

## OUR MISSION

INL's K-12 STEM Program works to inspire Idaho's future STEM workforce, impact students, teachers and families by integrating best practices in STEM education, and empower employees to become STEM mentors to transform K-12 STEM into a driver for innovation.

## STEM IN ACTION

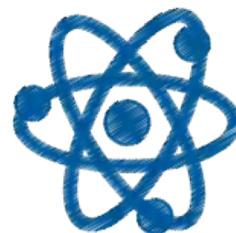


### DOMINOS CHAIN REACTION

*When an atom is split, a huge amount of energy is released. When the energy is released in a slow controlled manner, it can be used to generate electricity. Nuclear fission is the process of splitting of a large atom into two or more smaller atoms. The fission of U-235 (Uranium) splits off two neutrons, which in turn strike two more U-235 atoms. Two neutrons are split from each of the two U-235 atoms. Each of these neutrons then go on to strike another U-235 atom. Each of those atoms are split releasing two neutrons, which go on and hit more Uranium atoms. The chain reaction continues on and on, getting bigger and bigger with each split. The bigger the chain reaction, the more energy that is created. To demonstrate this reaction, line up dominoes in different patterns. Try to find the best pattern that will cause a chain reaction and knock all the dominoes down in the shortest amount of time. Compare how the dominos hitting other dominos are similar to chain reactions that happen in nuclear fission.*

### TRY THIS AT HOME

- *What objects work best to stop a chain reaction? In a nuclear reactor control rods are used to slow down the reaction. A control rod is made up of cadmium or boron. These elements absorb neutrons. If you insert the control rod between the uranium atoms, the amount of neutrons available to cause more splits is reduced, breaking the chain reaction. Try using a ruler and place it between the dominoes to slow down the reaction. Where would you put the rod to only have 9 out of the 15 dominoes fall?*
- *What is the farthest distance that you can spread out the dominoes and still have a chain reaction?*
- *Go bowling, how does the setup of the bowling pins cause the most effective chain reaction? What happens to the chain reaction when the center pin is knocked down?*



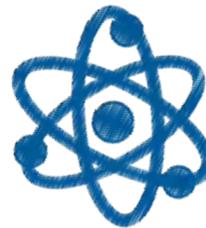
# GUIDING QUESTIONS

- How does the placement of the dominoes affect the chain reaction?
- Does the way the domino is placed affect the chain reaction? (on long edge or on end)

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## MATERIALS

- Dominoes
- Flat surface



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## PROCEDURES

1. Stand dominoes up on their short end, and arrange them in any pattern on a flat surface.
2. Knock over a single domino. What happens to the other dominos?
3. Try different patterns. Knock over one domino – what happens to the others?
4. After you've tried multiple patterns, arrange them in a single line. Now what happens to the dominoes?

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## CAREERS IN STEM

### BUILDING STEM SKILLS

*If you enjoy the challenge of learning new things, understanding how things work, and solving problems, a career in STEM could be your future! At INL, engineers are working on developing batteries for next generation concepts and working with automobile makers to advance energy storage technologies. Electric vehicles are considered clean energy or renewable energy, which means the emissions from the car do not pollute our air or water. Visit us and learn more about the careers that await you.*

### RESOURCES

<http://nuclearconnect.org/in-the-classroom/for-teachers/nuclear-chain-reaction-using-dominoes>  
[https://www.ducksters.com/science/physics/nuclear\\_energy\\_and\\_fission.php](https://www.ducksters.com/science/physics/nuclear_energy_and_fission.php)

### STUDENTS + PARENTS + EDUCATORS

*For information on grants, training and student opportunities; curriculum ideas and resources, please visit us at: [stem.inl.gov](http://stem.inl.gov).*

