

Physics, Oscillators (Tomáš Nečas)

Time

90 min

Topic

experimental study of oscillators (age 16-17)

Lesson goals

Students will learn a typical scientific method, how to do the experimental research of some physical system. At the end, they will also learn some basic facts about mechanical oscillators. And of course, they will improve their experimental skills.

Whole task first

Usually, in lab works the students get an exact list of instructions, what to do. In this lesson they get at first the main question and then they must invent their own method.

Laboratory equipment

Springs, weights, thread, staves, ruler, stopwatch

Task one: spring with mass

Complete the oscillator with weight and spring. You can use different weights and springs. The picture shows you, how you can change the stiffness of the springs, when you use more than one spring.

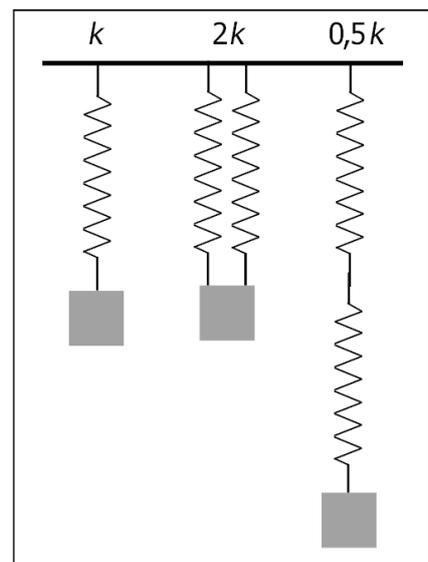
Your task is to investigate, how the period of the oscillator depends on all possible parameters.

You can use the computer and force meter to measure the period.

Task two: pendulum

Complete the pendulum with thread and weight. You can use different weights and change the length of the thread. Your task is to investigate, how the period of the oscillator depends on all possible parameters.

You can use the computer and force meter to measure the period.



Conclusion

(cca 15 min at the end of the lesson)

All students are working together and comparing their results. The teacher helps to finish the formulas.

Notes

Students work in groups of 3. If some group is slower, it does not need to start the second task. It is better to do one job precisely.