CHAPTER 2
COGNITIVE NEUROSCIENCE
TEST BANK

Multiple Choice

1. The forebrain includes the ____.
   a. corpus callosum, cerebellum, and cerebral cortex
   b. hippocampus, medulla, pons, and thalamus
   c. cerebral cortex, basal ganglia, the limbic system, thalamus, and hypothalamus
   d. amygdala, reticular activating system, and corpus callosum
   ANS: c. REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
   KEY: Bloom's: Remember

2. The basal ganglia of the forebrain are crucial to ____.
   a. motor function
   b. hearing
   c. sleeping and waking
   d. regulating behavior necessary for species survival
   ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
   KEY: Bloom's: Remember

3. The limbic system is important to ____.
   a. memory retrieval
   b. relaying sensory information
   c. emotion, motivation, and learning
   d. motor information
   ANS: c REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
   KEY: Bloom's: Remember

4. All of the following are part of the limbic system *EXCEPT* the ____.
   a. primary motor cortex
   b. septum
   c. amygdala
   d. hippocampus
   ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
   KEY: Bloom's: Remember

5. Dysfunction of the basal ganglia is known to cause ____.
   a. visual agnosia
   b. semantic memory loss
   c. extreme fear
   d. motor deficits
   ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
   KEY: Bloom's: Remember

6. Which of the following processes would most likely involve the limbic system?
   a. Bill stretches his arms high into the air.
   b. Bill is walking home at night and is startled by a runner.
   c. Bill solves a physics problem.
   d. Bill feels an acute pain in his wrist.
   ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
   KEY: Bloom's: Apply

7. When the amygdala is stimulated, what reactions are likely to result?
   a. fearful hallucinations, frightening flashbacks in memory
   b. dizziness, headache, loss of consciousness
   c. insomnia, inability to concentrate, restlessness
   d. intense concentration
   ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
   KEY: Bloom's: Apply

8. The ____ and ____ both play a role in anger.
   a. amygdala; hippocampus
   b. septum; amygdala
   c. hippocampus; septum
   d. primary motor cortex; septum
   ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
   KEY: Bloom's: Remember

9. Which of the following would most likely involve the septum?
   a. Mike is frightened by a man pointing a knife at him.
   b. Mike remembered a man who sold him a knife.
   c. Mike sees a man who using a knife to peel vegetables.
   d. Mike sees a photo of a man whittling with a knife.
   ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
   KEY: Bloom's: Apply

10. Which of the following would most likely involve activity in the amygdala?
    a. Wilma sees a cute cat but the cat will not come when she calls.
    b. Wilma talks about her own pets, who she obviously loves
    c. Wilma is frightened when the horse she is riding rears up.
    d. Wilma leans over to pet a large dog who likes to be petted.
    ANS: c REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Apply

11. The ____ plays a critical role in the formation of new memories.
    a. thalamus
    b. hippocampus
    c. hypothalamus
    d. aphasia

ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Remember

12. Damage to the hippocampus can result in loss of memory function in which old information can be recalled but new memories cannot be formed. One form of hippocampal damage is called ____.
    a. "locked-in" syndrome
    b. apraxia
    c. aphasia
    d. Korsakoff's syndrome
    ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

13. Disruption in the hippocampus does *NOT* seem to result in deficits in ____ memory.
    a. declarative
    b. short-term
    c. procedural
    d. long-term
    ANS: c REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Understand

14. Jennifer has damage to a certain area of her brain. She can remember people and events from long ago, but she cannot remember where she ate lunch today. Judging by her symptoms, Jennifer may have damage to the ____.
    a. hypothalamus
    b. hippocampus
    c. thalamus
    d. corpus callosum
    ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Apply

15. Which area of the brain is known to sort information and send it to appropriate areas in the cerebral cortex?
    a. hippocampus
    b. basil ganglia
    c. amygdala
    d. thalamus
    ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

16. Which part of the brain is responsible for regulating behavior that is important for the survival of the organism and regulating emotions and reactions to stress?
    a. hypothalamus
    b. thalamus
    c. pons
    d. cerebellum

ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Remember

17. Although the midbrain is not as important in mammals as in nonmammals, it is significant in that it houses the reticular activating system, which is essential in regulating ____.
    a. consciousness, heartbeat, and breathing
    b. bodily coordination, balance, and muscle tone
    c. breathing, swallowing, and digestion
    d. the signals passing from one part of the brain to another
    ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

18. Physicians make a determination of brain death based in part on the lack of activity of the ____.
    a. midbrain
    b. brainstem
    c. medulla oblongata
    d. cerebellum
    ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Apply

19. The ____, located in the hindbrain, is responsible for controlling the heartbeat, and to some extent, breathing, swallowing, and digestion.
    a. pons
    b. cerebellum
    c. cerebral cortex
    d. medulla oblongata
    ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

20. Which part of the hindbrain contains neural fibers that pass signals from one part of the brain to another and thus serves as a relay station?
    a. medulla oblongata
    b. pons
    c. cerebellum
    d. limbic system
    ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

21. Which part of the hindbrain is responsible for coordination, balance, and muscle tone and also includes memory related to procedural movements?
    a. hypothalamus
    b. amygdala
    c. septum
    d. cerebellum

ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Remember

22. Connell, age 32, was in a bad motorcycle accident. He was airlifted to a tertiary care facility and when his family arrived, they were informed that it was likely Connell was brain dead. To determine whether Connell is, in fact, brain dead, his doctors must determine that his ____ has been damaged so severely that various reflexes of the head (e.g., the pupillary reflex) are absent for more than 12 hours.
a. frontal lobe
b. corpus callosum
c. brainstem
d. pons
ANS: c REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Understand

23. Which patient has symptoms consistent with damage to the medulla oblongata?
a. The patient who is experiencing both short-term and long-term memory loss
b. The patient who is not able to sense pain or pressure
c. The patient who displays irregular aggression patterns
d. The patient who experiences heartbeat irregularity and breathing problems
ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Understand

24. Sonia lays in a hospital bed and cannot be awakened. Scans of her brain show damage to the ____, which is important for regulating overall level of consciousness.
a. corpus callosum
b. white matter
c. reticular activating system
d. medulla oblongata
ANS: c REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Apply

25. The convolutions of the cerebral cortex comprise ____, which are small grooves; ____, which are raised areas or bulges; and ____, which are large grooves.
a. sulci; fissures; gyri
b. fissures; sulci; gyri
c. gyri; fissures; sulci
d. sulci; gyri; fissures
ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Understand

26. The cerebral cortex is ____.
a. the main lobe of the forebrain
b. the bridge between the left and the right hemispheres of the brain
c. a one- to three-millimeter-thick layer that covers the surface of the brain
d. a layer, covering the surface of the brain, that comprises about 60% of the brain

ANS: c REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Remember

27. The cerebral cortex is often referred to as ____, whereas the myelinated nerve fibers of the brain's interior are often called ____.
    a. contralateral; ipsilateral
    b. gray matter; white matter
    c. ipsilateral; contralateral
    d. white matter; gray matter
    ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

28. ____ refers to transmission of information to the opposite side, whereas ____ refers to transmission to the same side.
    a. Contralateral; ipsilateral
    b. Occipital; frontal
    c. Ipsilateral; contralateral
    d. Parietal; temporal
    ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Understand

29. Most motor information transmission is ____.
    a. parietal
    b. contralateral
    c. ipsilateral
    d. occipital
    ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

30. The corpus callosum serves to ____.
    a. make certain contralateral transmissions ipsilateral
    b. regulate the transmission of information along the cerebral cortex
    c. allow transmission of information between the left and right hemispheres
    d. transmit information from the left and right hemispheres to the spinal cord
    ANS: c REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

31. Suppose there are two radio stations, one receiving signals from the western hemisphere and one receiving signals from the eastern hemisphere. A cable connects the two stations so that signals sent out from one half of the world can be transmitted to the other half. This cable is analogous to the brain's ____.
    a. corpus callosum
    b. cerebral cortex
    c. white matter
    d. medulla oblongata

ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Understand

32. The two halves of the brain, which rely on the corpus callosum for communication, are called _____.
a. hemispheres
b. lobes
c. contralaterals
d. caudals
ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Remember

33. French physician Marc Dax noticed a relationship between the loss of speech and the side of the brain in which damage had occurred in patients suffering from ____.
a. prosopagnosia
b. aphasia
c. ablation
d. schizophrenia
ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Remember

34. Paul Broca believed that ____.
a. localization of function does not exist
b. the left hemisphere of the brain is critical to normal speech function
c. the right hemisphere of the brain is critical to normal speech function
d. neither hemisphere of the brain is critical to normal speech function
ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Remember

35. Based on extensive research, Karl Lashley concluded that localization of specific memories ____.
a. can be demonstrated through the use of a large variety of techniques
b. can be demonstrated only by using incision
c. can be demonstrated only by using ablation
d. cannot be demonstrated
ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Remember

36. Which part of the left hemisphere of the brain appears to contribute to language comprehension?
a. Dax's area
b. Wernicke's area
c. Lashley's area
d. Broca's area
ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Remember

37. Split-brain patients sometimes have difficulty reconciling information that is ____ and thus largely localized in the left hemisphere with information that is ____ and thus generally localized in the right hemisphere.
    a. verbal; spatial
    b. spatial; verbal
    c. visual; auditory
    d. tactile; olfactory
    ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Understand

38. Which abilities have been found to be localized on the right side of the brain for most split-brain patients?
    a. the ability to follow stories
    b. nearly all language functions
    c. skilled, purposeful movement
    d. finding patterns in visual stimuli
    ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Understand

39. The approach to studying the brain in order to understand what specific part of the brain controls what specific skills or behaviors is called ____.
    a. synthesis
    b. localization of function
    c. ecological validity
    d. lobotomy
    ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

40. What percentage of the adult population has language functions predominantly localized in the left hemisphere of the brain?
    a. 100
    b. 90
    c. 50
    d. 20
    ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

41. When viewing a picture that is half one person's face and half another person's face, a split brain patient would most likely ____.
    a. ask why you are showing her half of two different faces
    b. say the image portrays the whole face of whomever is depicted on the right side
    c. point to the image of the whole face of whomever is depicted on the right side
    d. simply be unable to answer because the question seems nonsensical
    ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

42. Juan has a disorder affecting his ability to perform skilled movements. Juan most likely has ____.
    a. dyslexia
    b. aphasia
    c. apraxia
    d. agnosia
    ANS: c REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

43. ____ is well known for his work with split-brain patients.
    a. Lashley
    b. Broca
    c. Gazzaniga
    d. Dax
    ANS: c REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

44. The cerebral hemispheres and cortex can be divided into four parts, called ____, that are largely arbitrary anatomical regions divided by fissures.
    a. lobes
    b. sulci
    c. gyri
    d. ventricles
    ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Remember

45. The frontal lobe is responsible for ____.
    a. sensing pain and pressure
    b. visual processing
    c. auditory processing
    d. higher thought processes and motor processing
    ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

46. Which of the following would most likely involve the use of the frontal lobe?
    a. Tia sees her finger in a nutcracker.
    b. Tia feels incredible pain when she gets her finger caught in a nutcracker.
    c. Tia hears a nutcracker closing.
    d. Tia considers how to use an oddly designed nutcracker to crack a nut.
    ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Understand

47. The parietal lobe is primarily responsible for ____.
    a. planning and execution of movement
    b. somatosensory processing
    c. auditory processing

d. visual processing
ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Remember

48. The main functions of the temporal and occipital lobes, respectively, are ____.
a. visual processing and auditory processing
b. gustatory processing and olfactory processing
c. auditory processing and visual processing
d. olfactory processing and gustatory processing
ANS: c REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Remember

49. Tom puts his hand on a warm stove burner and senses the heat coming from the stove. The message of warmth travels from his hand to which lobe of the brain?
a. occipital
b. parietal
c. temporal
d. frontal
ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Apply

50. Mary wakes up in the middle of the night to hear a loud thump coming from the stairway. She then hears creaking and a voice whispering. Her ____ lobe makes it possible for her to hear the sounds.
a. occipital
b. parietal
c. temporal
d. frontal
ANS: c REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Apply

51. Joe is walking around a room completely in the dark. He cannot see anything. When he feels the doorknob with his hand, he pulls the door open. What location in the brain most directly enabled him to accomplish what he attempted?
a. the temporal lobe
b. the occipital lobe
c. the parietal lobe
d. the cerebral fissures
ANS: c. REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Apply

52. Which part of the brain, located in the frontal lobe, is important for controlling movement?
a. the ventricles
b. the cerebral fissures
c. somatosensory cortex
d. primary motor cortex

ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Remember

53. The parietal lobe contains the ____, which is involved in experiencing pressure, texture, temperature, and pain.
    a. association areas
    b. primary motor cortex
    c. primary somatosensory cortex
    d. primary visual cortex
    ANS: c REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

54. Although the brain makes up only one fortieth of the total weight of the adult human body, it uses ____ of the circulating blood, available oxygen, and available glucose.
    a. one-thirtieth
    b. one-twentieth
    c. one-tenth
    d. one-fifth
    ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

55. Cells called ____ transmit information throughout the nervous system.
    a. glia
    b. astrocytes
    c. myelin
    d. neurons
    ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

56. What is the junction between terminal buttons of one neuron with the dendrites of other neurons called?
    a. synapse
    b. soma
    c. nodes
    d. hillock
    ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

57. At the end of the branches of an axon are the ____, which look like small knobs.
    a. terminal buttons
    b. synapses
    c. nodes of Ranvier
    d. astrocytes
    ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

58. The chemical messengers of the nervous system are called ____.
    a. synapse
    b. hormones
    c. neurotransmitters
    d. neurobinders
    ANS: c REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

59. Three types of chemical substances appear to be involved in neurotransmission: ____.
    a. monoamine neurotransmitters, amino-acid neurotransmitters, and neurobinders
    b. monoamine neurotransmitters, amino-acid neurotransmitters, and neuropeptides
    c. amino-acid neurotransmitters, neurobinders, and cerebropeptides
    d. monoamine neurotransmitters, neuropeptides, and neurobinders
    ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

60. Adrian has Alzheimer's and has a difficult time with his memory. The doctors say that his memory difficulties are associated with low levels of ____.
    a. acetylcholine
    b. dopamine
    c. dratonin
    d. serotonin
    ANS: a REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Apply

61. Which neurotransmitter is most associated with attention, reward and reinforcement, learning, and motivational processes?
    a. acetylcholine
    b. dopamine
    c. GABA
    d. serotonin
    ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
    KEY: Bloom's: Remember

62. Which neurotransmitter is important for regulating impulsivity and is associated with eating behavior as well as aggressive behavior?
    a. acetylcholine
    b. dopamine

c. GABA
d. serotonin
ANS: d REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Remember

63. Kent is a chronic alcoholic and is homeless. As a result of both his chronic heavy alcohol use and his dietary deficiencies, Kent's ____ has deteriorated and he is experiencing memory problems.
a. hypothalamus
b. hippocampus
c. septum
d. amygdala
ANS: b REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain
KEY: Bloom's: Understand

64. In which technique do researchers document the behaviors of individuals thought to have brain damage and then, after the person dies, examine the brain for lesions?
a. postmortem studies
b. in vivo techniques
c. ipsilateral transmission
d. brain damage analysis (BDA)
ANS: a REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Remember

65. Which of the following is *NOT* an *in vivo* technique for viewing the structures and functions of the brain?
a. recording the electrical activity of the brain
b. still-imaging of the brain (e.g., CT scan, MRI scan)
c. examining how radioactive material is transported and used in the brain
d. dissecting the brain to locate possible lesions
ANS: d REF: Viewing the Structures and Functions of the Brain
KEY: Bloom's: Understand

66. Tan, a patient of Broca's who had severe speech problems, was capable of uttering only one syllable "Tan" (hence the name). After Tan's death, examination of his brain revealed a number of lesions in the frontal lobe. It was ascertained from this that parts of the frontal lobe are important for speech production. Gathering knowledge from someone about brain function after death with known difficulties is an example of ____.
a. Broca's technique
b. brain capacity functional analysis
c. in vivo techniques
d. postmortem studies
ANS: d REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Apply

67. Derrick has a number of electrodes attached to his head. He is probably about to participate in a study involving use of ____.
    a. fMRI
    b. ERPs
    c. PET
    d. CT scan
    ANS: b. REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Apply

68. Which technique to study the living brain is based on examining the recording of the electrical frequencies and intensities of the brain over time?
    a. CT
    b. PET
    c. EEG
    d. MRI
    ANS: c REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Remember

69. Which techniques for studying the brain obtain a still image that can help with revealing the structures of the brain?
    a. metabolic techniques
    b. electrical techniques
    c. static techniques
    d. functional techniques
    ANS: c REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Remember

70. Which static imaging technique uses a strong magnetic field to analyze magnetic changes in the energy of the orbits of nuclear particles in the molecules of the body?
    a. MRI
    b. BSE
    c. ERT
    d. PET
    ANS: a REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Remember

71. What type of technique takes advantage of the brain's consumption of glucose or oxygen and specifically looks for which part of the brain is most active during more generalized processing?
    a. metabolic techniques
    b. electrical techniques
    c. static techniques
    d. functional techniques
    ANS: a REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Remember

72. Which type of metabolic imaging technique uses a radioactive form of oxygen that emits positrons as it is metabolized to look at the physiological functioning of the brain in action?
    a. EEG
    b. GMT
    c. PET
    d. ERPs
    ANS: c REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Remember

73. Which neuroimaging technique is able to look at increases in oxygen use to produce an image of the working brain?
    a. fMRI
    b. MRI
    c. CT
    d. ERP
    ANS: a REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Remember

74. Which technique for studying cognition temporarily disrupts normal activity of the brain in a very small area by placing a coil on the person's head and passing a current through it?
    a. EEG
    b. TMS
    c. MRI
    d. MEG
    ANS: b REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Remember

75. Which technique involves measuring brain activity through detection of magnetic fields by placing a device over the head?
    a. TMS
    b. fMRI
    c. EEG
    d. MEG
    ANS: d REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Remember

76. Which disorder is caused by an interruption in the flow of blood to the brain and often results in noticeable loss in cognitive functioning?
    a. vascular disorder
    b. dementing disorder
    c. neurodegenerative disorder
    d. neoplastic disorder
    ANS: a REF: Brain Disorders KEY: Bloom's: Remember

77. Another name for a tumor is ____.
    a. hemorrhagia

b. neoplasm
c. ischemia
d. apraxia
ANS: b REF: Brain Disorders KEY: Bloom's: Remember

78. Which type of stroke occurs when fatty tissue that has built up over years breaks free and then becomes lodged in an artery in the brain?
a. neoplastic stroke
b. hemorrhagic stroke
c. dementing stroke
d. ischemic stroke
ANS: d REF: Brain Disorders KEY: Bloom's: Remember

79. Which type of stroke is due to a blood vessel in the brain suddenly breaking and filling the surrounding tissue with blood, causing cells to die?
a. ischemic stroke
b. neoplasms
c. hemorrhagic stroke
d. aphasic stroke
ANS: c REF: Brain Disorders KEY: Bloom's: Remember

80. Some individuals experience closed-head injuries in combat or in accidents. What characterizes a closed-head injury?
a. The skull has been penetrated and the brain has been damaged.
b. There is no evidence of any physical damage but there is a psychological disorder.
c. The skull has not been penetrated but there is damage to the brain.
d. The damage has occurred over time as a result of repeated head injuries.
ANS: c REF: Brain Disorders KEY: Bloom's: Understand

Essay

1. List the three main regions of the brain and the structures in each.
ANS: The forebrain is the region of the brain located toward the top and front of the brain. It includes the cerebral cortex, the basal ganglia, the limbic system, the thalamus, and the hypothalamus. The midbrain helps to control eye movement and coordination. By far the most indispensable of these structures is the reticular activating system (RAS). The hindbrain comprises the medulla oblongata, the pons, and the cerebellum.

REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Remember

2. Explain the concept of hemispheric specialization. Include in your discussion a description of the abilities of each hemisphere and the role of the corpus callosum.
ANS: Hemispheric specialization refers to the idea that certain functions are predominantly localized in one hemisphere or the other. The left hemisphere is important not only in

language but also in movement. People with apraxia—disorders of skilled movements—often have had damage to the left hemisphere. These people have lost the ability to carry out familiar purposeful movements such as forming letters when writing by hand. Another role of the left hemisphere is to examine past experiences to find patterns. Finding patterns is an important step in the generation of hypotheses. The right hemisphere is largely "mute". It has little grammatical or phonetic understanding. But it does have good semantic knowledge. It also is involved in practical language use. People with right-hemisphere damage tend to have deficits in following conversations or stories. They also have difficulties in making inferences from context and in understanding metaphorical or humorous speech. The right hemisphere also plays a primary role in self-recognition. In particular, the right hemisphere seems to be responsible for identifying one's own face.

The corpus callosum is a dense aggregate of neural fibers connecting the two cerebral hemispheres. It transmits information back and forth. Once information has reached one hemisphere, the corpus callosum transfers it to the other hemisphere.

REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Understand

3. Identify and discuss the roles of three neurotransmitters.
ANS: Acetylcholine is associated with memory functions, and the loss of acetylcholine through Alzheimer's disease has been linked to impaired memory functioning in Alzheimer's patients. Acetylcholine also plays an important role in sleep and arousal. When someone awakens, there is an increase in the activity of so called cholinergic neurons in the basal forebrain and the brainstem.

Dopamine is associated with attention, learning, and movement coordination. Dopamine also is involved in motivational processes, such as reward and reinforcement. Schizophrenics show high levels of dopamine. This fact has led to the "dopamine theory of schizophrenia," which suggests that high levels of dopamine may be partially responsible for schizophrenic conditions. Drugs used to combat schizophrenia often inhibit dopamine activity. In contrast, patients with Parkinson's disease show low dopamine levels, which leads to the typical trembling and movement problems associated with Parkinson's. When patients receive medication that increases their dopamine level, they (as well as healthy people who receive dopamine) sometimes show an increase in pathological gambling. Gambling is a compulsive disorder that results from impaired impulse control. When dopamine treatment is suspended, these patients no longer exhibit this behavior. These findings support the role of dopamine in motivational processes and impulse control.

Serotonin plays an important role in eating behavior and body-weight regulation. High serotonin levels play a role in some types of anorexia. Specifically, serotonin seems to play a role in the types of anorexia resulting from illness or treatment of illness. For example, patients suffering from cancer or undergoing dialysis often experience a severe loss of appetite. This loss of appetite is related, in both cases, to high serotonin levels. Serotonin is also involved in aggression and regulation of impulsivity. Drugs that block serotonin tend to result in an increase in aggressive behavior.

REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Understand

4. List and describe the function of the various neuronal structures.
   ANS: Neurons vary in their structure, but almost all neurons have four basic parts. These include a soma (cell body), dendrites, an axon, and terminal buttons. The soma contains the nucleus of the cell (the center portion that performs metabolic and reproductive functions for the cell). It is responsible for the life of the neuron and connects the dendrites to the axon. The dendrites are branchlike structures that receive information from other neurons, and the soma integrates the information. Learning is associated with the formation of new neuronal connections. The axon is a long, thin tube that extends (and sometimes splits) from the soma and responds to the information, when appropriate, by transmitting an electrochemical signal, which travels to the terminus (end), where the signal can be transmitted to other neurons. The terminal buttons are small knobs found at the ends of the branches of an axon that do not directly touch the dendrites of the next neuron. Rather, there is a small gap, the synapse. The synapse serves as a juncture between the terminal buttons of one or more neurons and the dendrites (or sometimes the soma) of one or more other neurons.

REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Remember

5. Describe the different types of strokes and the impact they have on the brain.
   ANS: An ischemic stroke usually occurs when a buildup of fatty tissue occurs in blood vessels over a period of years, and a piece of this tissue breaks off and gets lodged in arteries of the brain. Ischemic strokes can be treated by clot-busting drugs. The second kind of stroke, a hemorrhagic stroke, occurs when a blood vessel in the brain suddenly breaks. Blood then spills into sur- rounding tissue. As the blood spills over, brain cells in the affected areas begin to die. This death is either from the lack of oxygen and nutrients or from the rupture of the vessel and the sudden spilling of blood. The prognosis for stroke victims depends on the type and severity of damage. Symptoms of stroke appear immediately on the occurrence of stroke.

REF: Brain Disorders KEY: Bloom's: Understand

6. How can researchers trace observed behavior resulting from brain damage to a certain location in the brain once a patient has died?
   ANS: Postmortem studies and brain dissections have been done for centuries. Even in the twenty-first century, researchers often use dissection to study the relation between the brain and behavior. In the ideal case, studies start during the lifetime of a person. Researchers observe and document the behavior of people who show signs of brain damage while they are alive. Later, after the patients die, the researchers examine the patients' brains for lesions —areas where body tissue has been damaged, such as from injury or disease. Then the researchers infer that the lesioned locations may be related to the behavior that was affected. The case of Phineas Gage was explored through these methods.

REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Understand

7. What are the major functions of the hypothalamus?
   ANS: The hypothalamus is involved in regulating the endocrine system; the activities of the autonomic nervous system; survival behavior (e.g., fighting, feeding, fleeing, and mating); consciousness; and emotions, pleasure, pain, and stress reactions.

REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Remember

8. An individual with intractable epilepsy has had her corpus callosum severed in an attempt to reduce her seizures. The patient has been asked to draw a three-dimensional form with her left hand. The patient is successful. However, when asked to draw the same object with the right hand, the patient was not able to perform the task successfully. Why not?
   ANS: Visuospatial processing occurs in the right hemisphere and motor control is contralateral, so the patient is able to accurately draw a cube with the contralateral (left) hand but not the ipsilateral hand.

REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Apply

9. What is the basic premise of metabolic imaging? Identify at least two metabolic imaging methods and explain how they are conducted.
   ANS: Metabolic imaging techniques rely on changes that take place within the brain as a result of increased consumption of glucose and oxygen in active areas of the brain. The basic idea is that active areas in the brain consume more glucose and oxygen than do inactive areas during some tasks. An area specifically required by one task ought to be more active during that task than during more generalized processing and thus should require more glucose and oxygen.

   PET scans measure increases in oxygen consumption in active brain areas during particular kinds of information. To track their use of oxygen, participants are given a mildly radioactive form of oxygen that emits positrons as it is metabolized (positrons are particles that have roughly the same size and mass as electrons, but that are positively rather than negatively charged). Next, the brain is scanned to detect positrons. A computer analyzes the data to produce images of the physiological functioning of the brain in action. PET scans are not highly precise because they require a minimum of about half a minute to produce data regarding glucose consumption. If an area of the brain shows different amounts of activity over the course of time measurement, the activity levels are averaged, potentially leading to conclusions that are less than precise.

   Functional magnetic resonance imaging (fMRI) is a neuroimaging technique that uses magnetic fields to construct a detailed representation in three dimensions of levels of activity in various parts of the brain at a given moment in time. This technique builds on MRI, but it uses increases in oxygen consumption to construct images of brain activity. The basic idea is the same as in PET scans, but the fMRI technique does not require the use of radioactive particles. Rather, the participant performs a task while placed inside an MRI machine. This

machine typically looks like a tunnel. When someone is wholly or partially inserted in the tunnel, he or she is surrounded by a doughnut-shaped magnet. An fMRI creates a magnetic field that induces changes in the particles of oxygen atoms. More active areas draw more oxygenated blood than do less active areas in the brain. So shortly after a brain area has been active, a reduced amount of oxygen should be detectable in this area. This observation forms the basis for fMRI measurements. These measurements then are computer analyzed to provide the most precise information currently available about the physiological functioning of the brain's activity during task performance.

A related procedure is pharmacological MRI (phMRI). The phMRI combines fMRI methods with the study of psychopharmacological agents. These studies examine the influence and role of particular psychopharmacological agents on the brain. phMRIs have been used to examine the role of agonists (which strengthen responses) and antagonists (which weaken responses) on the same receptor cells. These studies have allowed for the examination of drugs used for treatment. The investigators can predict the responses of patients to neurochemical treatments through examination of the person's brain makeup. Overall, these methods aid in the understanding of brain areas and the effects of psychopharmacological agents on brain functioning.

Another procedure related to fMRI is diffusion tensor imaging (DTI). DTI examines the restricted dispersion of water in tissue and, of special interest, in axons. Water in the brain cannot move freely, but rather, its movement is restricted by the axons and their myelin sheaths. DTI measures how far protons have moved in a particular direction within a specific time interval. This technique has been useful in the mapping of the white matter of the brain and in examining neural circuits. Some applications of this technique include examination of traumatic brain injury, schizophrenia, brain maturation, and multiple sclerosis

A recently developed technique for studying brain activity bypasses some of the problems with other techniques. Transcranial magnetic stimulation (TMS) temporarily disrupts the normal activity of the brain in a limited area. Therefore, it can imitate lesions in the brain or stimulate brain regions. TMS requires placing a coil on a person's head and then allowing an electrical current to pass through it. The current generates a magnetic field. This field disrupts the small area (usually no more than a cubic centimeter) beneath it. The researcher can then look at cognitive functioning when the particular area is disrupted.

Magnetoencephalography (MEG) measures brain activity from outside the head (similar to EEG) by picking up magnetic fields emitted by changes in brain activity. This technique allows localization of brain signals so that it is possible to know what different parts of the brain are doing at different times. It is one of the most precise of the measuring methods. MEG is used to help surgeons locate pathological structures in the brain.

REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Understand

10. Describe the homunculus of the primary motor cortex. How is the size of a given structure on the homunculus (for example, the lips as opposed to the toes) related to function? Compare this to the somatosensory homunculus.

ANS: The motor cortex can be mapped to show where, and in what proportions, different parts of the body are represented in the brain. Maps of this kind are called homunculi (homunculus is Latin for “little person”) because they depict the body parts of a person mapped on the brain. For both motor and sensory function, the size of the body part in the homunculus is related to function. Those areas of the body that are particularly sensitive or that are used in fine, complex motions have larger representations in the brain.

REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom’s: Analyze

11. Identify the four lobes of the brain and outline the major functions of each.
ANS: The frontal lobe, toward the front of the brain, is associated with motor processing and higher thought processes, such as abstract reasoning, problem solving, planning, and judgment. It tends to be involved when sequences of thoughts or actions are called for. It is critical in producing speech. The prefrontal cortex, the region toward the front of the frontal lobe, is involved in complex motor control and tasks that require integration of information over time.

The parietal lobe, at the upper back portion of the brain, is associated with somatosensory processing. The primary somatosensory cortex receives information from the senses about pressure, texture, temperature, and pain. It is located right behind the frontal lobe’s primary motor cortex. If your somatosensory cortex were electrically stimulated, you probably would report feeling as if you had been touched. The parietal lobe also helps you perceive space and your relationship to it—how you are situated relative to the space you are occupying. It is also involved in consciousness and paying attention.

The temporal lobe is located below the parietal lobe, directly under your temples. It is associated with auditory processing and comprehending language. Some parts are more sensitive to sounds of higher pitch, others to sounds of lower pitch. The auditory region is primarily contralateral. Both sides of the auditory area have at least some representation from each ear. If your auditory cortex were stimulated electrically, you would report having heard some sort of sound. The temporal lobe is also involved in retaining visual memories. For example, if you are trying to keep in memory

The occipital lobe is associated with visual processing. The occipital lobe contains numerous visual areas, each specialized to analyze specific aspects of a scene, including color, motion, location, and form. Projection areas are the areas in the lobes in which sensory processing occurs. These areas are referred to as projection areas because the nerves contain sensory information going to (projecting to) the thalamus. It is from here that the sensory information is communicated to the appropriate area in the relevant lobe. Similarly, the projection areas communicate motor information downward through the spinal cord to the appropriate muscles via the peripheral nervous system (PNS). The visual cortex is primarily in the occipital lobe. Some neural fibers carrying visual information travel ipsilaterally from the left eye to the left cerebral hemisphere and from the right eye to the right cerebral hemisphere. Other fibers cross over the optic chiasma and go contralaterally to the opposite hemisphere. In particular, neural fibers go from the left side of the visual field for each eye to the right

side of the visual cortex. Complementarily, the nerves from the right side of each eye's visual field send information to the left side of the visual cortex.

REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Analyze

12. When Henry Molaison, known to generations of psychology students as HM, the man who, following surgical damage to his hippocampus in an attempt to lessen his seizures, suffered profound and wide-ranging memory loss, died in 2008, he had arranged to donate his brain to science for post mortem examination. Why is it that, even with today's sophisticated imaging techniques, post mortem analyses remain scientifically valuable?
ANS: Post mortem analyses are typically performed on individuals who have brain lesions as a result of injury, disease or surgery or who have abnormal brain structures as a result of congenital differences. Although some such lesions can be created in animals for the purposes of research, they cannot ethically be created in humans for the purpose of research. Neuroimaging techniques, while they are continuously advancing in their ability to provide both static and dynamic images of the brain, may miss subtle structural differences that are visual when stained brain slices are viewed under the microscope.

REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Evaluate

13. How does Gazzaniga view the question of hemispheric specialization? How do the hemispheres function independently and how do they function together?
ANS: Gazzaniga does not believe that the two hemispheres function completely independently but rather that they serve complementary roles. For instance, there is no language processing in the right hemisphere (except in rare cases of early brain damage to the left hemisphere). Rather, only visuospatial processing occurs in the right hemisphere. Gazzaniga has argued that the brain, and especially the right hemisphere of the brain, is organized into relatively independent functioning units that work in parallel. According to Gazzaniga, each of the many discrete units of the mind operates relatively independently of the others. These operations are often outside of conscious awareness. Although these various independent and often subconscious operations are taking place, the left hemisphere tries to assign interpretations to these operations.

REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Understand

14. Neurological disorders like Parkinson's may be treated with medications that affect neurotransmitter systems. Identify a major side effect of medications used for Parkinson's and explain how it is that drugs intended to affect movement or cognition have such a broad array of side effects unrelated to the reasons the drugs were prescribed.
ANS: Patients with Parkinson's disease show low dopamine levels, which leads to the typical trembling and movement problems associated with Parkinson's. When patients receive medication that increases their dopamine level, they (as well as healthy people who receive dopamine) sometimes show an increase in pathological gambling. Gambling is a compulsive disorder that results from impaired impulse control. When dopamine treatment is suspended,

these patients no longer exhibit this behavior. This can occur because of the complexities of neurotransmitter symptoms. Neurotransmitters may affect many different brain systems and thus affect a range of behaviors and experiences.

REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Understand

15. Compare and contrast the two major types of head injuries. What are the long-term implications of head injuries in terms of functioning?
ANS: Head injuries are of two types. In closed-head injuries, the skull remains intact, but there is damage to the brain, typically from the mechanical force of a blow to the head. Slamming one's head against a windshield in a car accident might result in such an injury. In open-head injuries, the skull does not remain intact but rather is penetrated, for example, by a bullet.

Damage resulting from head injury can include spastic movements, difficulty in swallowing, and slurring of speech, as well as many other cognitive and behavioral problems. Cognitive symptoms can vary widely, depending on the area of the brain that is affected. Patients may experience concentration problems, may have difficulty understanding others or speaking and putting their own thoughts in words, may find it hard to understand abstract concepts, or may have trouble remembering things.

REF: Brain Disorders KEY: Bloom's: Remember

16. As part of a research project for a biological psychology class, you are assigned to work with experienced researchers who have access to equipment that allows you to study the human brain. Describe two electrical *in vivo* techniques and how they would allow you to learn about the human brain.
ANS: Electroencephalograms (EEGs) are recordings of the electrical frequencies and intensities of the living brain, typically recorded over relatively long periods. Through EEGs, it is possible to study brainwave activity indicative of changing mental states such as deep sleep or dreaming. To obtain EEG recordings, electrodes are placed at various points along the surface of the scalp. The electrical activity of underlying brain areas is then recorded. The information, therefore, is not localized to specific cells. The EEG is sensitive to changes over time. For example, EEG recordings taken during sleep reveal changing patterns of electrical activity involving the whole brain. Different patterns emerge during dreaming versus deep sleep. EEGs are also used to diagnose epilepsy because they can indicate whether seizures appear in both sides of the brain at the same time, or whether they originate in one part of the brain and then spread.

To relate electrical activity to a particular event or task (e.g., seeing a flash of light or listening to sentences), EEG waves can be measured when participants are exposed to a particular stimulus. An event-related potential (ERP) is the record of a small change in the brain's electrical activity in response to a stimulating event. The fluctuation typically lasts a mere fraction of a second. ERPs provide good information about the time- course of task-related brain activity. In any one EEG recording, there is a great deal of "noise"—that is,

irrelevant electrical activity going on in the brain. ERPs cancel out the effects of noise by averaging out activity that is not task-related. Therefore, the EEG waves are averaged over a large number (e.g., 100) of trials to reveal the ERPs. The resulting wave forms show characteristic spikes related to the timing of electrical activity, but they reveal only general information about the location of that activity (because of low spatial resolution as a result of the placement of scalp electrodes).

REF: Viewing the Structures and Functions of the Brain KEY: Bloom's: Evaluate

17. Describe Farah's research on childhood poverty and cognitive neuroscience. What are the implications of her work?
ANS: The most profound effects of poverty are in kindergarteners are in the language and executive function systems. In first graders and in middle school students, there were striking SES disparities in language and executive function, as well as in declarative memory. Language ability in middle school was predicted by the amount of cognitive stimulation they experienced as 4-year-olds—being read to, being taken on trips, and so on. In contrast, declarative memory ability in middle school was predicted by the quality of parental nurturance received as young children—being held close, being paid attention to, and so on. The latter finding might seem an odd association. Why would affectionate parenting have anything to do with memory? Yet research with animals shows that when a young animal is stressed the resulting stress hormones can damage the hippocampus, a brain area important for both stress regulation and memory. This research has also shown that more nurturing maternal behavior can buffer the young animal's hippocampus against the effects of stress. This is consistent with the hypothesis that the stressful environment of poverty affects hippocampal development, with additional help or hindrance from parenting. These findings suggest that reducing poverty and providing needed supports to the parents of infants and young children may have far-reaching impacts on their ability to function in and contribute to society.

REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Understand

18. Describe ipsilateral and contralateral projection in the human brain.
ANS: The cerebral cortex forms the outer layer of the two halves of the brain—the left and right cerebral hemispheres. Although the two hemispheres appear to be similar, they function differently. The left cerebral hemisphere is specialized for some kinds of activity, whereas the right cerebral hemisphere is specialized for other kinds. For example, receptors in the skin on the right side of the body generally send information through the medulla to areas in the left hemisphere in the brain. The receptors on the left side generally transmit information to the right hemisphere. Similarly, the left hemisphere of the brain directs the motor responses on the right side of the body. The right hemisphere directs responses on the left side of the body. Not all information transmission is contralateral—from one side to another. Some ipsilateral transmission—on the same side— occurs as well. For example, odor information from the right nostril goes primarily to the right side of the brain. About half the information from the right eye goes to the right side of the brain; the other half goes to the left side of the brain. In addition to this general tendency for contralateral specialization, the

hemispheres also communicate directly with one another. The corpus callosum is a dense aggregate of neural fibers connecting the two cerebral hemispheres. It transmits information back and forth. Once information has reached one hemisphere, the corpus callosum transfers it to the other hemisphere. If the corpus callosum is cut, the two cerebral hemispheres cannot communicate with each other. Although some functioning, such as language, is highly lateralized, most functioning—even language—depends in large part on integration of the two hemispheres of the brain.

REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Understand

19. Describe the gross anatomy and general functions of the cerebral cortex.

ANS: The cerebral cortex plays an extremely important role in human cognition. It enables us to think. Because of it, we can plan, coordinate thoughts and actions, perceive visual and sound patterns, and use language. Without it, we would not be human. The cerebral cortex forms a 1- to 3-millimeter layer that wraps the surface of the brain somewhat like the bark of a tree wraps around the trunk. In human beings, the many convolutions, or creases, of the cerebral cortex include three elements. Sulci (singular: sulcus) are small grooves. Fissures are large grooves. And gyri (singular: gyrus) are bulges between adja- cent sulci or fissures. These folds greatly increase the surface area of the cortex. If the wrinkly human cortex were smoothed out, it would take up about 2 square feet.

The volume of the human skull has more than doubled over the past 2 million years, allowing for the expansion of the brain, and especially the cortex. The surface of the cerebral cortex is grayish. It is sometimes referred to as gray matter because it primarily includes the grayish neural-cell bodies that process the information that the brain receives and sends. In contrast, the underlying white matter of the brain's interior includes mostly white, myelinated axons.

REF: Cognition in the Brain: The Anatomy and Mechanisms of the Brain KEY: Bloom's: Understand

20. What are the major types of brain tumors? What symptoms do they produce? How are they diagnosed and treated?

ANS: Brain tumors, also called neoplasms, can affect cognitive functioning in serious ways. Tumors can occur in either the gray or the white matter of the brain. Two types of brain tumors can occur. Primary brain tumors start in the brain. Most childhood brain tumors are of this type. Secondary brain tumors start as tumors somewhere else in the body, such as in the lungs. Brain tumors can be either benign or malignant. Benign tumors do not contain cancer cells. They typically can be removed and will not grow back. Cells from benign tumors do not invade surrounding cells or spread to other parts of the body. If, however, they press against sensitive areas of the brain, they can result in serious cognitive impairments. They also can be life-threatening, unlike benign tumors in most other parts of the body. Malignant brain tumors, unlike benign ones, contain cancer cells. They are more serious and usually threaten the victim's life. They often grow quickly. They tend to invade surrounding healthy brain tissue. In rare instances, malignant cells may break away and cause cancer in other parts of the body. Common symptoms of brain tumors include headaches (usually worse in the morning); nausea or vomiting; changes

in speech, vision, or hearing; problems balancing or walking; changes in mood, personality, or ability to concentrate; problems with memory; muscle jerking or twitching (seizures or convulsions); and numbness or tingling in the arms or legs. The diagnosis of brain tumor typically is made through neurological examination, CT scan, or MRI. The most common form of treatment is a combination of surgery, radiation, and chemotherapy.

REF: Brain Disorders KEY: Bloom's: Understand