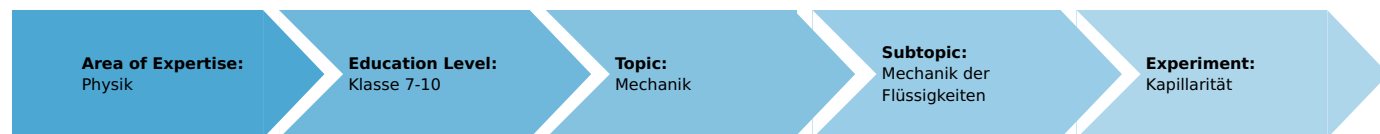


Capillary action (Item No.: P1002400)

Curricular Relevance



Difficulty



Easy

Preparation Time



10 Minutes

Execution Time



10 Minutes

Recommended Group Size



2 Students

Additional Requirements:

- Scissors
- Coloured chalk

Experiment Variations:

Keywords:

Task and equipment

Information for teachers

Additional Information

The students should measure the height that water rises in four capillary tubes and investigate the resulting graph. In a supplementary problem the graph generated by plotting the measured values against the reciprocals of the diameters should be analysed.

Capillary action (Item No.: P1002400)

Task and equipment

Task

How high does water rise in a narrow tube?

Immerse four glass tubes with varying inner diameters in water and observe whether or not and how high the water rises in each case.



Equipment



Position No.	Material	Order No.	Quantity
1	Support base, variable	02001-00	1
2	Support rod, stainless steel, l = 250 mm, d = 10 mm	02031-00	1
2	Support rod with hole, stainless steel, 10 cm	02036-01	1
3	Boss head	02043-00	1
4	Glass tube holder with tape measure clamp	05961-00	1
5	Measuring tape, l = 2 m	09936-00	1
6	Capillary tube, 4, 0.5 to 1.2mm	40581-00	1
7	Glass beaker DURAN®, short form, 600 ml	36015-00	1
Additional material			
	Coloured chalk		
	Scissors		

Set-up and procedure

Set-up

Set up a stand with the support base (Fig. 1) and the 250 mm support rod (Fig. 2).

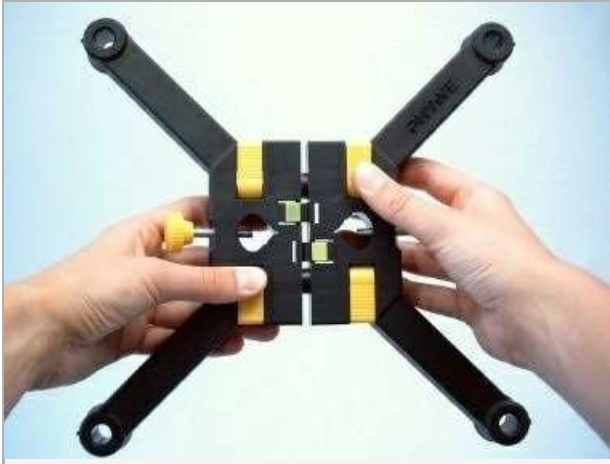


Fig. 1



Fig. 2

Clamp the bosshead to the 250 mm support rod, and clamp the 100 mm support rod into the bosshead (Fig. 3). Fix the glass tube holder to the 100 mm support rod (Fig. 4).



Fig. 3



Fig. 4

Place the capillary tubes in the glass tube holder, arranging them according to their diameters.

Fill the beaker with approx. 500 ml of water (Fig. 5).



Fig. 5

Procedure

- Moisten the four tubes thoroughly by immersing them as deeply as possible in the water and then pulling them out until only their lower ends are immersed.
- Measure the capillary rise, i.e. the heights of the water columns in the four tubes, with the measuring tape (Fig. 6). Hold a piece of paper behind the tubes if you cannot see the water level well.
- Record the four heights in Table 1 in the report.
- Dry the capillary tubes well after measuring; blow any residual water out of the tubes.



Fig. 6

In order to disassemble the support base, press the yellow buttons (Fig. 7).



Fig. 7

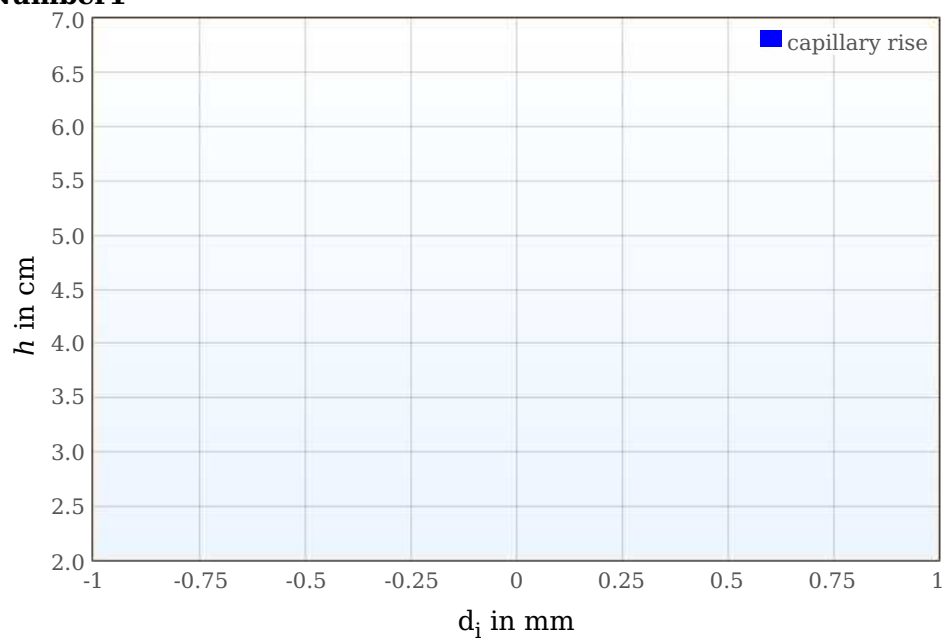
Report: Capillary action

Result - Table 1

Record all the measured values in table.

d_i in mm	h in cm	
6,5	0	
4,6	0	
3,4	0	
2,4	0	

Number1



Evaluation - Question 1

What kind of curve is the graph generated from Table 1?

Evaluation - Question 2

What statement (the ..., the ...) can you make about these results?

Evaluation - Additional Task 1

Let a drop of water fall on the table; touch it with a piece of chalk. Describe your observation and explain it.

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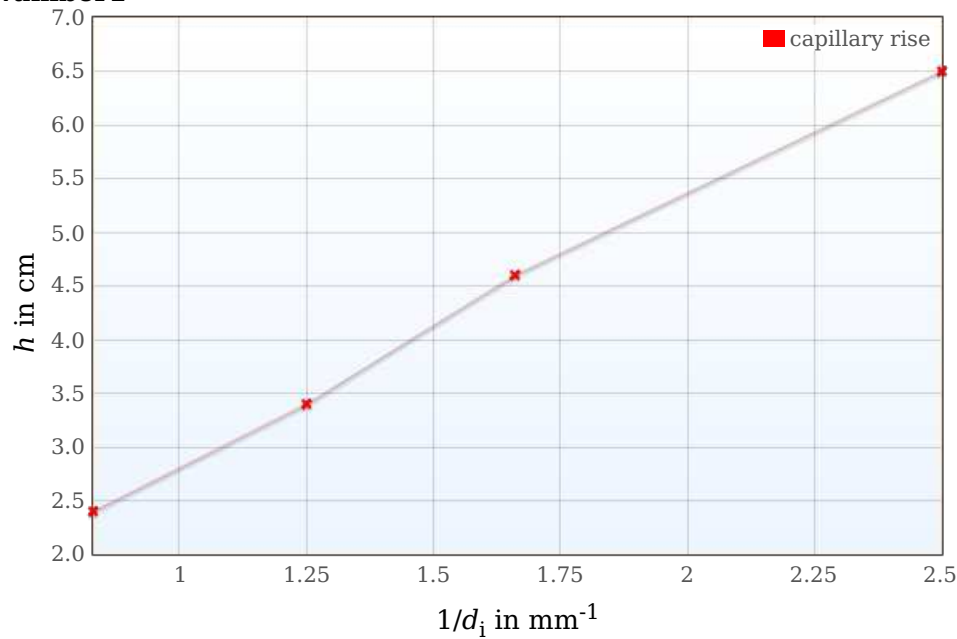
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Evaluation - Additional Task Table 2

Calculate the reciprocals of d_i and look at the graph generated by plotting the capillary rise, h , as a function of $1/d_i$.

d_i in mm	$1/d_i$ in mm^{-1}	h in cm
2,50	0,40	6,5
1,66	0,60	4,6
1,25	0,80	3,4
0,83	1,20	2,4

Number1

Evaluation - Additional Task 2

What kind of curve do you obtain?

Evaluation - Additional Task 3

Can you state why the curve now appears different?
