

Momentum and Collisions

# Concept Review

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## Conservation of Momentum

A radioactive nucleus is initially at rest. When it decays, it splits into two moving parts, one of which has exactly 50 times the mass of the other. Assume there are no external forces acting on the nucleus, and answer the following questions.

1. What is the total momentum of the nucleus before the fission (split) occurs?

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2. What is the total momentum of the pieces after the event?

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3. Assume the less massive particle moves east ( $0^\circ$ ). In words, compare the size and direction of the two momentum vectors.

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4. Because the masses are different, the velocities must be different. Determine the ratio of the velocity of the small particle to the velocity of the large particle.

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5. What generalization can you make about the relative velocities and the masses in this type of situation?

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