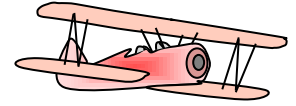




Bathurst Aero Club

Science Week – Aircraft Materials

Aircraft are made out of many different materials including metals, wood and plastics. Each of these materials has its own positive and negative features.



Sudden fracture of structural materials was one of the more common causes of accidents in early aircraft. Materials were selected for maximum strength and minimum weight and their fracture resistance was a lower priority. Now aerospace design engineers select materials based on a number of properties not just their strength.

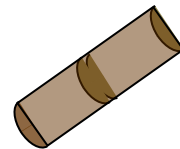
Experiment – Aircraft Material Properties

Materials can be classed as **Brittle** or **Ductile** depending on their behaviour leading to their failure.

A fun way to investigate these material properties is with a box of mixed chocolates!

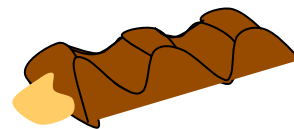
Brittle Material - These materials allow for little change before breaking. Examples of these materials used in aviation include glass and carbon fibre composites.

- Select a plain chocolate bar - like dairy milk
- Try breaking it apart.
- How does it crack?



Ductile Material – These materials can be stretched, bent and twisted before breaking. Examples of ductile materials used in aviation include aluminium and steel alloys.

- Now choose a caramel filled chocolate
- Try breaking it apart.
- How does it react?



Other Materials - Aircraft materials need a combination of many properties.

As you eat your other chocolates think about whether they are hard or soft, strong or weak, brittle or ductile. In what ways do you think these properties are used in aircraft design?