

MINISTRY OF EDUCATION
SECONDARY ENGAGEMENT PROGRAMME
GRADE 10
PHYSICS

WEEK 9: Deformation and Hooke's Law WORKSHEET

Table 1 shows the results obtained by a student who performed an experiment to investigate how the length of a spring varies with the load applied to the end of the spring.

Load F/N	Length L/m
2.0	0.36
4.0	0.35
6.0	0.40
8.0	0.46
10.0	0.51

Table 1

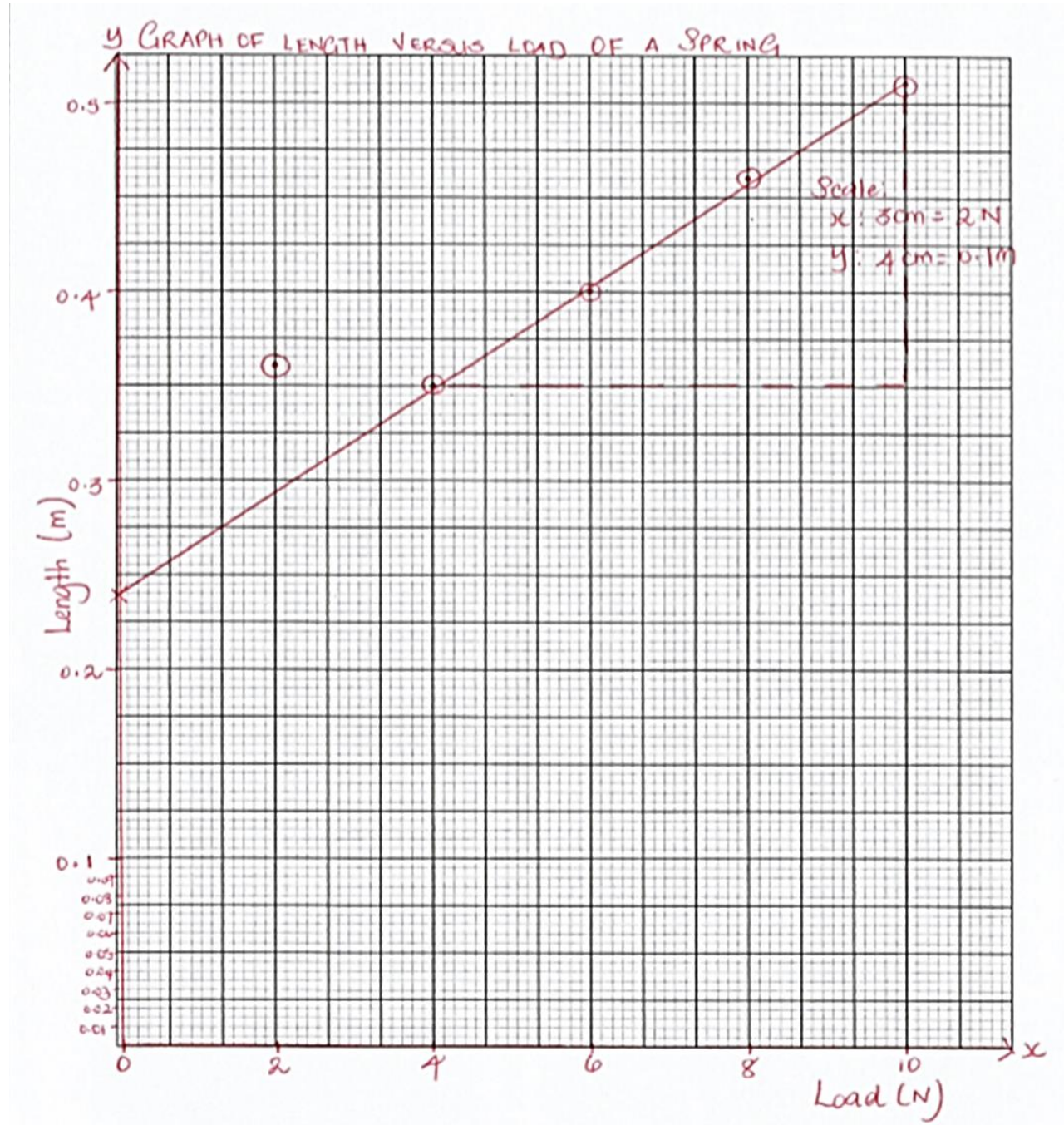
- a) Using graph paper, a graph of length (L) on the vertical axis versus Load (F). Start each axis at zero.
- b) Determine the gradient of the graph.
- c) What information about the spring does the gradient of the graph provide?
- d) Use the graph to find the original length of the spring.
- e) Use the gradient to calculate the extension of the spring if a 0.7 kg mass hangs freely from the end of the spring. Hence calculate the length of the spring with the mass attached. [$g = 10 \text{ N kg}^{-1}$]
- f) If the spring was stretched beyond its elastic limit how would this affect the shape of the graph?
- g) How would you identify the region where proportionality exists?
- h) Classify each of the following as either a scalar or vector quantity
 - I. Force
 - II. Extension

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Worksheet - Answer Sheet

The graph must be plotted in pencil. Answer sheet plotted in pen due to scanning



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b) Gradient = $0.027\text{m}/\text{N}$

c) $\frac{1}{k}$ or 1 over the constant of proportionality. The gradient is the reciprocal of the spring constant.

d) By extrapolation: 0.24m

e) 0.43m

f) The graph would no longer be linear, it would curve.

g) Constant gradient and all the points are evenly spaced out and lie on the line.

h) Load – Vector Extension – Scalar