CHAPTER 13   Simple Harmonic Oscillators

DEMO:

← spring
← mass
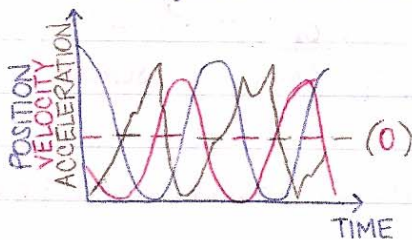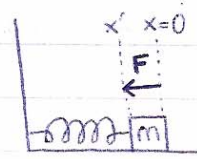attached to paper

If not stretched beyond it's limit, will be a SHO

[Noisy because v and a graphs are derived from position]

Don't need gravity, can be depicted horizontally:

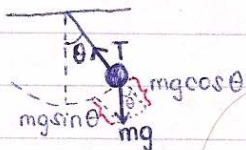| If x is...	F is...
positive	negative
0	0
negative	positive

CQ1: In SHM, acceleration is not constant

$a = -kx/m$
  ↳ always changing

Pendulums and Springs

$F_{restoring} = kx = mg\theta$

NOTE: Oscillations in space and time are related, but DIFFERENT

Period (T) and Frequency (f)

T = time to go around circle at ω; time of 1 cycle

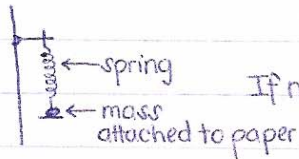   DEMO: Shadow graph: circular oscillation projected on a flat surface = SHM

$f = 1/T = \omega/2\pi$
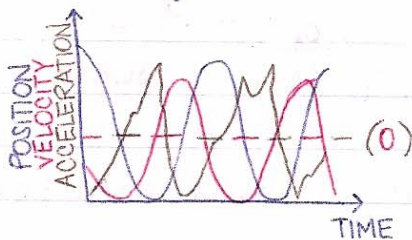
CQ2: Highest f? C (shortest T)
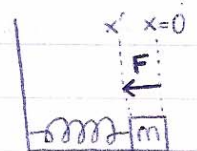
CHAPTER 13   Simple Harmonic Oscillators

DEMO: ← spring

← mass attached to paper

If not stretched beyond it's limit, will be a SHO

[Noisy because v and a graphs are derived from position]

POSITION / VELOCITY / ACCELERATION vs TIME — (0)

Don't need gravity, can be depicted horizontally:

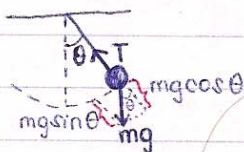| If x is...	F is...
positive	negative
0	0
negative	positive

x=0, F

CQ1: In SHM, acceleration is not constant

$a = -kx/m$

↖ always changing

Pendulums and Springs

$F_{restoring} = kx = mg\theta$

θ, T, $mg\cos\theta$, $mg\sin\theta$, mg

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Period (T) and Frequency (f)

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DEMO: Shadow graph: circular oscillation projected on a flat surface = SHM

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CQ2: Highest f? C (shortest T)