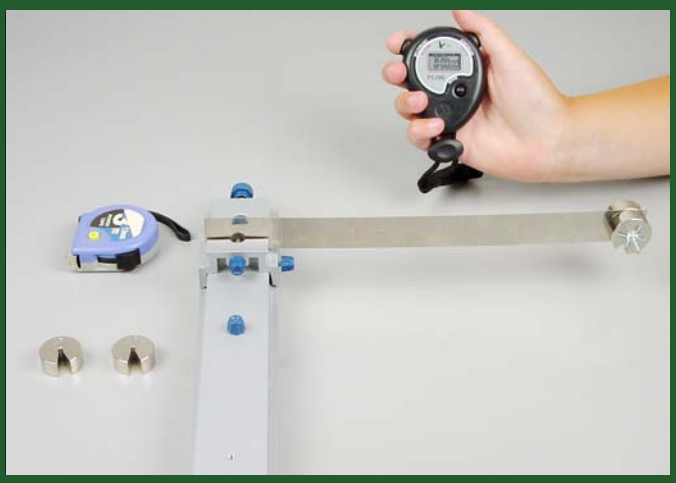
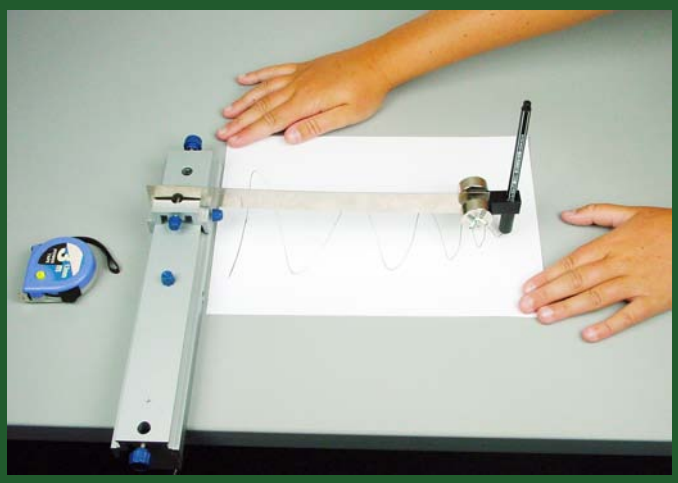
Student Experiments

Manual

VIBRATIONS AND WAVES

P9160-4S





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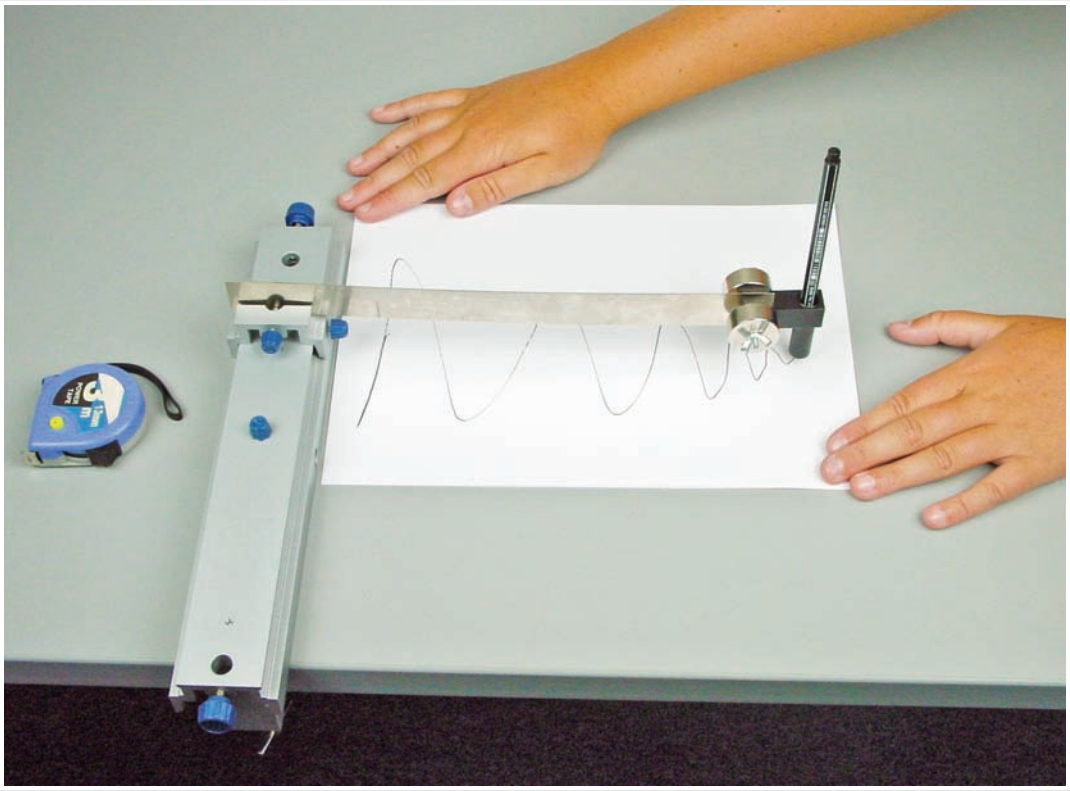
PATH TIME CHART OF HARMONIC OSCILLATION

SWS 1.2

Required Kit:
P9901-4A Rail stand material
P9901-4B Mechanics 1
P9901-4S Vibrations and Waves



Material:
1x Stand rail, 300mm
1x Table clamp
1x Sliding saddle for screens, springs and pointers
1x Holder for pencil
2x Slotted weights, 50g
1x Measuring tape
1x Threaded rod with butterfly nut
1x Flat spring steel

Pencil, Sheet of paper A4

PATH TIME CHART OF HARMONIC OSZILLATION

SWS 1.2

This temporal course of oscillation can be seen by introducing a time axis. In this experiment the time axis is produced by unifrom movement of a strip of paper during the oscillation of the flat spring.

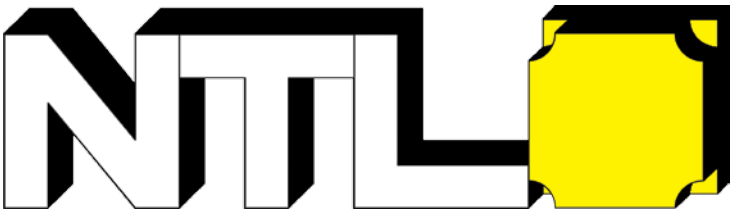
Preparation: Arrange according to the illustration. The table clamp with stand rail is fixed to the edge of the table. The sliding saddle for scales is placed on the stand rail. The flat spring is clamped in this sliding saddle. At the end of the flat spring the holder for the pencil is mounted in such a way that the drill hole of the holder is exactly above the drill hole of the flat spring. The threaded rod is pushed through this drill hole. One 50 g slotted mass is put on the left and one on the right hand side of the flat spring and fixed by means of the butterfly nut. The pencil is inserted in the holder. The flat spring is clamped in such a way that the distance of the pencil from the edge of the sliding saddle with setscrew is 30 cm.

A sheet of paper is placed beneath the flat spring. The pencil is to touch the sheet in its center.

1. **Experiment:** The spring is deviated about 4 cm. It starts oscillating. During the oscillation the paper is pulled as uniformly as possible (normal to the direction of oscillation) underneath the pencil.

2. **Experiment:** The spring is clamped in such a way that the distance of the pencil to the sliding saddle is half as long as in the first experiment (15 cm). The sheet of paper is placed beneath the spring in such a way that the recording of the oscillation can start at the same place as the recording of the first oscillation. The flat spring is set in oscillation. The paper is moved along underneath the pencil at about the same speed as in the first experiment.

Conclusion: The temporal course of the oscillation of a flat spring is sinusodial oscillation. The frequency of the oscillation depends on the length of the oscillating flat spring. It is the higher the shorter the length of the flat spring is.



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