Study Questions for Chapter 7: Cognition


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This module contains 213 questions. (Gasp!) Be sure you have printed the entire module.

**Learning Objectives**

- Be able to identify the stages of Piaget's theory and the ages and characteristics associated with each stage.
- Be able to define and recognize examples of these terms:
  - schemes, assimilation, accommodation
  - operations
  - primary and secondary circular reactions, object permanence, A-not-B error; symbolic capacity
  - conservation (be able to recognize the different conservation problems and the order in which they develop)
  - centration / decentration, irreversibility / reversibility, static thought / transformational thought
  - egocentrism, class inclusion, seriation, transitivity
  - hypothetical-deductive reasoning.
- Understand the role that cognitive conflict plays in cognitive development.
- Know the three major limitations of preoperational children's thought.
- Be able to discuss the implications of formal operational thinking for adolescent development.
- Be able to recognize examples of adolescent egocentrism.
- Be able to discuss skills that may develop after formal operations.
- Be able to describe how elderly people do on Piagetian tasks and list three reasons why they perform the way they do.
- Be able to list the criticisms of Piaget's theory and discuss what the research says about the validity of each criticism.
- Be able to summarize Vygotsky's theory and compare and contrast it to Piaget's theory of cognitive development.
- Be able to define and cite examples of:
  - zone of proximal development,
Piaget's Constructivist Approach

2. Piaget was interested in children’s mistakes because he noticed that children of the same age often made similar kinds of mental errors, and those errors were different from the ones made by children in other age groups. Why did Piaget think that these age-related patterns of errors were important?

3. Piaget referred to the study of how we develop a knowledge of reality and the basic dimensions of space, time and causality as _______________.

4. The branch of philosophy that studies knowledge of reality is called _______________.

5. Piaget used the term "genetic" to mean _______________.

6. Piaget's methods included ________________________ of his own three children and flexible (non-standardized) question and answer interviews with children using what he called the ________________________.

What is intelligence?

7. What is Piaget's definition of intelligence?

8. A scheme is:

9. An infant sees a bottle and grasps it with both hands. The grasping would be considered a _______________.

10. A preschool child sees the bottle and picks up her doll and pretends she's Mama feeding the baby. This would also be an example of a _______________.

11. A teenage babysitter sees the bottle and mentally calculates how long it’s been since the baby she's taking care of was fed. This action would be an example of a _______________.

How does intelligence develop?
12. Piaget believes that children actively create knowledge of the world from their experiences, a position called _______________.

13. Knowledge of the world is in the form of cognitive structures, called _______________, which change as children organize and reorganize their existing knowledge and adapt to new experiences.

14. Piaget believes that all forms of understanding (intelligence) is created by the processes of _______________ and _______________.

15. Combining existing schemes into new and more complex ones is called _______________.

16. When an elementary school age child combines knowledge of addition, subtraction and multiplication to master long division, she is exhibiting _______________.

17. The process of adjusting to the demands of the environment is _______________.

18. When an infant senses that she/he must reach farther in order to grasp a toy, she/he is exhibiting _______________.

19. Adaptation involves two processes: _______________ and _______________.

20. Assimilation means:

21. Bryce has a terrier that he refers to as "doggie." He also refers to the neighbor's dachshund as "doggie." When Bryce sees a horse for the first time, he calls it "doggie." Bryce is using _______________.

22. Baby Janet goes to Cubbies' restaurant with her family and sees a squeeze bottle of ketchup. She grasps the bottle with both hands and tries to drink from it. This would be an example of _______________.

23. Throughout the lifespan, we use our existing cognitive structures to understand new events. In these situations we are using _______________.

24. Accommodation occurs when:

25. When Bryce notices that horses have different characteristics than dogs (they're bigger, they don't bark), he begins to call dogs, "doggie" and horses, "horsie". Now Bryce is using _______________.

26. If Baby Janet finds that she doesn't like the taste of the ketchup but likes to squeeze it out on the plate and make a design, then Janet is using _______________.
27. Seven-month-old Hank is crawling around the house. He encounters small objects such as Duplo blocks, Fischer Price people and balls. What will he do with those objects?

28. Putting small objects in his mouth would be Hank's __________ for small objects. In other words, his "concept" of a small object is that it is something to put in his mouth.
   Hank's scheme is: small object = put in mouth

29. One day, Hank's parents buy some magnetic letters to stick on the refrigerator. One falls off and Hank sees it. What is he going to do with that letter?

30. If Hank puts the magnetic letter in his mouth, Piaget would say that Hank is __________ the magnet into his existing scheme.

31. One day Hank notices, by chance, that the magnet (even covered with drool) will stick to the refrigerator door. He pulls it off and puts it back on and pulls it off and puts it back on. He tries to stick the magnet to the wall and the stove and the coffee table. He tries to stick his Duplo blocks onto the refrigerator. Now Hank is exhibiting __________.

32. Hank's scheme for small objects is now more elaborate than before. Now, he can either put them in his mouth or stick them on the fridge. Piaget would say that Hank has __________ or modified his scheme to fit the unique properties of the magnet.

33. Once we have schemes, we apply them to make sense of the world. This process is called __________. However, when we encounter new problems that force us to change our typical ways of thinking, then we use the process of __________.

**NOTE:** When the child's cognitive schemes are consistent with the information that she gets from her eyes, ears, etc. then the child is in a state of balance or equilibrium. In a state of equilibrium, the individual can predict and understand what she sees happening in the environment. For example, if you pick up your keys and accidentally drop them, you can predict that they will fall to the ground. You know why they fall to the ground (gravity) and so you are in a state of equilibrium. You can predict and explain to yourself how the keys will behave. If one day you picked up your keys and they didn't fall down but hung in midair, you would be out-of-balance or your equilibrium would be upset. This is called disequilibrium. Disequilibrium creates cognitive conflict, which stimulates cognitive growth. When new events challenge our old schemes or prove our understanding to be inadequate we experience __________ and __________.

34. While the keys example is implausible, children's schemes are changing rapidly as their perceptual and memory abilities improve. As they perceive and remember more and more information from their environment, they are likely to encounter events that are incompatible with their existing schemes. When this happens, they experience
The desire to move away from disequilibrium and move toward a balance or equilibrium is what motivates children to construct new knowledge.

35. Cognitive conflict and disequilibrium stimulate ______________. What is equilibration?

36. **Critical thinking question**: Contrast Piaget's view of motivation and learning with that of the learning theorists, such as B.F. Skinner. What do behaviorists view as the motivation for learning and development?

37. According to Piaget, intelligence develops through:

38. On the nature/nurture debate Piaget's position would be:

39. Piaget proposed that there are four ______________ of cognitive development.

40. List four the stages of Piaget’s theory of cognitive development and the approximate ages for each stage.

41. Children all progress through stages of cognitive development in the same order, i.e., in an ______________.

42. The age ranges for Piaget’s stages are only averages, and some children may reach these stages earlier or later than others. A child’s stage of cognitive development is determined by ______________ rather than physical age.

**NOTE**: Look back at the list of Piaget’s stages. Notice that the term *operation* comes up over and over in Piaget's theory. An operation is a reversible manipulation of the environment. For example, if you open a window, you have manipulated the environment. If you close that window again, you have restored the environment to its original state.

43. Opening and closing a window would be an ______________.

44. Most of the operations Piaget describes are mental rather than physical actions and are performed on symbols rather than objects. Take the number 8 and square it. \(8^2 = 64\). Take the square root of 64 and the answer is 8. This is an example of a symbolic ______________.

45. Adding and subtracting; multiplication and division would be examples of ______________. Piaget defines an operation as:
NOTE: According to Piaget, the ability to perceive the reversibility of operations like addition and subtraction reflects the beginning of operational thought. This ability is the cornerstone of logical thinking according to Piaget. Children who are preoperational think in qualitatively different ways from adults. This means that they don't just know less than older children or adults. They don't just process information more slowly or less efficiently. Preoperational children have different mental structures and they perceive the world in a different way than older children. Since they are preoperational (think about what the prefix PRE means), they cannot yet engage in operational thought. The thinking of children who have reached concrete operations resembles adults' thinking much more than that of younger children.

The Infant

46. The sensorimotor stage lasts approximately from _______ to _______.
47. During the sensorimotor stages, infants come to know the world through their ___________ and ___________.

48. When infants begin to coordinate what they see, hear, and taste with their motor actions, they are forming _________________ _________________.

49. Infants’ thinking is qualitatively different that that of older children because they:

Substages of the Sensorimotor Stage

50. The sensorimotor stage is broken down into _______ substages.

NOTE: You don't need to memorize all these substages, just the ones mentioned below.

51. When 1- to 4-month-olds repeatedly kicks their legs, suck their thumbs, blow bubbles, or vocalize sounds, they are in the ___________ ___________ ___________ substage of the sensorimotor period.

52. Three month old Mary makes a sound, "aahh". She hears the sound she made, but at first doesn't connect it with her action. She repeats the action by chance and hears the sound again. She does this over and over and over. This is an example of a _____________________.

53. Eventually Mary realizes that the action of vibrating her vocal cords is causing the sound she hears. Mary has learned something about cause and effect relationships. The purpose of ________________ is to learn about cause and effect.

54. By engaging in primary circular reactions, infants are learning about the connection between their motor actions (vibrating their vocal cords) and the sensory effects (sounds) they produce. In other words, they are learning about __________ and __________. Primary circular reactions are called primary because they involve:
55. When 4- to 8-month-olds repeat interesting actions on objects, such as shaking a rattle to produce a sound or hitting a mobile to make it wiggle, then are in the __________ __________ __________ substage of the sensorimotor period.

56. Six-month-old Maggie wakes up from her nap and while waiting for her parents to come, she entertains herself by batting her mobile with her hand. The mobile spins around and the bells ring. Mary is in the substage of the sensorimotor period known as ____________________________.

57. Maggie doesn't realize that the spinning colors and ringing bells result from her action, batting the mobile. She repeats this action by chance and gets the same sensory information from her eyes and ears. She repeats the action over and over. This is an example of a ________________, and Maggie has learned something about ______________ relationships.

58. In performing secondary circular reactions, Maggie is learning about the connection between her action (batting the mobile) and the sensory effects it produces (movement and sound). Maggie is learning about __________ and __________. Secondary circular reactions are called secondary because they involve:

**NOTE:** Primary circular reactions and secondary circular reactions both involve repeated actions. Both primary and secondary circular reactions are the sensorimotor infant's means of learning about cause and effect relationships. Primary circular reactions are actions that involve the infant's own body—kicking feet, vocalizing, etc. Secondary circular reactions are performed on external objects, such as toys.

59. Look at the examples below and identify them as primary or secondary circular reactions:

a. ____________ An infant drops a spoon on the floor. The parent picks it up, wipes it off and returns it to the child. The child drops the spoon again. This is repeated over and over.

b. ____________ A baby who is crying, puts his fist in his mouth and sucks on it. He calms down. He repeats this action over and over.

c. ____________ A baby who is bored grabs her toes. She plays with them and tries to bring them to her mouth. She drops the toes. Then she grabs them again and again tries to bring them to her mouth.

d. ____________ Baby Tim hands his mother a toy duck. She hands it back to him. He hands it back to her, etc. etc. etc.

60. Through primary and secondary circular reactions, a baby is learning about the connection between what she sees, hears, feels and tastes and her own ______________.
61. When infants use one object to represent another and engage in pretend play, they are able to do this because of the new capacity for ____________ ____________.

62. When infants have achieved symbolic thought, they can also imitate models no longer present because they can create and later recall a ____________ ____________ of what they have seen.

**The Development of Object Permanence**

63. Object permanence refers to:

64. When does the concept of object permanence develop?

65. The understanding that a toy continues to exist even though it has fallen off the table and rolled under the couch is called ________________.

66. You show a toy to a six-month-old infant and she is reaching for it. Then you hide the toy behind a pillow. What will the infant do?

67. What would a 10-month-old infant do?

68. Piaget repeatedly hid a toy in the same location, and his daughter Jacqueline at age 10 months retrieved the toy every time. However when he hid the toy in a new location (while his infant daughter watched), Jacqueline searched in the original hiding place. This tendency to search for an object where they last found it (A) rather than in its new hiding place (B) is referred to as the ____________.

69. A toddler may see his mother disappear into the kitchen. She then moves into the dining room. He goes into the kitchen to find her. Not seeing her in the kitchen, he cries but looks no further. This is an example of the ________________.

70. Piaget believed that the concept of object permanence was not fully mastered until about the age of ________________, when:

71. What would a child have to do to convince Piaget that she has fully mastered object permanence?
72. Research by Baillargeon suggests that Piaget _________ (overestimated OR underestimated) infant's understanding of object permanence.

73. Briefly explain the difference between the way Baillargeon measured object permanence and how Piaget measured it.

74. Explain how Baillargeon's findings differ from those of Piaget.

75. Are Baillargeon's findings inconsistent with Piaget's?

NOTE: Look on Blackboard for a link to a video demonstrating the A-not-B error. Piaget's theory is much more compelling when you see a child actually doing the things he described.

**The Emergence of Symbols.**

76. The crowning achievement of the sensorimotor stage is internalizing behavior schemes to construct ___________ ___________ that can guide future behavior.

77. This new ability to use images, words, or gestures to represent objects and experiences is called ___________ ___________.

78. The ability to pretend that one thing stands for another, e.g., a word represents an object, develops during the beginning of thought substage of the sensorimotor period.

79. When a child uses a cooking pot as a hat, he is using a ____________.

80. When the child uses the word "Mama" to represent a person, she is using a ____________.

81. Describe an example of how Piaget's daughter Lucienne used symbolic thought.

**The Child**

**The Preoperational Stage**
82. The preoperational stage lasts from approximately age _________ to _________.

83. What is the major difference between sensorimotor infants and preoperational children?

84. Give several examples of preschool children's use of symbolic thought.

85. Although children have made tremendous advances when they enter the preoperational stage of cognitive development, their thought processes are still limited. Preoperational children are highly influenced by their immediate perceptions. Briefly describe this limitation.

86. _______________ _______________ is when children focus on the most obvious features of an object or situation.

Lack of Conservation

87. Define conservation.

88. Describe two examples of conservation problems (see page 196).

NOTE: There are three major reasons why preoperational children have difficulty with conservation. These include: (1) centration (lack decentration); (2) irreversibility (lack reversibility), and (3) static thought or the inability to perceive transformations (lack transformational thought). Be sure you can explain these three major limitations of preoperational thought by the time you get to question #100.

89. Decentration is defined as:

90. In order to correctly judge that a tall thin glass can hold the same amount of liquid as a short fat glass, the child has to pay attention to _________ and _________.

91. Preoperational children tend to focus on only one dimension of a problem at a time. Piaget refers to this tendency as __________________.
92. A preoperational child says that the tall thin glass has more water in it than the short fat glass justifying her answer by saying, "This one is way up to here and this one is only up to here." The child is exhibiting ________________.

93. Reversibility is:

94. Hannah, an eight year old, agrees that two short fat glasses have equal amounts of water. When an adult pours one of the glasses into a tall thin glass, she still insists that the two glasses have equal amounts of water. The adult asks, "Why do you think so?" What answer might Hannah give to suggest that she was using reversibility to prove that the two glasses have the same amount?

95. A preoperational child might think that if you poured the water from the tall thin glass back into the short fat glass that the water would overflow. This child lacks the concept of ________________.

96. Transformational thought is defined as:

Static thought is defined as:

97. Give an example of transformational thought

98. A four-year-old agrees that two balls of clay have equal amounts of clay. You then roll one ball into a sausage shape. The child claims that the sausage has more clay than the ball. He cannot see that the clay that made up the original ball was changed into the shape of a sausage. This child lacks ________________ ________________.

99. Centration, irreversible thinking, and static thinking are characteristic of children in which Piagetian stage?

100. Decentration, reversibility, and transformational thought are characteristic of children in which Piagetian stage?

101. One more time… List and describe the three major limitations of preoperational children's thinking that contribute to their difficulties in solving conservation problems.
Egocentrism

102. A tendency to view the world only from your own perspective and not take into account other people's point of view is called ____________________.

103. Describe the three mountains task used by Piaget to demonstrate egocentrism.

104. A child participating in a research study is given the communication task to describe a game to a blindfolded listener. The child repeatedly says things like, "See this? It does like that." and "Look at this thing." This child is exhibiting ____________________.

105. A friend of mine had a four-year-old daughter, Bridget. One day when visiting, I noticed Bridget swipe a bowl of candy and run into the den. When I followed her in there, she was hiding behind the couch with her hands over her eyes. I asked her what she was doing and Bridget replied, "You can't see me. My eyes are closed." Piaget would describe this behavior as an example of ____________________.

Difficulty with Classification

106. The logical understanding that the parts are included within the whole is called _________ ________.

107. You show a child a toy farm with 3 cows and 6 horses. You ask the child, "Does Farmer Brown have more horses or more animals?" The child replies, "More horses." This child lacks the concept of ____________________. This child is probably younger than age _____ years.

108. In the card game Gin Rummy, you have to organize your cards into 2, 3 or 4 of a kind or in a straight (i.e., Jack, Queen, King, etc.) This means that the same card could belong to one set (i.e., a pair of Jacks) or to another set (9, 10, Jack, Queen) depending on what other cards you drew. Would you want to play this game with a 4-year-old? Why or why not?

Did Piaget Underestimate the Preschool Child?
109. Rochel Gelman found that children as young as 3 have some grasp of conservation of number under what circumstances?

110. Flavell’s study involved showing 3-year-olds a card with a cat on one side and a dog on the other side. The card was held up between the experimenter and the child so that each could see only one side of the card. When children were asked what the experimenter could see, they answered correctly rather than giving only their own perspective. This shows that children are less ____________________ than Piaget suggested.

111. If 4-year-olds modify their speech to 2-year-old siblings to take into account their younger brother's and sister's language abilities, this would suggest that preoperational children are not as ____________________ as Piaget suggested.

112. Although preoperational children fail to respond correctly to Piaget's class inclusion task, they do know that a rose is a flower and that flowers are plants not animals. What does this suggest about Piaget's assessment of young children's cognitive abilities?

The Concrete Operations Stage

113. Piaget's Concrete Operational Stage lasts approximately from age _____ to _____ years.

Conservation

114. In a conservation of liquid task, an 8-year-old may argue that because "... the tall glass is really thin and the short glass is much fatter, so they really have the same amount of water." This child is using ____________________ to correctly solve the conservation problem.

Test Taking Tip: Always re-read fill-in-the-blank questions to make sure the answer makes sense. It doesn't make sense to say: The child is using conservation to solve a conservation problem.

115. Another 8-year-old may argue that the tall thin glass and the short fat glass have the same amount of liquid because, "... if you pour that water back into the short glass, they'll be the same." This child is using the logical ability of ____________________ to solve the conservation problem.

116. A third child may say, "It's the same water. You didn't change how much there was. You just made it look different by pouring it in a different glass." This child is using ____________________ to reason about liquid conservation.
117. Children who can use these logical skills to solve conservation problems are probably in Piaget's ________________ stage.

118. While the preoperational child's thinking is characterized by centration, irreversibility and lack of transformational thought, the concrete operational child's thinking is characterized by ________________, ________________ and ________________.

119. In Figure 7.4, you see the different conservation tasks—liquid, mass, number, etc. Notice that children master these different forms of conservation at different ages. Children generally master conservation of liquid at age __________, conservation of mass at age __________, conservation of number at age __________, conservation of area at age __________, and conservation of volume at age __________. Piaget refers to this uneven pattern of development as ________________ ________________.

120. You have a bag of cookies to share with Mary. There are 7 cookies left in the bag. You arrange two rows of cookies so that the top row has four cookies scrunched together and the second row has three cookies spread way out. When asked which row she would choose, Mary indicates that she would prefer to have row 2 with the cookies spread out. This task would be an example of conservation of ________________.

121. Mary is probably in which of Piaget's stages?

122. Ten-year-old John and his parents order a pizza, half sausage and half pepperoni. John and his mother only want pepperoni. John's father only wants sausage. John asks the waiter not to cut the pizza but to bring a knife. He insists that you can cut the pizza in such a way that each person can have one-third of the pizza and not have to eat anything but the kind of pizza they want. This child lacks conservation of ________________. (Hint: The answer is not conservation of pizza.)

123. Horizontal decalage refers to the fact that:

124. Conservation of liquid, mass and number develop near the beginning of the ________________ stage.

125. Although your book suggests that mass, liquid and number develop at about the same age, there is some evidence that number may be an easier task and may develop closer to age 5 or 6, or during the transition toward concrete operational thought. What about this task would seem to make it easier than mass or liquid—why might a child understand it earlier?

**Note:** Look on Blackboard for a video of a child trying to solve the conservation of number problem. It will amaze and convince you!
126. How would you test a child for conservation of mass?

127. Even though a 7- or 8-year-old might understand conservation of mass, if you ask them whether the ball of Playdough weighs as much as the sausage shaped piece of Playdough, they may tell you than one weighs more. This suggests that conservation of mass is ______________ than conservation of weight. Conservation of weight usually develops around age 8 or 9.

**NOTE:** Horizontal decalage illustrates the concrete characteristic of elementary school aged children's thought. They see the various conservations problems as separate individual problems to be solved one at a time. Understanding conservation of mass doesn't help you understand conservation of weight. Although the two tasks may seem similar to you, the concrete operational child doesn't see the (abstract) relationship between the various conservation tasks.

128. Conservation of area and volume do not develop until the age of __________, near the end of the ___________________ stage or even the beginning of the _________________ stage.

129. To sum up, list the ages and order in which these different conservation tasks develop:

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**Seriation and Transitivity**

130. An elementary school aged child lines up his classmates according to height from shortest to tallest. This would be an example of ________________.

131. Seriation develops during the ________________ stage.

132. If asked to organize a set of sticks from shortest to tallest, how would the preoperational child approach this task?

133. Sarah, a friend from church, is taller than Jane. Jane has another friend from school, Beth, who is shorter than Jane. Jane knows that Sarah is taller than Beth even though the two girls have never met. Jane is exhibiting ________________.
134. Jane is probably in Piaget's ____________________ stage.

135. If Jane was unsure whether Sarah or Beth were taller and wanted to invite them both over to her house so that she could compare them, then you might suspect Jane was in Piaget's ____________________ stage.

Other Advances

136. Children in Piaget’s ____________________ stage are egocentric, in contrast to children in Piaget’s ____________________ stage who are able to recognize other people’s perspectives.

137. Children in the ____________________ stage have mastered class inclusion, whereas children in the ____________________ stage have trouble with classification.

138. Decentration, reversibility and transformational thought are characteristics of the ____________________ child. Centration, irreversibility, and static thought are characteristics of the ____________________ child.

139. The limitation of children's thinking in the concrete operational stage is:

140. What does it mean for children’s thinking to be concrete?

141. Concrete Operational children have difficulty thinking about ____________________ and ____________________.

The Adolescent

The Formal Operations Stage

142. Individuals who are able to think logically about ideas that are hypothetical or abstract and use systematic scientific problem solving skills are in Piaget's ____________________ stage.

143. If concrete operations are mental actions on objects (tangible things and events), then formal operations are mental actions on ____________________.

144. The stage of formal operations begins at approximately age ____________________.

Hypothetical and Abstract Thinking

145. When children are asked to draw a picture of where they would place a “third eye” if they could have one and place it anywhere on the body, how did the responses of concrete and formal operational children differ?
146. Concrete operational thought is limited to realities, whereas formal operational thought can deal with ________________, including those that contradict ________________.

147. If a child defined justice in terms of police and judges, that child is likely to be in the ________________ stage of cognitive development.

148. Give an example of an abstract concept and how it would be defined by someone in the stage of formal operations.

149. If you drink poison, you will die. Fred drank poison. Therefore: (Fred will die). This is an example of a logical syllogism that could be solved by a child in the ________________ stage.

150. If you drink milk, you will die (just assume). Jill drank milk. Therefore: (Jill will die). This is the type of logical reasoning that a child in the ________________ stage is capable of.

**NOTE**: Concrete Operational children can solve a logical syllogism if it is consistent with the real world. They have difficulty applying logical arguments to hypothetical situations or problems that are inconsistent with the real world.

151. All cats purr. I have a cat. Does she purr? Could a concrete operational child answer that correctly? Why or why not?

153. All cats are blue. I have a cat. Is she blue? Could a concrete operational child solve this problem correctly? Why or why not?

153. Could a 13-year-old solve the blue cat problem? Why or why not?

**Problem Solving**

**NOTE**: Piaget used many different tasks to assess formal operational thinking. One of them is the pendulum problem on page 201. The child was shown a pendulum and asked to determine what controls the rate of oscillation of the pendulum, (or, in other words, makes the pendulum move fast or slow). Four possible factors are introduced: the length of the string, the weight of the object, the height (or point) from which the pendulum is released and the force with which it
is released (impetus). By manipulating a pendulum, the child must figure out which factor or factors controls the rate of oscillation.

154. To solve this problem, concrete operational children tend to use a ________________ strategy.

155. What aspects of solving this problem do concrete operational children have difficulty with?

156. What aspects do they do well at?

157. Formal operational individuals are able to approach the problem systematically. To begin with, they do what?

158. **Critical thinking problem**: To generate all the possible hypotheses, adolescents use what Piaget called combinatorial logic. This means they generate all possible solutions to the problem in all the different combinations. Given the four factors that might play a role in the pendulum problem, length, weight, height and force, how many possible combinations are there?

159. Try to generate all these combinations. (If you need help see the hints below.)

**Hint 1**: There are 16 possible combinations.

**Hint 2**: The first four are the four factors by themselves. Maybe it's only length and nothing else or only weight and nothing else, etc.

**Hint 3**: Maybe it's a combination of two or more factors.

**Hint 4**: The 16th combination is a trick.

*Solution to this question is at the end of this module.*

160. Being able to generate all possible solutions to the pendulum problem is a characteristic of individuals in the ________________ stage.

161. Forming many hypotheses and systematically testing them through an experimental method is called ________________ reasoning.

162. If the adolescent reasons that the length of the string may control the rate of oscillation of the pendulum and she tests long and short strings with the same weight and the same height and the same force, then she is using ________________ reasoning.

163. A teenager thinks that maybe having the TV on is interfering with his studying. He tests this out by studying for his weekly quiz with the TV on one week. The next week, he studies the
same amount and in the same way but without the TV on. His grade improves on the second quiz. This boy is using the ________________ approach.

164. Being able to use the scientific method to test hypotheses, to think systematically about hypothetical ideas and abstract concepts, and to understand the symbolism of a book such as *Moby Dick* requires thinking at the __________________ stage of cognitive development.

Progress Toward Mastery

165. Learning algebra, scientific problem solving or logic would seem to be tasks that require ________________ reasoning.

166. (True or False) Some research suggests that high school students do not consistently show evidence of formal operational thought.

167. List two ways in which the thinking of late adolescents is different than that of early adolescents.

168. Flieller (1999) reports that a higher percent of adolescents engage in formal operational reasoning today than in 1967. This is an example of a ________________ effect. (Think back to Chapter 1). What might have caused this change?

Formal operational thought is highly influenced by:

*Implications of Formal Operational Thought*

169. Adolescents who are capable of thinking independently and imagining alternatives to the way things are now may have difficulty with their parents. Why?

170. David Elkind describes adolescents as having difficulty distinguishing their own thoughts and feeling from those of other people. He labels this ________________ ________________.

171. Two types of adolescent egocentrism include the ________________ and the ________________.

172. If a teenager goes to school with a facial blemish and thinks that everyone is noticing his face, this would illustrate Elkind's concept of the ________________.
173. When adolescents believe that their own experiences are unique and have never been experienced by anyone else before, this illustrates Elkind's idea of the ________________.

174. List two other examples of adolescent's personal fables.

175. High scores on adolescent egocentrism seems to be related to adolescents engaging in ________________ behaviors.

176. Adolescent egocentrism declines as teenagers get older, unless what is true?

177. Recent research has found that adolescent egocentrism is more strongly related to advances in __________ _________ _________ skills than to developing cognitive skills.

**The Adult**

*Limitations in Adult Cognitive Performance*

178. About ____% of college students show consistent use of formal operational reasoning.

179. What are some factors that may influence whether an individual uses formal operational thought?

180. Describe the study by DeLisi and Staudt. What do their results suggest about the development of formal operational thought?

181. DeLisi and Staudt's research suggests that what kind of college students would do well on Piaget's pendulum problem?

182. What kind of college students would do well writing an essay envisioning how the US would be different if every decision now made by Congress were made by each citizen voting at home electronically?

**Growth beyond Formal Operations**
183. It is possible that cognitive abilities continue to develop beyond formal operations. One idea that might characterize postformal thought is the idea that knowledge is ___________________ rather than absolute.

184. Relativistic thinking means that:

185. A(n) ___________________ thinker believes that truth lies in the nature of reality and that there is only one truth. A(n) ___________________ thinker believes that there are multiples ways to look at a problem, depending on your initial assumptions.

186. Labouvie-Vief asked people of various ages to reason about the problem of John's heavy drinking and Mary's response when he comes home drunk again. What did the preadolescents and adolescents believe that Mary would do?

187. What did the adults believe that the wife would do?

188. Realizing that the wife might or might not leave her husband would be an example of ___________________ thinking.

189. Perry studied developmental changes in college students’ postformal thinking and found that beginning college students took an extreme ___________________ view, but then became frustrated when they realized that all questions do not have a single, correct answer. Then they shifted to an extreme ___________________ view, where they thought that any opinion was as good as any other opinion and found it difficult to decide which one to believe. What is the third developmental phase in this sequence?

190. The concrete operations thinker performs mental actions on concrete objects and the formal operations thinker performs mental actions on ideas, but the postformal thinker is able to ___________________.

191. Relativistic thinking and other types of advanced thinking are more likely to be seen in adults who:

Aging and Cognitive Skills
192. Elderly people often perform worse than younger people on Piagetian tasks that require formal or even concrete operations. Discuss three reasons for this.

**Piaget in Perspective**

*Piaget's Contributions*

193. List three (specific) important contributions Piaget made to developmental psychology.

**Challenges to Piaget**

194. Sigelman discusses 5 criticisms of Piaget's theory. List and briefly explain each one and give an example of each from other parts of the chapter:

1. 

2. 

3. 

4. 

5. 

**Vygotsky's Sociocultural Perspective**
195. Vygotsky's theory of cognitive development tries to address the last challenge to Piaget's theory: the lack of attention to social influences. Vygotsky's main theme is:

**Culture and Thought**

196. Discuss how Vygotsky's theory would explain the fact that adolescents and adults do not all or always exhibit formal operational thought.

197. Vygotsky believed that children acquire their society's "mental tools" by:

**Social interaction and thought**

198. The zone of proximal development refers to:

199. Explain how the example of Annie and her father illustrates the concept of a zone of proximal development.

**NOTE:** Think of a zone as a space. In this case, the lower boundary of the zone is what the child can do without help and the upper boundary of the zone is what the child can do with help from a more skilled person.

200. Vygotsky believed that children learn through guided participation, which means:

201. Bruner suggested that parents provide scaffolding for their children which means:

202. In the example of Annie and her father working on the jigsaw puzzle, dad used ______________ to help Annie learn how to do the task herself.

**NOTE:** Scaffolding and guided participation are often confused. You might think of guided participation as the act of engaging in a skilled behavior alongside an expert adult, e.g., a Navajo
child working alongside an expert weaver. The child helps more and more as they become more skillful with practice. Scaffolding refers to the way the adult judges what the child is able to do at a certain point and how the adult adjusts the expectations of the child accordingly.

**The Tools of Thought**

203. According to Vygotsky, the most important tool for parents to pass thinking skills to their children is _________________. What are some other important tools that parents provide to children, at least in industrialized nations?

204. Piaget believed that cognitive development influences language. In contrast, Vygotsky argued that ________________ shapes thought in important ways. Vygotsky believed that thought changed fundamentally when the child:

205. Piaget and Vygotsky both noticed that preschool children often talk to themselves while going about their daily activities and they also have conversations in which two children seem to be paying little attention to what the other child says. Piaget labeled this _________________, and saw it as further evidence of ________________ that is characteristic of children in the ________________ stage of cognitive development. He _____ (did OR did not) believe that egocentric speech played an important role in development.

206. In contrast to Piaget’s view, Vygotsky called this kind of language _________________ and argued that its function is to:

207. Did Vygotsky think that private speech was a sign of children’s cognitive immaturity?

208. What essential role did Vygotsky think that private speech played in cognitive development?

209. What are the effects of age, intelligence, type of task, and difficulty of task on children's use of private speech?

210. What effect does private speech have on children's problem solving ability
211. Describe how the Annie example with the jigsaw puzzle illustrates the transition from social to private to inner speech.

*Applications: Improving Cognitive Functioning*

212. List two ways that we could apply Piaget's theory and two ways that we could apply Vygotsky's theory to education and learning.

Piaget:

Vygotsky:

*Evaluation of Vygotsky (also see “A comparison of Vygotsky and Piaget” in Table 7.3)*

213. Which theorist would agree with each of the following statements?

______________ Cognitive development results from interaction with skilled adults.

______________ Children construct their own knowledge.

______________ Cognitive development is universal.

______________ Development results from guided participation in the zone of proximal development.

______________ Cognitive development depends on social and historical context.

______________ Children and adults construct knowledge together.

______________ Egocentric or private speech is a sign of intellectual maturity in preschool children.

______________ Egocentric or private speech is a sign of immaturity in preschoolers.
Collaborative learning with advanced peers is a more effective way to learn than working independently.

Solution to question number 159: