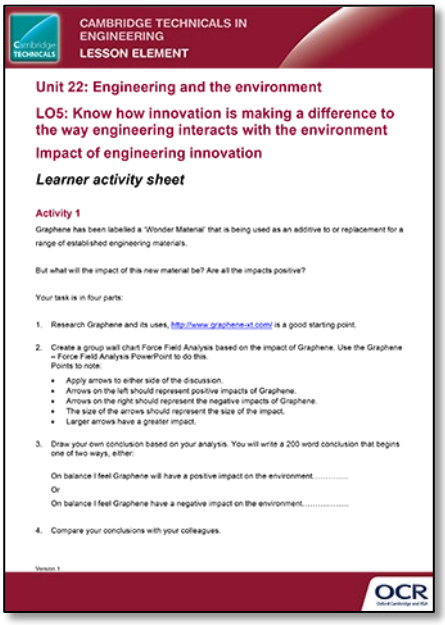
Unit 22: Engineering and the environment

LO5: Know how innovation is making a difference to the way engineering interacts with the environment

Impact of engineering innovation

Instructions and answers for teachers

These instructions should accompany the OCR resource 'Impact of engineering innovation' *activity which supports Cambridge Technicals in Engineering Level 3.*


CAMBRIDGE TECHNICALS IN ENGINEERING
LESSON ELEMENT

Unit 22: Engineering and the environment

LO5: Know how innovation is making a difference to the way engineering interacts with the environment

Impact of engineering innovation

Learner activity sheet

Activity 1

Graphene has been labelled a 'Wonder Material' that is being used as an additive to or replacement for a range of established engineering materials.

But what will the impact of this new material be? Are all the impacts positive?

Your task is in four parts:

1. Research Graphene and its uses, http://www.graphene-xt.com/ is a good starting point.
2. Create a group wall chart Force Field Analysis based on the impact of Graphene. Use the Graphene – Force Field Analysis PowerPoint to do this.
   Points to note:
   - Apply arrows to either side of the discussion.
   - Arrows on the left should represent positive impacts of Graphene.
   - Arrows on the right should represent the negative impacts of Graphene.
   - The size of the arrows should represent the size of the impact.
   - Larger arrows have a greater impact.
3. Draw your own conclusion based on your analysis. You will write a 200 word conclusion that begins one of two ways, either:

   On balance I feel Graphene will have a positive impact on the environment.....
   Or
   On balance I feel Graphene have a negative impact on the environment.....
4. Compare your conclusions with your colleagues.

Version 1

OCR

The Activity:

In this Lesson Element, learners will investigate Graphene.

This activity offers an opportunity for English skills development.

This activity offers an opportunity for maths skills development.

Suggested timings:

Activity 1: 2 hours

Activity 1

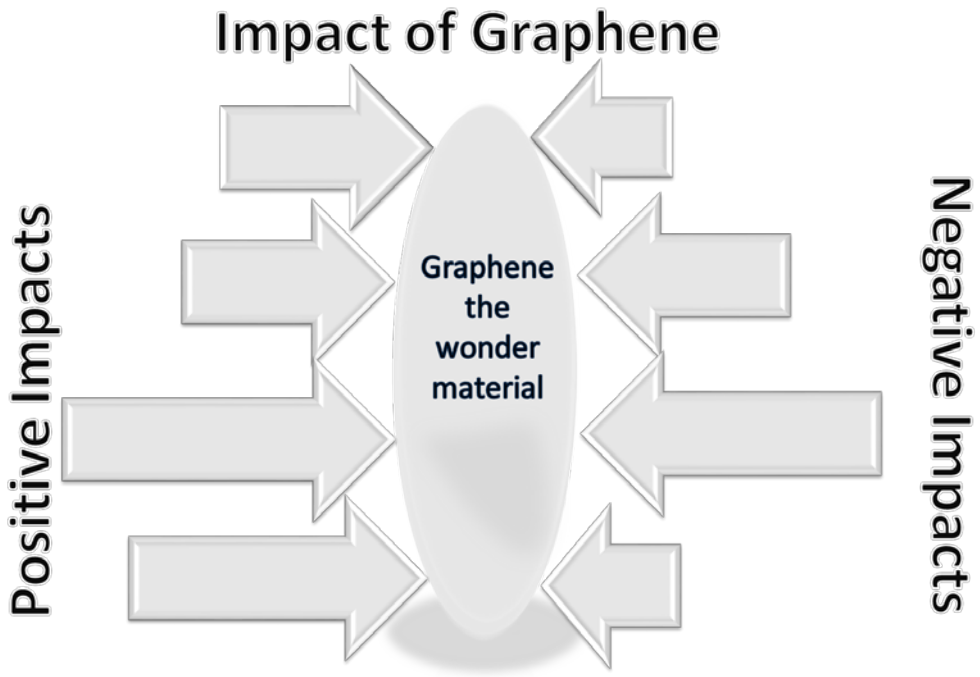
Graphene is a new engineering material that is right at the start of its life cycle. The properties of Graphene are extraordinary and organisations are rushing to find new uses and applications for the material.

Teachers should guide the learners to information on Graphene such as the G-Next website at: http://www.graphene-xt.com/ to find out about Graphene. There are links to YouTube videos on the site.

Learners then create a large annotated wall chart in the style of a Force Field Analysis. http://www.mindtools.com/pages/article/newTED_06.htm. The Mind Tools web site has an explanation of how to apply force field analysis.

Give the learners the Impact of Graphene – Force Field Analysis Power Point and advise them:

- To apply arrows to either side of the discussion.
- Arrows on the left should represent positive impacts of Graphene.
- Arrows on the right should represent the negative impacts of Graphene.
- The size of the arrows should represent the size of the impact.
- Larger arrows have a greater impact.



Learners could then be asked to draw their own conclusion based on the analysis.

They should write a short conclusion starting either:

1. On balance I feel Graphene will have a positive impact on the environment because ……..

Or

2. On balance I feel Graphene have a negative impact on the environment because ……..