

## Is Homework Good for You?

**Instructions**. Read all instructions carefully. Access this activity as instructed by your teacher. If running directly off the internet, use Internet Explorer for best results.

Use the yellow arrows to move forward and back through this activity. Be sure to click on hyperlinks (in blue) to learn more information. You will need this information to answer all of the questions below. The questions follow the order of the activity. Answer questions in your own words using complete sentences.

1. What is the name of the field of biology that includes study of the brain?

2. What is learning? What is memory?

3. How long does short-term memory last?

### 4. SHORT-TERM MEMORY TESTS

A. Pictures. After observing the objects for 30 seconds, write down all of the items you remember.

B. How many objects did you remember? Express this number as a percentage (percentage = the number you remembered/total number of objects x 100).

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C. Letters. For each trial, wait until the letters disappear and then write down the letters you remember.

Trial	The letters I remember are...	# letters remembered	% letters remembered
1			
2			
3			
4			
5			
6			

D. Did you find it easier to remember pictures (1st memory test) or letters (2nd memory test)? Explain.

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E. Here's another test of your short-term memory. Write down as many letters from the first sequence as you can remember.

F. Write down as many letters from the second sequence as you can remember.

G. Was it harder or easier to remember the second sequence of letters? Why or why not?

H. Explain why the first sequence of letters contained 15 pieces of information while the second sequence of letters contained 5 pieces of information.

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5. How does short-term memory become long-term memory?
  
6. How long does it take for taxi drivers to learn the streets and places of London?
  
7. There are both men and women taxi drivers. Why did the researchers study only male taxi drivers?
  
8. What do PET scans and fMRI allow us to do?
  
9. What characteristics are used to organize the brain into different regions?
  
10. Carefully examine the design of this experiment. Explain why the researchers measured brain activity in taxi drivers while they completed five different mental tasks.
  
11. Both PET and fMRI can be used to record changes in blood flow. How does blood flow relate to brain activity? (Hint: What does the blood carry that the brains needs?)

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12. What is the name of the brain region that showed high activity *only* during recall of routes? Where is this region located?

13. What question did the researchers try to answer in their follow-up study?

14. Explain one example of evidence from other species that the hippocampus plays a role in spatial memory.

15. Based on results from the second study, what was different about the hippocampus of taxi drivers compared to the brains of men who did not drive taxis?

16. How did the length of time someone worked as a taxi driver affect the changes researchers observed in the hippocampus?

17. Other studies have shown that different regions of the brain are active during different activities. Do you think these other activities might affect the hippocampus? Explain your answer.

18. How do you think homework might affect your brain? Will homework cause your whole brain to grow, or just parts of your brain? Clearly explain your answer.