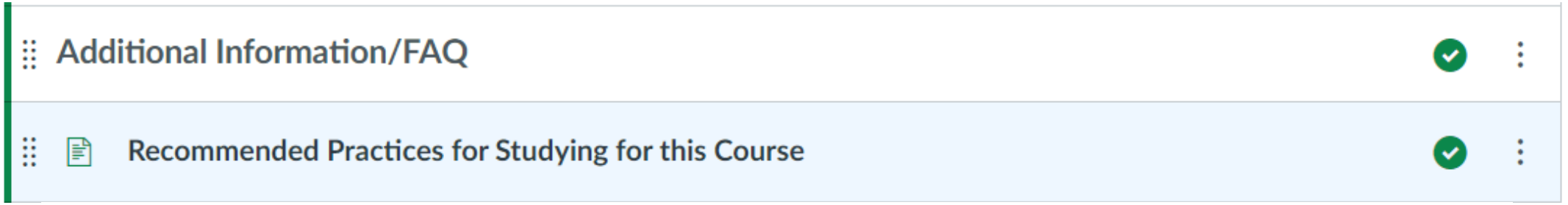
SQUARECAP

How prepared do you feel for the exam?

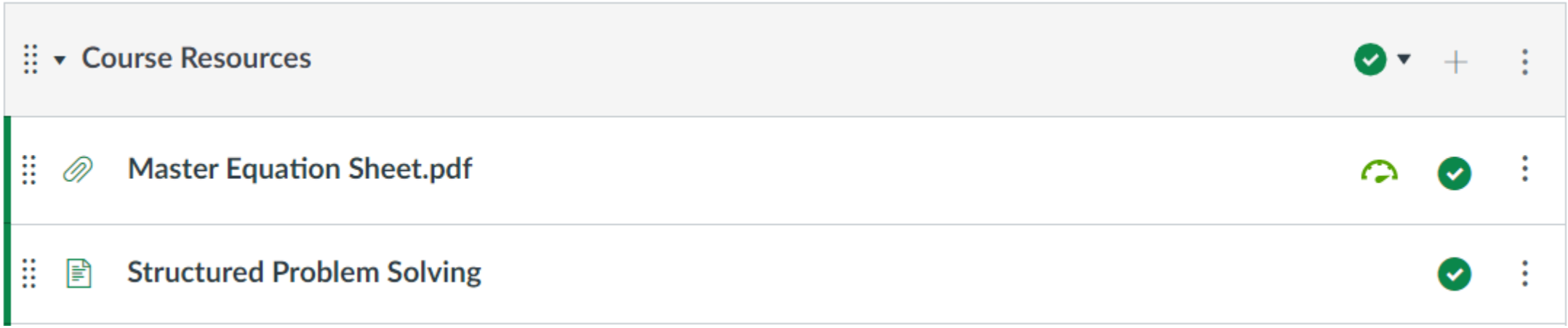
How are you preparing?

Resources for Reviewing and Preparing



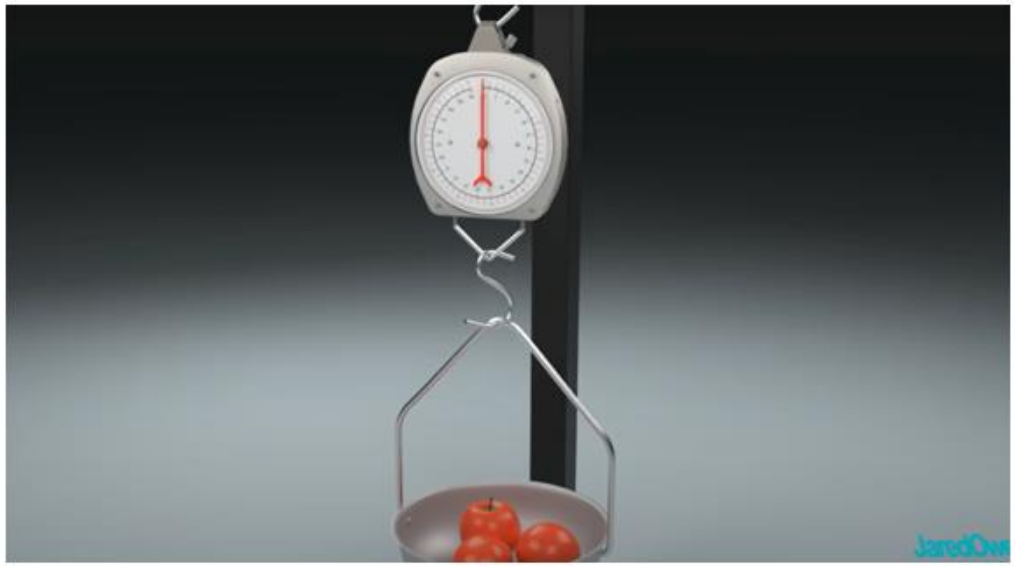
Student Practice Area

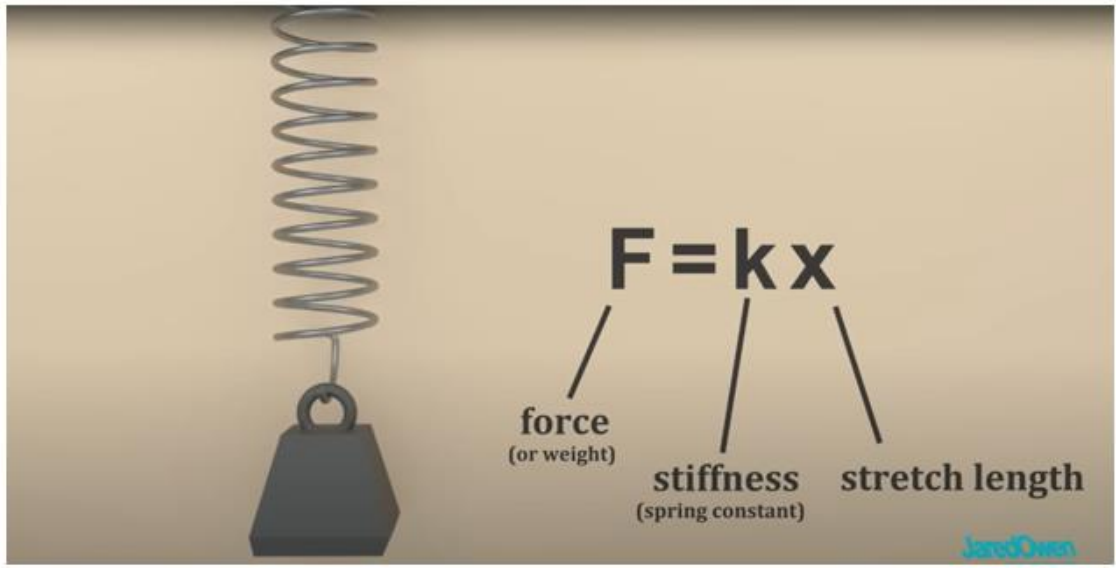
Taking a practice assignment is like taking a homework assignment, except the scores aren't recorded. From the main *Class Management* page select ***Student Practice Area*** from the drop-down under *Class Menu*. This will take you to a practice window as seen in Figure 2.



Recap: Springs and Things

Prelecture Review: Linear Elasticity





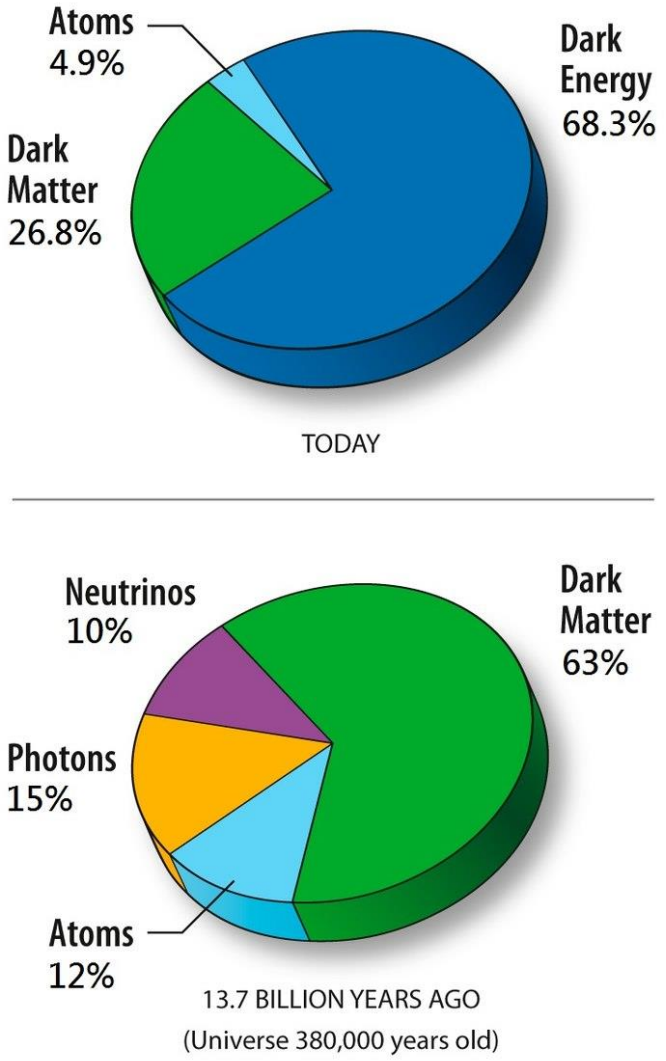
$$F_E = -k\Delta x$$

Direction: Restoring Force

What are our questions and/or comments?

Recap: My Comments and Questions

- Comment: There is an approximate sense in which spacetime itself has an elasticity, causing it to expand. This can be made precise in the "Newton-Hooke" approximation of general relativity (I'll try to bring this up later on).



Prelecture Review: Master Equation Sheet

Geometry, Kinematics, and Statics

Units and Constants

SI Mass: kg SI Distance: m SI Time: s

$1\ kilo\ (k) = 10^3 \quad 1\ centi\ (c) = 10^{-2}$

$1\ milli(m) = 10^{-3}\ 1\ nano\ (n) = 10^{-9}$

$1\ angstrom\ (\text{Å}) = 10^{-10}\ m$

$g \approx 9.81 \frac{m}{s^2}$

$\rho = \frac{m}{V} \qquad s = \frac{d}{t} \qquad \dot{m} = \frac{m}{t}$

Geometry

$c^2 = a^2 + b^2 - 2ab\cos\theta \qquad A = \frac{1}{2}lh$

$A = (\alpha + \beta + \gamma - \pi)R^2$

$\sin\theta = \frac{o}{h} \qquad \cos\theta = \frac{a}{h} \qquad \tan\theta = \frac{o}{a}$

$\sin\theta^2 + \cos\theta^2 = 1$

$C = 2\,\pi r \qquad A = \pi r^2$

$A = 4\,\pi r^2 \qquad V = \frac{4}{3}\pi r^3$

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \qquad y = ax^2 + bx + c$

$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

Calculus

$\frac{d}{dx}\, x^n = n\, x^{n-1}$

$\frac{d}{dx}\sin x = \cos x \quad \frac{d}{dx}\cos x = -\sin x$

Vectors and Coordinates

$\vec{A} = (x, y, z) \quad \vec{A} + \vec{B} = (x_A + x_B, y_A + y_B, z_A + z_B)$

$A = \left|\vec{A}\right| = \sqrt{x^2 + y^2 + z^2}$

$\vec{A} \cdot \vec{B} = AB\cos\Delta\theta$

$x \times y = z \qquad y \times z = x \qquad z \times x = y$

$\left|\vec{A} \times \vec{B}\right| = AB\sin\Delta\theta$

$x = r\cos\theta \qquad y = r\sin\theta$

What are our questions and/or comments?

Prelecture Review: Master Equation Sheet

Motion in 1, 2, and 3D

$\dot{x}_{avg} = \frac{\Delta x}{\Delta t}$ $\quad v(t) = \dot{x}(t)$ $\quad a(t) = \dot{v}(t) = \ddot{x}(t)$

$x(t) = x_0 + v_0 t + \frac{1}{2} a t^2$ $\quad a_g = -g$

$\theta(t) = \theta_0 + \omega t + \frac{1}{2} \alpha t\text{^}2$

$v_f^2 = v_i^2 + 2a\Delta x$

$\omega_f^2 = \omega_i^2 + 2\alpha\Delta\theta$

$\frac{\Delta A}{\Delta t} = constant$ $\quad \frac{T^2}{r^3} = \eta_{Kepler} = constant$

$\vec{r}(t) = (x(t), y(t), z(t))$ $\quad a_c = \frac{v^2}{r}$

What are our questions and/or comments?

My Comments and Questions

- Comment: If you're content with all the practice problems, try coming up with new ones. Can you imagine modifying the problems while keeping them solvable by the same methods?

Open Review

- Any questions welcome