

SHM concepts

1. Real springs have mass. How will the true period and frequency differ from those given by the equations for a mass oscillating on the end of an idealized massless spring?
2. If you double the amplitude of an object in SHM, how does this change the frequency?
3. If a pendulum clock is accurate at sea level, will it gain or lose time when taken to high altitude? Explain.
4. If you quadruple the length of a pendulum while cutting the mass of the bob in $\frac{1}{2}$, how will its period and frequency change?
5. The following items deal with a playground swing.
 - a. How could you increase its frequency of oscillation?
 - b. At which point(s) in the swing are you accelerating linearly? Why?
 - c. Where along your swing path is your speed the greatest?
 - d. Would this swing work in deep space? Explain.

6. The following items deal with one of those baby bouncers -- the ones that hook to the top of a doorway, with a spring and a baby harness connected together.
- a. My kid used to get sick every time I put him in that because it would oscillate too quickly. What could I have done to slow it down?
 - b. During the ride, is my kid's acceleration constant? Explain.
 - c. While at the top of the motion, what is my kid's speed? What is the direction of his acceleration? Why?
 - d. Are the forces ever balanced? If so, where?
 - e. Would this contraption work any differently on the moon? Explain.