

**Bridgeport Public Schools
Embedded Performance Task**

Grade 5



Catch It!

Student Materials

Catch It!

An Investigation of Factors Affecting Human Reaction Time

Engage

The soccer goalie on the cover page sees the ball coming and has to move quickly to reach and catch the ball. In less than a second, he must see where the ball is traveling and know where to move his arms, legs and hands so he can catch the ball before it goes into the goal. How can the goalie make all these decisions so fast?

Explore

You will explore how quickly people react to catch a falling ruler. Then, you and your partners will compare the reaction times of different people.

Investigation #1: Observing the Reaction Times of Different People

1. Explore by following steps (a) through (f). Record observations (*Noticings*) and questions (*Wonderings*) in a data table in your science notebook:

- a. The “researcher” holds the ruler vertically (straight up and down). The “subject” opens the fingers of the catching hand and holds them near the bottom of the ruler, right next to the 0 cm line (without actually touching it).
- b. Without warning, the starter lets go of the ruler and the subject catches it by quickly pinching the fingers around the falling ruler.
- c. The researcher reads the measurement on the ruler at the point where the fingers are holding it. All members record the distance the ruler dropped in a data table. Repeat several times. In the chart below, find the distance closest to the one recorded for the subject. Then look at the Reaction Time column to find out how much time it took the subject to catch the ruler. If the exact distance is not listed in the chart, estimate the reaction time by using the numbers that are in the chart.



Distance Ruler Dropped	Reaction Time
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(in centimeters)	(in seconds)
1	.05
2	.07
3	.08
4	.09
5	0.10
10	0.14
15	0.18
20	0.20
25	0.23
30	0.25

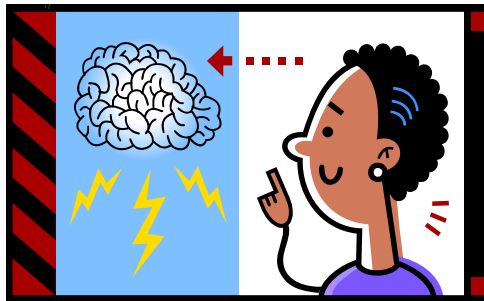
- d. RECORD the reaction time data for each trial in the Time column of your data table.
 - e. Switch roles and repeat.
2. CALCULATE the average time it took for each subject to catch the ruler.
 3. RECORD the average reaction times in your notebook.
 4. INTERPRET the data. Which of your subjects had the fastest reaction time? What factors do you think contributed to the different reaction times?
 5. SHARE findings with the class. Compare findings of different groups. Are your results similar or different? What might explain these differences?
 - a. Did you notice any similarities among the people with the fastest reaction times?
 - b. Chart observations and questions for further investigations.

EXPLAIN

Investigate Through Research

Learn more about what's happening inside your body during the reaction test. Do some research in books, magazines or the internet to find out more about how your senses get information to your brain, and how your brain responds.

Write a reflection that explains your understanding of how the brain and senses work together to help you catch the falling ruler.



ELABORATE

Investigation #2: What Affects Reaction Time?

In Investigation #1, you may have noticed that people have different reaction times. Through your research, you have learned how the senses and the brain communicate to cause reactions. What human characteristics or environmental conditions do you think might affect how fast someone can react? In Investigation #2, you will identify a reaction time question to explore.

Do your experiment following the steps below:

1. **DECIDE** on a research question. **RECORD** it in your science notebook.
2. **DESIGN** a plan to conduct your investigation.
3. **CREATE** a data table in your science notebook that will help you keep your measurements organized. You will also want to record any unexpected observations and questions.
4. **CONDUCT** your experiment. Collect and record data for each trial in your notebook.
5. **CALCULATE** the average time it took for each subject to catch the ruler. **RECORD** the average reaction times for each subject in your data table.
6. **DRAW** a bar graph that compares the average reaction times of your subjects for the factor you tested.
7. **INTERPRET** the data. What conclusions can you draw based on the graph? Did the factor you investigated have an effect on the reaction times of your subjects?

Present Your Findings:

Work with your partners to make a poster that summarizes your investigation. Use the poster to make a presentation to your class to share the results of your investigation. They will want to hear what you found out in Investigation #2. Some of them may have done a similar investigation, and you will want to know if their findings were similar to yours.

Your poster should include:

- The question you were investigating;
- A brief description of how you did your experiment;
- A bar graph showing your findings; and
- The conclusion that is supported by your data.

Be prepared to tell your class about any data you collected that might not be accurate because of unexpected things that happened during your experiment.