

## INSTRUCTIONAL GUIDE

### Contents

- Spark Timer
- Roll of spark-sensitive tape
- Bench clamp

#### Recommended for activities:

- [Acceleration Car \(P4-1980\)](#)
- [Constant Velocity Car \(44-1090\)](#)
- [Meter Stick \(P1-7072\)](#)
- Graph paper or graphing software



### Introduction

Spark timers have long been used to reliably measure parameters of linear movement such as the acceleration a falling object or velocity of a moving vehicle. This particular apparatus is designed to safely enclose the needles under an acrylic panel while still allowing the student to clearly observe the timer's mechanism.

### Background

#### Usage:

- Place the timer at a proper location according to the type of experiment. Use clamps as necessary.
- Make sure the power switch is off, cut the recording tape to an appropriate length. Pass the tape through the slot on the right of the unit, under the needles, and through the other side. Affix the end of tape on the left side of the unit to a moving object.
- Select either of the frequency values and turn power on. 10 Hz will create 10 dots every second, and 60 Hz will create 60 dots every second. For most activities, the 10 Hz setting is sufficiently accurate.
- Put the object in motion to record on the tape.

#### Storage:

To store the apparatus, coil the AC cord round the main body with the plug on the rear side.

#### Adjustment:

To adjust the discharge needles, disconnect the AC cord from an outlet and put the power switch in the ON position. Turn the needle adjusting screw so that the tips come in contact with the travelling surface of the tape. If the needle tips are off the recording paper, they may skip recording some measurements. If they are pressed too hard against the tape, friction becomes greater and results may be skewed.

## Resources

Cool Stuff Lab Activity: <https://www.arborsci.com/blogs/cool-labs/spark-timer-motion>

### Objective:

Students will use a spark timer to record the motion of two toy cars. The spark timer produces a physical record of the motion by making a mark on tape at set intervals. Students measure the distance between the marks and graph the motion. For constant velocity motion, the marks on the tape will be evenly spaced. The position vs. time graph will be a straight line with positive slope. The velocity vs. time graph will be a horizontal line. The pull-back car will accelerate and then decelerate. The acceleration will appear on the position vs. time graph as a parabola, and on the velocity vs. time graph as a line with positive slope.

## Related Products

**PocketLab Voyager2 (P1-4001)** PocketLab Voyager 2 connects with a single button to a smartphone, tablet, Chromebook or computer and instantly streams data that you can see and record. Using the FREE PocketLab app, you can easily analyze your data, create graphs and integrate your data with other software.

**Timer and Photogates (P4-1450)** Digital Timer & photogates. No computer required for this simple, intuitive data collection device. Complete set includes Timer, two photogates with cords, AC adaptor, user's manual, and hard carrying case.

**BeeSpi (P4-1490)** The BeeSpi timer is a compact, battery powered photogate ready to use in one step! Two parallel photogates detect, measure, and display speeds of any objects that pass through, from zero to 99.99 km/h.