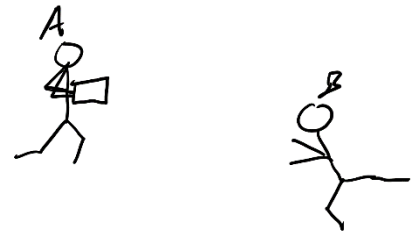


1. A monkey is trying to open a coconut by dropping it out of a tree onto the ground, but the coconut isn't breaking.
  - a. Describe a different strategy that the monkey could use to break the coconut by dropping it from the same height.
  - b. How does your strategy work?
    - Describe what happens to the coconut's momentum when it hits the ground.
    - Then describe the relationship between impulse and momentum.
    - Finally, explain how your strategy causes the coconut to break.

2. Astronauts A and B are floating motionless in space. Astronaut A has a package, which she throws to Astronaut B, and which Astronaut B catches.



- a. Suppose that momentum is conserved in "the system" when B catches the package, but not when A throws it. If this is true, which items are part of "the system?"
- b. Explain how you know that your answer to part a is correct.
- c. If "the system" consists of both astronauts and the package, when is momentum conserved? When is it not conserved?
- d. Suppose "the system" consists of both astronauts and the package. During which of the following moments does total KE remain constant? For each situation, explain how you know.
  - While A is in the process of pushing the package toward B.
  - While the package is between A and B.
  - The time interval beginning when the package is between the astronauts and ending after B has caught the package.

3. Students collected data on two identical sleds (A and B) that were released from the tops of identical snowy hills. The sled accelerated down the hills and crashed into obstacles at the same speed. The two obstacles had the same mass. The students' data table is below. Some of the information is missing.

Sled Letter	Impulse (Ns)	Average Impact Force (N)	Average Impact Time (s)
A	3	90	
B		35	0.1

- a. Describe how the obstacle that was hit by sled A probably differed from the obstacle that was hit by sled B.
- b. Provide evidence and explain your reasoning for part A.
- c. Which sled had the highest speed after the collision?
- d. Provide evidence and explain your reasoning for part c.