Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Standard Scores**

Forming a Question or Hypothesis 1 2 3 4 5 6

Designing an Investigation 1 2 3 4 5 6

Collecting and Presenting Data 1 2 3 4 5 6

Analyzing and Interpreting Results 1 2 3 4 5 6

Period \_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Life Science Work Sample, Benchmark 3

Standard 7.3.1

I CAN design a good controlled scientific investigation.

**REACTION RATE SCIENTIFIC INVESTIGATION**

**Forming a Question or Hypothesis**

**Background**: Reaction rate is the time that it takes you to react to a particular situation. Your reaction time depends on many factors including the stimulus and the particular part of the body that is to react, such as: it takes longer to move your foot from the gas to the brake pedal then it does for your fingers to grab something simply because your leg is heavier, and it has to move father. An observation that I have made about my reaction rate is that when my hands are cold, I cannot catch a ball as fast as when my hands are warm. Also, I recently watched a scientific T.V. show wherein it stated that distractions, such as listening to music while driving, may slow down reaction time.

**Question**: To what extent does\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Control**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Independent Variable:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Dependent Variable:**

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**Hypothesis**: If\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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I CAN design an investigation that uses appropriate materials and describes in accurate detail the procedures used.

**Designing an Investigation**

**Materials**: \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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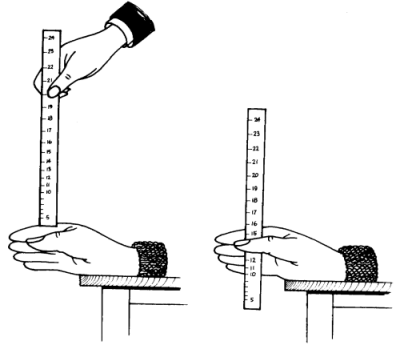
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**Designing an Investigation-continued**

**Procedures**: For the **control** trials:

1. Partner #1 sits near the edge of the table with elbow on the table so that his/her wrist extends over the side.

2. Partner #2 holds the ruler vertically in the air with the zero centimeter line at the

[](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&docid=-lqcroARd9CQNM&tbnid=fApbvJgthJk6AM:&ved=0CAUQjRw&url=http://www.rsscse-edu.org.uk/pose/level1/book6/sectionb.htm&ei=wh4uUoaaOKiQiQLJuYHQDA&bvm=bv.51773540,d.cGE&psig=AFQjCNGsFp9GfGWIId8pwdpSh3Etv-C8mw&ust=1378840524447337)

top of Partner #1’s thumb and index finger,

but not touching.

3. Partner #1 tells Partner #2 when he/she is ready.

4. Without warning, Partner #2 releases the ruler

and lets it drop—Partner #1 must catch the

ruler as quickly as possible as soon as he/she

sees the ruler fall.

5. Record in meters the distance the ruler fell—

look at the where the top of the thumb is on the ruler for measurement.

6. Repeat 20 times.

7. Next, Switch and now Partner #2 will be the test subject.

8. Next we will convert distance the ruler fell into time elapsed in seconds by using a conversion table of distance fell to seconds.

For the Independent Variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Describe what you did for your independent variable.

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And then we repeated steps 1 – 8 above.

Collecting and Presenting Data

Standard 7.3S.2 and S.3

I CAN organize, display and analyze the results of an investigation, and communicate conclusions; determine if as investigation is valid.

Make a table to collect your data:

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period \_\_\_\_\_\_Date \_\_\_\_\_\_\_\_\_\_\_\_\_

**Reaction Rate Lab-Data Collection**

**Control Group\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Independent Variable \_\_\_\_\_\_\_\_\_\_\_\_\_**

**cm** **seconds** **cm** **seconds**

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Total seconds \_\_\_\_\_\_\_\_ Total seconds \_\_\_\_\_\_\_\_\_\_\_

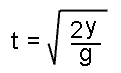
Average seconds \_\_\_\_\_\_\_ Average seconds \_\_\_\_\_\_\_\_

CONVERSION TABLE

To convert distance (cm) ruler fell into time elapsed (sec)

|  |  |
| --- | --- |
| Distance | Time |
| ~2 cm | 0.06 sec |
| ~4 cm | 0.09 sec |
| ~6 cm | 0.11 sec |
| ~8 cm | 0.13 sec |
| ~10 cm | 0.14 sec. |
| ~12 cm | 0.16 sec |
| ~14 cm | 0.17 sec |
| ~16 cm | 0.18 sec |
| ~18 cm | 0.19 sec |
| ~20 cm | 0.20 sec |
| ~22 cm | 0.21 sec |
| ~24 cm | 0.22 sec |
| ~26 cm | 0.23 sec |
| ~28 cm | 0.24 sec |
| ~30 cm | 0.25 sec |
| ~32 cm | 0.26 sec |

Formula



In the formula,

t = time (in seconds); y = distance (in cm); g = 980 cm/sec2 (acceleration due to gravity). [Note: you can also use inches in your distance measurement, but you must change g to equal 385.8 in/sec2.]

REACTION RATE SCIENTIFIC INVESTIGATION Graph

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Independent Variable

Control

**ANALYZE AND DRAW CONCLUSIONS**

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

P. \_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

I CAN design a good controlled scientific investigation.

*Write your data and observations in sentences.*

My average reaction time for my control is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_seconds.

My average reaction time using my independent variable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ seconds.

These results indicate that my reaction time (slowed or got faster) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with my independent variable.

My hypothesis is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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I (accept or reject)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ my hypothesis because my reaction time

(got slower or got faster) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with my independent variable.

Variables not planned on that may have influenced the results of my experiment were:

the ruler may have been held at slightly different heights before being dropped

(name at least one more)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How can you apply your results in everyday life. (Why do your results matter?)

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Are there any other questions which you thought of during this investigation that you might lead you to another investigation?

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