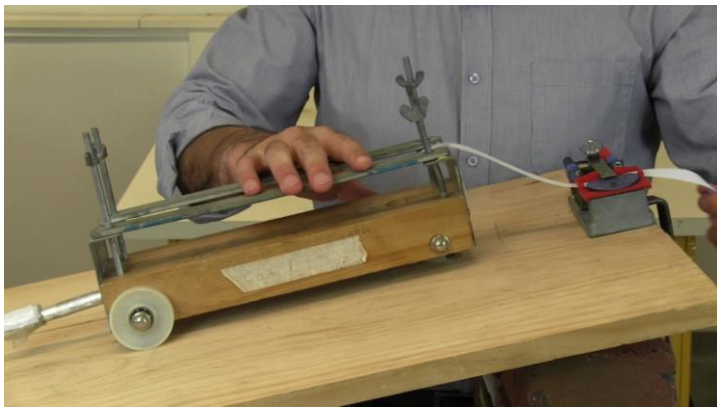
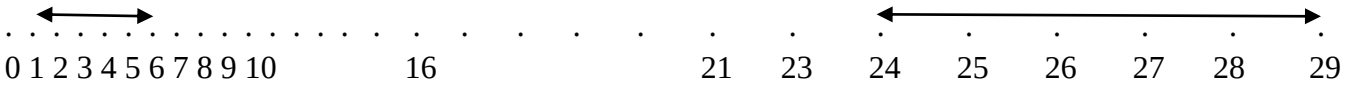
**Analysing Motion Using Ticker Timers** **Name: _____**

Ticker timers vibrate at exactly 50 ticks per second (50 Hertz or 50 Hz). They mark dots on a ticker tape which is attached to a moving object such as a trolley. Each dot on the ticker tape occurs exactly 0.02 seconds apart (which is 1/50 of a second). By measuring the distance between the dots you can easily calculate the object's speed. To simplify things we will be measuring the distance between every 5 dots, which equates to 5 x 0.02 seconds: 0.1 seconds. The dots might look something like this:






1. As practise, calculate the average speed between dot 1 and dot 6.

Step 1: find the distance with a ruler. Distance = _____millimetres = _____ metres

Step 2: work out the time. Time = 5 time intervals × 0.02 seconds = _____ seconds

Step 3: calculate the speed. Average speed = distance / time = _____

2. Calculate the average speed between dot 24 and dot 29.

Distance = _____millimetres = _____ metres

Time = _____ time intervals × 0.02 seconds = _____ seconds.

Average Speed = distance / time = _____

**Aim:** To investigate the speed of an accelerating trolley.

**Method:**

- Attach the ticker timer to the AC power supply.
- Tape a 1m-long ticker tape to the trolley.
- Turn on the power so that the ticker timer is vibrating.
- Elevate one end of the bench and allow the trolley to accelerate down hill.
- Mark the tape from the **first clear dot** to the last clear dot every **five time intervals** (which represents 0.1 seconds). It should look something like this.

- Measure the length of each 5-tick interval and fill in the table.
- Cut out each 5-tick interval (exactly on the lines that you drew) and construct a "graph" by pasting them in order onto the thick line on the bottom of the next page.

**Results:**

| Time Interval | Length of each 5-tick interval. (mm) | Length of each 5-tick interval. (in metres) | Duration (seconds) | Speed (m/s) | Elapsed Time (s) |
|---|---|---|---|---|---|
| 1 | | | 0.1 | | 0.1 |
| 2 | | | 0.1 | | 0.2 |
| 3 | | | 0.1 | | 0.3 |
| 4 | | | 0.1 | | 0.4 |
| 5 | | | 0.1 | | 0.5 |
| 6 | | | 0.1 | | 0.6 |
| 7 | | | 0.1 | | 0.7 |
| 8 | | | 0.1 | | 0.8 |
| 9 | | | 0.1 | | 0.9 |
| 10 | | | 0.1 | | 1.0 |
| 11 | | | 0.1 | | 1.1 |
| 12 | | | 0.1 | | 1.2 |
| 13 | | | 0.1 | | 1.3 |
| 14 | | | 0.1 | | 1.4 |
| 15 | | | 0.1 | | 1.5 |

Describe what happened to the speed of the trolley as it rolled down hill.