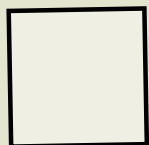
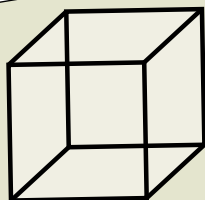


FUEL FOR THOUGHT

AMAZING MEASURING!



Two Dimensions



Three Dimensions

When we use a ruler to measure the length of a line, that is measuring in one dimension. Measuring the area of a flat surface is measuring in two dimensions. Measuring in 3-D is called measuring something's **volume**.

GOLF CLUB RULES

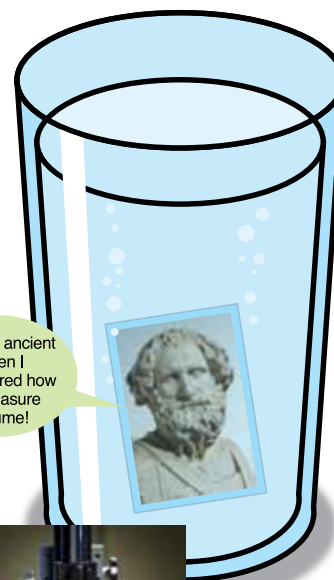
In professional and amateur golf, the head of the club can be no more than 2.8 in (7.1 cm) high and 5 in (12.7 cm) wide. The volume can be no larger than 28.07 cubic inches (460 cubic centimeters).

Measuring the height and width of a club is straightforward. But how do you measure the volume? To find out read the **Scientist's Notebook**.

ARCHIMEDES DISPLACEMENT EXPERIMENT

The Ancient Greek mathematician, Archimedes, discovered that the volume of an object can be determined by measuring the change in water level (displacement) when an object is placed in it.

I wasn't ancient when I discovered how to measure volume!



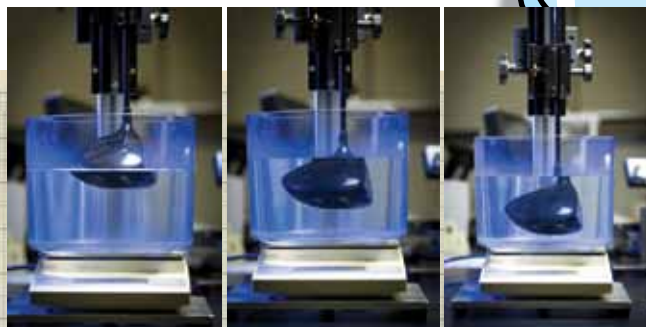
STEM workers typically use metric measurement because it is internationally accepted and understood.

Interestingly, the USGA uses the British Imperial System of measurement – which includes inches, feet and yards – in their measurements, because of golf's history and tradition. After all, the game did get its start in the British Isles.

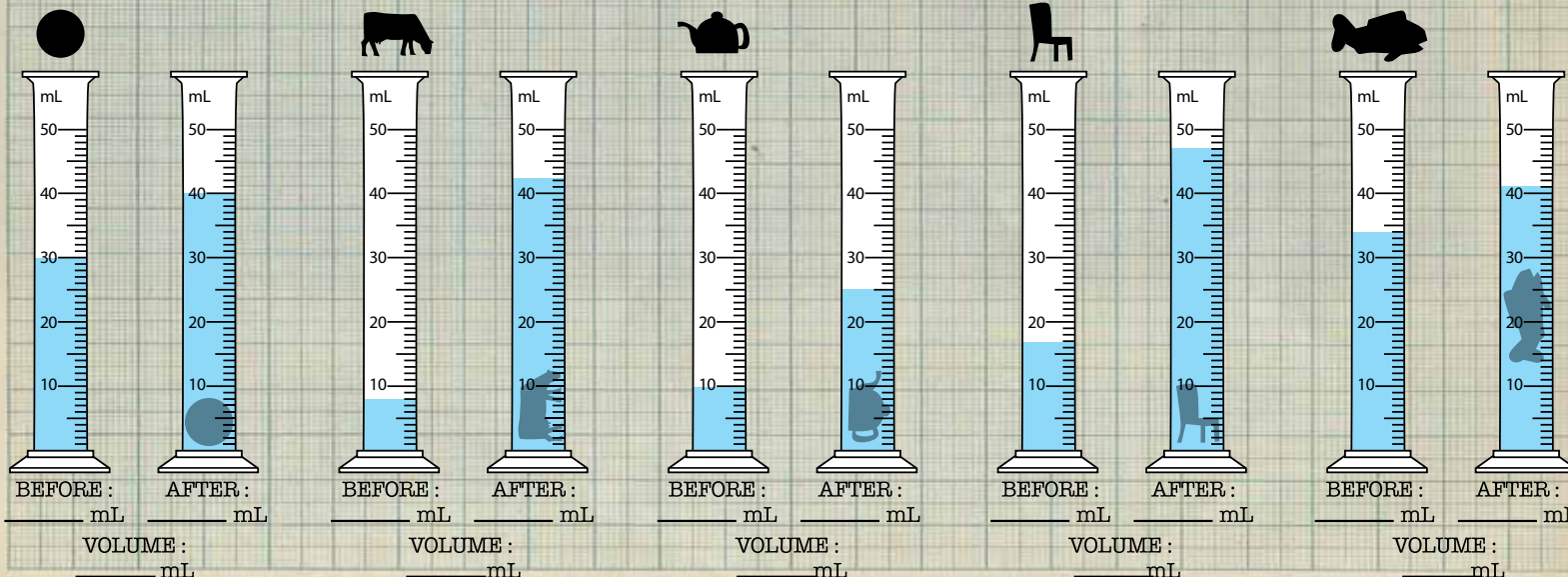
Scientist's Notebook

Record the measurement before an object is dropped into each graduated cylinder.

Then record the level after it is in the water. The difference between these two levels is the **VOLUME**.



At the USGA Test Center, the club head is attached to a shaft which is mounted to hold the club head in the exact location needed for an accurate measurement. The club is then submerged and the level of displacement is measured.



STEM Connection: If a golf club had a targeting laser that lined up a golfer's shot, a player could get a better score even with poor aiming skills. As technology improves golf equipment, it is important to have rules which keep the game a challenge of skill.