

ACTIVITY #8

REFLEXES



MYTHBUSTERS: THE EXPLOSIVE EXHIBITION COMPONENT:
DODGE A BULLET

MYTHBUSTERS
THE EXPLOSIVE EXHIBITION.

 **Discovery**
EDUCATION

WONDER

How fast are your reactions? Can you compete with a Mythbuster?

RESEARCH

Your body's systems carry out the processes that keep you alive - your digestive system helps supply the fuel you need, your immune system keeps you from getting sick, and your muscular system lets you move around.

The nervous system keeps them all connected and working together. It's made of two parts, the central and peripheral nervous systems that work together to send electrical and chemical messages around the body very quickly.

The central nervous system contains your brain and spinal cord. Your peripheral nervous system contains the nerves that collect information from your body and send it to your brain, and carries messages from the brain to the rest of the body.

TEST AND DISCOVER

MATERIALS

- Ruler (12 in/30 cm)
- Partner
- Pen or pencil
- Blueprint

SAFETY FIRST!

Stepping into the shoes of a MythBuster should not mean sacrificing your safety. Keep these guidelines in mind for each activity:

1. Read or listen carefully to all the directions before you start the experiment.
2. Use the equipment and materials only as instructed.
3. Keep your work area clean and organized.
4. Take care when using scissors, or restrict their use to adults.
5. Use plastic instead of glass wherever possible.

PROCEDURE

1. Have your partner hold the ruler so that it hangs above your hand and between the thumb and index finger on the hand you use to write with. Your fingers should be level with the 0 on the ruler (right at the bottom); your partner holds the ruler at the other end (near the 12 in/ 30 cm mark).
2. Your partner drops the ruler without warning - can you catch it?
3. Note where your fingers land when you catch the ruler. Compare that number with the chart below to estimate your reaction time. Record it on your Blueprint.
4. Switch roles with your partner and try it again. Who has the faster reaction time?
5. Try it at least 5 more times, alternating turns with your partner. Do you notice a change in your reaction time as you get more practice?
6. Try it two more times. Switch positions and repeat all of the steps to see who has the fastest reaction times.

TABLE OF REACTION TIMES FOR THE RULER DROP

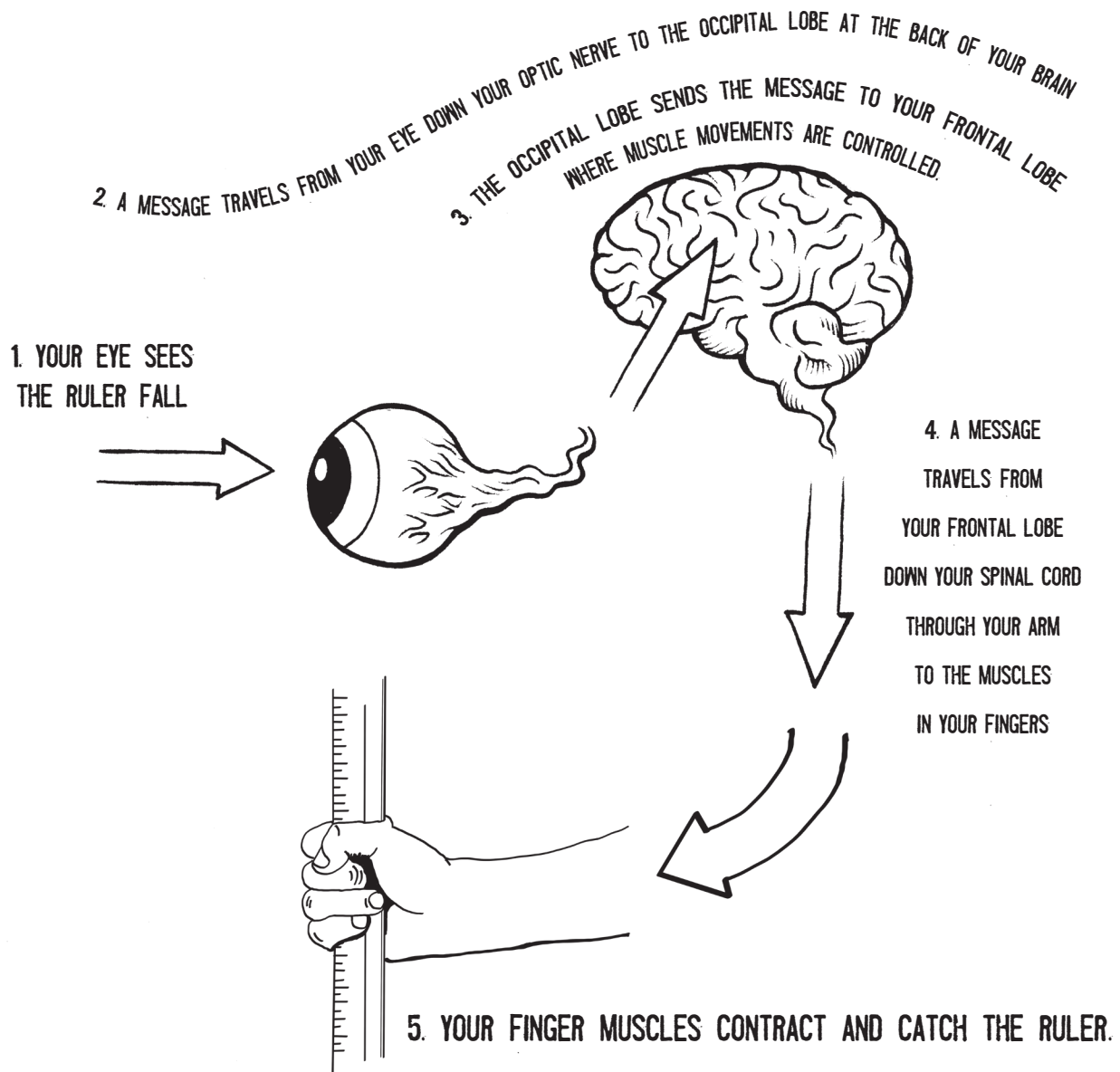
DISTANCE RULER FELL	REACTION TIME (SEC)
2 INCHES (APPROX. 5 CM)	0.10
4 INCHES (APPROX. 10CM)	0.14
6 INCHES (APPROX. 15CM)	0.17
8 INCHES (APPROX. 20CM)	0.20
10 INCHES (APPROX. 25.5CM)	0.23
12 INCHES (APPROX. 35CM)	0.25

THINK ABOUT IT

- Can you trace the path through your nervous system? Describe it. How did you know when to catch it?
- Which of your five senses did you use?
- Who had the fastest reaction time? Why?
- What factors would affect reaction time?
- Can you train yourself to have a faster reaction time?
- What is your reaction time with your other hand?

RESULTS

Your peripheral and central nervous system both play a role in helping you catch the ruler, using the following steps:



And that all happens in less than a quarter of a second!

SO WHY ARE SOME PEOPLE FASTER THAN OTHERS?

It has to do with practice. The more times you do something, the faster and more accurate you get. When you first learned to tie your shoes or type on a keyboard, it probably took a while. After a while, using the same nerves over and over trains them (and your muscles) to perform the task.

TIPS FOR TEACHERS

Have your class calculate averages for both individuals and the entire class, as well as observe the minimums, maximums and trends as students build their skills. Try doing more than 5 trials to achieve more accurate results.

KEEP DISCOVERING!

Take some more data! Try this with your friends and family, making sure to record their distance, reaction time and something about them such as their age, hobbies or careers. What types of patterns do you see?

What is your reaction time to things that you feel? Touch a piece of ice – how soon do you feel the cold? Why does your reaction time differ for your sense of touch versus your sense of sight?

WANT TO LEARN MORE?

THE MYTHBUSTERS RESPOND TO THEIR DODGE A BULLET EPISODE.

<http://dsc.discovery.com/videos/mythbusters-dodge-a-bullet/>

<http://dsc.discovery.com/videos/mythbusters-dodge-a-bullet-aftershow.html>

LEARN ABOUT THE ROLE OF YOUR EYES AND NERVOUS SYSTEM IN YOUR REACTION TO A STIMULUS.

<http://player.discoveryeducation.com/index.cfm?guidAssetId=206D2834-9A23-419F-96AB-006B40DACF90&blnFromSearch=1&productcode=US>

HOW DOES THE BRAIN PROCESS STIMULI? CHECK IT OUT!

<http://player.discoveryeducation.com/index.cfm?guidAssetId=C7D9CB42-4F86-4DAE-BCF5-93E24A3F010D&blnFromSearch=1&productcode=US>

NATIONAL SCIENCE EDUCATION STANDARDS

Grades 5-8, Standard A: Abilities necessary to do scientific inquiry

Grades 5-8, Standard A: Understandings about scientific inquiry

Grades 5-8, Standard C: Structure and Function in living systems

Grades 5-8, Standard C: Regulation and Behavior

Grades 5-8, Standard G: Nature of Science

This guide has been developed for use by educators, group leaders and families for use in connection with "Mythbusters: The Explosive Exhibition" (the "Educators"). The activities described in this guide are potentially dangerous and could result in injury or damage. This guide is provided on an "AS IS" basis and the Museum of Science and Industry disclaims all warranties, express or implied, regarding the guide. Use of this guide is done at the risk of the Educators. By using this guide, you release the Museum of Science and Industry, its officers, employees, directors, trustees, agents and volunteers from and against any and all liability, claims, actions, costs, expenses, damages, attorney fees, breach of contract actions and all causes of actions whatsoever, that you may now have or may acquire in the future, arising out of or relating to any loss, damage or injury that may be sustained by you, the people you are educating, or to any property belonging to you or the people you are educating, as a result of the use of the guide.



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1. HAVE YOUR PARTNER HOLD THE RULER SO THAT IT HANGS ABOVE YOUR HAND AND BETWEEN THE THUMB AND INDEX FINGER ON THE HAND YOU USE TO WRITE WITH. YOUR FINGERS SHOULD BE LEVEL WITH THE 0 ON THE RULER (RIGHT AT THE BOTTOM); YOUR PARTNER SHOULD HOLD THE RULER AT THE OTHER END (NEAR THE 12).
2. YOUR PARTNER SHOULD DROP THE RULER WITHOUT WARNING -CAN YOU CATCH IT?
3. NOTE WHERE THE TOP OF YOUR THUMB LANDS WHEN YOU CATCH THE RULER. COMPARE THAT NUMBER WITH THE CHART BELOW TO ESTIMATE YOUR REACTION TIME. RECORD IT ON YOUR BLUEPRINT.
4. TRY IT AT LEAST 5 MORE TIMES. THEN SWITCH POSITIONS AND REPEAT ALL THE STEPS TO SEE WHO HAS THE FASTEST REACTION TIMES

TABLE OF REACTION TIMES FOR THE RULER DROP

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BLUEPRINT: REFLEXES



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THE EXPLOSIVE EXHIBITION

CAN YOU TRACE THE PATH THROUGH YOUR NERVOUS SYSTEM? DESCRIBE IT.
HOW DID YOU KNOW WHEN TO CATCH IT?

WHICH OF YOUR FIVE SENSES DID YOU USE?

WHO HAD THE FASTEST REACTION TIME? WHY?

WHAT FACTORS WOULD AFFECT REACTION TIME?

CAN YOU TRAIN YOURSELF TO HAVE A FASTER REACTION TIME?

WHAT IS YOUR REACTION TIME WITH YOUR OTHER HAND?



BLUEPRINT: REFLEXES

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