

## Periodic Motions

Name \_\_\_\_\_ ID \_\_\_\_\_ TA \_\_\_\_\_

Partners \_\_\_\_\_

Date \_\_\_\_\_ Section \_\_\_\_\_

**Please exercise caution so that the swinging weight does not hit people and the photo gate, and treat all springs gently.**

### Pendulum Motion

#### **Conceptual Discussion:**

What is the definition of the period for a pendulum motion? In other words, how do you determine one period?

#### **1. Length dependence of the period** [Fixed mass = 0.10 kg, Fixed amplitude = 10°]

#	Length $\ell$ (m) <span style="color: red; font-size: small;">The increment or decrement must be at least 0.1 m.</span>	Period $T$ (s)
1		
2		
3		
4		
5		

**Question 1:** Does the period of a simple pendulum depend upon its length? If so, how does it depend on?

## Spring Motion

### Conceptual Discussion:

What is the definition of the period for a spring motion? In other words, how do you determine one period?

--

### 2. Periodic spring motion

- Amplitude dependence

Fixed mass,  $m = 0.10$  kg (100 g); **Just put a 50-g weight since the hanger has already 50 g.**

Fixed spring constant,  $k_1 =$  \_\_\_\_\_ N/m  $\Leftarrow$  from the previous experiment

Amplitude	Period
0.02 m	
0.04 m	
0.06 m	
0.08 m	

- Mass dependence

Fixed amplitude,  $A = 0.06$  m (6 cm);

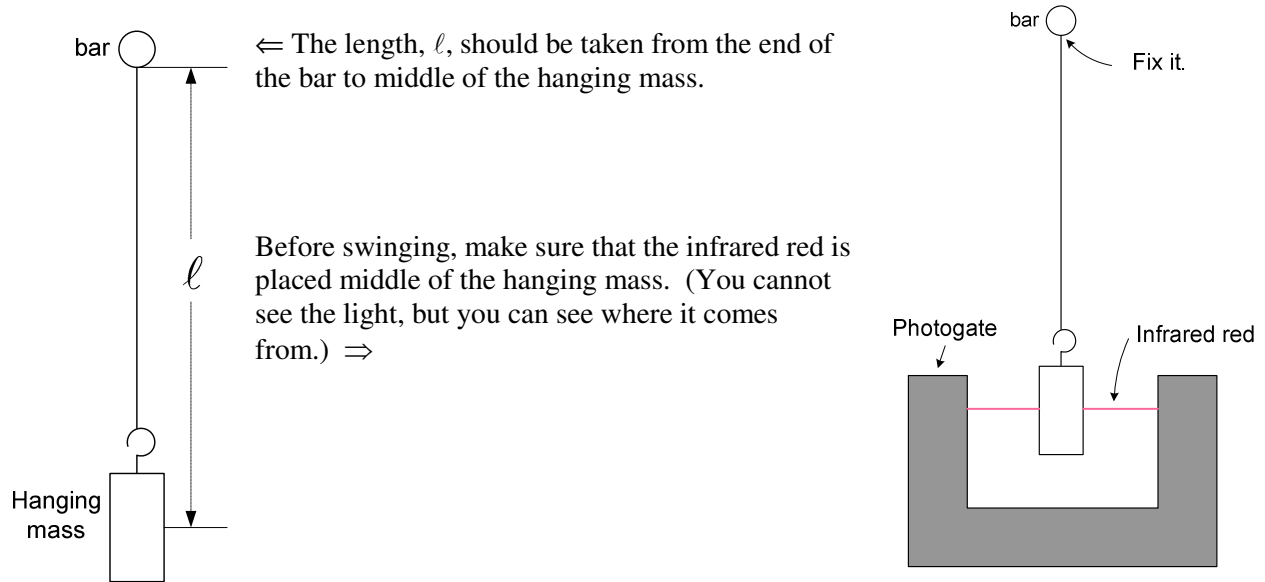
Fixed spring constant,  $k_1 =$  \_\_\_\_\_ N/m  $\Leftarrow$  from the previous experiment

Mass <b>Calculate the total mass</b>	Period
Nothing + 0.05 kg (mass of the weight hanger) = 0.05 kg	
0.02 kg + 0.05 kg (mass of the weight hanger) =	
0.04 kg + 0.05 kg (mass of the weight hanger) =	
0.06 kg + 0.05 kg (mass of the weight hanger) =	

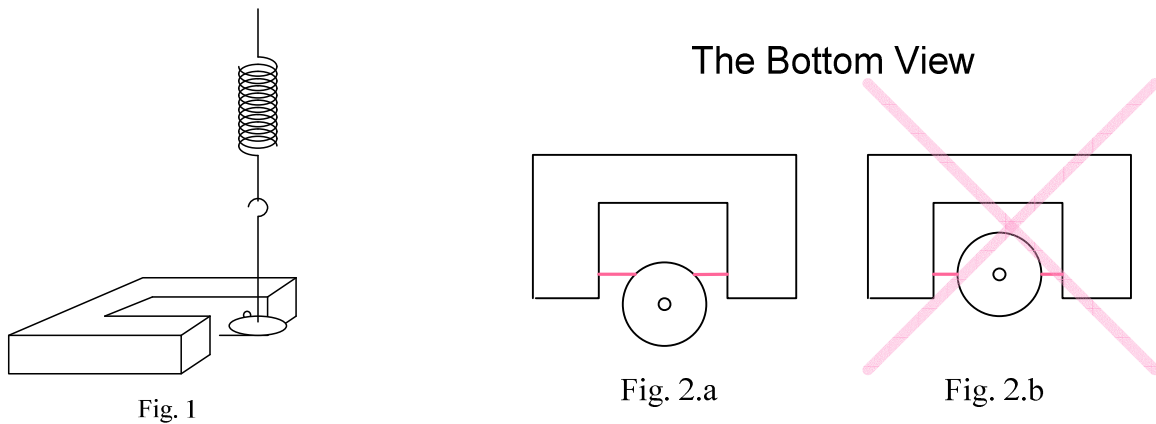
**Question 2:** Does the period of a spring motion depend upon its amplitude of motion? If so, how? How about the mass dependence?

**Notes for the periodic pendulum & spring motions**

**For the 1<sup>st</sup> part of experiment**



**For the 2<sup>nd</sup> part of this lab (period of spring motion), make sure following things.**



The disk part of the weight hanger should be placed in the middle of the photo gate when it does not move (Fig.1). To obtain proper results, the disk should be placed shown as Fig. 2.a.