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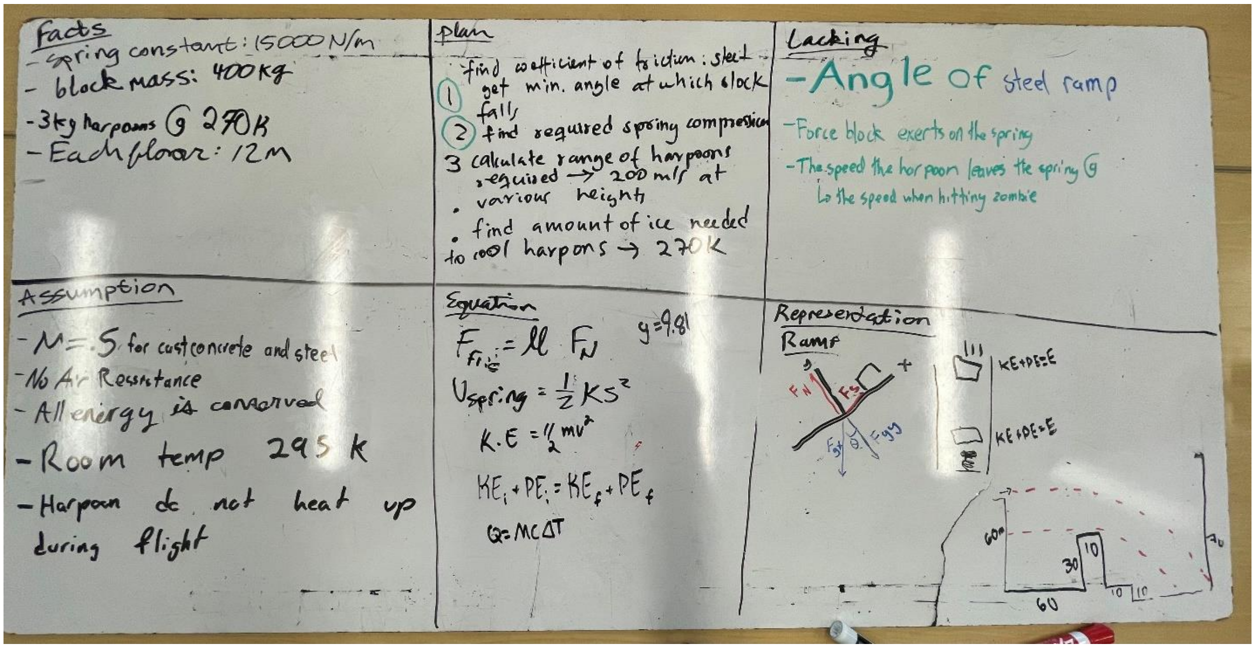
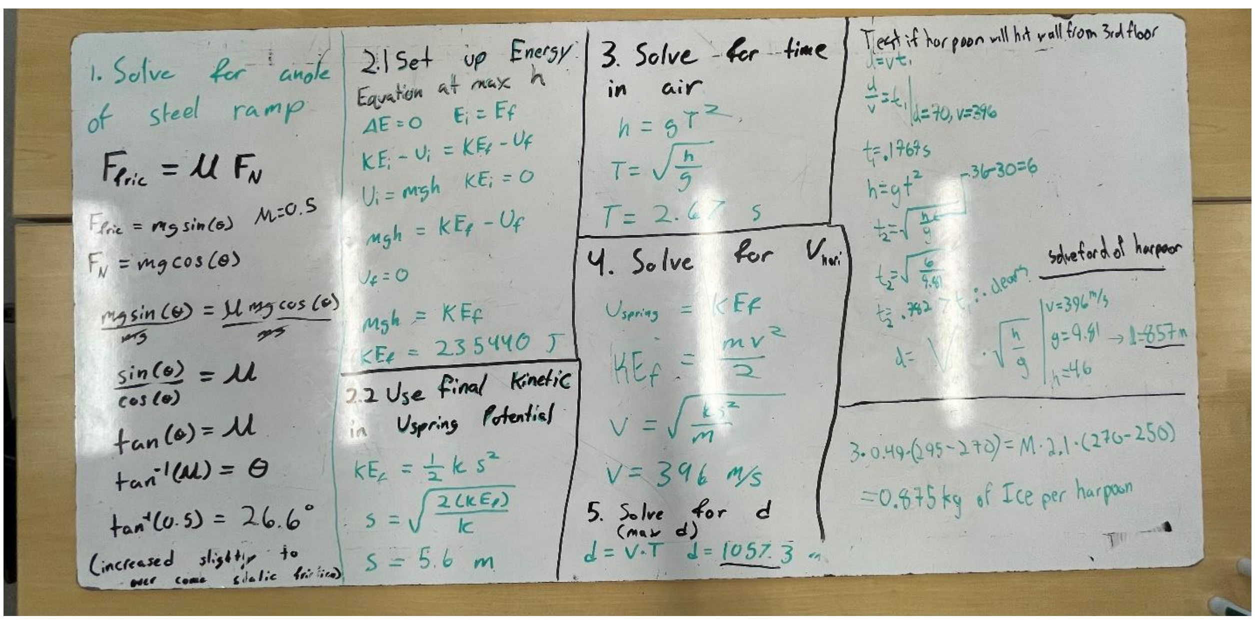
**REFLECTION PROMPT: Reflecting on this week in class, were you able to improve on what you said last week? Why or why not?** This week in class I felt I was able to contribute a bit more than I had the previous week, in both our assessments of the problems and our problem solving process. Our group was able to identify items that we were solving for and were more clear in developing our plan and process this week.

**What went well this week? Be specific and include supporting examples from this week's class.** This week in class I was able to stay involved and clearly understand our process. I think our group is working pretty well together and it's easy for me to share my view of the problem. This week we stepped up our plan and made sure to develop our plan as we broke down the problem and brainstormed. We clearly broke down our process in solving and connected it with our plan by numbering the step we were working on and splitting up the step with drawn borders.

**What area(s) could you improve on for next week related to in class and how might you work to improve those next week? What strategies might you try to improve next week?** Next week I think we need to be more explicit and write down all of our assumptions that we need to make in order to solve our problem. I would like to stay involved and maybe as a group we could switch roles to make sure everyone can stay involved and make sure everyone is understanding our process and how we obtained our answers.

**PASTE IMAGES OF YOUR TUESDAY WHITEBOARDS HERE:**



Facts
- Mass satellite: 4500 kg
- mass probe: 400 kg
- dist from Earth: $1.9\times10^9$ m
- satellite speed: 340 m/s
- asteroid mass: 9300 kg
- asteroid speed: 950 m/s
- dist sat to asteroid: $5\times10^5$ m
- probe spring stiffness: $5.3\times10^9$ N/m

Plan
1. Calculate time for signal to reach satalite
2. Calculate if Asteroid will hit satalite before signal
3. Calculate the speed the spring must launch the probe to have satalite reach Earth
4. Time you can wait to send signal

Lacking
- Spring compression
- Time for signal to reach satalite
- Force the spring must exert

Assumptions
Speed of light: $3\times10^8$ m/s
Signal travels @ speed of light
- collisions are maximally inelastic: Momentum conserved but energy is not

Equation
$KE = \frac{1}{2}mv^2$
$U_{spr} = \frac{1}{2}ks^2$

Representations


$K.E_i = \frac{1}{2} m_t v_t^2 = \frac{1}{2} ks^2$

$\frac{1}{2} \cdot ks^2 =$ $\quad P_i = m_t v_t = \text{Force}\,\Delta t$

1. Solve for time it takes signal to reach satellite

$V_s = \frac{d}{t}$ $\quad t = \frac{d}{V_{sig}}$

$t = \frac{1.9\times10^6}{3\times10^8} = 6.3$ seconds

2. How far will satellite and asteroid travel

$d_s = V_s \cdot t$ $\quad d_a = V_a \cdot t$

$d_s = 2152.2$ $\quad d_a = 6015.5$ m

(they won't collide before signal)

3.1 Solve for speed of probe to stop asteroid $V_t = 0$

$(M_A \cdot V_a) + (M_p \cdot V_p) = (M_A + M_p)V_t$

$(M_A \cdot V_a) + (M_p \cdot V_p) = 0$

$M_p \cdot V_p = -(M_A \cdot V_a)$

$V_p = \frac{-(M_A \cdot V_A)}{M_p}$ $\quad V_p = -22{,}087.5$ m/s

3.2 Solve for speed of satallite

$V_t(M_p + M_s) = V_s \times M_s + V_p \times M_p$

$V_t(M_p + M_s) - V_p \times M_p = V_s \times M_s$

$V_s = \frac{V_t(M_p + M_s) - V_p \times M_p}{M_s}$

$V_s = \frac{340(400+4500) - (-22{,}087.5) \times 400}{4500}$

$V_s = 2{,}333.56$ m/s

3.3 Solve for compression of spring

$KE_p + KE_s = PE_{spring} + KE_{ts}$

$KE = \frac{1}{2}mv^2$ $\quad \hookrightarrow U_{spr} = \frac{1}{2}ks^2$

$\frac{1}{2}m_p V_p^2 + \frac{1}{2}m_s V_s^2 = \frac{1}{2}ks^2 + \frac{1}{2}m_t v_t^2$

$\sqrt{\frac{m_p \times v_p^2 + m_s \times V_s^2 - m_t \times v_t^2}{k}} = s$

$s = \sqrt{\frac{400\times22{,}089.5^2 + 4500\times2{,}333.56^2 - 4900\times340^2}{5.3\times10^9}}$

$s = 6.43$ m

4. $|v_a| + |v_s| = d$

$950t + 340t = 500{,}000$

$819.672 - t_{for\,signal}$

Time you can wait is 813.37 seconds