

*Woolfolk et al., Educational Psychology, 7<sup>th</sup> Canadian edition*  
**Chapter 2: Cognitive Development**

**Multiple Choice Questions**

- 1) Which of the following is NOT an example of a developmental change?
- A) Julius is working on his batting skills, and he hit the ball much farther today
  - B) Caitlin left out several steps in the process of conducting the lab experiment, but she understands what she did wrong and is redoing the experiment.
  - C) Mark is walking carefully on one foot while his sprained ankle heals.
  - D) Milos has learned enough English to introduce himself to other students

Answer: C

Explanation: C) *Mark's situation involves temporary change* caused by an accident. Development includes orderly, adaptive changes we go through between conception and death that remain for a reasonably long period of time.

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Skill: Understanding

- 2) Which one of the following is an example of maturation?
- A) Gaining weight from age two to age three
  - B) Losing weight due to exercise
  - C) Losing weight during a brief illness
  - D) Learning which foods produce the most weight

Answer: A

Explanation: A) *Maturation refers to changes that occur naturally and spontaneously* rather than as a result of environmental circumstances. An example would be gaining weight from age two to age three. Losing weight due to illness or exercise is not a natural occurrence, but one that is caused by particular environmental events.

Page Ref: 24

Skill: Understanding

- 3) As time goes on, Tina becomes a happier individual, more in touch with life, and content with her situation. This description emphasizes what kind of development for Tina?
- A) Cognitive
  - B) Personal
  - C) Physical
  - D) Social

Answer: B

Explanation: B) In contrast with social development that involves relations with others,

*personal development* is illustrated in the scenario on changes in Tina's personality (such as being happier, changes in self-concept, etc.).

Page Ref: 23-24

Skill: Understanding

- 4) Which of the following would NOT be considered a general principle in nearly all theories of development?
- A) Development is balanced.
  - B) Development is gradual.
  - C) Development occurs in an orderly way.
  - D) Individuals develop at different rates.

Answer: A

Explanation: A) Development is gradual, occurs in an orderly way, and occurs at variable rates. *Development is NOT considered to be balanced*, i.e., development is not balanced across physical, personal, social, and cognitive development.

Page Ref: 25

Skill: Knowledge

- 5) Which of the following is NOT one of the three key questions surrounding development that continue to elicit debate among researchers and theorists?
- A) Are there critical periods for developing abilities?
  - B) What is the source of development?
  - C) Do people develop at different rates?
  - D) What is the shape of development?

Answer: C

Explanation: Options A, B and D are the three questions that theorists continue to debate. The different rates at which people develop is considered one of the general principles that almost all theorists would agree with.

Page Ref: 24-25

Skill: Knowledge

- 6) If John is introduced to the concept of fractions today, he will not be able to start adding and subtracting them tomorrow. What general principle of development is illustrated?
- A) Development proceeds through identifiable stages.
  - B) Development takes place gradually.
  - C) Maturation is the basis for development.
  - D) John lacks personal development.

Answer: B

Explanation: B) *Development takes place gradually*. John will need to acquire more

experience and skills with fractions before he can perform specific operations such as adding and subtracting. He may, however, acquire those skills at different rates than others.

Page Ref: 25  
Skill: Understanding

- 7) What part of the brain coordinates and orchestrates skilled movements?
- A) Cerebellum
  - B) Hippocampus
  - C) Thalamus
  - D) Amygdala

Answer: A

Explanation: A) The *cerebellum* is the part of the brain that coordinates and orchestrates skilled movements. The thalamus is associated with the ability to learn new information. The hippocampus is involved in the recall of new information and new experiences, while the amygdala directs emotions.

Page Ref: 25  
Skill: Knowledge

- 8) Mr. Mills instructs his students to practice the steps in the process over and over. As a result of students' practice, what is happening in their brains?
- A) Overproduction of neurons in the amygdala
  - B) Pruning of neurons in the amygdala
  - C) Increase in number of axons per neuron
  - D) Strengthening of connections between neurons

Answer: D

Explanation: Connections between neurons become stronger with use and practice, but they become weaker when not used.

Page Ref: 26  
Skill: Knowledge

- 9) What part of the brain has the information processing capacity of a small computer?
- A) Each neuron
  - B) Cerebellum
  - C) Thalamus
  - D) Hippocampus

Answer: A

Explanation: Each neuron has the processing capacity of a small computer. Neurons are specialized nerve cells that accumulate and transmit information in the brain and other

parts of the nervous system. An infant brain contains billions of neurons with such capacity. The cerebellum, thalamus, and hippocampus are regions of the brain.

Page Ref: 26  
Skill: Knowledge

10) The part of the cerebral cortex that matures first controls

- A) higher-order thinking processes.
- B) physical movements.
- C) the processing of language.
- D) the formation of associations.

Answer: B

Explanation: B) *Control of physical movements* matures in the cerebral cortex before other functions, such as activities that involve verbalization.

Page Ref: 28  
Skill: Knowledge

11) The last part of the brain to develop fully is the

- A) cerebellum.
- B) cerebral cortex.
- C) frontal lobe.
- D) thalamus.

Answer: C

Explanation: C) The last section of the brain to develop fully is the *frontal lobe* in the cerebral cortex.

Page Ref: 28-29  
Skill: Knowledge

12) Specialization of the two hemispheres of the brain involves

- A) Broca's area.
- B) lateralization.
- C) the primary auditory cortex.
- D) Wernicke's area.

Answer: B

Explanation: B) Specialization in the two hemispheres of the brain relates to *lateralization*.

Page Ref: 29  
Skill: Knowledge

- 13) A debate assignment involves the analysis of divergent perspectives on an issue, development of arguments to support diverse perspectives, and efficient recall of resources and persuasive points during the debate. What part or parts of the brain are most likely functioning to complete this assignment effectively?
- A) Amygdala
  - B) Right hemisphere of the cortex processing creatively
  - C) Left hemisphere of the cortex processing analytically
  - D) Many parts working simultaneously

Answer: D

Explanation: D) Nearly any task, particularly the complex skills and abilities that concern teachers, requires simultaneous participation of many different areas of the brain in constant communication with each other. For example, the right side of the brain is better at figuring out the meaning of a story, but the left side is where grammar and syntax are understood. So both sides of the brain have to work together in reading and other complex cognitive tasks.

Page Ref: 29

Skill: Knowledge

- 14) What facts about brain development during adolescence explain their risk-taking impulsivity?
- A) The right hemisphere develops earlier than the left hemisphere.
  - B) The left hemisphere develops earlier than the right hemisphere.
  - C) The limbic system develops more slowly than the prefrontal lobe.
  - D) The limbic system develops earlier than the prefrontal lobe.

Answer: D

Explanation: D) One explanation for this tendency to avoid risks and impulsive behaviour looks to differences in the pace of development for two key components of the brain—the limbic system and the prefrontal cortex. *The limbic system develops earlier*; it is involved with emotions and reward-seeking/novelty/risk-taking/sensation-seeking behaviours. *The prefrontal lobe takes more time to develop*; it is involved with judgment and decision making.

Page Ref: 30

Skill: Knowledge

- 15) Which of the following is NOT a myth about the brain?
- A) Alcoholic beverages kill brain cells.
  - B) Some people are more “right brained” and others are more “left brained.”
  - C) Our brains are changing all the time.
  - D) You use only 10% of your brain.

Answer: C

Explanation: C) *A common myth incorrectly suggests that the brain does not change.* However, our brains are changing all the time and one idea in which neuroscience informs teaching practice is that teachers and students should embrace the amazing plasticity of the brain.

Page Ref: 32, 34  
Skill: Knowledge

16) Which of the following is NOT considered a general principle for the teaching implications of neuroscience?

- A) The brain is not malleable.
- B) Because cognitive functions are differentiated, assessment should be differentiated.
- C) There are multiple ways to teach and learn a skill.
- D) Some learning disorders have a neurological basis

Answer: A

Explanation: A) *The brain is relatively plastic*, so enriched, active environments and flexible instructional strategies are likely to support cognitive development in young children. Changes in the brain do take time and teachers should be consistent and patient in their teaching.

Page Ref: 35-36  
Skill: Knowledge

17) Which of the following is NOT considered an influence in our cognitive development according to Piaget?

- A) Activity
- B) Exploration
- C) Maturation
- D) Social transmission

Answer: A

Explanation: A) According to Piaget, there are four factors that interact to influence changes in thinking. Maturation involves the unfolding of genetically programmed changes in biology. Activity involves the increasing ability to act on the environment (as we mature) and to learn from it. Social transmission involves learning from others. Equilibration involves the search for mental balance between cognitive schemes and information from the environment. *Exploration is not related to Piaget's theory.*

Page Ref: 37-38  
Skill: Knowledge

18) Which of the following pairs of factors that influence thinking is thought by Piaget to be genetic or inherited tendencies?

- A) Accommodation and assimilation
- B) Adaptation and organization

- C) Assimilation and schemes
- D) Schemes and equilibration

Answer: B

Explanation: B) Based on his work in biology, Piaget concluded that all species inherit two basic tendencies: *organization* (the combining of behaviours into coherent systems) and *adaptation* (adjusting to the environment).

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Skill: Knowledge

19) According to Piaget, the basic blocks of thinking and memory that permit us to represent objects and events in our world are called

- A) actions.
- B) accommodations.
- C) adaptations.
- D) schemes.

Answer: D

Explanation: D) *Schemes* are Piaget's basic blocks of thinking. These schemes are an organized system of thought or action that permit us to mentally represent or "think about" objects and events in our own world.

Page Ref: 38

Skill: Knowledge

20) The two processes involved in adaptation are

- A) assimilation and accommodation.
- B) assimilation and equilibration.
- C) equilibration and organization.
- D) social transmission and scheme.

Answer: A

Explanation: A) The two processes of adaptation are *assimilation and accommodation*. Accommodation is defined by Piaget as the process of changing existing schemes to respond to a new situation. Assimilation is the process of changing what is learned to fit existing schemes.

Page Ref: 38

Skill: Knowledge

21) Which one of the following is the clearest example of Piaget's concept of assimilation?

- A) Learning that a green light means "go" and a red light means "stop."
- B) Learning to paint with a new type of brush.
- C) Looking at teachers as they lecture.

D) Looking at a worm and thinking that it is a snake.

Answer: D

Explanation: D) The clearest example of assimilation of the choices given is *looking at a worm and thinking that it is a snake*. The observer is "fitting" the stimulus (worm) into her mental scheme at the moment, which is apparently oriented to expect to see a snake or which assigns (based on experiences) greater saliency to a snake than to a worm. The environmental stimulus is being mentally "changed" in accord with the learner's existing schemes.

Page Ref: 38

Skill: Understanding

22) Jeannie observed rocks sinking in water and said, "I already knew that. All rocks sink." Then she saw a piece of pumice floating on water and was told that pumice is rock. Several days later, she was asked again if rocks sink in water. She replied, "Well, most do." In Piaget's terms, what process did Jeannie use to draw this conclusion?

- A) Accommodation
- B) Assimilation
- C) Classification
- D) Conservation

Answer: A

Explanation: A) Jeannie is using *accommodation* by changing her ideas about whether rocks sink or float based on her experience in observing a floating piece of pumice. Assimilation would have involved resisting the idea that rocks float, perhaps by failing to accept pumice as a type of rock.

Page Ref: 38

Skill: Understanding

23) According to Piaget, the process of searching for a balance between cognitive schemes and environmental information is called

- A) accommodation.
- B) adaptation.
- C) assimilation.
- D) equilibration.

Answer: D

Explanation: D) *Equilibration* is defined by Piaget as the process of searching for a balance between cognitive schemes and environmental information. When a balance occurs, equilibrium is felt; imbalance causes disequilibrium.

Page Ref: 38

Skill: Knowledge

- 24) When we try a particular strategy and it does not work, the discomfort we experience is called
- A) assimilation.
  - B) centration.
  - C) disequilibrium.
  - D) non-adaptation.

Answer: C

Explanation: C) *Disequilibrium* is the discomfort we feel when a scheme does not work as expected. It promotes new learning by motivating us to continue searching for a solution.

Page Ref: 38

Skill: Knowledge

- 25) According to Piaget, people pass through the four stages of cognitive development
- A) at the same levels of competence.
  - B) at the same rates, adjusted for intelligence.
  - C) in specifically determined ages.
  - D) in the same sequence.

Answer: D

Explanation: D) Piaget theorized that people pass through the four stages of cognitive development *in the same sequence*. However, they do this at different rates, depending on individual development.

Page Ref: 38

Skill: Knowledge

- 26) best conveys a child's thinking What of the following sayings best conveys a child's thinking before the notion of object permanence is acquired?
- A) "A bird in the hand is worth two in the bush."
  - B) "A penny saved is a penny earned."
  - C) "A stitch in time saves nine."
  - D) "Out of sight, out of mind."

Answer: D

Explanation: D) Before object permanence is acquired, a child thinks that an object that is no longer visible has disappeared "*out of sight, out of mind*" as the saying goes.

Page Ref: 39

Skill: Understanding

- 27) In Piaget's theory, an understanding of object permanence is acquired during what period of development?

- A) Early preoperational
- B) Operational
- C) Formal operational
- D) Sensorimotor

Answer: D

Explanation: D) Object permanence, the understanding that objects exist even if not visible, is acquired during the *sensorimotor period*.

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Skill: Knowledge

- 28) Michelle covers her own eyes, because she thinks her parents will not see her when they are playing a game of peek-a-boo. What stage of Piaget's cognitive theory does this account best illustrate?

- A) Concrete operations
- B) Formal operations
- C) Preoperational thought
- D) Sensorimotor

Answer: D

Explanation: D) Michelle is in the first stage of cognitive development, the *sensorimotor stage*. During this phase, infants will develop object permanence, the awareness that an object exists in the environment whether they can see it or not. Michelle demonstrates a lack of object permanence in this game. As is common during early stages of the sensorimotor period, she believes that if she can't see others, others can't see her.

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Skill: Understanding

- 29) In the sensorimotor stage of development, a child begins to develop

- A) goal-directed actions.
- B) mental operations.
- C) preoperational thought.
- D) semiotic functions.

Answer: A

Explanation: A) Toward the end of the *sensorimotor period*, children begin to use *logical, goal-directed actions* in which they play with objects in an orderly fashion (for a purpose, with a goal in mind). By the preoperational period, these types of actions are well established.

Page Ref: 39

Skill: Knowledge

- 30) Nathan is shown two balls of clay that he identifies as equal in quantity. When one of the balls is then rolled into a sausage, Nathan says that piece (i.e., sausage) now has more clay. In what stage of development is he likely to be?
- A) Concrete operations
  - B) Goal-directed operations
  - C) Preoperational thought
  - D) Sensorimotor

Answer: C

Explanation: C) Nathan is probably in the *preoperational stage* because he is failing to demonstrate the principle of conservation. If he were in the concrete operations or formal operations stages, he would indicate that both pieces contain the same amount of clay because the quantity of the sausage-like piece has not changed.

Page Ref: 40, 42

Difficulty: Understanding

- 31) Billy refuses to drink his orange juice from the 1/2 full glass that his mother gives to him. He wants her to pour the juice into his favourite cup and watches his mother fill it to the brim. Billy likes his cup better because he gets more juice in it. With what cognitive concept in Piaget's theory is Billy having trouble?
- A) Accommodation
  - B) Assimilation
  - C) Conservation
  - D) Semiotic function

Answer: C

Explanation: C) The cognitive concept illustrated by Billy's thinking that he gets more juice in his small cup than in the half-full larger cup is an example of a child who has not yet developed Piaget's concept of *conservation*.

Page Ref: 40

Skill: Understanding

- 32) After stringing beads from a large necklace onto a smaller empty string, a child states that there are now more beads on the small string than there were on the larger string. What cognitive concept (Piaget's theory) does this behaviour best illustrate?
- A) Accommodation
  - B) Assimilation
  - C) Conservation
  - D) Equilibration

Answer: C

Explanation: C) This situation describes a *conservation task*. The child is apparently preoperational. He or she is *failing to conserve quantity by thinking that the small string*

*contains more beads* (because it "appears" more loaded with beads).

Page Ref: 40

Skill: Understanding

- 33) A teacher pours juice from a larger glass into two tiny glasses, and the child beams, happy now that he has "more juice." What cognitive stage (Piaget's theory) does the account best illustrate?
- A) Concrete operations
  - B) Formal operational thought
  - C) Preoperational thought
  - D) Sensorimotor

Answer: C

Explanation: C) The child is in the *preoperational stage*. We can conclude this because he has *failed to demonstrate conservation* by thinking that the tiny glasses contain more juice.

Page Ref: 40

Skill: Understanding

- 34) A preoperational child's belief that a tall, narrow glass contains more liquid than a short, wide glass is probably due to difficulties in
- A) decentring.
  - B) egocentrism.
  - C) serration.
  - D) object permanence.

Answer: A

Explanation: A) *Decentring* is the ability to focus on more than one aspect of a situation at a time. This occurs, for example, when the preoperational child perceives that, because a glass is taller, it must also have more liquid. In this case, the child is unable to see that the amount of liquid has not changed.

Page Ref: 40

Skill: Knowledge

- 35) Corinne has mastered this type of problem: "If the white house is bigger than the blue house, and the blue house is bigger than the red house, is the white house bigger or smaller than the red house?" What stage of Piaget's cognitive theory does this situation best illustrate?
- A) Concrete operations
  - B) Formal operations
  - C) Preoperational thought
  - D) Sensorimotor

Answer: A

Explanation: A) By demonstrating an ability to understand seriation, Corinne is evidently in the *concrete operations stage*. She would be less capable at this task, however, if she were dealing with abstractions rather than with concrete objects (houses of different colours).

Page Ref: 43

Skill: Understanding

36) David has just purchased a car and is intensely interested in it. When the car has engine trouble, he is able systematically to locate the problem. What cognitive stage of Piaget's theory does this situation best illustrate?

- A) Concrete operations
- B) Formal operations
- C) Preoperational thought
- D) Sensorimotor

Answer: B

Explanation: B) David appears to be in the *formal operations stage*. He is able to use logical thinking to locate the engine trouble systematically. He is evidently using formal thought to solve unique problems.

Page Ref: 43

Skill: Understanding

37) What is the hallmark of Piaget's stage of formal operations?

- A) Semiotic function
- B) Hypothetico-deductive reasoning
- C) Organized thinking of dependent elements
- D) Reversible thinking

Answer: B

Explanation: B) The hallmark of Piaget's stage of formal operations is *hypothetico-deductive reasoning*. This ability involves both deductive and inductive reasoning to solve real as well as hypothetical problems.

Page Ref: 43

Skill: Knowledge

38) Janie was having some difficulty deciding how to organize her defense for the debate competition. She prepared several hypothetical arguments that her opponents might raise, and how she might reply. What cognitive stage of Piaget's theory does this account best illustrate?

- A) Concrete operations
- B) Formal operations

- C) Preoperational thought
- D) Sensorimotor

Answer: B

Explanation: B) Janie's problem with organizing her defense for the debate reflects the *characteristics of formal operations*, including hypothetico-deductive reasoning, problem solving, and scientific thought.

Page Ref: 43

Skill: Understanding

- 39) Sierra walked into class late and felt quite embarrassed. To make matters worse, she was having a bad hair day and felt like all eyes were on her, judging her, and rejecting her. Sierra's thinking can be described as

- A) adolescent egocentrism
- B) adaptation by assimilation
- C) reversible thinking
- D) disequilibrium

Answer: A

Explanation: A) *Adolescent egocentrism* is the assumption that everyone else shares one's thoughts, feelings, and concerns. This leads to the sense of an imaginary audience or the feeling that everyone is watching.

Page Ref: 45

Skill: Understanding

- 40) Which one of the following statements best reflects Piaget's position on the question of speeding up cognitive development?

- A) Acceleration is both inefficient and useless.
- B) Acceleration is effective for only the brightest students.
- C) Keeping cognitive development "on track" is a teacher's role.
- D) Speeding up cognitive development is a teacher's role.

Answer: A

Explanation: A) Because biological maturation is genetically programmed, parents and teachers have little impact on this facet of cognitive development. Consequently, Piaget would contend that forced *acceleration is both inefficient and useless*.

Page Ref: 48-49

Skill: Understanding

- 41) Current views about the limitations of Piaget's theory generally support the idea that

- A) Piaget's tasks appear to have been invalid for judging cognitive ability.
- B) Piaget's tasks appear to have generally been too easy for subjects.

- C) Piaget tended to overestimate children's abilities and underestimate their social differences.
- D) Piaget tended to underestimate children's abilities and overlook the social and cultural issues.

Answer: D

Explanation: D) It appears that Piaget *underestimated children's abilities* by using tasks that were too difficult and directions that were too confusing. He also *overlooked social and cultural issues*. Recent studies have shown that children can reason at higher levels than Piaget had thought.

Page Ref: 48

Skill: Knowledge

- 42) An increasingly influential view of cognitive development proposed by Vygotsky is based on
- A) concrete experiences.
  - B) creation of complex schemes of thought.
  - C) sociocultural theory.
  - D) mastery of scientific thinking

Answer: C

Explanation: C) *Sociocultural theory* is becoming an increasingly influential view of cognitive development.

Page Ref: 49-50

Skill: Knowledge

- 43) Which theorist or group of theorists promoted the idea that knowledge is co-constructed during social interactions?
- A) Vygotsky
  - B) Piaget
  - C) Neo-Piagetian theorists
  - D) Elkind

Answer: A

Explanation: A) Vygotsky assumed that higher mental processes, such as directing your own attention and thinking through problems, first are *co-constructed* during shared activities between the child and another person. A co-constructed process is a social process in which people interact and negotiate to create an understanding or to solve a problem. The final product is shaped by all participants.

Page Ref: 50

Skill: Knowledge

- 44) For Vygotsky, the role of cultural tools in cognitive development involves

- A) both real and psychological tools.
- B) essentially real tools.
- C) predominantly symbolic tools.
- D) primarily psychological tools.

Answer: A

Explanation: A) According to Vygotsky, the role of cultural tools in cognitive development involves *both real and psychological tools*.

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Skill: Knowledge

45) The role of "private speech" in Vygotsky's view is to

- A) call attention to oneself during play.
- B) guide children toward self-regulation.
- C) encourage children to learn new words.
- D) stimulate the development of language from simple words to full sentences.

Answer: B

Explanation: B) According to Vygotsky, *private speech* moves children toward self-regulation: the ability to plan, monitor, and guide one's own thinking and problem solving.

Page Ref: 53

Skill: Knowledge

46) Piaget called children's self-directed talk \_\_\_\_\_ while Vygotsky called the same behaviour \_\_\_\_\_.

- A) egocentric speech; private speech
- B) private speech; egocentric speech
- C) private speech; social speech
- D) social speech; private speech

Answer: A

Explanation: A) Children's self-directed talk is Piaget's *egocentric speech* and Vygotsky's *private speech*.

Page Ref: 53

Skill: Knowledge

47) The zone of proximal development is the area where students may solve a problem

- A) by themselves.
- B) with no disequilibrium.
- C) with support.

D) without frustration.

Answer: C

Explanation: C) The zone of proximal development is the area between the learner's current development level and the level the learner could achieve with some support from a more capable peer or through adult guidance.

Page Ref: 54

Skill: Knowledge

48) The “Magic Middle” refers to

- A) a learning environment that support the average or “mid-level” learner.
- B) the knowledge of a middle child in a given family.
- C) a place of “match” where students are neither bored nor frustrated by a task.
- D) a learning activity that require the use of a computer to scaffold learning.

Answer: C

Explanation: C) This term was coined by Kathleen Berger (2009) refers to a “*match*” in instruction to a child’s level of development where instruction is somewhere between what the student already knows and what the student isn’t ready to learn (*therefore leading to neither boredom or frustration*). This term is related to the concept of zone of proximal development (ZPD) described by Vygotsky.

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Skill: Knowledge

49) According to Vygotsky, scaffolding represents

- A) a barrier or a block to solving a problem.
- B) a plateau that children reach before progressing to a new stage.
- C) artificial support, such as notes, on which children can rely while learning.
- D) external support for helping children solve problems on their own.

Answer: D

Explanation: D) The zone of proximal development is the point at which a child cannot solve a problem alone but can do so *with support or scaffolding*. Teachers can help children move to higher reasoning levels by providing appropriate guidance during problem solving.

Page Ref: 58

Skill: Knowledge

### **True/False Questions**

50) Developmental changes are genetically determined rather than environmentally determined.

Answer: FALSE

Explanation: Current views of development emphasize complex *coactions* (joint actions) of nature (genes) and nurture (environment).

Page Ref: 24

- 51) The part of the brain directly associated with the coordination of skilled movements is the cerebellum.

Answer: TRUE

Explanation: In addition to balance and smooth, skilled movements, the cerebellum may play a role in higher cognitive functions such as learning.

Page Ref: 25

- 52) Positron emission is the name given to describe the production of new neurons.

Answer: FALSE

Explanation: The production of new neurons is called neurogenesis

Page Ref: 26

- 53) The brains of young children show more plasticity than the brains of adults.

Answer: TRUE

Explanation: Plasticity is the brain's ability to remain adaptable. Because they are not yet as specialized or lateralized as the brains of adults, the brains of young children show more plasticity. For example, young children with damage to the left side of their brain are able to partially overcome this damage, which allows language development to continue.

Page Ref: 29

- 54) One explanation for the strong emotions and reward-seeking behaviour amongst adolescents is the faster development of the right cortex over the left.

Answer: FALSE

Explanation: The limbic system involves emotions and reward seeking/novelty/risk-taking/sensation-seeking behaviours. It develops earlier than the prefrontal lobe that is involved with judgment and decision making.

Page Ref: 30

- 55) A young child's brain can only manage to learn one language a time.

Answer: FALSE

Explanation: Children can and do learn more than one language simultaneously.

Page Ref: 32

- 56) Active learning environments and flexible instruction support cognitive development as a result of the relative plasticity of the brain.

Answer: TRUE

Explanation: Flexible instructional strategies and active learning environments are likely to support cognitive development in young children and learning in adults. This is a result of the relative plasticity of the brain.

Page Ref: 36

- 57) Assimilation takes place when a person uses existing schemes to make sense of events in their world.

Answer: TRUE

Explanation: Assimilation involves fitting new information into existing schemes.

Page Ref: 38

- 58) Understanding of object permanence occurs during the sensorimotor stage.

Answer: TRUE

Explanation: Object permanence is developed by infants during the sensorimotor stage.

Page Ref: 39

- 59) The development of language is associated with the concrete operational stage.

Answer: FALSE

Explanation: The rapid development of language is associated with the preoperational stage.

Page Ref: 40

- 60) Seriation refers to the ability to work with symbols.

Answer: FALSE

Explanation: Seriation refers to the arrangement of objects in sequential order according to one aspect (e.g., size, weight, or volume).

Page Ref: 43

- 61) The cognitive stage associated with ability to understand hypothetical situations is formal operations.

Answer: TRUE

Explanation: The concrete-operational child is not yet able to reason about hypothetical, abstract problems. In the formal operations stage, one can consider a hypothetical situation and reason deductively. The hallmark of formal operations is hypothetico-deductive reasoning.

Page Ref: 43

- 62) Hypothetico-deductive reasoning is characteristic of adolescent egocentrism.

Answer: FALSE

Explanation: Hypothetico-deductive reasoning and adolescent egocentrism are both characteristics of the formal operations stage.

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- 63) According to Piaget, most adults may be able to use formal operational thought in only a few areas in which they have the greatest interest or experience.

Answer: TRUE

Explanation: Piaget suggested that most adults are able to use formal operational thought in areas that they have the greatest interest and experience.

Page Ref: 45

- 64) Neo-Piagetian theorists are concerned with how attention, memory, and strategy use relate to Piaget's theory of cognitive development.

Answer: TRUE

Explanation: Non-Piagetian theorists retain Piaget's insights about children's construction of knowledge but add findings from information processing about the role of attention, memory, and strategies.

Page Ref: 46

- 65) Vygotsky viewed children's private speech to be a form of egocentric speech that indicates a child is unable to see the world through the eyes of others.

Answer: FALSE

Explanation: Vygotsky believed that language in the form of private speech (talking to yourself) guides cognitive development. Piaget's viewed children's self-directed talk as egocentric speech.

Page Ref: 53

66) When children are in a zone of proximal development, use of scaffolding is appropriate.

Answer: TRUE

Explanation: The zone of proximal development is the area between the child's current development level and the level of development that the child could achieve with guidance and support such as verbal prompts and structuring. The supports that are offered by adults have been called scaffolding.

Page Ref: 54

67) One of the major limitations of Vygotsky's theory is that it consists mostly of general ideas.

Answer: TRUE

Explanation: Vygotsky died before he could elaborate on his ideas. As a result, his theory consists mostly of general ideas.

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### Completion Questions

68) Changes in the way an individual relates to others is known as \_\_\_\_\_ development.

Answer: social

Page Ref: 23

69) Developmental changes that are genetically programmed are a function of \_\_\_\_\_.

Answer: maturation

Page Ref: 24

70) The specialization of the two hemispheres of the brain is called \_\_\_\_\_.

Answer: lateralization

Page Ref: 29

71) The brain's tendency to remain adaptable and flexible is known as \_\_\_\_\_.

Answer: plasticity

Page Ref: 29

72) According to Piaget, \_\_\_\_\_ occurs when new information alters existing schemes or creates new ones.

Answer: accommodation

Page Ref: 38

73) When a scheme produces an unsatisfactory result, a student experiences \_\_\_\_\_.

Answer: disequilibrium

Page Ref: 38

74) "Out of sight, out of mind" describes the behaviour of children who have not acquired \_\_\_\_\_.

Answer: object permanence

Page Ref: 39

75) The principle that some characteristics of an object remain unchanged in spite of changes in appearance is called \_\_\_\_\_.

Answer: conservation

Page Ref: 40

76) Having the ability to focus on more than one aspect of a situation at a time is called \_\_\_\_\_.

Answer: decentring

Page Ref: 40

77) The process of making an orderly arrangement of objects from large to small or vice versa is called \_\_\_\_\_.

Answer: seriation

Page Ref: 43

78) The ability to reason abstractly and deductively occurs during the Piagetian stage of \_\_\_\_\_.

Answer: formal operations

Page Ref: 43-44

79) Hypothetico-deductive reasoning is the hallmark of Piaget's stage of \_\_\_\_\_ operations

Answer: formal

Page Ref: 43

- 80) Kathleen Berger refers to the space between what the learner already knows and what he or she is not yet ready to learn as the \_\_\_\_\_.

Answer: Magic middle

Explanation: Berger refers to the magic middle as the space between what the learner already knows and what the learner is not yet ready to learn as the *magic middle*, which is similar to Vygotsky's notion of the Zone of Proximal Development (ZPD).

Page Ref: 54

- 81) \_\_\_\_\_ learning involves discovering what students need, providing information, prompts, and encouragement at the right time, and finally increasing student independence by gradually eliminating these supports.

Answer: Assisted

Page Ref: 58

### Short Answer Questions

- 82) Define development and identify specific types of forms it can take. Then explain how maturation relates to development.

Answer: Development refers to orderly and relatively long-term changes that take place over one's life span. *Physical development* involves bodily changes, *personal development* changes in personality, *social development* changes in the way one relates to others, and *cognitive development* changes in one's thinking. Maturation is the part of development that involves genetically-based changes that are not influenced by environmental factors.

Page Ref: 23-24

- 83) Riley is typically a rule follower who doesn't cause trouble. He's on the football team, has a good reputation, and likes school. In his tenth-grade year, he has started going out with the guys after football games on Friday nights. Now he's breaking rules, taking risks, and doing things that his younger self labeled as stupid and reckless. Based on what we know about brain development, what explains Riley's behaviour?

Answer: Based on what we know about brain development, the limbic system develops faster than the prefrontal cortex. The limbic system is the part of the brain involved with emotions and reward-seeking, sensation-seeking behaviour and impulsivity. The prefrontal lobe is involved with judgment and decision making. At Riley's age, he is dealing with a maturing limbic system that is more responsive to emotional stimulation. At the same time, his judgments are less mature and less controlling of the impulsive desires and reckless influences.

Page Ref: 30

- 84) Describe Piaget's theoretical views on cognitive development using and defining the

following terms in your answer: organization, adaptation, assimilation, accommodation, equilibration.

Answer: According to Piaget, humans inherit two basic instincts. The first is organization which is the ongoing process of arranging information into a coherent system. The second is adaptation which is the instinct to adjust to the environment. A central characteristic of organization for Piaget is the innate tendency to organize knowledge into psychological structures (schemes). Two basic processes are involved in adaptation as these schemes are exposed to new information. When existing schemes are used to interpret new information, assimilation takes place. Accommodation involves the alteration of existing schemes or the creation of new ones in response to new information. According to Piaget, organization and adaptation are a balancing act and theorizes that equilibration is a process in which changes in thinking take place. Disequilibrium occurs when a scheme does not produce a satisfying result and results in discomfort and impels us to search for a solution through assimilation and accommodation.

Page Ref: 37-38

- 85) Name and define the basic aspects of reasoning that must be mastered before a child is able to solve problems of conservation.

Answer: According to Piaget, mastery of conservation problems requires an understanding of three basic aspects of reasoning: identity, compensation, and reversibility. Mastery of identity involves understanding that material stays the same if nothing is added or taken away. Compensation involves an awareness that an apparent change in one aspect can be compensated by a change in another direction. Reversibility, in Piaget's theory is the ability to think through the steps of an operation and then undoing them (this is also known as reversible thinking).

Page Ref: 41-42

- 86) Describe strategies that you would use to teach a class of students who are all most likely in Piaget's concrete-operational stage of development.

Answer: Concrete-operational children are usually in upper elementary and middle school, though some older students remain in this stage of development. The following strategies should be effective:

- Use concrete objects in teaching when possible. For example, use models in science lessons, and diagrams that illustrate government branches in social studies classes.
- Give students an opportunity to manipulate and test objects. For example, set up simple science experiments, or have students create objects by hand to illustrate history lessons.
- Ensure that presentations and readings are brief and well-organized.
- Use familiar examples to explain more complex ideas. An example of this might be comparing students' lives with the characters in a story.
- Give opportunities to classify and group objects and ideas on increasingly complex levels. This might include activities like comparing the systems of the human body to other kinds of systems (i.e. comparing the brain to a computer).
- Present problems that require logical, analytical thinking.

Page Ref: 44

87) Discuss the general critiques of Piaget's theory of cognitive development.

Answer: The main critiques of Piaget's theory of cognitive development concern the idea of separate stages, his apparent underestimation of children's abilities, and the role of culture on cognitive development. Some psychologists have questioned the existence of four separate stages as children are not entirely consistent. Moreover, the processes described by the stages may be more continuous than they seem. The criticism for his underestimation of children's abilities stem from the critique that the problems he gave young children may have been too difficult and it is possible that they understood more than they could show in the problems. Piaget also argued that cognitive operations could not be accelerated but research has demonstrated that children can learn to perform cognitive operations with effective instruction. Finally, Piaget's theory overlooks cultural and social influences on development.

Page Ref: 47-49

88) Define Vygotsky's zone of proximal development.

Answer: The zone of proximal development is the point when a child can master a task if given appropriate help and support. It suggests that students should have to reach a bit to understand, with the necessary support of parents, teachers, and peers. Such support is called scaffolding. Vygotsky's ideas suggest that students should be guided by explanations, demonstrations, and cooperative learning within their zone of proximal development.

Page Ref: 54-55

### Case Studies

89) Trip, a seventh-grader, is having difficulty learning principles of fractions, such as two out of five is  $\frac{2}{5}$ ,  $\frac{3}{5}$  is less than  $\frac{2}{3}$ , and so on. While his classmates seem to follow most of the examples given in class and in the textbook, Trip feels overwhelmed and confused by them. He is good at other subjects (such as reading and social studies) but is falling behind rapidly in mathematics. Being familiar with Piaget's stages of development, you suspect that Trip is very concrete in his thinking about mathematical principles compared to many of his classmates.

A) Based on the above assessment of Trip's situation, what teaching approaches would Piaget's ideas suggest for making the principles of fractions more understandable to Trip?

Answer: The teacher will want to provide Trip with hands-on learning experiences and use concrete props. For example, the teacher could give Trip two apples to cut into pieces. Trip could cut one apple into five pieces and the other apple into three pieces. He could then compare the combined physical amount of two of the pieces from the five-piece cut apple to two of the pieces from the three-piece cut apple.

Page Ref: 44

B) If Trip is a concrete thinker in mathematics, is he likely to think in similar ways in

other subjects? Explain using appropriate ideas from Piaget and Vygotsky.

Answer: According to Piagetian theory, Trip is also likely to think in concrete ways in other subject areas. For example, he may struggle with comparing the human brain to a computer. Neo-Piagetians, however, believe Trip may show general patterns of concrete thinking and yet be able to use some more advanced schemes within a particular domain. Trip may reason differently about social situations and numerical concepts. From Vygotsky's perspective, the teacher would want to consider Trip's sociocultural factors, such as how language is used, rather than focusing on whether or not Trip had surpassed a specific stage.

Page Ref: 46-48, 50-51

90) Mason is another seventh grader who is having difficulty in math class. He stares blankly at the test paper asking him to compute fractions such as  $\frac{5}{7}$  and  $\frac{9}{12}$  as percentages. He can't remember at all how to determine whether  $\frac{4}{5}$  is larger or smaller than  $\frac{5}{8}$ , so he makes a guess. He hopes that, with some luck, he might manage in the class. On the weekend, Mason is watching his favourite sport, basketball. He remarks to his sister, "Oh, this guy made eight out of 11 shots last week; he's close to an 80 percent shooter so he should be for these free throws." After the player makes both shots, Mason looks down at the statistics sheet he's been keeping on the local teams' shooting percentages and updates the statistics.

A) Is the inconsistency between Mason's performances on school test problems and in working with basketball statistics a problem for Piaget's stage theory? That is, if Mason is at a particular stage of reasoning, shouldn't he be able to deal with the school problems as successfully as the basketball ones? Explain.

Answer: The inconsistency noted in this case study is a critique of Piaget's theory although Piaget put less emphasis on the stages of cognitive development in his later work. Mason should be able to solve the school-based math problems equally as well as the basketball ones. The teacher may need to help Mason see the connection between the two situations. Also, Mason's interest is likely to be influenced by the extent to which the student can move beyond rote memorization of mathematical principles. The teacher may want to introduce a math game to facilitate interest. Also, it is important for the teacher to explain why it is important for students to have an understanding of fractions and percentages in our society.

Page Ref: 45-46

B) How might Vygotsky explain the role of other people in shaping Mason's math skills in the two contexts? Explain.

Answer: First, the teacher may want to look at the statistics sheet Mason created. This sheet is viewed as a cultural tool and it would be important to find out if Mason shares the sheet with any other persons. For instance, what do the headings on the columns for the data communicate to others? In addition, from Vygotsky's perspective it would be important to know if Mason typically watches basketball alone or with his brother who is four years older. It may be that his brother is providing scaffolding (cues, encouragement) to Mason as they watch the game together.

Page Ref: 50-52, 58

C) Knowing Mason's behaviours, how might a teacher work with him to improve his performances on the fractions and percentages unit?

Answer: The teacher may want to integrate a physical education unit on basketball with a mathematics lesson. Mason would get the concrete experience recommended by Piaget. He would also be involved in a highly social activity, which would be supported by both Piaget and Vygotsky's theories. The basketball team could be instructed to plan and monitor their basketball activities in order to solve the math problem.

Page Ref: 44, 50