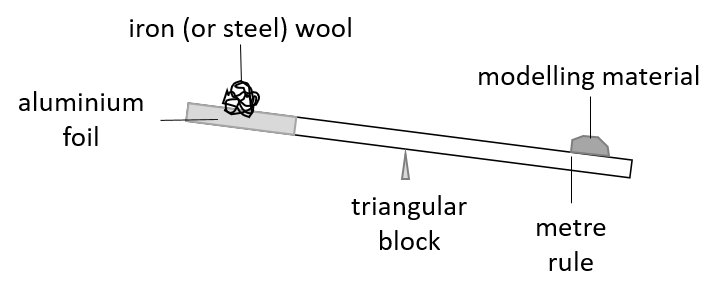
**Iron wool balance**

1. An experiment is set up as shown below.



**Predict**

What will happen to the balance as the iron wool burns?

**Explain**

Explain why you think this will happen.

A Bunsen burner is used to heat the iron wool from the top.

**Observe**

Do your observations agree with your predictions?

**Explain**

What do you now think is the correct explanation for what you observed?

*Chemistry > Big idea CCR: Chemical reactions > Topic CCR2: Understanding reactions > Key concept CCR2.2: Combustion*

|  |
| --- |
| **Response activity** |
| **Iron wool balance** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | During combustion new products are formed from the combination of oxygen with the fuel, resulting in an increase in measured mass. |
| Observable learning outcome: | Predict an increase in mass following the burning of a metal. |
| Activity type: | predict, explain, observe, explain |
| Key words: | mass |

This activity can help develop students’ understanding by addressing the misunderstandings revealed by the following diagnostic question:

* Burning iron wool

**What does the research say?**

Research carried out in New Zealand (Driver, Guesne and Tiberghien, 1985) found that about a quarter of twelve year olds predicted an increase in mass of iron wool when it burned. However, only a few gave the scientifically correct reason that oxygen combines with the iron. Some suggested that the increase would be due to physical changes such as the addition of soot from the flame.

About another quarter of students predicted the mass would stay the same. Some used the reasoning that the iron wool would still be there, but that it had changed into powder form.

The most popular response was that the iron wool would get lighter. The reasons give often related to a gas or smoke being given off or something being ‘burnt away’.

**Ways to use this activity**

This activity could be carried out as a pencil and paper task (using the Powerpoint as this includes a diagram of the observation needed.

Students may benefit from observing a demonstration of the actual experiment. In this case the worksheet should be used, and predictions made and discussed before heating the iron wool with the Bunsen burner. Further class discussion may be used to challenge any continuing misunderstandings.

**Equipment**

For the demonstration:

* metre rule
* aluminium foil
* iron or steel wool (about 4g)
* modelling material
* triangular block (or knife edge)

**Technician notes**

Full details of this demonstration may be found at [www.rsc.org/learn-chemistry](http://www.rsc.org/learn-chemistry) (See “The combustion of iron wool”).

The modelling material should be added so that that end of the rule is just down (this is important).

**Health and safety**

Eye protection should be worn and heat resistant mats used.

Aluminium foil should be wrapped around the metre rule in order to protect it from the Bunsen burner flame.

Practical work should be carried out in accordance with local health and safety requirements, guidance from manufacturers and suppliers, and guidance available from CLEAPSS.

**Expected answers**

The scientifically correct prediction is that the side of the rule on which the iron wool is placed will gradually lower. This is because its mass increases relative to the modelling material as oxygen combines with the iron during the burning process.

**Acknowledgments**

Developed by Helen Harden (UYSEG), from Children’s Ideas in Science (Driver et al., 1985).

Images: Helen Harden

**References**

Driver, R., Guesne, E. and Tiberghien, A. (1985). *Children's Ideas in Science,* Milton Keynes, UK: Open University Press.