

B-1

Time and Distance

1 Using the timer as a stopwatch

There are no questions to answer for Part 1.

2 Using the photogates

- Exactly what do you do to start and stop the clock? Be very specific in your answer. Someone who has never seen the photogate before should be able to read your answer and know what to do with the light beam to make the clock start, and what to do to make it stop.
- If you block the light beam several times in a row, does the time add or does the timer start at zero every time you break the beam? Your answer should provide observations that back up what you say.

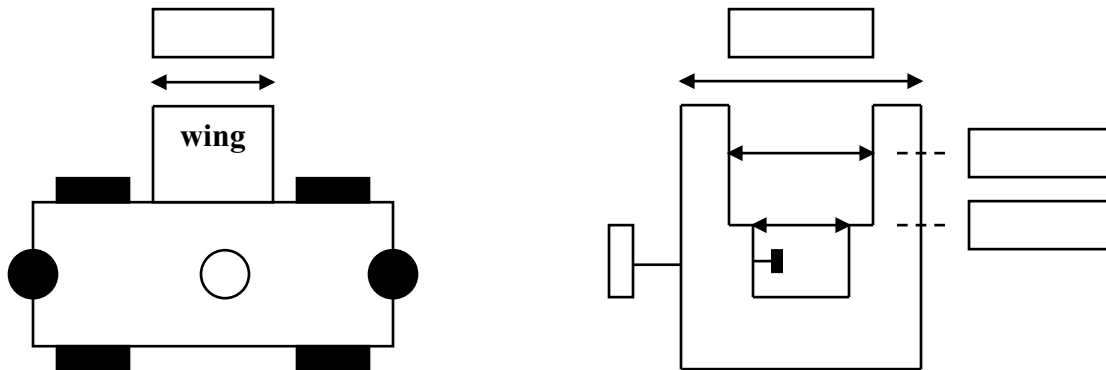
3 Using the timer with two photogates

- What starts and stops the timer when only the "A" light is on?
- What starts and stops the timer when only the "B" light is on?
- What starts and stops the timer when both "A" and "B" lights are on?
- Does the timer still make measurements when there are no lights on?
- What happens if you go through photogate A once and through photogate B multiple times?

4 Reflecting on what we learned

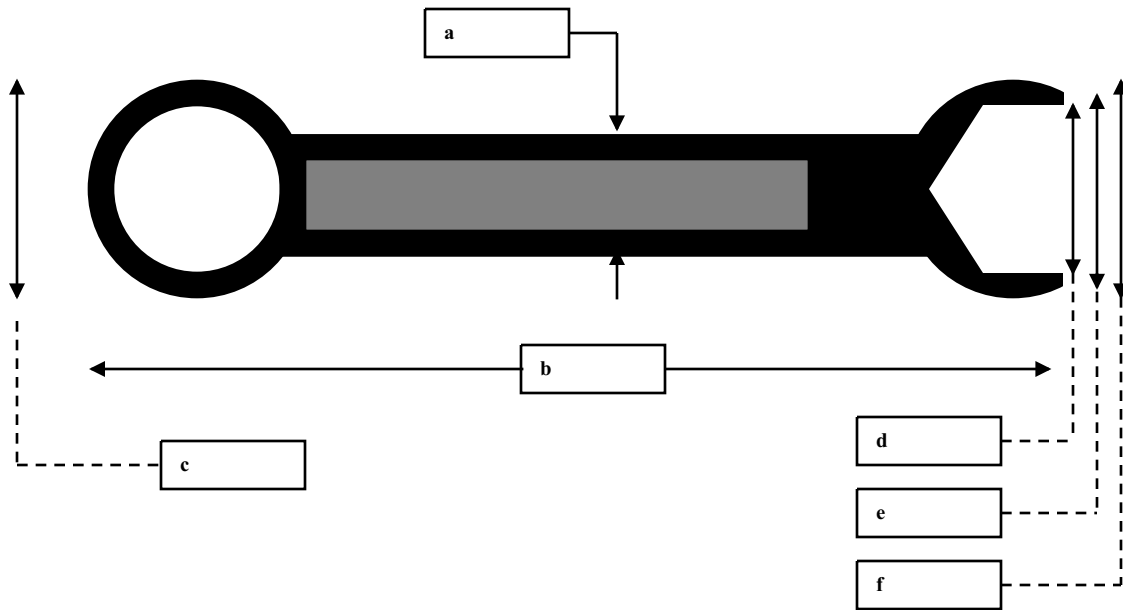
- Resolution means the smallest interval that can be measured. Try using one photogate to determine the resolution of the timer. Give your answer in seconds and tell how your observations support your answer.
- The words accuracy and precision have special meanings in science that are a little different from how people use these words every day. The word accuracy refers to how close a measurement is to the true value. The word precision describes how close together repeated measurements are. When measurements are precise they are close to the same value. It is possible to be precise but not accurate. Which is likely to be more precise: time measurements made with a stopwatch or measurements made with photogates?

5 Dimensions and diagrams



6 Measureing metric length

- Use the metric ruler to make measurements of each of the following dimensions. Write the measurement in centimeters in the appropriate box. You should be accurate to the nearest millimeter.
- The word precision describes how close repeated measurements of the same quantity are. For example, saying measurements are precise to 0.5 cm means the measurements were within ± 0.5 cm of the average measurements. Compare your measurement b (see below) with the results from four other groups. fill in the blanks:
The average measurement for b is _____ centimeters. This measurement is precise to _____ centimeters. This means the measurements are within \pm _____ of the average.



7 Measureing English length
Do not do this section

Questions

1. How many seconds are in a half hour? Show your work.
2. Explain the difference between accuracy and precision.