

Domino Knockdown: Kinetic Energy Transfer

Summary

Using marbles, pennies, and dominoes, students will demonstrate how energy can be transferred from one object to another.

Grade levels 4

Materials

- Dominoes (from the orange bag)
- Marbles (from the orange bag)
- Pennies (from the green bag)
- Measuring tape (from pink bag)

NGSS Alignment

[K-PS2-1](#)

[3-PS2-2](#)

[4-PS3-1](#)

[4-PS3-3](#)

ELA Opportunities



Math Connection



Teacher Background Knowledge

In this activity, students are investigating kinetic energy. Kinetic energy is the energy of moving objects. When an object is at rest its energy is called potential energy. A ball held at the top of a ramp has potential energy. As the ball moves down the ramp, the energy becomes kinetic energy. Kinetic energy can be transferred to other objects during a collision. Billiard balls transfer kinetic energy from one to the next when they come into contact with one another. Collisions may involve one moving and one stationary object, or both objects may be moving.

Lesson Instructions

PART 1: Students investigate marble collisions

1. Have students get their materials from their science kits.
2. Ask students to think about how they can make a marble move without touching the marble. Have students share their ideas.
3. Demonstrate how to strike a marble with a domino to make it move.
4.  Have students write down the observations and questions. Ask: What do you notice? What do you wonder? (This can be done in a whole group, or in breakout groups).
5. Ask students: What do you think will happen if you strike the marble with the domino faster? Why? Students can share their initial ideas verbally or in breakout groups.



6. Ask students: Why did the marble move? Where did it get the energy? Where did the energy come from?
7. Have students discuss with their groups how the movement of the marble was different during the two demonstrations and what they think caused the difference. .

PART 2: Students investigate penny collisions

8. Have students line up 4 pennies. Have students slide the 5th penny into the row of pennies.
9. Have students practice this a few times. Have students try sliding the penny slowly and then at greater speed.
10.  Have students investigate how far a penny will move when a penny slides into the row. Students should use their tape measure to record how far a penny travels when.
11. Ask students ask why
12. Have students predict what will happen if we line up 3 pennies and slide 2 pennies into the line
13. Have students try this activity multiple times.
14. Follow up the activity with informational text, videos, and vocabulary.

PART 3: Students investigate dominoes

15. Ask students to relate what they have learned about energy transfer to dominoes. Have students set up their dominoes in a line.
16. Have students knock down one domino. Have students explain their observations.
17. Ask: How is the energy moving from one domino to another? You only touched one domino, but they all fell over. Why??
18. Have students experiment with dominoes to show and explain energy transfer.

Lesson Resources

Google slides (Coming soon!)

Flipgrid (Coming soon!)

Seesaw (Coming soon!)

[Primary Reading](#) Epic: Newton and Me

Intermediate Reading (Coming soon!)

Mystery Science Connection

- 4th Grade Unit (Energizing Everything)
- Kinder Unit (Force Olympics)

Primary Modifications

- Instead of focusing on energy transfer, focus on motion and forces (pushes

Intermediate Modifications

- Have students use an interactive [Newton's Cradle](#)



- and pulls)
- What is making the _____ move?
 - Explain how soccer players use pushes and pulls to play a game
 - Whole group instead of breakout groups (asynchronous investigation)



- Have students draw a model to show how energy is moving in the investigation
- [Collision & Energy Change Interactive Lesson](#)
- Have students design a Rube Goldberg Machine
- [Chain Reaction Machine Video \(OK Go\)](#)