

### Great Forces at Work

Dr. Martin Luther King Jr. was a man whose energy created momentous change in Civil Rights. Connecting his ability to effect change with the science concepts: Force, Motion, and Energy is a timely strategy for developing the **Link** critical thinking trait. Students will review causal relationships related to force, motion, and energy, helping them apply their knowledge to reach new understandings.

*Note: This activity would be best used as a follow-up or culminating lesson to reinforce previously taught concepts related to force, motion and energy.*

*Note: In departmentalized grade levels or classrooms, this activity could be split and used by both teaching partners.*

*Note: Preview literature and Internet websites for appropriate content to match your district guidelines.*



### Getting Started



**Critical Thinking Trait Focus—Link:** *I apply knowledge to reach new understandings.* Review the **Link** critical thinking trait with students and explain they will be using it to help connect Martin Luther King Jr.'s positive change to science.

**Learning Standards Focus**—forces cause change, energy exists in many forms, cause/effect relationships, Newton's Laws of Motion, potential and kinetic energy. Review previously learned concepts related to force, motion, and energy from ThinkUp! Science units.

**Vocabulary**—momentum, effect, impact, consequence, force, influence, motion, energy, cause, inertia, potential energy, kinetic energy

**Materials**—interactive science notebook, Think It Out page, string, scissors, large button or disk, hole punch

### Instruction

#### Activity Directions:

1. Introduce students to Martin Luther King Jr. using a short title or excerpt to read aloud (see literature connection titles below).
2. Prompt students with thought-provoking questions to facilitate the development of the **Link** critical thinking trait. Examples might include:
  - a. *“What connections can you make between the concepts of force and influence?”*
  - b. *“What is the relationship between \_\_\_? Or What distinguishes force from influence?”*
  - c. *“How did MLK’s influence create motion in Civil Rights? How can you relate this to your understanding of force/motion/energy?”*
3. Allow students to work individually, in pairs, or in small groups to explore previously learned concepts of force and motion using this [Button Spinner Activity](#) and [Demonstration Video](#) for the purpose of finding links between their understanding of force and Martin Luther King Jr.’s influence on Civil Rights.
4. Have students review concepts in their science notebooks to find additional concept **links**.

5. Guide students as they write conclusions in their interactive science notebooks following their investigations. Conclusions might include:
- A force is needed to begin motion the motion of the button spinner. This might relate to the actions of a person sparking a movement for positive change.*
  - Due to inertia, the button will continue to rotate even after the string unwinds. This might relate to the influence MLK had on the Civil Rights Movement.*
  - Momentum, at some point slows, and eventually stops. This might relate to people getting busy in their lives and allowing positive movement to slow or stop*
  - Force and motion are used to keep the momentum going. The same concept applies when actions are taken to affect the progress of positive change.*
  - Force elicits motion, while influence elicits change*

### Reflect

After students have **Linked** concepts related to force and influence, facilitate a discussion about their thinking and learning. Guide students as they focus on how the **Link** critical thinking trait helped them process through the task. Emphasize the importance of using **Link** to reach new understandings. Invite students to create one or more analogy brackets to illustrate their understanding of the relationships between force and influence.

### Literature Suggestions:

**Books About Reflecting on Achievements:** *The Boy Who Changed the World* by Andy Andrews, *Each Kindness* by Jacqueline Woodson, *The Ripple* by Monica Stoltzfus and Alexandra H. MacVean, *Forces: Physical Science for Kids* by Andi Diehn, *Martin's Big Words: The Life of Dr. Martin Luther King, Jr.* by Doreen Rappaport

**Books About Goal Setting:** *The Girl Who Drew Butterflies* by Joyce Sidman, *One Drop of Kindness* by Jeff Rubiak, *Who Was Martin Luther King, Jr.?* by Bonnie Bader, *The Tin Snail* by Cameron McAllister.

### Additional Web Resources:

Video about Martin Luther King Jr.: [The Life of Dr. Martin Luther King Jr.](#)

Video about Influence: [Kid President: How To Change the World](#)

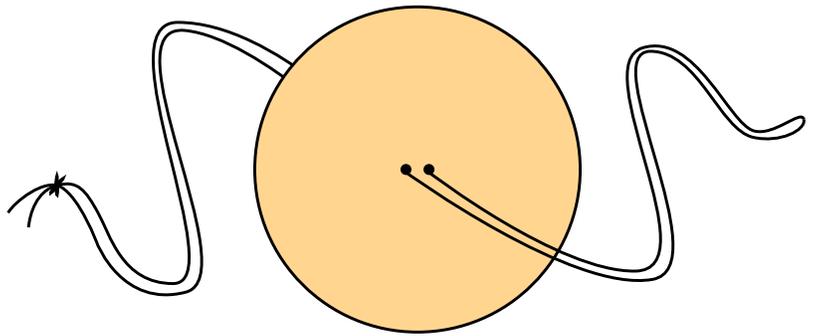
Video about Force, Motion, and Energy: [Bill Nye The Science Guy](#)



#### We love to see how students interact with our resources!

Take photos of your students' work, share them on social media, and use the hashtags: **#MentoringMinds #CriticalThinking**. Find us on Twitter, Facebook and LinkedIn **@mentoringminds**

**Be sure to remember your social media tags! Each month, we will choose a post to win a prize!**



## Button Spinner

### Instructions

#### Materials

- String
- Scissors
- Large button or disk  
*(disks can be made from cardboard, CDs, milk cartons, plastic food lids, etc.)*
- Hole punch *(if making your own disks)*

#### Safety Precautions

- Be aware of your surroundings when using the button spinner.
- Keep a safe distance away from other participants.
- Button spinners can become tangled in hair. Keep the button spinner away from long hair.
- The string can make your fingers sore. Handles can be added with plastic straws, tape, or craft foam.

#### Steps

1. Cut a length of string about 90 cm long.
2. Thread the string through the holes of the button and tie the ends in a knot.
3. Place two fingers at each end of the loop.
4. Spin the device about 10 times to twist the string.
5. Pull the ends of the string tight, then gradually release the tension.
6. When the button slows down, pull the string tight.
7. Continue releasing and tightening the tension of the string.

### Button Spinner Science

Button spinners produce both mechanical and sound energy (which is also a form of mechanical energy). Force is needed to start the button spinner in motion. The button rotates in two directions, winding and unwinding. As the string untwists, torque, or rotational force, is applied to the button, causing it to spin. Increasing speed results in a buzzing sound. Due to inertia, the button will continue to rotate even after the string unwinds.

### Activities

- Use the button spinners to explore force, motion, and energy.
- Color the disk faces to demonstrate color mixing.
- Have students design investigations by testing different shapes, materials, or sizes of buttons or disks.
- Make connections to contributions of scientists. Share how button spinners inspired centrifuges that are powered without electricity.

### Think it Out!

Relation Statement

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Relation Statement

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Relation Statement

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Relation Statement

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Relation Statement

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