

Falling Like Dominoes

Introduction

In order to use nuclear power as an energy source, a self-sustaining chain reaction must be initiated. In this activity you will simulate a chain reaction with dominoes.

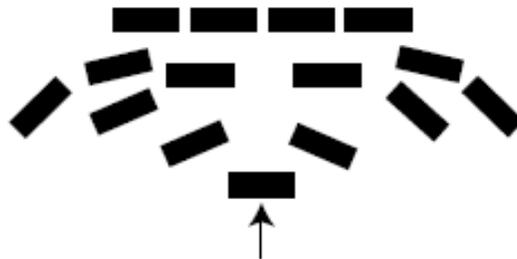
Procedure

1. Obtain 15 dominoes and a ruler from your teacher.
2. Set the dominoes upright in a straight line spaced about 1.5 cm apart. Push the first domino and observe what happens.

Question 1: When one domino is pushed over how many dominoes does it impact directly?

Answer: Each domino only knocks over one other domino.

3. Now set up the dominoes in the patten below. The front-to-back spacing should be about 1.5 cm.



4. Push over the domino indicated by the arrow in the diagram above and observe what happens.

Question 2: When one domino is pushed over, how many dominoes does it impact directly?

Answer: Each domino knocks over at least two other dominoes.

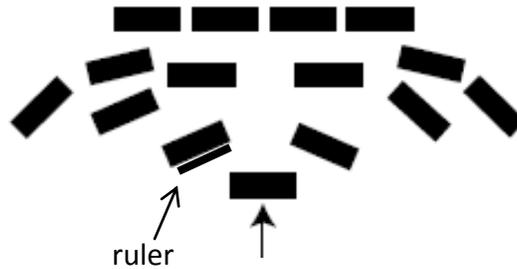
Question 3: Describe the difference between what happened in step 2 and what happened in step 4.

Answer: In step 2, the dominoes fall sequentially (one at a time). In step 4, multiple dominoes are being knocked over at the same time.

Question 4: Which set-up of dominoes is a better simulation of a chain reaction? Justify your answer.

Answer: Step 4 is a better simulation. Initially, only one domino is pushed. The one domino ends up causing multiple dominoes to fall over simultaneously.

5. Now place ruler just in front of the domino as indicated in the diagram below. The ruler should be standing on end.



6. Push over the domino indicated by the arrow in the diagram above and observe what happens.

Question 5: Describe the difference between what happened in step 4 with step 6. Based on what you read in the “Nuclear Propulsion” handout, what does the ruler simulate?

Answer: With the ruler in place, only the dominoes on the right side fall over. The ruler is simulating a control rod, moderating the amount of material involved in a chain reaction.

7. Below are several fission reactions involving Uranium-235. Fill in the missing parts.

