Date of Lab____________ Date of Submission______________

Laboratory Report

Title Oscillation of Spring

Homeroom	Section	Name	
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Lab Partners

What did you learn?
In this lab, we tried to make sure the formula $T = 2\pi\sqrt{\frac{m}{k}}$, $F = kx$ is correct. We did experiment alone and usedspring and timer. As a result, spring constant calculated from $F=kx$ formula is different from spring constant calculated from $T=2\pi\sqrt{\frac{m}{k}}$. We learned this is because resonance of the spring. I drew 2 graph by the result ?

・Meet a deadline ・Write logically ・Write clearly ・Write with your own words

Teacher Comments

Nice graphs.

1	2	3	4	5	6	7	8	9
Due 提出期限	Summary 要旨	Intro. 序	Method. 方法	Results 結果	Table/Fig. 表/図	Discussion 考察	Clearness わかりやすさ	General 全般
+ 12/11					++		+	++

* Write your report in English * Use this form as a cover sheet.
* Submit your reports by the due day on your lab.

Result

Table 1

m(kg) (x1 0^-3)	f(N)	x (m) (x10^-2)	T(s)	T^2 (s^2)
50	0.49	1.0	0.29	0.084
70	0.686	1.8	0.310	0.096
80	0.784	2.0	0.321	0.103
90	0.882	2.4	0.347	0.120
100	0.98	2.8	0.356	0.127
110	1.079	3.0	0.372	0.138
120	1.176	3.4	0.393	0.154
130	1.274	3.6	0.400	0.160
140	1.372	4.0	0.413	0.171
150	1.47	4.3	0.441	0.194
160	1.565	4.5	0.453	0.205
170	1.666	4.8	0.478	0.228

Table2

	Graph1	Graph2
spring constant	30.95	26.617

Discussion

1.The spring constant k calculated from the diagram and graph 1
Graph 1 is line. It means that elongation is proportion to elastic force.
The slope of the graph means inelasticity of spring. If k is big, it would be difficult to strech

F= mg
F = kx

$$k = \frac{\Delta F}{\Delta x}$$

Spring k $\frac{1.666-0.49}{0.048-0.01}=$ 30.95(N/m)

2. The spring constant k can also calculate from comparing mass of weights m vs period^2 T^2. Since Graph 2 is also line, you can say the mass is proportional to Period ^2

$$T = \frac{2\pi}{w}$$

$$T = 2\pi \sqrt{\frac{m}{k}}$$

$$k = \frac{4\pi \wedge 2\Delta m}{\Delta T \wedge 2}$$

Spring: k $\frac{4\pi \wedge 2(0.17-0.05)}{0.228-0.084}$ = 26.617 (N/m)

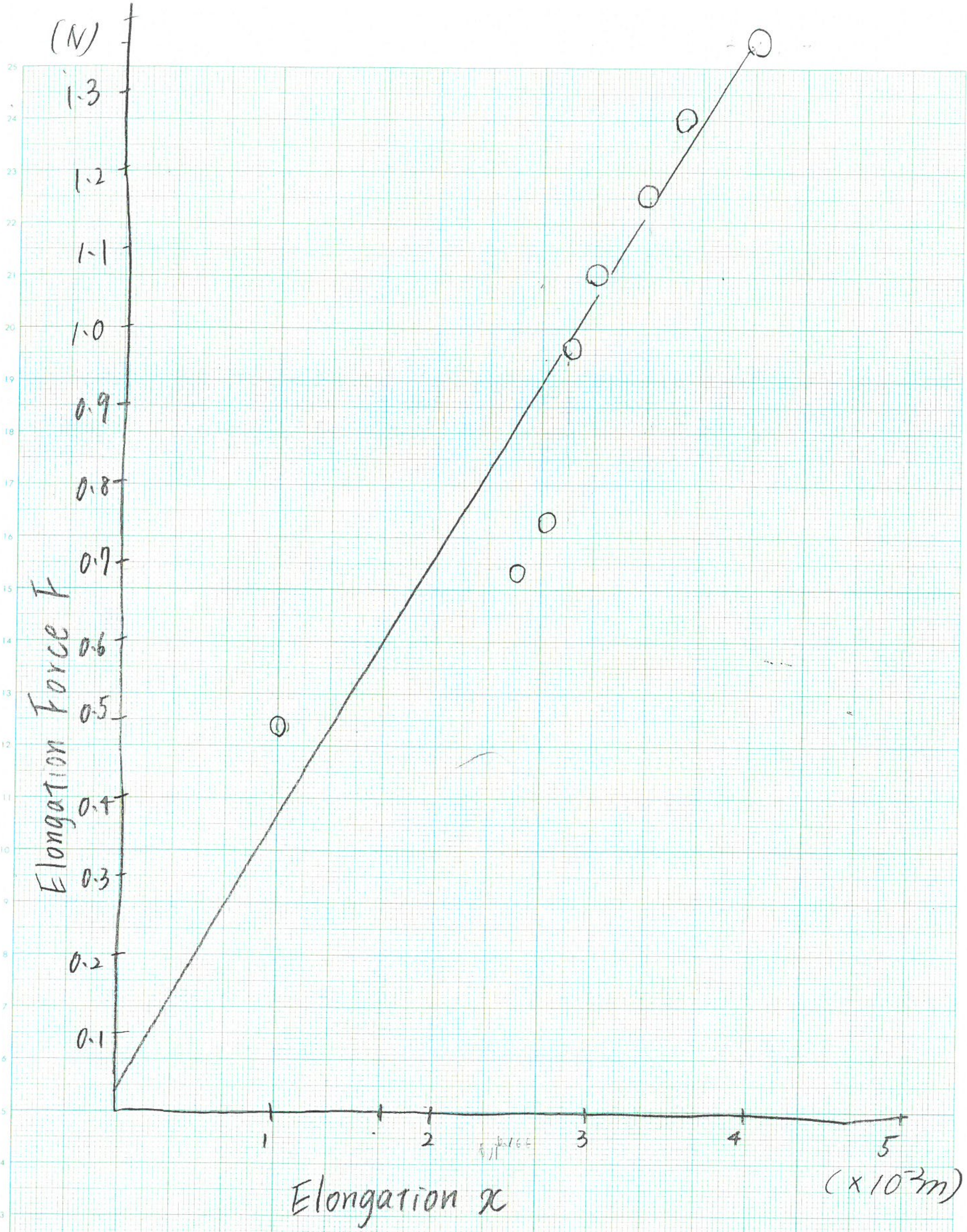
3. Theoretical Formula T = $\frac{2\pi}{\omega} = 2\pi\sqrt{\frac{m}{k}}$

By Graph 2, you can know that mass is proportional to the period^2 .

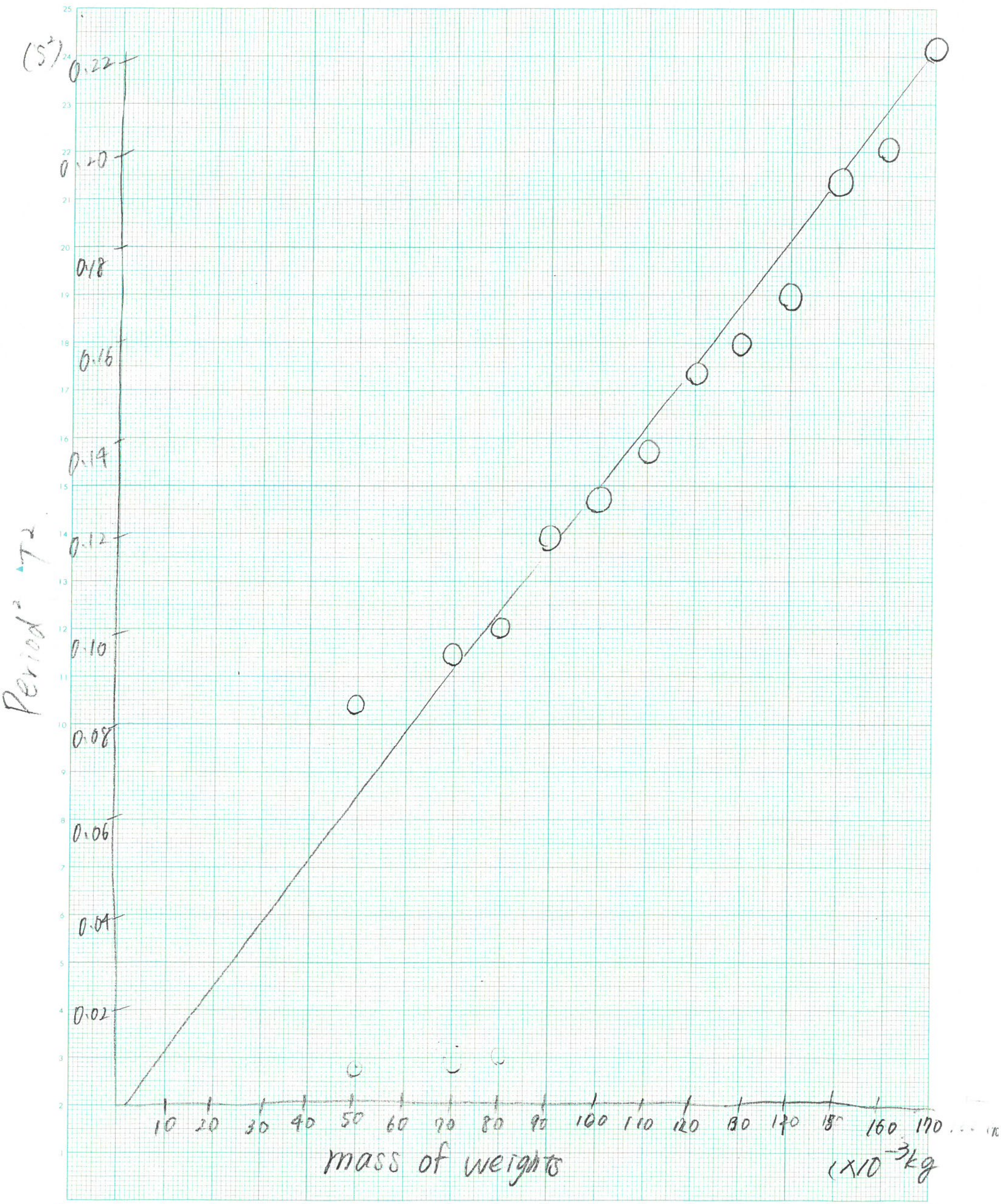
If you square theoretical formula T^2 $= \frac{4\pi \wedge 2m}{k} = \left(\frac{4\pi \wedge 2}{k}\right)m$

you would consider that the mass is proportional to the period^2 by formula.

4. As shown in the table 2 , the spring constant k calculated from graph 1 is greater than graph2. It was because the resonance occurred and the spring did not go up and down straight when using spring and weights. It made the period long. If there was no resonance, the period would be short, the slope of spring in graph2 would be gentle, and the difference would be less.



Graph 1 Elongation x vs Elastic Force F



Mass of weights vs Period² T²

JIS-A4 1mm (250×180) コクヨ ホ-19