



QADIMS LUMIÈRE

Montessori to Matric O & A Level
School & College

UNIVERSITY TOWN PESHAWAR

13th JUNE, SUMMER VACATION TASK

CLASS 6TH

SCIENCE



MUSLIM SCIENTIST:-

Muslim scientists and inventors, including Arabs, Persians and Turks, were probably hundreds of years ahead of their counterparts in the European Middle Ages. They drew influence from Aristotelian philosophy and Neo-platonists, as well as Euclid, Archimedes, Ptolemy and others. The muslims made innumerable discoveries and wrote countless books about medicine, surgery, physics, chemistry, philosophy, astrology, geometry and various other fields.

The most famous muslim scientists and inventors and their wonderful inventions.

Ibn Sina (980 – 1037) Also known as Avicenna. Persian philosopher and scientist known for his contributions to Aristotelian philosophy and medicine.

Muhammad ibn Musa Al-Khwarizmi (780 – 850) Also known as Algoritmi or Algaurizin. His works introduced Hindu-Arabic numerals and the concepts of algebra into European mathematics.

Jabir Ibn Haiyan (722 – 804) Also known as Geber. The father of Arab chemistry known for his highly influential works on alchemy and metallurgy.

Ibn Al-Haytham (965 – 1040) Also known as Alhazen. Arab astronomer and mathematician known for his important contributions to the principles of optics and the use of scientific experiments.

Making difficult measurements

If you have the right instrument, measuring is usually pretty easy. However, sometimes things can be a little more difficult to measure and need thinking about.

Problem 1

How do you find the mass of a single rice grain?

Solution

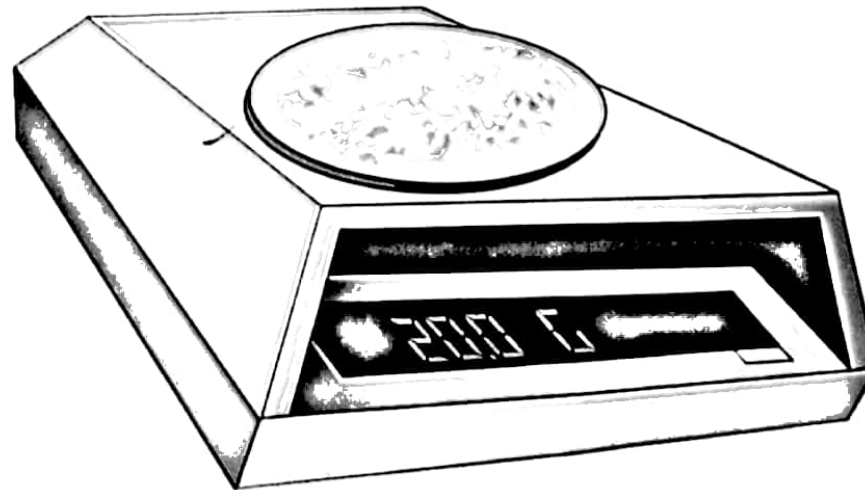
19 Rice grains are very light and it is very unlikely that you will have a balance that can measure very small masses. An easy way is to weigh 100 rice grains and divide their mass by 100.

Calculation:

mass of 100 rice grains = 20.0 g

mass of 1 rice grain = $\frac{20.0}{100}$ g = 0.2 g

Note: If the rice grains are not exactly the same, then 0.2 g is the *average* mass of one rice grain.



Problem 2

How do you find the volume of an irregular shaped object?

Solution

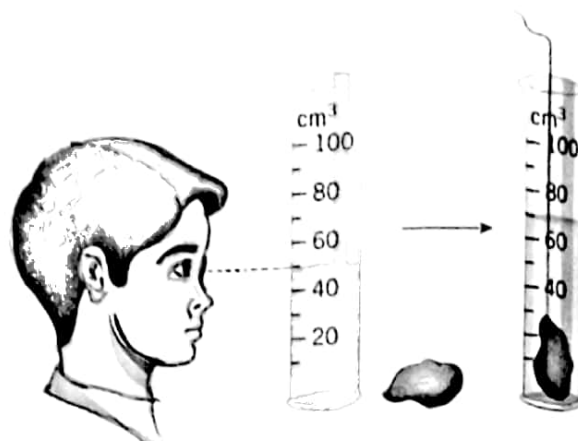
Put some water into a measuring cylinder and measure the volume. Then carefully lower the object into the water until it is fully submerged. Measure the volume again. The difference between the two readings is the volume of the object.

Calculation:-

volume of water = 50 cm^3

volume of water + object = 70 cm^3

volume of object = $70 \text{ cm}^3 - 50 \text{ cm}^3 = 20 \text{ cm}^3$



Problem 3

How do you time one swing of a pendulum accurately?

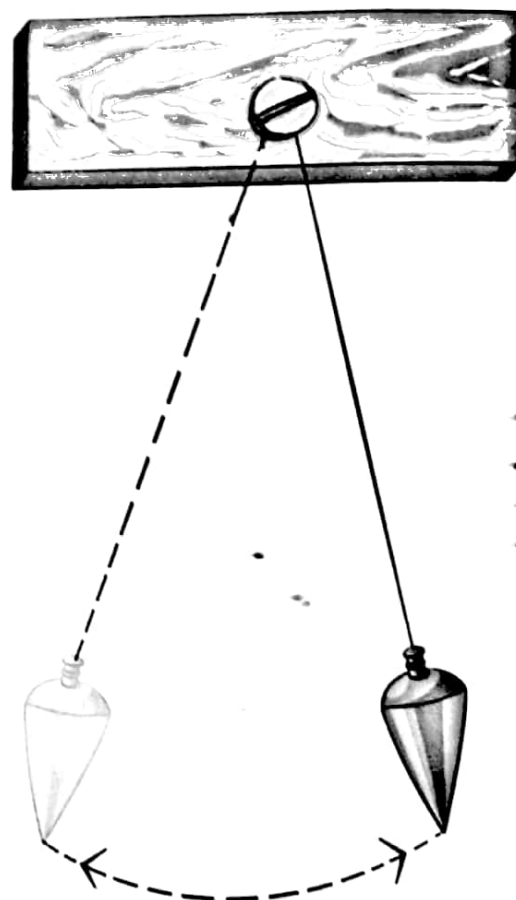
Solution

No matter how far a pendulum swings, the time for one swing is always the same. However, one swing may be too fast to time accurately, but you can get a good answer by timing 10 swings and dividing the result by 10.

Calculation:

time for 10 swings = 15.0 s

time for 1 swing = $\frac{15.0}{10} \text{ s} = 1.5 \text{ s}$



Test yourself

- 1 What is the average mass of one nail if 50 nails have a mass of 200 g?
- 2 A cork floats in water. Suggest how you could find the volume of an irregular piece of cork.
- 3 A bee beats its wings 250 times each second. What is the average time for a single beat of a bee's wing?

Handling data

Scientific information is sometimes called **data**. Very often an experiment gives you lots of data. Data is very useful if you organize and present it in the most appropriate way.

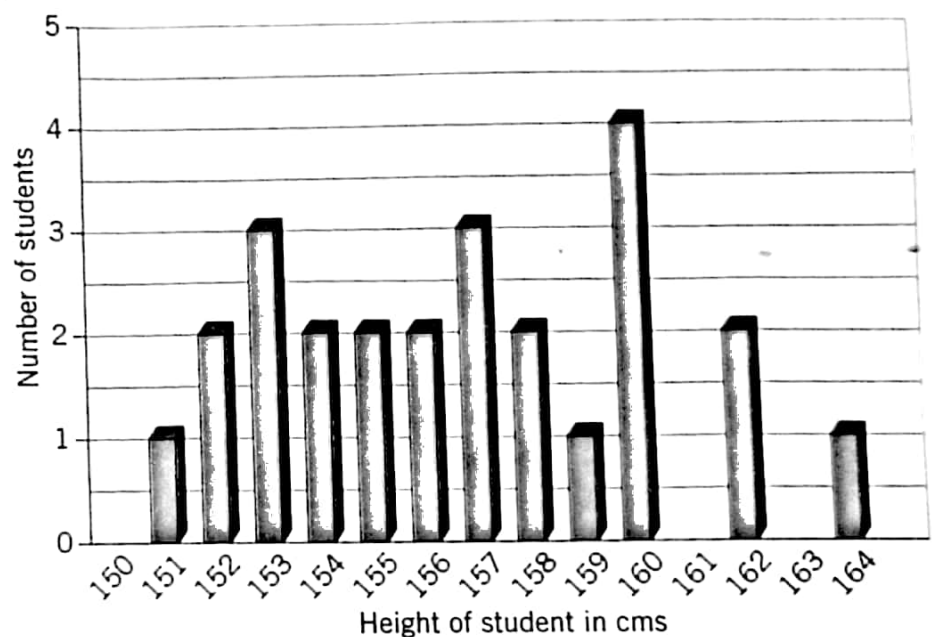
Tables

Putting data in a table is one way of displaying information. This weather chart is a good example. Information is collected together and you can compare the results quite easily. However, a table containing lots of information can be confusing and boring to look at. That is why data is also presented in graphs and charts.

Day	1	2	3	4	5	6	7
night time temperature (at 11 00 p.m.)	2°C	0°C	-1°C	5°C	6°C	7°C	2°C
amount of cloud at 11 00 p.m.			none				
daytime temperature (at 11 00 a.m.)	16°C	17°C	18°C	13°C	14°C	13°C	15°C
amount of cloud at 11 00 a.m.			none				

Bar charts

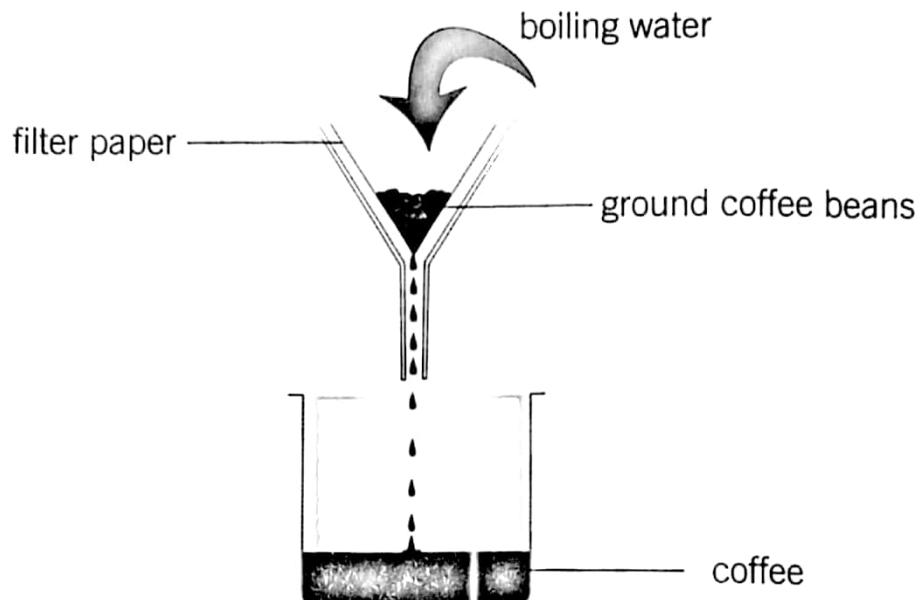
A **bar chart** shows the results of an experiment as a picture. You can see at a glance what the results show. This bar chart shows the heights of a group of students.



Test yourself

- What is 'data'?
- Look at the table.
 - What is the highest temperature?
 - When was the temperature lowest?
 - Describe the relationship between the amount of cloud and the night time temperature.
- What advantage does a line graph have over a bar chart?
- Look at the bar chart.
 - What is the smallest height?
 - What is the most common height?
 - How many students have a height of 160 cms or more?

3 The diagram shows how a coffee machine works.



- i. How do you know that some substances in coffee beans are soluble?
- ii. What is the purpose of the filter paper?
- iii. What is i) the filtrate? ii) the residue?
- iv. Some small insoluble bits of ground coffee beans pass through the filter paper.
 - a. What effect will this have on the coffee?
 - b. What is the scientific name for this mixture?
 - c. Explain how a sediment is formed.

4 Describe briefly how you would separate the following mixtures.

- i. petrol and water
- ii. sugar and sand
- iii. heptane (boiling point 98°C) and octane (boiling point 126°C), both of which are components of petrol
- iv. a suspension of starch in water
- v. sugar and water
- vi. a mixture of different watercolour paints

- 5 A teacher says that the black ink he uses in his pen is mainly water with some coloured dyes. Zara says she will try and separate the water by distilling the ink. Owen says he will investigate the dyes using paper chromatography.
- Describe how Owen will separate the coloured substances in the ink.
 - Draw a diagram to show the apparatus that Zara could use.

Ideas for investigation



- 1 Obtain a selection of different coloured washable pens. Washable pens contain ink which can be dissolved in water.

Carry out an investigation to find out if the different coloured inks are pure colours or if they are made up of different colours. Put your results in a table like this.

Colour of ink in washable pen	Number of colours in ink

- 2 Rock salt is dug out of the ground as an impure form of common salt, sodium chloride. Investigate how to obtain pure salt from rock salt.