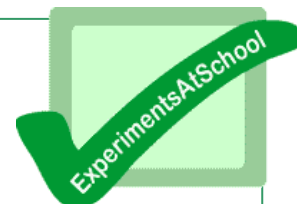




# Reaction Time Beat the Gun!



**How fast can you react?  
What factors can affect reaction time?  
When is a quick reaction vital?**

## **Task A**

Think of some situations where a quick reaction time is vital. E.g. Survival: an antelope trying to escape from a cheetah; a person avoiding being burnt.

Now make a list of some of the possible factors in humans that could affect how quickly they can react?

## **Task B**

You are going to investigate human reaction times.

You need to think of a statement or hypothesis to test and consider how you are going to conduct your experiment. (Page 2 has an example worksheet to help you in your investigation.)

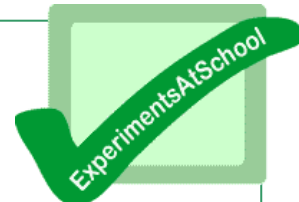
You can gather data using the *ExperimentsAtSchool* website at [www.experimentsatschool.org.uk](http://www.experimentsatschool.org.uk). Here you can test the reaction times of yourself, classmates, friends or family members. Remember to read the instructions carefully.

You can also use the datasets available to download which have data from Phase 4 of *CensusAtSchool* and data from children in the UK, New Zealand and South Australia. There are demonstration versions of the New Zealand and South Australian reaction timers as well.

Remember data you collect yourself is called *Primary Data* and data you use from the website or find from elsewhere is called *Secondary Data*.

### **FACT**

At the time of writing, the fastest ever 100m sprinter is Tim Montgomery (USA). He clocked an incredible 9.78 seconds in 2002 at Paris, France. The previous world record was 9.79 seconds – a mere 100th of a second slower. That's why it's so important that sprinters get off to a flying start; not only does every second count, every fraction of a second counts, too! The world record now (2009) for the 100 m is 9.58 seconds and the holder is Usain Bolt.



## Beat the Gun – Worksheet

1) Write down your hypothesis or statement that you are going to test below.

For example:

People will have faster reactions using the hand they normally write with.

Old people have slower reactions than young people.

People who play computer games have faster reactions than those who don't.

My hypothesis is .....

.....

2) Explain how you are going to find evidence to support or contradict your hypothesis. How many people are you going to test? How many times should each person do the test? How will you make sure it is a fair test? Are you testing reactions to sight or sound?

I am going to test ..... people. Each person will do the test ... times.

I am testing reaction to .....

To make this a fair test I am.....

.....

.....

3) Tabulate and present your data. You may decide to work out averages or group your data. Stem and leaf diagrams and bar charts are useful to show your data.

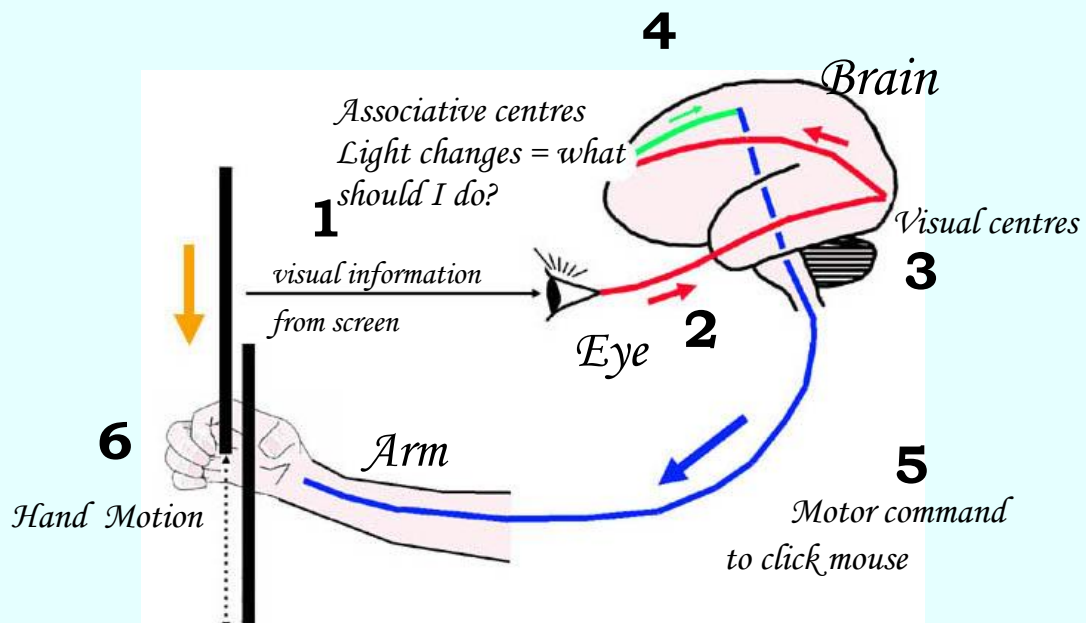
4) Conclusions: What have you found out? Can you be sure your conclusions are correct? Is there anything else you could do to be more certain?

.....

.....

## The Science of Reaction Times.

Reaction time is the time it takes the brain to translate visual information into your voluntary (or conscious) motor commands and actions i.e. moving your finger to click the mouse. The shorter the time, the faster the reaction. The flow of information along the 'visual' and 'motor' nerve pathways is fairly constant even with lots of practice. However practice affects the 'associative centres' in the brain, so you can respond faster to what is happening.



## Extension Ideas

### **Does noise affect reaction time?**

Test reactions with and without music playing. Some people claim that the type of music, such as classic or hard rock affects this differently.

### **Is your reaction time different for sound and sight?**

To test reactions to sight and sound you can use the website at Explore Science however you can only do one test a day without registering on this American site.

[www.explorescience.com/activities/Activity\\_page.cfm?ActivityID=38](http://www.explorescience.com/activities/Activity_page.cfm?ActivityID=38)

### **Does tiredness affect reaction time?**

Test reaction times at different times during the day.

### **Does caffeine affect reaction time?**

Test the reaction times of those who have had cola at breakfast or coffee against those who haven't had any caffeine.

### **Do distractions affect reaction time?**

Try swinging an object next to the computer or have a conversation with the participant or start telling jokes. Test reaction times with the distraction and without.

**Practical Reaction test.** Use a ruler or a specially designed reaction ruler. One possible way of doing this is described on a pupil worksheet from the Physics Factbook

<http://hypertextbook.com/facts/2006/reactiontime.shtml>

You could contrast the results from this experiment with the ExperimentsAtSchool online version.

Investigate braking and stopping distances while driving. How fast a reaction time is needed for safe driving?

Are there certain jobs in which a fast reaction time is vital?