

Name: \_\_\_\_\_

AP Biology  


## **Chapter 38 Active Reading Guide** **Nervous and Sensory Systems**

### **Section 1**

1. This concept begins with a look at the evolution of nervous systems. You will want to study this to tie in with your study of animal diversity. To master this concept, you will need to be solid in the vocabulary that is used here. Begin by defining these terms:  
nerve net-  
  
nerve-  
  
cephalization-  
  
ganglia-
2. What are the two components of the central nervous system?
3. A reflex is the body's automatic response to certain stimuli. Give two examples of reflex responses.
4. What is the function of cerebrospinal fluid in mammals? Where is it found?
5. Distinguish between white matter and gray matter.
6. Neurons conduct nerve impulses. What are the specialized support cells that have other functions, including myelination, structural support, and protection?

7. What makes up the peripheral nervous system (PNS)? What is the function of the PNS?
  
8. Figure 38.5 in your text shows the branches of the peripheral nervous system.
  - a. Which branch is sometimes called the “voluntary nervous system”?
  
  - b. Which one is often termed “involuntary?”
  
9. What would be the effect of stimulation by the sympathetic nervous system on heart rate?

What would be the effect of stimulation by the parasympathetic nervous system on peristalsis?

10. Concept Check Question 1 in your text asks: Which division of your autonomic nervous system would likely be activated if you learned that an exam you had forgotten about would start in 5 minutes? Explain your answer.
  
11. Now, take question 10 a step further, and describe the specific physiological responses that would occur.

## **Section 2**

12. Give the primary function of each of the following structures:  
brainstem (includes pons, medulla)-

cerebrum-

cerebellum-

thalamus-

hypothalamus-

### **Section 3**

13. Describe the function centered in each lobe of the cortex.

Frontal lobe:

Temporal lobe:

Parietal lobe:

Occipital lobe:

### **Section 4**

14. Explain each type of receptor, and give an example.  
mechanoreceptors:

chemoreceptors:

electromagnetic receptors:

thermoreceptors:

pain receptors:

15. What is perception? Explain the difference between what you see and what you perceive when you see an optical illusion.

### **Section 5**

16. Explain how statocysts function. What are the statoliths?

17. Name the functions of the following parts of the ear:

auditory canal-

tympanic membrane-

malleus, incus, stapes-

round window-

outer ear-

middle ear-

inner ear-

semicircular canals-

cochlea-

auditory nerve-

Eustachian tube-

organ of Corti-

hair cells-

18. Read the section on Hearing very carefully. As you read and study Figure 38.21 in your text, begin writing a list of events. Step 1 is done for you. Prompts are given for the next events.

a. Moving air waves cause the tympanic membrane (eardrum) to vibrate.

b. Bones/stapes:

- c. Oval window:
  - d. Fluid inside the cochlea:
  - e. Hair cells/mechanoreceptors:
  - f. Round window:
19. The sense of equilibrium is centered in the inner ear. Explain how the three fluid-filled semicircular canals and otoliths allow you to detect motion in different planes.

**Section 6**

20. Give the function of these eye structures:

choroid-

cornea-

retina-

lens-

aqueous humor-

vitreous humor-

fovea-

optic nerve-

21. Complete the following chart.

Photoreceptor	Function	Location
Rods		
Cones		

22. Devise a diagram to show the conversion of retinal + opsin to rhodopsin. Include light activation as well as return to inactive state.

23. What type of receptor is found in the taste buds? List the five types of tastes here.

24. As with taste, the receptors for smell are \_\_\_\_\_.

*Note 1: Have you ever been asked to do taste tests and draw a map of the tasting areas of the tongue? Any region of the tongue can detect any of the five types of taste!*

*Note 2: Sensations of sweet, umami, and bitter, as well as scent detection, all require a G protein-coupled receptor and a signal transduction pathway with second messengers—just another reminder that this is a common mechanism!*