Periodic Motions

Name	IDTA
Partners	
Date	Section

Please exercise caution so that the swinging weight does not hit people and other fragile objects.

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 = $0.10 \,\mathrm{kg}$, Fixed amplitude = 10°]

#	Length ℓ	Period T
	(m)	(s)
	The increment or decrement must be at least 0.1 m.	
1		
2		
2		
3		

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

Spring Motion

2. Hooke's law (Finding the spring constant) $g = 9.80 m/s^2$

#	Hanging Mass	Gravitational Force	Displacement x	Spring Constant
	(kg)	F = mg	(m)	k = F / x
		(N)		(N/m)
1	Nothing + 0.05 kg			
	(mass of the weight			
	hanger)			
	= 0.05 kg			
2	0.02 kg + 0.05 kg			
	(mass of the weight			
	hanger)			
	= 0.07 kg			

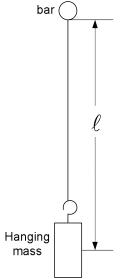
3 0.04 kg + 0.05 kg					
(mass of the weight					
hanger)					
= 0.09 kg					
Calculate the average spring constant.					
k =	(N/m)				
Conceptual Discussion:					
What is the definition of the period for a sprin	ng motion? In other words, how do you				
determine one period?					
3. Periodic spring motion					
• 0					
 Amplitude dependence 					
Fixed mass, $m = 0.10 \text{ kg} (100 \text{ g})$; Just put a 5	50-g weight since the hanger has already 50 g.				
Fixed spring constant, $k = $	Fixed spring constant, $k = $ N/m \Leftarrow from the previous experiment				
Amplitude	Period				
0.02 m					
0.04					
0.04 m					
0.06					
0.06 m					
Mass demandance					
• Mass dependence					
Fig. 1 1:41- A = 0.06 ··· (6 ···)					
Fixed amplitude, $A = 0.06 \text{ m} (6 \text{ cm});$					
Final anning agreement to	N/m / from the manious over mineral				
Fixed spring constant, $k = $	N/m ← from the previous experiment				
Mass	Devie 4				
Mass Calculate the total mass	Period				
Nothing + 0.05 kg (mass of the weight hanger)					
= 0.05 kg (mass of the weight hanger)					
0.02 kg + 0.05 kg (mass of the weight hanger)					
= 0.07 kg $= 0.07 kg$ (mass of the weight hanger)					
0.04 kg + 0.05 kg (mass of the weight hanger)					
1 0 0 (Í				

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

= 0.09 kg

Notes for the periodic pendulum & spring motions

For the 1st part of experiment



 \Leftarrow The length, ℓ , should be taken from the end of the bar to middle of the hanging mass.

Before swinging, make sure that the infrared red is placed middle of the hanging mass. (You cannot see the light, but you can see where it comes from.) \Rightarrow