Tabulation of Data

- First column must always be the independent raw data.
- Independent and dependent raw data must be written in the correct d.p. depending on the instrument used.
- There should be at least 6 sets of data. Sometimes you might need about 7 or 8 to get a good even spread of the range.
- Headings must be accompanied with the correct units.

Practice 1: Bending of Half-Metre Rule

Procedure:

1. Tie a length of string at the 49.0 cm mark of the half-metre rule and make a loop below it as shown in Fig. 1.
2. Clamp the other end of the rule between two pieces of wood at the 5.0 cm mark of the half-metre rule, so that the half-metre rule hangs over the edge of the bench (see Fig. 2)
3. Measure the height h_o of the free end of the half-metre rule above the ground.
4. Place the 50g hanger in the loop of thread to act as the first load *M*. Measure the new height *h* of the free end of the half-metre rule above the ground.
5. Measure *h* for various loads *M*.
6. Plot *h* against *M*.
7. Discuss any anomalous data/results you may have obtained.

$h_o = 90.8$ cm

M/g	h/cm		
	Increasing load	Decreasing load	Average
50	90.0	90.0	90.0
100	89.3	89.3	89.7
150	88.5	88.4	88.5
200	87.7	87.6	87.7
250	86.9	86.9	86.9
300	86.2	86.2	86.2

Practice 2: The effect of a moveable mass on the behaviour of a compound pendulum

Procedure:

(a) Clamp the optical pin horizontally in the retort stand. Suspend the metal rod from the optical pin so that the rod swings easily from the optical pin (see diagram above).

(b) Mould the plasticine provided into a sphere and push it on to the rod so as to form a weighted pendulum. Clip the crocodile clip onto the rod immediately below the sphere so as to prevent it from slipping down the rod.

(c) Measure the period of oscillation T of the pendulum and also the distance l from the pivot to the centre of mass of the sphere.

(d) Repeat these measurements for different positions of the sphere.

(e) Plot a graph of $T^2 l$ against l^2.

(f) Discuss any anomalous data/results you may have obtained.

l/m	Nos of osc. n	Time for n oscillations/s			Period T/s	$T^2 l$/ms^2	l^2/m^2
		t_1/s	t_2/s	t_{ave}/s			
0.100	20	23.81	23.78	23.80	1.190	0.1416	0.0100
0.200	20	23.28	23.12	23.20	1.160	0.2691	0.0400
0.300	20	24.22	24.28	24.25	1.213	0.4410	0.0900
0.400	20	26.25	26.19	26.22	1.311	0.6875	0.160
0.500	20	28.13	28.25	28.19	1.410	0.9933	0.250
0.600	20	30.09	30.15	30.12	1.506	1.361	0.360

Practice 3: The period of oscillation of a suspended rule

Procedure:

(a) Set up the apparatus as shown in Fig. 1.

(b) Arrange the threads at some distance *d* apart and ensure that the threads are vertical and equidistant from both ends of the rulers.

(c) Adjust the length of the thread to a length of L = 50 cm.

(d) Measure L.

Raise your hand to alert your teacher that you have completed step (d). Do not proceed to step (e) until you are instructed to do so.

(e) Give the suspended metre rule an angular displacement about a vertical axis through the centre of the rule and set it into small angular oscillation, as shown in Fig. 2.

(f) Find the period of oscillation T for varying values of d.

(g) Plot a graph of lg T against $\lg(\frac{1}{d})$.

(h) Discuss any anomalous data/results you may have obtained.

$L = 50.1$ cm

d/cm	Nos of osc. n	Time for n oscillations/s			Period T/s	$\lg(T/s)$	$\lg(d/cm)$
		t_1/s	t_2/s	t_{ave}/s			
80.0	25	25.60	25.41	25.51	1.020	0.0086	1.903
70.0	20	23.19	23.38	23.29	1.165	0.0663	1.845
60.0	15	20.56	20.34	20.45	1.363	0.1345	1.778
50.0	15	24.66	24.68	24.67	1.645	0.2162	1.699
40.0	10	20.47	20.47	20.47	2.047	0.3111	1.602
30.0	10	27.34	26.97	27.14	2.714	0.4336	1.477

Practice 4: Loading of a Spring

Procedure:	(a)	Set up the apparatus as shown in Fig. 1.
	(b)	Measure and record the height h_o of the pointer above the table. Indicate on the Fig.1 the distance h_o in the way you measure it.
	(c)	Attach the 50 g hanger to the lower end of the spring with two 50 g slotted weights to act as the first load *M* as shown in Fig. 2. **Note that the minimum load *M* is 150 g**.
	(d)	Measure and record the new height *h* of the pointer above the table.
	(e)	Calculate the extension $x = h_0 - h$ of the spring due to the mass *M*.
	(f)	Repeat the procedure for different values of *M*.
	(g)	Plot *x* against *M*.
	(i)	Discuss any anomalous data/results you may have obtained.

$h_0 = 37.2$ cm

M/g	h/cm			x/cm
	Increasing load	Decreasing load	Average	
150	33.8	33.6	33.7	3.5
200	30.8	30.7	30.8	6.4
250	27.8	27.8	27.8	9.4
300	24.9	24.8	24.9	12.3
350	21.9	21.9	21.9	15.3
400	19.0	19.0	19.0	18.2