PHYSICS LAB

(20147)

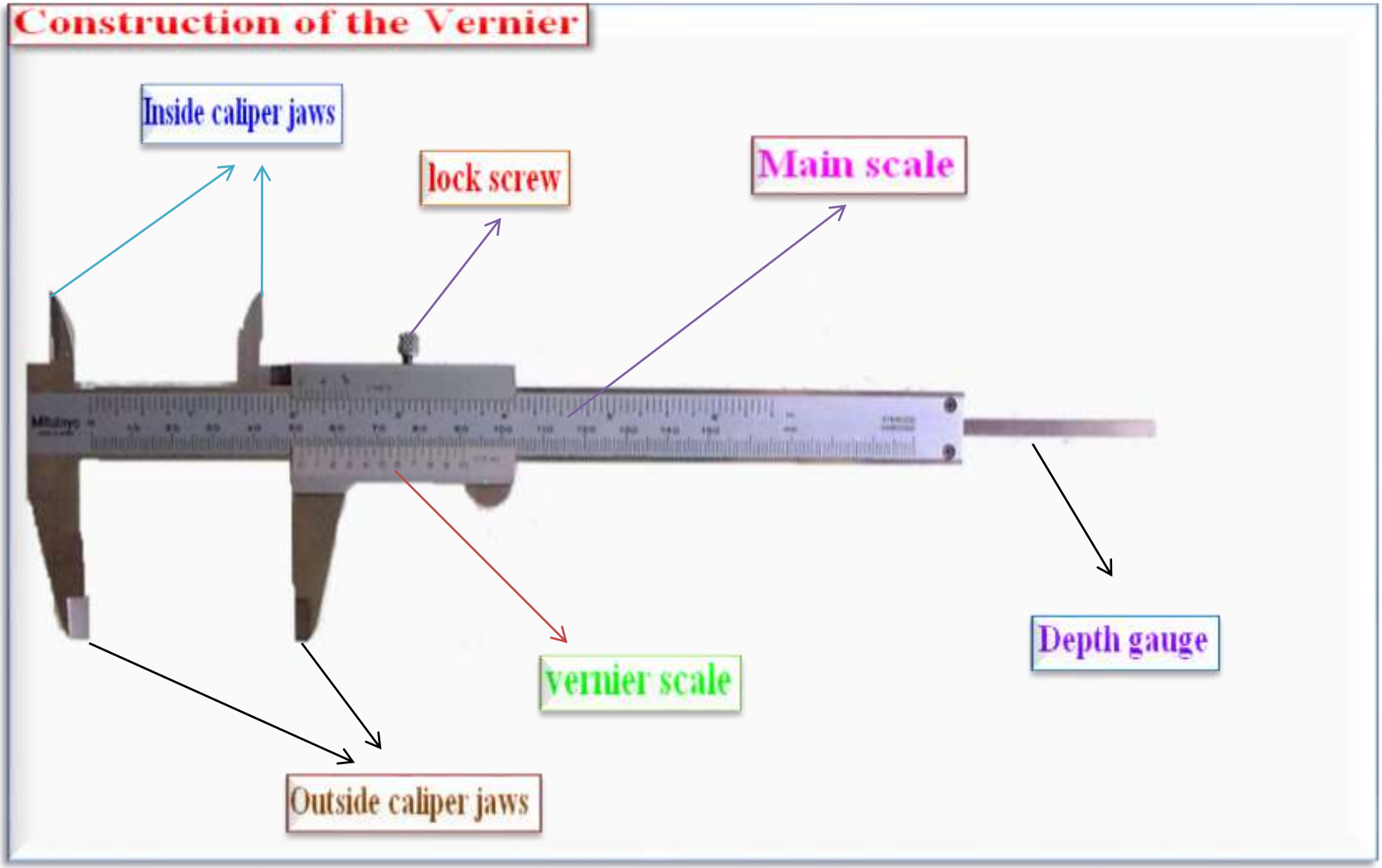
Experiment No. 2

Basic Measurement I

A. Vernier Caliper

B. Micrometer Caliper

A . The vernier Caliper



Using the Vernier caliper in measurement

Measuring Depth

Example : What is the reading of the vernier in fig.2?

- **Position of the vernier zero.**

It lies between 32 and 33 mm, we take the smallest as main reading.

Main reading = 32 mm.

- **The two coincident lines.**

We search for two lines in main scale and in Vernier scale that coincide. In our example, it is the line 7, we take it as Vernier reading.

Vernier reading = 7x2x0.05 = 0.7 mm.

- **The final result.**

The total reading or the count value is the sum of main reading and vernier reading

Count value = 32 + 0.7 = 32.7 mm

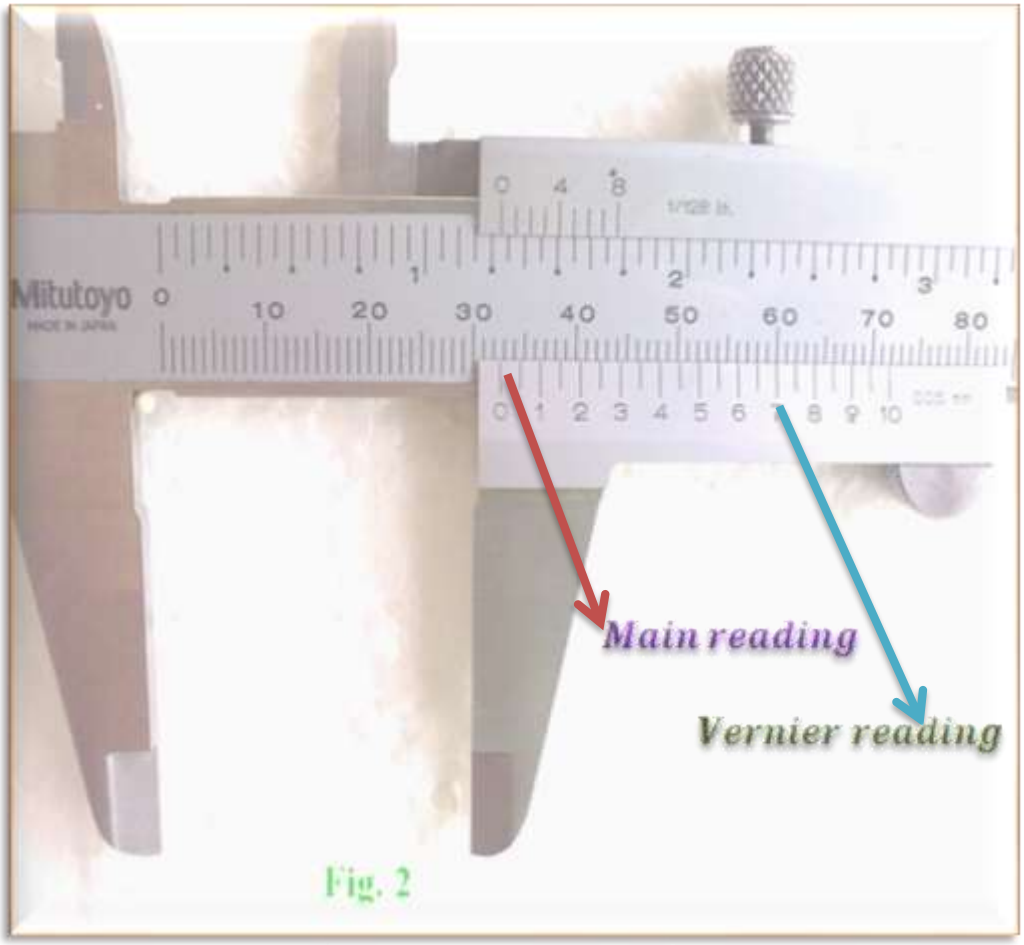
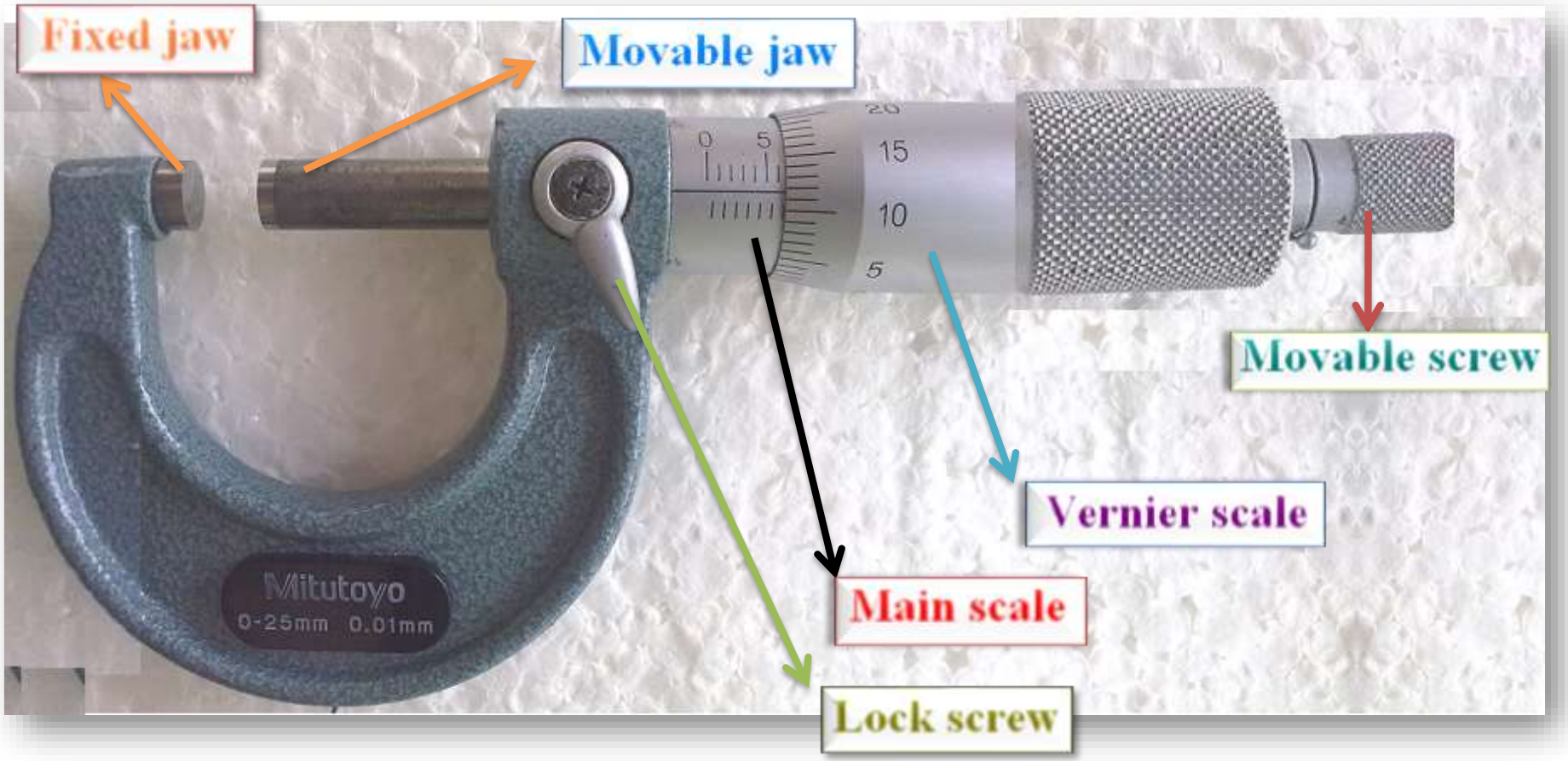


Fig. 2

B. The micrometer caliper



Construction of the micrometer

How to use the micrometer

The zero reading of the micrometer.

Before we use the micrometer, it should read zero, the two zero lines must coincide as in fig.1, if not we adjust it.

Measuring the diameter of a wire.

We put the wire between the two jaws, as shown in fig.2 then we turn the movable screw until the two jaws touches the wire, so we hear a tick sound then we stop turning the screw.

After we sure of our measurement, we take the reading of the micrometer which represents the diameter of the wire.

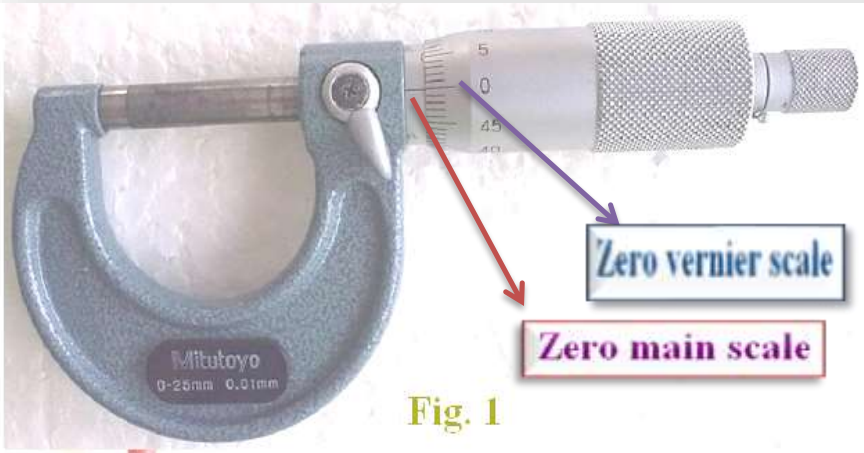


Fig. 1

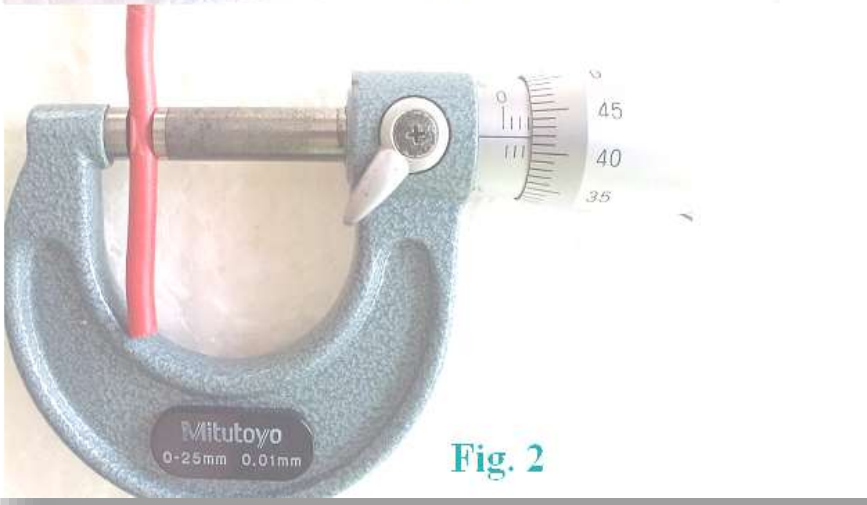


Fig. 2

Example :

What is the reading of the micrometer shown in the figure?

Main reading.

We see from the figure that the main reading is 3 mm.

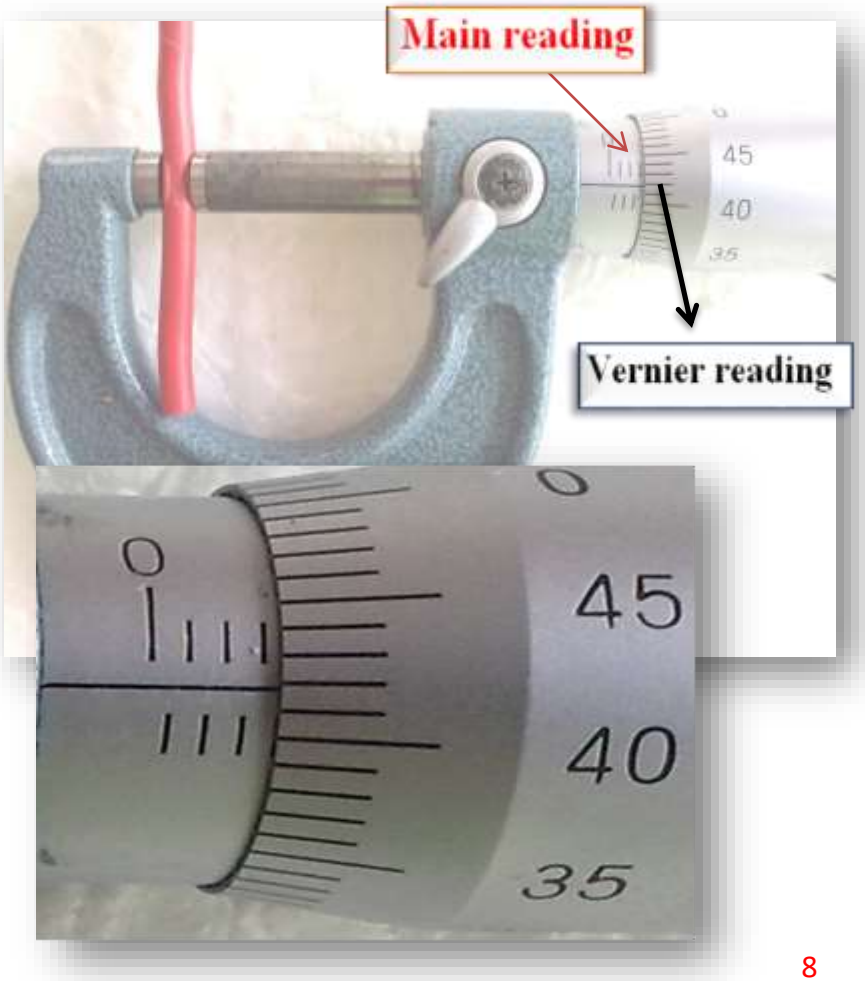
The vernier reading.

We see from the figure that the verier reading is 42 x 0.01 = 0.42 mm.

The final result.

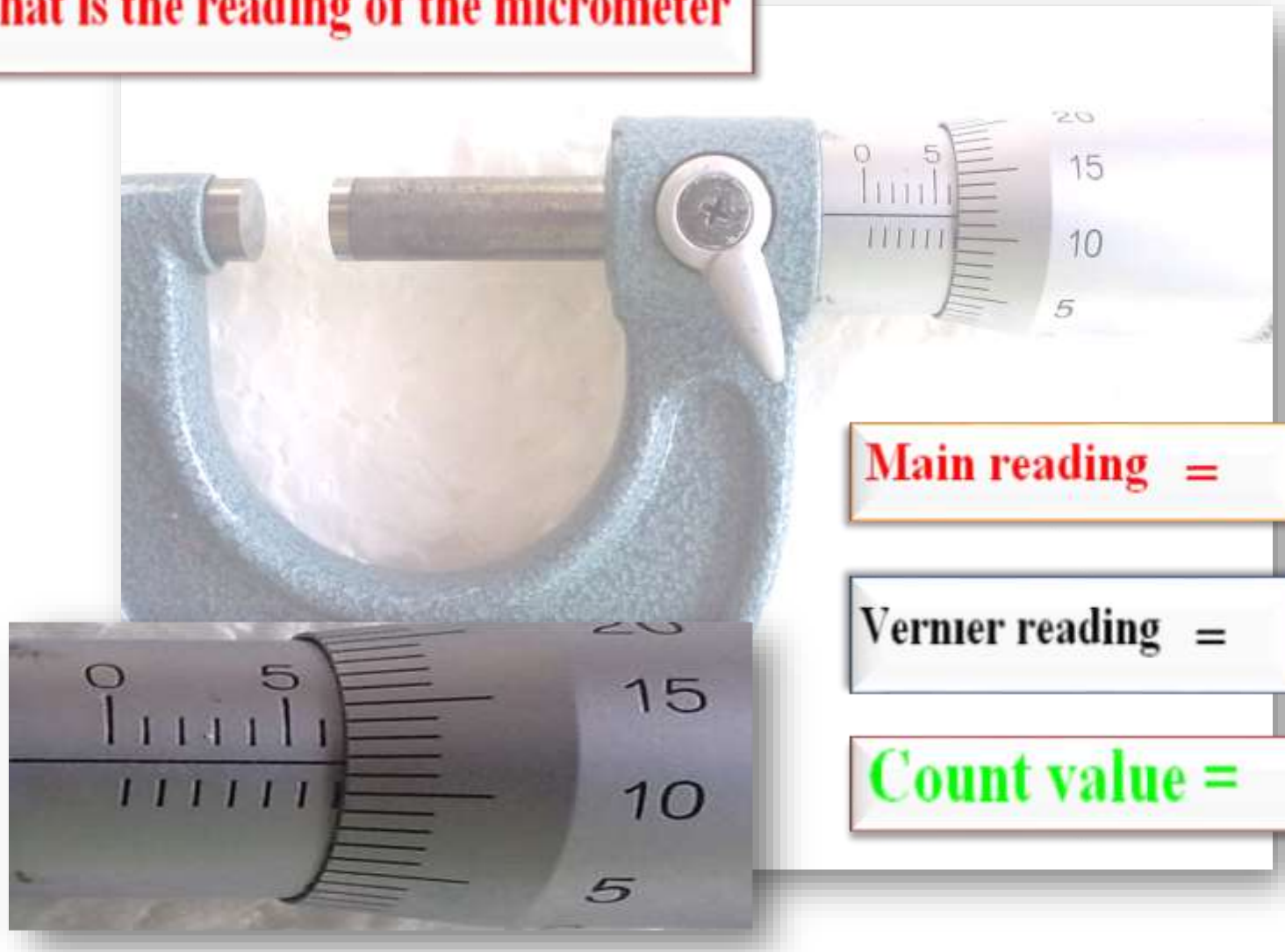
The diameter of the wire is

3 + 0.42 = 3.42 mm .



Example :

What is the reading of the micrometer



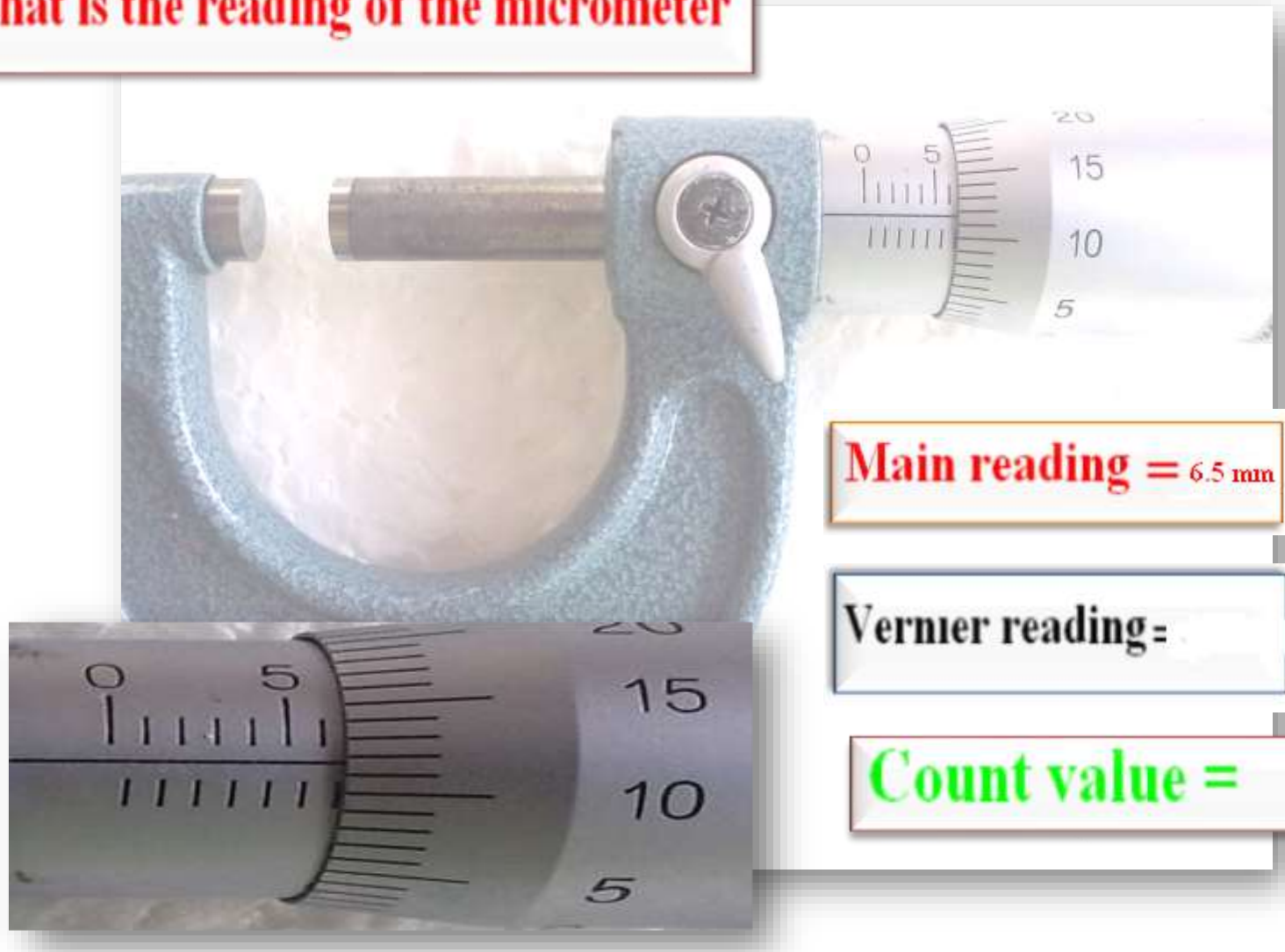
Main reading =

Vernier reading =

Count value =

Example :

What is the reading of the micrometer



Main reading = 6.5 mm

Vernier reading =

Count value =

Example :

What is the reading of the micrometer

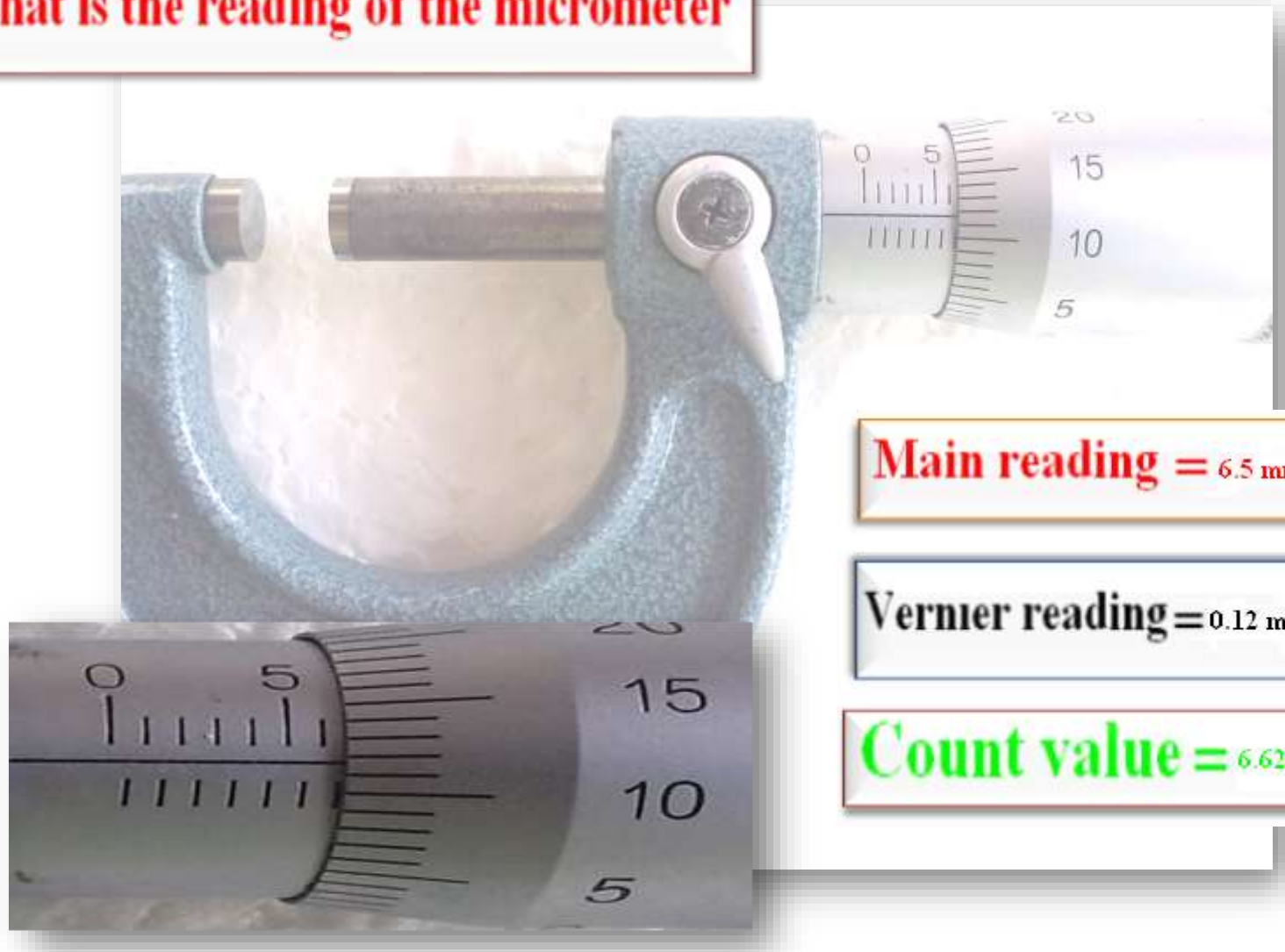
Main reading = 6.5 mm

Vernier reading = 0.12 mm

Count value =

Example :

What is the reading of the micrometer



Main reading = 6.5 mm

Vernier reading = 0.12 mm

Count value = 6.62 mm

Basic Measurement I

Objectives:

To be familiar to use the verneir caliper and micrometer caliper to measure the dimensions of different objects.

Apparatus:

Vernier caliper, micrometer caliper, plastic cylinder, set of different wires.

Results:

A. The vernier Caliper. **Sample:**

Complete the following table

Table 1 : Diameter of the thin plastic tube

No.	Main Scale mm	Vernier Scale mm	Diameter mm
1	6	5.5x 2 x 0.05	6.55
2	6	0.55 X	

Table 2: Diameter of a Thick Plastic tube

Term		Main Scale mm	Vernier Scale Mm	Count Value mm	Mean Value mm
Out side Diameter	1	6	7.5 x 2 x0.05	6.75	
	2	6	0.75 X	6.75	
Inside Diameter	1	6	7.5 x 2 x0.05 = 0.75 X	6.75	
	2				
Length	1				
	2				

B. The micrometer Caliper.

Complete the following table .

Table 3. Diameter of different wires

Term		Main Scale Mm	Vernier Scale Mm	Diameter Mm	Mean value of diameter Mm
Thick wire	1	4.5	32x 0.01	4.82	
	2	4.5	0.32 X		
Mid wire	1	4.5	32x.01 = 0.32 X		
	2				
Thin wire	1				
	2				

Conclusions:

1. From the results in table 2 what is the inner volume of the cylinder?

_____

2. From the results in table 3, what is the radius of the thin wire?

_____

Questions:

a) From the fig. below, write the reading of the micrometer.

Main reading (mm)	Vernier reading (mm)	Total reading (mm)