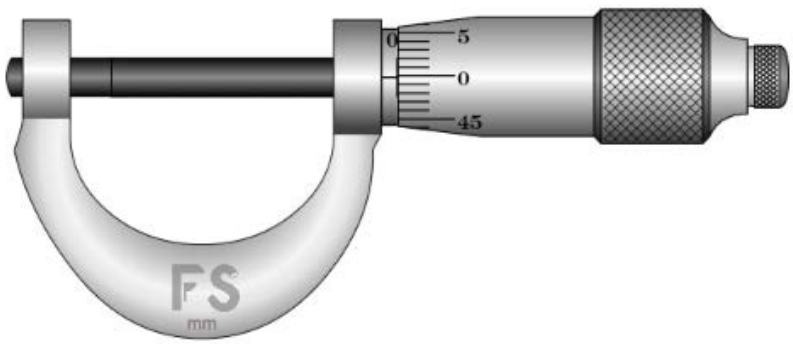
FLASHY SCIENCE

Micrometer experiment

Instructions



www.flashyscience.com

Real world relevance

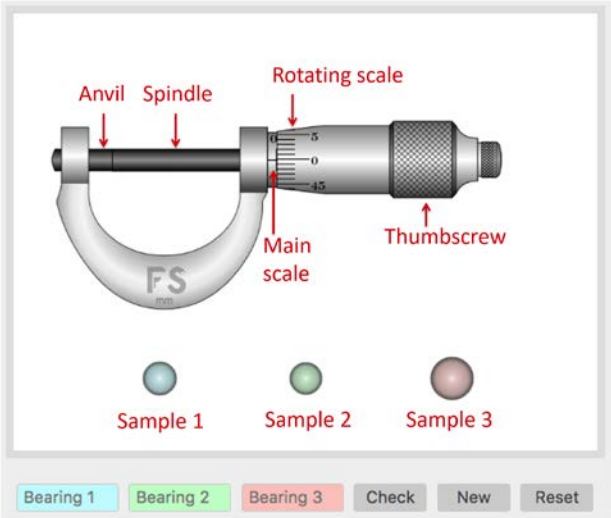
Measurement is the starting point of meaningful scientific understanding. Micrometers are common pieces of equipment used across science and engineering that allow object dimensions to be measured with a high degree of accuracy and precision. This can be vital for designing mechanical components or for experiments in which sample dimensions affect the outcomes, e.g. resistance or stress.

Micrometers use a moveable spindle that is closed around a sample. A combination of a fixed and rotating scales allow sample dimensions to be measured to high precision, typically ±0.01 mm. This simulation allows you to learn how to use micrometers using ball bearing samples of different widths.

FlashyScience Instructions – Micrometer

Micrometers are common pieces of lab equipment that allow the size of millimetre-scale objects to be measured with high precision. This FlashyScience experiment allows you to learn how to use them and practice taking measurements.

Operating the Experiment

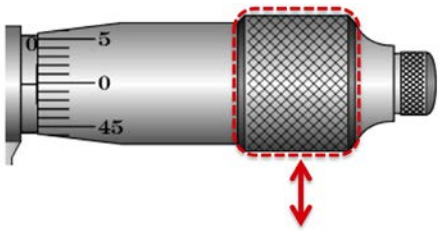


1. When you start the Micrometer experiment you will see:

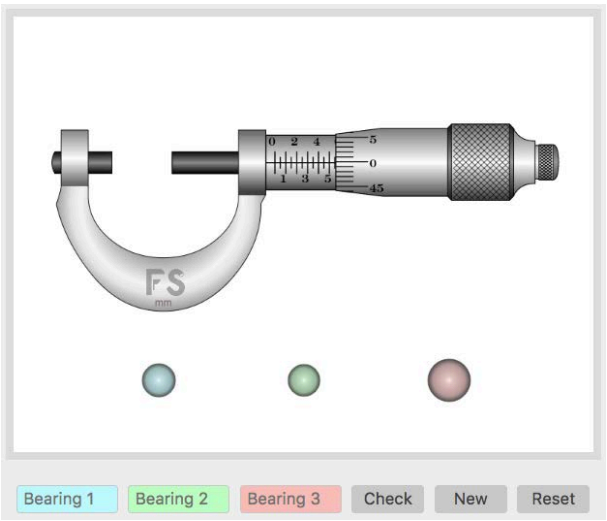
- The micrometer
- Three spherical samples of different widths
- Three text boxes for checking your measured widths and a 'Check' button
- 'New' and 'Reset' buttons

The micrometer has a stationary *anvil* and a moveable *spindle*, a *thumbscrew* to open and close the micrometer, and measurement aids of a *main scale* and a *rotating scale*.

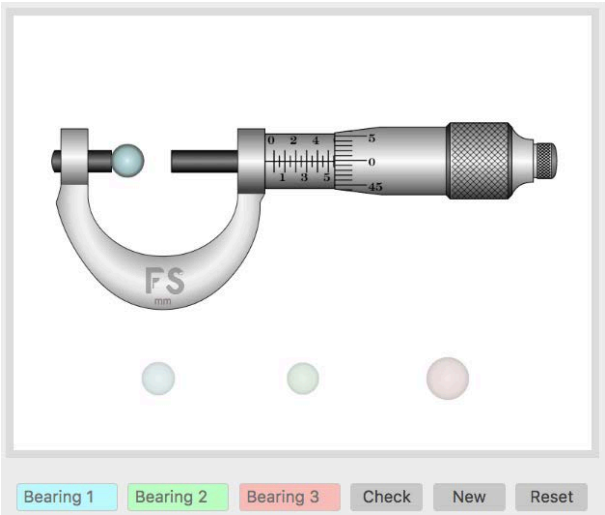
2. Click and drag the *thumbscrew* up or down to move the *spindle* to the right (to open the micrometer) or left (to close the micrometer).



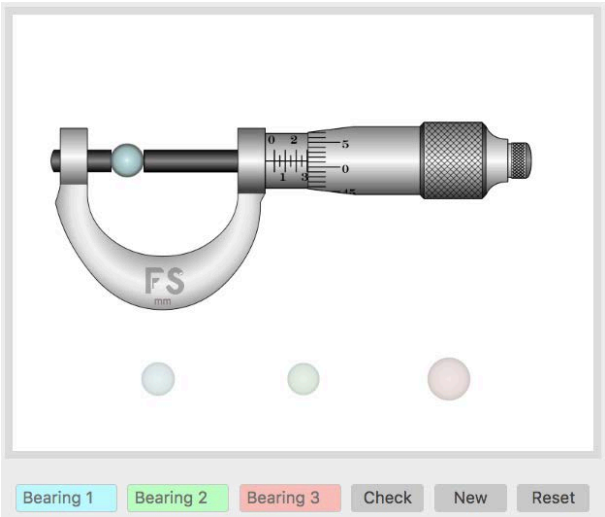
3. Move the *spindle* to create a gap between it and the *anvil* that is larger than the sample you want to measure.



3. Click and drag a sample so that it snaps into place next to the anvil.

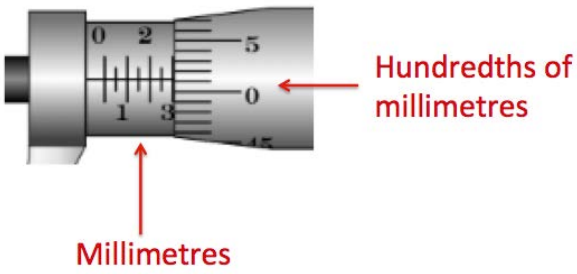


4. Move the *spindle* to contact the sample by clicking and dragging the *thumbscrew* down. When the *spindle* touches the sample the *thumbscrew* will stop rotating.

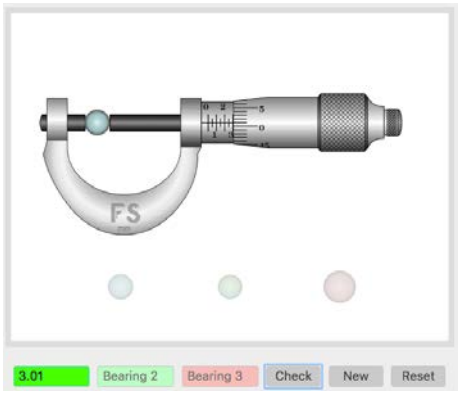


5. Read the sample width using the micrometer scales. To do this:

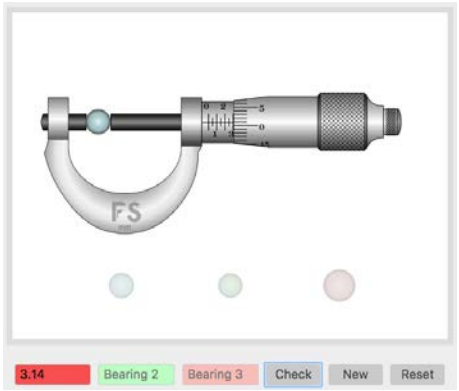
- Find the value of the largest valued tick mark shown on the *main scale*. In the example here, this is 3.0 mm (just!).
- Find the value on the *rotating scale* alongside the *main scale* axis. This value is in hundredths of a millimetre. In the example here, the value is '1', which equates to 0.01 mm.
- Add the values from the above steps to find the overall sample measurement. Here, this would be 3.0 + 0.01 mm = 3.01 mm.



6. Check your measurement by typing it into the appropriate 'Sample Width' text box and pressing 'Click'. The text box will become green if you have a correct measurement and red if your measurement is different to the sample width.



Correct sample 1 width entered



Incorrect sample 1 width entered

7. Drag the sample out of the caliper jaws or click 'Reset' to return the sample to its original place. You can then choose a new sample.

8. You can click on 'New' at any time to create a new set of samples with different widths.