Name(s)

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Project Number

S1824

Project Title

Fatter Is Hotter: A Study of Cooling Rates Comparing Surface Area to Volume

Abstract

Objectives/Goals

To find which surface area to volume ratio wether it be big or small has the fastest cooling rate.

Methods/Materials

2 sets of 1 square, 1 rectangle, and 1 triangle are cut out of the same wood using a saw and tape measure. The madd of each shape is the same within sets. One set is half scale of the other. The surface area of each shape is recorded. After measuring the area for all of the shapes drill a hole in each shape for a thermometer. Put the digital thermometer in the hole. Place that shape into the pot of boiling water until the shape reaches 90 degrees Celsius. Pull out the shape using a pair of tongs and monitor the temperature. Recored the temperature shown every 60 seconds until the temperature stops dropping. Repeat until all of the figures have been tested.

Results

In the ratio of surface area to volume the small rectangle had the largest ratio which means the small rectangle cools the fastest. The large square had the smallest surface area to volume ratio. The large square had the slowest cooling rate only losing 0.83 degrees Celsius every minute. The small rectangle lost 2.46 degrees Celsius every minute. This suggests the bigger the surface area to volume ratio the faster it cools.

Conclusions/Discussion

In conclusion the data support the hypothesis. The results show that having a bigger surface area to volume ratio will cause the object to cool down faster while having a smaller surface area to volume ratio will cause the object to cool down slower. Although there are more shapes to be tested like sphere, cylinder, cone, or trapezoid, with knowing the cooling rates of these three different shapes; square, rectangle, and triangle there can be new ways to make cooling systems.

Summary Statement

This project is about cooling rates comparing surface area to volume.

Help Received

father helped cut shapes and make data graphs