Illusionforge — Activity Book

A Spark & Anvil activity book — puzzles, questions, and fun from Illusionforge.

Write in the book, circle your answers, and check the Answer Key at the back.

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1. Optics

Circle the correct answer

1. What is light?
(A) A type of matter that takes up space (B) A solid substance that bounces around (C) A form of energy that travels in waves (D) A liquid that flows from the sun

2. What happens to light when it hits a mirror?
(A) It changes color completely (B) It is absorbed and disappears (C) It reflects, bouncing off at an equal angle (D) It bends and passes through the mirror

3. What is refraction?
(A) The absorbing of light by a dark object (B) The bending of light when it passes from one material into another (C) The blocking of light by a wall (D) The bouncing of light off a surface

4. Why does a pencil in a glass of water look broken?
(A) Water turns the pencil invisible at the surface (B) The pencil is made of two pieces of wood (C) The water actually breaks the pencil (D) Light bends as it passes from water to air, making the pencil look shifted

5. What is a transparent material?
(A) A material that blocks all light (B) A material that absorbs light as heat (C) A material that lets most light pass through it (D) A material that only reflects light

6. What is the difference between transparent, translucent, and opaque?
(A) All three mean the same thing (B) Transparent lets light through clearly, translucent scatters light, opaque blocks all light (C) Opaque lets light through, transparent blocks it (D) Translucent is the same as transparent

Write the answer

7. What part of the eye is like a lens that focuses light?
Answer: _____

8. How does a convex lens (curved outward) affect light rays?
Answer: _____

9. Why does a magnifying glass make things look bigger?
Answer: _____

10. What is a prism and what does it do to white light?
Answer: _____

Match each question to its answer

1. Why does a rainbow appear after it rains? →
2. Why does a swimming pool look shallower than it really is? →
3. What is the focal point of a lens? →
4. Which color of light bends the most through a prism? →
5. What is a shadow? →

(A) Light from the pool bottom bends when it leaves the water, making the bottom look closer
(B) Violet
(C) A dark area formed when an opaque object blocks light
(D) The point where parallel light rays meet after passing through the lens
(E) Tiny water drops act like prisms and split sunlight into colors

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2. Vision

Circle the correct answer

11. What is persistence of vision?
(A) The way our eyes track moving objects (B) The ability to see in the dark (C) The way our eyes briefly hold an image even after it disappears (D) The power to remember faces

12. How do movies create the illusion of motion?
(A) By showing many still pictures very quickly, one after another (B) By projecting living actors directly (C) By using mirrors that vibrate (D) By using moving paint on the screen

13. What is a flipbook?
(A) A book with slightly different drawings on each page that look like motion when flipped (B) A book with electric lights (C) A book with mirrors on every page (D) A book that flips itself open automatically

14. What is a thaumatrope?
(A) A spinning disk with two pictures, one on each side, that blend together when spun (B) A musical instrument that vibrates strings (C) A magnifying glass with a handle (D) A type of camera that takes very fast photos

15. Why does a spinning bicycle wheel sometimes look like it's spinning backwards in a movie?
(A) The wheel is actually broken (B) The film is being played in reverse (C) The camera captures frames at a rate that makes spokes look like they move backward between shots (D) Light reflects off the spokes in special ways

16. What is a zoetrope?
(A) A flat painting on a wall (B) A telescope for looking at stars (C) A cylinder with slits and pictures inside that creates animated motion when spun (D) A clock that ticks loudly

Write the answer

17. Why do you need the slits in a zoetrope?
Answer: _____

18. What is an afterimage?
Answer: _____

19. If you stare at a red square then look at white paper, what do you see?
Answer: _____

20. What are the three primary colors of light?
Answer: _____

Match each question to its answer

1. What is the difference between primary colors of light and primary colors of paint? →
2. What happens when red and green light are mixed? →
3. What is a strobe light and how does it create illusions? →
4. Why does a fan look like it's slowing down or stopped under a strobe light? →
5. What is animation? →

(A) A flashing light that makes moving objects appear to freeze or move strangely
(B) Creating the illusion of motion by showing a series of slightly different images
(C) Light primaries (RGB) add together to make brighter colors; paint primaries subtract light to make darker colors
(D) The strobe flashes at the same rate as the fan blades, so each flash catches them in the same spot

(E) They make yellow light

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3. Forces

Circle the correct answer

21. What is a force?
(A) A measurement of time (B) A type of color (C) A unit of energy (D) A push or pull that can change an object's motion

22. What is center of gravity?
(A) The exact middle of the object's height (B) The single point where an object's weight is balanced (C) The brightest part of the object (D) The biggest part of the object

23. Where is the center of gravity of a uniform ruler?
(A) At the middle of its length (B) Anywhere along it (C) At one end (D) Half an inch from one end

24. If a person leans forward without bending their knees, what happens?
(A) Their center of gravity moves backward (B) Their center of gravity shifts forward, and if it goes past their feet, they fall (C) Gravity disappears (D) Nothing happens

25. What is the 'base of support' of an object or person?
(A) The area covered by the object's contact with the ground (B) The heaviest part of the object (C) The center of the object (D) The top of the object

26. Why is a wider stance more stable than a narrow stance?
(A) A wider base of support means the center of gravity can shift farther before falling outside the base (B) Wider stances are heavier (C) The earth pulls harder on wide stances (D) Narrow stances have no friction

Write the answer

27. What is a 'force vector'?
Answer: _____

28. If two equal forces push an object in opposite directions, what happens?
Answer: _____

29. Why can a magician balance a fork and spoon on the edge of a glass?
Answer: _____

30. Why do birds and gymnasts spread their arms while balancing?
Answer: _____

Match each question to its answer

1. What happens to an object's stability if its center of gravity is very high? →
2. Why are race cars built low to the ground? →
3. What is gravity? →
4. Why does a tightrope walker carry a long pole? →
5. What is friction? →

(A) It lowers their center of gravity and increases rotational inertia, making balance easier
(B) A low center of gravity makes them more stable during fast turns
(C) It becomes less stable and tips over more easily
(D) A force that pulls objects with mass toward each other
(E) A force that resists motion between two surfaces in contact

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4. Perception

Circle the correct answer

31. What is an optical illusion?
(A) A real change in the object (B) A type of camera trick (C) A picture or sight that tricks your brain into seeing something different from reality (D) A kind of light beam

32. What is the Müller-Lyer illusion?
(A) A swirling color pattern (B) A spinning circle (C) A 3D cube that flips inside out (D) Two lines of equal length appear different because of arrow-like fins at their ends

33. In the Müller-Lyer illusion, which line looks longer?
(A) Neither — they look like circles (B) The line with outward-pointing fins (like an open arrow) (C) Both look exactly the same (D) The line with inward-pointing fins (like a closed arrow)

34. What is the Ponzo illusion?
(A) A pattern of moving dots (B) Two equal-sized objects appear different because of converging lines suggesting depth (C) A black-and-white optical wheel (D) A 3D image that pops off the page

35. Why does an object look bigger when placed near the converging lines in the Ponzo illusion?
(A) The colors trick the eye (B) The lines actually make the object grow (C) The brain interprets it as farther away — and since it takes up the same space, it must be larger (D) The brain is broken

36. What is the Ebbinghaus illusion?
(A) A spiral that seems to move on its own (B) A drawing of stairs that never end (C) A picture that flips between two images (D) A circle surrounded by small circles looks larger than the same circle surrounded by big circles

Write the answer

37. In the Ebbinghaus illusion, which center circle looks bigger?
Answer: _____

38. What kind of cues does the Ponzo illusion use?
Answer: _____

39. Why are optical illusions useful to scientists?
Answer: _____

40. What is depth perception?
Answer: _____

Match each question to its answer

1. Why might the Müller-Lyer illusion be weaker for people who grew up in environments without buildings? →
2. What is the moon illusion? →
3. Why does the moon appear larger near the horizon? →
4. What is a 'reversible figure' illusion? →
5. What is the 'Necker cube' illusion? →

(A) Likely because nearby objects (trees, buildings) provide depth cues that trick the brain into thinking the moon is farther away
(B) An image you can interpret in two different ways, like a vase or two faces
(C) A 2D wireframe drawing of a cube that flips between two 3D orientations
(D) Their brains may not be trained to interpret corner-like cues as depth signals
(E) The moon looks larger near the horizon than high in the sky, even though its size doesn't change

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5. Cognition

Circle the correct answer

41. What is 'change blindness'?
(A) Not being able to see anything at all (B) Color blindness for changes (C) Failing to notice a change in a visual scene because attention is elsewhere (D) A type of eye disease

42. What is 'inattentional blindness'?
(A) A type of color blindness (B) Being unable to pay attention at all (C) An eye disease (D) Failing to notice an unexpected object or event when focused on a different task

43. In the famous 'invisible gorilla' experiment, what did many participants fail to see?
(A) A person in a gorilla suit walking through a basketball game (B) A flashing light (C) A loud noise (D) A real gorilla in the gym

44. Why do magicians rely on inattentional blindness?
(A) Magicians have special hypnosis powers (B) Magicians use it for fun only (C) Inattentional blindness only works in cartoons (D) Audiences focus where the magician directs, missing the secret action elsewhere

45. What is 'attention'?
(A) The ability to hear sounds (B) The ability to see colors (C) The mental process of focusing on some information while ignoring other information (D) A type of muscle in the eye

46. Why can't we pay attention to everything around us?
(A) Attention is just laziness (B) Our eyes are too small (C) Brains can pay attention to infinite things (D) The brain has limited processing capacity and must prioritize

Write the answer

47. What is a 'flicker paradigm' experiment?
Answer: _____

48. Why does a 'blank frame' between images cause change blindness?
Answer: _____

49. Why do magicians clap their hands or make loud noises during tricks?
Answer: _____

50. What is 'multitasking' and is it really possible?
Answer: _____

Match each question to its answer

1. Why is texting while driving dangerous? →
2. What can magicians do to make a coin 'vanish' from the audience's view? →
3. What is 'misdirection'? →
4. What is 'selective attention'? →
5. What is the 'cocktail party effect'? →

(A) The brain's ability to focus on specific information and ignore other inputs
(B) The art of directing attention away from what's really happening
(C) Time their action with the audience's blink or eye movement
(D) Being able to focus on one conversation in a noisy room
(E) It causes inattentional blindness — drivers fail to notice obvious hazards

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6. Magic Science

Circle the correct answer

51. What two main fields combine to make most magic tricks work?
(A) Math and geography (B) Physics and psychology (C) Music and dance (D) Chemistry and biology

52. How does a magician make a coin appear to vanish?
(A) By secretly transferring the coin or hiding it while drawing attention elsewhere (B) By shrinking the coin (C) By making the coin invisible with chemicals (D) By teleporting the coin

53. What is 'sleight of hand'?
(A) Skilled, secret manipulation of objects using the hands (B) A handshake style (C) A magic spell (D) A type of high-five

54. Why is timing so important in magic?
(A) Timing makes the audience laugh more (B) A secret action must happen when the audience isn't looking or expecting it (C) Magic shows have to start on time (D) Tickets must be sold at the right time

55. How does a magician 'levitate' an object?
(A) Heat from the magician's hands (B) Anti-gravity machines (C) Real magic and willpower (D) Often using thin threads, hidden supports, or counterweights invisible to the audience

56. Why do magicians often perform with elegant gestures and confident movement?
(A) Magicians must look fancy (B) Confident, smooth motion draws attention and hides quick secret actions (C) Confident magicians use real magic (D) Slow magicians scare people

Write the answer

57. Why might a magician have you 'pick a card, any card' but get a specific result?
Answer: _____

58. What is a 'palm' in magic?
Answer: _____

59. Why does a magician usually rehearse a trick hundreds of times?
Answer: _____

60. How does a magician 'cut' a person in half?
Answer: _____

Match each question to its answer

1. Why are mirrors sometimes used in magic tricks? →
2. Why might a magician build a story or 'patter' into the trick? →
3. How does a magician pull a rabbit from an empty hat? →
4. Why are magicians sometimes called 'applied psychologists'? →
5. Why is it important that an audience trusts the magician? →

(A) They use understanding of attention, memory, and expectation to fool real minds
(B) Trust reduces suspicion, so the audience accepts what they see without scrutinizing
(C) Talking guides attention, controls memory, and adds entertainment
(D) Mirrors at clever angles can hide compartments or duplicate objects
(E) A hidden compartment in the hat or a secret pouch under a table holds the rabbit

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7. Performance

Circle the correct answer

61. What is the 'effect' of a magic trick?
(A) The magician's costume (B) The lights on stage (C) The sound of applause (D) The apparent impossible result the audience sees (vanishing, transforming, levitating)

62. What is the 'method' of a magic trick?
(A) The music played during the trick (B) The secret technique used to create the effect (C) The applause from the audience (D) The way the magician greets the audience

63. Why is it important to design the effect before the method?
(A) It is faster this way (B) Method is unimportant to magicians (C) Starting with the audience experience ensures the trick has emotional impact (D) Methods are illegal to design first

64. What is 'physical misdirection'?
(A) Walking off-stage (B) Tripping during a trick (C) Pointing in the wrong direction on purpose (D) Using body movement, gestures, or eye contact to direct where the audience looks

65. What is 'psychological misdirection'?
(A) Speaking quietly (B) Mind-reading the audience (C) Hypnotism of all members (D) Using ideas, expectations, or narrative to direct what the audience thinks about

66. How do magicians use 'expectation' to fool audiences?
(A) By memorizing the audience's thoughts (B) By setting up an expected outcome, then surprising with something different (C) By predicting the future (D) By using crystal balls

Write the answer

67. What is 'pacing' in a magic performance?
Answer: _____

68. Why is the 'reveal' usually slower than the secret action?
Answer: _____

69. What is a 'magician's script'?
Answer: _____

70. Why do magicians study audience reactions?
Answer: _____

Match each question to its answer

1. What is a 'flourish' in magic? →
2. Why might a magician 'tip' a small move (show a flash)? →
3. How do magicians use 'before/after' framing in tricks? →
4. What is the 'too perfect' theory in magic? →
5. Why does a good magician care about their stage presence? →

(A) A skilled, visible display of dexterity (like a fancy card shuffle)
(B) If a trick is too obvious in its method or effect, audiences notice the deception
(C) By clearly showing the starting state and the ending state, with the secret action between them

(D) Confidence, posture, and engagement keep the audience focused and trusting
(E) To prove the hand is empty or set up false expectations for a later move

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8. Cognition

Circle the correct answer

71. What is cognitive psychology?
(A) The study of plants and animals (B) The scientific study of how the mind processes information (attention, memory, perception, thinking) (C) The study of rocks (D) The study of paint

72. What is 'working memory'?
(A) The temporary storage of information you're actively using (B) Things you remember from childhood (C) A type of computer chip in your head (D) Your long-term memory of all events

73. Why is human memory not like a video recording?
(A) Memory is reconstructed each time it's recalled, not played back from a perfect record (B) Memory is exactly like video (C) Memory is always perfect (D) Memory is recorded on tape

74. What is the 'misinformation effect'?
(A) When people lie on purpose (B) When false information after an event changes someone's memory of that event (C) A type of math error (D) Forgetting all information

75. What is a 'heuristic'?
(A) A foreign language word (B) A type of math problem (C) A mental shortcut for making quick judgments (D) A precise scientific method

76. What is 'confirmation bias'?
(A) A bias toward sports (B) A type of color (C) A bias toward eating breakfast (D) The tendency to notice and remember information that confirms existing beliefs

Write the answer

77. What is 'priming'?
Answer: _____

78. How might a magician use priming?
Answer: _____

79. What is the 'availability heuristic'?
Answer: _____

80. What is 'magical thinking'?
Answer: _____

Match each question to its answer

1. What is 'attentional capture'? →
2. How does the brain decide what to remember? →
3. What is the 'spotlight model' of attention? →
4. What is the 'planning fallacy'? →
5. How can scientists test cognitive psychology theories? →

(A) When an unexpected stimulus automatically grabs your attention
(B) Attention works like a spotlight, illuminating one area while leaving others in darkness
(C) Through controlled experiments measuring behavior, reaction time, and brain activity
(D) Through attention (only attended information is encoded) and meaning (deeply processed items are remembered better)
(E) Underestimating how long a task will take, even when you know past tasks took longer

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9. Impossible Figures And Paradox

Circle the correct answer

81. Why does a pencil in a glass of water look broken?
(A) The water actually breaks the pencil (B) Light bends as it passes from water to air, making the pencil look shifted (C) The pencil is made of two pieces of wood (D) Water turns the pencil invisible at the surface

82. Why do we have so many cues for depth and size?
(A) Because the brain needs to interpret a 2D image on the retina as a 3D world (B) To prevent us from seeing too clearly (C) To make life harder for our eyes (D) Because eyes are 2D devices only

83. How can sunlight set paper on fire with a magnifying glass?
(A) The lens contains hidden batteries (B) The lens slows the light down (C) The lens makes sunlight into a different color (D) The convex lens focuses sunlight to a tiny bright point, concentrating heat energy

84. Why do magicians use 'patter' (storytelling) during tricks?
(A) Audiences only listen to stories (B) Stories make tricks longer (C) Stories engage the audience emotionally and provide cover for secret actions (D) Magicians must talk constantly

85. What is a 'flip-book' illusion based on?
(A) Wind blowing through the book (B) Magnetism between drawings (C) Real motion of the pages (D) Persistence of vision blending separate drawings into smooth motion

86. If you shine a flashlight at a mirror at a 30-degree angle, at what angle does it reflect?
(A) 0 degrees — it disappears (B) 30 degrees on the opposite side (the angle of incidence equals the angle of reflection) (C) 60 degrees (D) 90 degrees straight back

Write the answer

87. Why is it important that an audience trusts the magician?
Answer: _____

88. Why might a spinning top look stationary under flashing lights?
Answer: _____

89. Why is human memory not like a video recording?
Answer: _____

90. Why can't we pay attention to everything around us?
Answer: _____

Match each question to its answer

1. How can knowing about cognitive biases help you? →
2. How does a magician pull a rabbit from an empty hat? →
3. How does a magician 'cut' a person in half? →
4. What is a strobe light and how does it create illusions? →
5. What is a 'flicker paradigm' experiment? →

(A) A flashing light that makes moving objects appear to freeze or move strangely
(B) A hidden compartment in the hat or a secret pouch under a table holds the rabbit
(C) It helps you make better decisions and avoid being manipulated by ads, scams, or false claims
(D) Using a specially built box with hidden compartments that allow one person to fold into one half
(E) Showing two slightly different images with a brief blank in between to test

10. Color And Brightness Illusions

Circle the correct answer

91. Why are illusions important for artists?
(A) Only photographers use illusions (B) Illusions ruin paintings (C) Artists never use illusions (D) Artists use them to create depth, motion, and impossible scenes on flat surfaces

92. Why do scientists use illusions and blindness research?
(A) To prove brains are bad (B) Just for entertainment (C) These phenomena reveal how the brain processes attention, memory, and perception (D) To replace school subjects

93. How does 'forcing' a card give the audience the illusion of choice?
(A) All cards are the same (B) The magician uses subtle timing and physical control so a specific card is most likely to be taken (C) The cards are glued together (D) The audience is hypnotized

94. Why do magicians and scientists both study perception?
(A) Magicians teach in universities only (B) They never share interests (C) Both want to understand how the brain interprets information — magicians to exploit it, scientists to explain it (D) Scientists do magic in labs

95. What is the 'too perfect' theory in magic?
(A) A trick that's not entertaining (B) A trick with no flaws (C) If a trick is too obvious in its method or effect, audiences notice the deception (D) A trick that always works

96. Why does a straw in a glass of water look like it's broken or shifted?
(A) The straw actually bends inside the glass (B) Light from the underwater part of the straw refracts as it exits the water (C) Water dissolves the straw (D) Air pressure pushes the straw sideways

Write the answer

97. Why does a tightrope walker carry a long pole?
Answer: _____

98. How can scientists test cognitive psychology theories?
Answer: _____

99. What's the main connection between magic, illusions, and cognitive psychology?
Answer: _____

100. Why do magicians never repeat the same trick twice in a row?
Answer: _____

Match each question to its answer

1. How is change blindness different from inattentional blindness? →
2. How can sunlight set paper on fire with a magnifying glass? →
3. What's the main lesson from classic optical illusions? →
4. Where is the center of gravity of a uniform ruler? →
5. Why might a magician 'tip' a small move (show a flash)? →

(A) The convex lens focuses sunlight to a tiny bright point, concentrating heat energy
(B) Change blindness is missing a change over time; inattentional blindness is missing an unexpected event in the present
(C) Vision is an active interpretation by the brain, not a perfect recording of reality
(D) At the middle of its length
(E) To prove the hand is empty or set up false expectations for a later move

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11. Auditory Illusions

Circle the correct answer

101. Why does a spinning bicycle wheel sometimes look like it's spinning backwards in a movie?
(A) The film is being played in reverse (B) Light reflects off the spokes in special ways (C) The camera captures frames at a rate that makes spokes look like they move backward between shots (D) The wheel is actually broken

102. How does a person walking maintain balance?
(A) By keeping their arms perfectly still (B) By concentrating very hard (C) By holding their breath (D) By continuously shifting their center of gravity over their planted foot

103. What's the main connection between magic, illusions, and cognitive psychology?
(A) All three reveal that perception is an active construction by the brain, not a direct view of reality (B) Only magic is real (C) Cognitive psychology proves illusions are fake (D) They are unrelated fields

104. Why are babies tricked less by some optical illusions than adults?
(A) Babies have stronger eyes (B) Some illusions depend on learned visual cues from experience with the environment (C) Babies can't see at all (D) Babies have larger pupils

105. Why don't tall, narrow towers fall over even though they seem unstable?
(A) They lean against the sky (B) They are held up by air pressure (C) Magnets attached to clouds hold them up (D) Their center of gravity is centered over their base of support

106. Why does practicing magic teach you about psychology?
(A) Magic teaches only sleight of hand (B) Magic has nothing to do with psychology (C) It requires understanding how attention, memory, and perception can be manipulated (D) Magic is purely physical

Write the answer

107. Why does a swimming pool look shallower than it really is?
Answer: _____

108. If a person leans forward without bending their knees, what happens?
Answer: _____

109. If two equal forces push an object in opposite directions, what happens?
Answer: _____

110. Why does a magnifying glass make things look bigger?
Answer: _____

Match each question to its answer

1. How does a magician 'read minds'? →
2. How can sunlight set paper on fire with a magnifying glass? →
3. Why might a magician 'tip' a small move (show a flash)? →
4. How does 'forcing' a card give the audience the illusion of choice? →
5. What's the main lesson from classic optical illusions? →

(A) The convex lens focuses sunlight to a tiny bright point, concentrating heat energy
(B) Using psychology, prepared scripts, and cold reading of body language
(C) The magician uses subtle timing and physical control so a specific card is most likely to be taken
(D) Vision is an active interpretation by the brain, not a perfect recording of reality
(E) To prove the hand is empty or set up false expectations for a later move

12. Taste Smell And Multisensory Illusions

Circle the correct answer

111. How does 'forcing' a card give the audience the illusion of choice?
(A) All cards are the same (B) The magician uses subtle timing and physical control so a specific card is most likely to be taken (C) The cards are glued together (D) The audience is hypnotized

112. Why does a 'blank frame' between images cause change blindness?
(A) The blank disrupts the motion cues our brains use to detect changes (B) The blank tires the eyes (C) The blank is brighter than the images (D) Blanks remove all memory of the first image

113. What can ordinary people learn from inattentional blindness research?
(A) Eye witnesses are always right (B) Always trust your eyes 100% (C) Our perception is not complete — we miss a lot, and should be humble about what we 'saw' (D) Always assume others can't see anything

114. Why do magicians often perform with elegant gestures and confident movement?
(A) Confident, smooth motion draws attention and hides quick secret actions (B) Slow magicians scare people (C) Magicians must look fancy (D) Confident magicians use real magic

115. Why might a magician have you 'pick a card, any card' but get a specific result?
(A) The audience can't really choose (B) The cards have magical powers (C) The magician reads minds (D) The deck may be set, or the magician forces a card through clever handling

116. Why is a pyramid one of the most stable shapes?
(A) Its wide base and low center of gravity make it very hard to tip over (B) Pyramids are made of magic stones (C) They store energy in their tips (D) They are perfectly round

Write the answer

117. Why does an object look bigger when placed near the converging lines in the Ponzo illusion?
Answer: _____

118. Why does practicing magic teach you about psychology?
Answer: _____

119. How do magicians use 'social attention'?
Answer: _____

120. How does a magician 'read minds'?
Answer: _____

Match each question to its answer

1. Why might a magician suddenly look like they're defying gravity? →
2. Why is timing so important in magic? →
3. Why might a magician 'tip' a small move (show a flash)? →
4. Why might a magician build a story or 'patter' into the trick? →
5. How is change blindness different from inattentional blindness? →

(A) They distribute their weight so their center of gravity stays over a hidden support point
(B) Talking guides attention, controls memory, and adds entertainment
(C) To prove the hand is empty or set up false expectations for a later move
(D) A secret action must happen when the audience isn't looking or expecting it
(E) Change blindness is missing a change over time; inattentional blindness is missing an unexpected event in the present

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13. Cross Topic Connections

Circle the correct answer

121. How does a magician plan for things to go wrong?
(A) They blame the audience (B) They restart the show if anything goes wrong (C) By rehearsing recoveries and having backup methods in case of mistakes (D) Magicians never plan for problems

122. Why does your shadow grow longer when the sun is low in the sky?
(A) The sun pushes shadows away from itself (B) Your body actually grows in the evening (C) Shadows always look longer at night (D) The angle of the sunlight is shallow, so the shadow stretches out farther

123. How do magicians create the illusion of weightlessness or floating?
(A) They use invisible balloons (B) They hold their breath very hard (C) They actually levitate using magic (D) By using hidden supports that align with their center of gravity, making them appear unsupported

124. How do magicians use 'social attention'?
(A) By yelling at the audience (B) By looking at their hand or an object, they cue the audience to look there too (C) By using flashing lights (D) By hypnotizing everyone

125. Why is a wider stance more stable than a narrow stance?
(A) Narrow stances have no friction (B) The earth pulls harder on wide stances (C) Wider stances are heavier (D) A wider base of support means the center of gravity can shift farther before falling outside the base

126. Why does a spinning bicycle wheel sometimes look like it's spinning backwards in a movie?
(A) The camera captures frames at a rate that makes spokes look like they move backward between shots (B) The film is being played in reverse (C) The wheel is actually broken (D) Light reflects off the spokes in special ways

Write the answer

127. How can knowing about cognitive biases help you?
Answer: _____

128. Why do scientists use illusions and blindness research?
Answer: _____

129. Why do magicians sometimes 'plant' an idea early in the show?
Answer: _____

130. How can scientists test cognitive psychology theories?
Answer: _____

Match each question to its answer

1. How do magicians use 'before/after' framing in tricks? →
2. Why is the sky blue during the day? →
3. Why does a swimming pool look shallower than it really is? →
4. Why is texting while driving dangerous? →
5. Why does a magician usually rehearse a trick hundreds of times? →

(A) To make secret moves smooth, invisible, and timed perfectly
(B) Light from the pool bottom bends when it leaves the water, making the bottom look closer
(C) By clearly showing the starting state and the ending state, with the secret action between them
(D) Tiny particles in the air scatter blue light more than other colors
(E) It causes inattentional blindness — drivers fail to notice obvious hazards

14. Real World Illusions In Medicine Safety

Circle the correct answer

131. Why do magicians never repeat the same trick twice in a row?
(A) Repetition is illegal in magic (B) Repetition lets the audience watch for the method instead of being amazed by the effect (C) Audiences hate seeing tricks twice (D) Magicians forget how

132. Why do birds and gymnasts spread their arms while balancing?
(A) Arms make them lighter (B) It helps them see better (C) Arms generate magnetic force (D) Spreading mass outward increases their 'rotational inertia,' making it harder to tip

133. Why do magicians sometimes have an 'assistant' on stage?
(A) Assistants can secretly help, providing extra hands, distraction, or hidden actions (B) Magicians need company (C) Assistants are part of the costume (D) The assistant does the real magic

134. Why does the moon appear larger near the horizon?
(A) It is colder near the horizon (B) The moon actually moves closer (C) The atmosphere bends light to enlarge it (D) Likely because nearby objects (trees, buildings) provide depth cues that trick the brain into thinking the moon is farther away

135. Why are illusions important for artists?
(A) Artists use them to create depth, motion, and impossible scenes on flat surfaces (B) Illusions ruin paintings (C) Only photographers use illusions (D) Artists never use illusions

136. Why does practicing magic teach you about psychology?
(A) Magic has nothing to do with psychology (B) Magic teaches only sleight of hand (C) It requires understanding how attention, memory, and perception can be manipulated (D) Magic is purely physical

Write the answer

137. What happens when red and green light are mixed?
Answer: _____

138. If you stare at a red square then look at white paper, what do you see?
Answer: _____

139. Why do magicians sometimes 'plant' an idea early in the show?
Answer: _____

140. Why does the Ponzo illusion not work as well without the converging lines?
Answer: _____

Match each question to its answer

1. Why does a swimming pool look shallower than it really is? →
2. How does 'forcing' a card give the audience the illusion of choice? →
3. How can knowing about cognitive biases help you? →
4. Why do drivers sometimes 'look but not see' a motorcyclist or pedestrian? →
5. Why is the 'reveal' usually slower than the secret action? →

(A) The driver's attention is on cars; unexpected objects fail to register (inattentional blindness)
(B) The reveal is meant to be savored; the secret action must be unnoticed
(C) The magician uses subtle timing and physical control so a specific card is most likely to be taken
(D) It helps you make better decisions and avoid being manipulated by ads, scams, or false claims
(E) Light from the pool bottom bends when it leaves the water, making the bottom look closer

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15. Misconceptions And Reasoning

Circle the correct answer

141. Why might a magician 'tip' a small move (show a flash)?
(A) To prove the hand is empty or set up false expectations for a later move (B) Because they have to (C) By accident only (D) To insult the audience

142. In the Müller-Lyer illusion, which line looks longer?
(A) The line with inward-pointing fins (like a closed arrow) (B) The line with outward-pointing fins (like an open arrow) (C) Both look exactly the same (D) Neither — they look like circles

143. What is the 'planning fallacy'?
(A) A mistake in math class (B) A type of city planning (C) Not making any plans (D) Underestimating how long a task will take, even when you know past tasks took longer

144. Why do magicians say their tricks are based on 'science, not supernatural'?
(A) Tricks involve no thinking (B) All tricks use real physical and psychological principles, not real magic (C) Real magic exists but is hidden (D) Saying 'science' makes them more popular

145. What is 'multitasking' and is it really possible?
(A) Working very fast (B) Doing several tasks at once — but the brain actually switches between them, not truly doing them simultaneously (C) A type of computer feature (D) Doing two tasks at the same time perfectly

146. How does 'forcing' a card give the audience the illusion of choice?
(A) The cards are glued together (B) The audience is hypnotized (C) The magician uses subtle timing and physical control so a specific card is most likely to be taken (D) All cards are the same

Write the answer

147. How does a convex lens (curved outward) affect light rays?
Answer: _____

148. Why do magicians use 'patter' (storytelling) during tricks?
Answer: _____

149. If a person leans forward without bending their knees, what happens?
Answer: _____

150. What makes a lens 'concave' versus 'convex'?
Answer: _____

Match each question to its answer

1. Why do scientists use illusions and blindness research? →
2. Why is the 'reveal' usually slower than the secret action? →
3. Why might the Müller-Lyer illusion be weaker for people who grew up in environments without buildings? →
4. How do magicians create the illusion of weightlessness or floating? →
5. Why don't tall, narrow towers fall over even though they seem unstable? →

(A) Their brains may not be trained to interpret corner-like cues as depth signals
(B) The reveal is meant to be savored; the secret action must be unnoticed
(C) These phenomena reveal how the brain processes attention, memory, and perception
(D) By using hidden supports that align with their center of gravity, making them appear unsupported
(E) Their center of gravity is centered over their base of support

16. Advanced Synthesis

Circle the correct answer

151. If a person leans forward without bending their knees, what happens?
(A) Gravity disappears (B) Their center of gravity shifts forward, and if it goes past their feet, they fall (C) Their center of gravity moves backward (D) Nothing happens

152. Why is animation considered an 'illusion' rather than 'real motion'?
(A) Because cartoons are usually funny (B) Because animated characters are not real (C) Because animations are slow (D) Because each frame is still — your brain creates the impression of motion through persistence of vision

153. Why is the choice of a 'volunteer' carefully managed?
(A) The first person to raise their hand is always chosen (B) Magicians use random choices only (C) Volunteers are paid actors (D) The magician picks someone whose response will help the trick succeed

154. How does a person walking maintain balance?
(A) By keeping their arms perfectly still (B) By concentrating very hard (C) By continuously shifting their center of gravity over their planted foot (D) By holding their breath

155. Why does a fan look like it's slowing down or stopped under a strobe light?
(A) The fan blades become invisible (B) Strobe lights turn off motors (C) The fan really slows down when the lights flash (D) The strobe flashes at the same rate as the fan blades, so each flash catches them in the same spot

156. Why do sunsets often look red or orange?
(A) The earth turns red at night (B) The sun changes color at night (C) Sunlight passes through more air at sunset, scattering away blue and leaving red and orange (D) Clouds add red dye to sunsets

Write the answer

157. How do magicians use 'before/after' framing in tricks?
Answer: _____

158. Why is it useful for our brains to use shortcuts (heuristics) even if they sometimes cause illusions?
Answer: _____

159. Why are magicians sometimes called 'applied psychologists'?
Answer: _____

160. Why might a magician 'tip' a small move (show a flash)?
Answer: _____

Match each question to its answer

1. What's the main connection between magic, illusions, and cognitive psychology? →
2. Why is the 'reveal' usually slower than the secret action? →
3. How does a magician 'read minds'? →
4. Why does an object look bigger when placed near the converging lines in the Ponzo illusion? →
5. Why are first impressions hard to change? →

(A) The reveal is meant to be savored; the secret action must be unnoticed
(B) Using psychology, prepared scripts, and cold reading of body language
(C) The brain anchors on early information and biases later judgments to confirm it
(D) The brain interprets it as farther away — and since it takes up the same space, it must be larger
(E) All three reveal that perception is an active construction by the brain, not a direct view of reality

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Riddle & Joke Break

Guess the answer, then check the key!

161. I bend light when it passes from one material to another, like air to water. What am I?

162. I split white light into a rainbow of colors. I'm made of glass and have triangular sides. What am I?

163. Two lines are the same length, but one looks longer because of arrow shapes at the ends. What illusion is this?

164. I'm the point in an object where all its weight feels balanced. If you support me, the object won't tip over. What am I?

165. I'm the reason your eyes don't notice the gaps between movie frames. Twenty-four still images per second look like smooth motion because of me. What am I?

166. I'm a magic technique where the magician makes you look one way while the trick happens somewhere else. What am I?

167. I'm an illusion where two identical circles look different sizes because of the circles surrounding them. What am I?

168. I'm a 2D drawing that looks like a 3D shape, but the shape couldn't actually exist. The Penrose triangle is a famous example. What am I?

169. Why did the light ray go to therapy?

170. Why did the prism break up with the flashlight?

171. Why don't magicians ever get lost?

172. What did the convex lens say to the concave lens?

173. Why was the mirror so confident?

174. Why did the light beam fail the swimming test?

Fun Facts

- Did you know? Light travels at about 299,792 kilometers per second -- fast enough to circle the Earth more than 7 times in one second!
- Did you know? When you watch a movie, you're actually seeing 24 still pictures per second. Your brain blends them into motion using persistence of vision!
- Did you know? In the famous "invisible gorilla" experiment, half the people watching a basketball game missed a person in a gorilla suit walking right through the players. That's inattentional blindness!
- Did you know? Isaac Newton discovered that white light is made of all the colors of the rainbow by passing sunlight through a prism in 1666!
- Did you know? Magicians use a technique called "misdirection" that's based on real psychology research. Your eyes can only focus on one tiny spot at a time, so magicians control where that spot goes.
- Did you know? The Müller-Lyer illusion was discovered in 1889. Even when you measure the lines and KNOW they're the same length, your brain still sees them as different. The illusion doesn't go away with knowledge!
- Did you know? A rainbow always appears at exactly 42 degrees from the point directly opposite the sun. That's why you can never reach the end of a rainbow -- the angle moves with you!
- Did you know? Your two eyes see slightly different images, and your brain combines them into one 3D view. That's called binocular vision -- it's how you judge distance!

Answer Key

1. C — A form of energy that travels in waves
2. C — It reflects, bouncing off at an equal angle
3. B — The bending of light when it passes from one material into another
4. D — Light bends as it passes from water to air, making the pencil look shifted
5. C — A material that lets most light pass through it
6. B — Transparent lets light through clearly, translucent scatters light, opaque blocks all light
7. The lens behind the pupil
8. It bends light rays so they meet at a point, called the focal point
9. It is a convex lens that bends light to enlarge the image your eye sees
10. A clear shape that splits white light into the colors of the rainbow
    Matching (Optics): 1→E, 2→A, 3→D, 4→B, 5→C
11. C — The way our eyes briefly hold an image even after it disappears
12. A — By showing many still pictures very quickly, one after another
13. A — A book with slightly different drawings on each page that look like motion when flipped
14. A — A spinning disk with two pictures, one on each side, that blend together when spun
15. C — The camera captures frames at a rate that makes spokes look like they move backward between shots
16. C — A cylinder with slits and pictures inside that creates animated motion when spun
17. They give your eye a brief glimpse of each image, like the shutter in a camera
18. A faint image you keep seeing after staring at something bright
19. A faint green square (the complementary color of red)
20. Red, green, and blue
    Matching (Vision): 1→C, 2→E, 3→A, 4→D, 5→B
21. D — A push or pull that can change an object's motion

22. B — The single point where an object's weight is balanced
23. A — At the middle of its length
24. B — Their center of gravity shifts forward, and if it goes past their feet, they fall
25. A — The area covered by the object's contact with the ground
26. A — A wider base of support means the center of gravity can shift farther before falling outside the base
27. A force shown as an arrow with a specific direction and size
28. They cancel out and the object doesn't accelerate
29. Their combined center of gravity is positioned over the glass's edge, balancing the system
30. Spreading mass outward increases their 'rotational inertia,' making it harder to tip
    Matching (Forces): 1→C, 2→B, 3→D, 4→A, 5→E
31. C — A picture or sight that tricks your brain into seeing something different from reality
32. D — Two lines of equal length appear different because of arrow-like fins at their ends
33. B — The line with outward-pointing fins (like an open arrow)
34. B — Two equal-sized objects appear different because of converging lines suggesting depth
35. C — The brain interprets it as farther away — and since it takes up the same space, it must be larger
36. D — A circle surrounded by small circles looks larger than the same circle surrounded by big circles
37. The center circle surrounded by smaller circles
38. Depth cues from converging lines
39. They reveal how the brain processes vision, depth, and size
40. The ability to judge how far away objects are
    Matching (Perception): 1→D, 2→E, 3→A, 4→B, 5→C
41. C — Failing to notice a change in a visual scene because attention is elsewhere

42. D — Failing to notice an unexpected object or event when focused on a different task
43. A — A person in a gorilla suit walking through a basketball game
44. D — Audiences focus where the magician directs, missing the secret action elsewhere
45. C — The mental process of focusing on some information while ignoring other information
46. D — The brain has limited processing capacity and must prioritize
47. Showing two slightly different images with a brief blank in between to test change blindness
48. The blank disrupts the motion cues our brains use to detect changes
49. To distract attention so the audience misses a critical action
50. Doing several tasks at once — but the brain actually switches between them, not truly doing them simultaneously
    Matching (Cognition): 1→E, 2→C, 3→B, 4→A, 5→D
51. B — Physics and psychology
52. A — By secretly transferring the coin or hiding it while drawing attention elsewhere
53. A — Skilled, secret manipulation of objects using the hands
54. B — A secret action must happen when the audience isn't looking or expecting it
55. D — Often using thin threads, hidden supports, or counterweights invisible to the audience
56. B — Confident, smooth motion draws attention and hides quick secret actions
57. The deck may be set, or the magician forces a card through clever handling
58. Hiding an object in the hand while pretending it's empty
59. To make secret moves smooth, invisible, and timed perfectly
60. Using a specially built box with hidden compartments that allow one person to fold into one half
    Matching (Magic Science): 1→D, 2→C, 3→E, 4→A, 5→B
61. D — The apparent impossible result the audience sees (vanishing, transforming, levitating)

62. B — The secret technique used to create the effect
63. C — Starting with the audience experience ensures the trick has emotional impact
64. D — Using body movement, gestures, or eye contact to direct where the audience looks
65. D — Using ideas, expectations, or narrative to direct what the audience thinks about
66. B — By setting up an expected outcome, then surprising with something different
67. The speed and rhythm of the performance, including pauses and buildup
68. The reveal is meant to be savored; the secret action must be unnoticed
69. A planned sequence of words, gestures, and timings for the performance
70. To learn which methods, pacing, and patter work best with real audiences
    Matching (Performance): 1→A, 2→E, 3→C, 4→B, 5→D
71. B — The scientific study of how the mind processes information (attention, memory, perception, thinking)
72. A — The temporary storage of information you're actively using
73. A — Memory is reconstructed each time it's recalled, not played back from a perfect record
74. B — When false information after an event changes someone's memory of that event
75. C — A mental shortcut for making quick judgments
76. D — The tendency to notice and remember information that confirms existing beliefs
77. When exposure to one idea influences responses to a related idea
78. By repeatedly using words or ideas that subtly guide the audience's later thoughts
79. Judging the likelihood of events by how easily examples come to mind
80. Believing that thoughts, words, or rituals can directly influence the physical world
    Matching (Cognition): 1→A, 2→D, 3→B, 4→E, 5→C
81. B — Light bends as it passes from water to air, making the pencil look shifted

82. A — Because the brain needs to interpret a 2D image on the retina as a 3D world
83. D — The convex lens focuses sunlight to a tiny bright point, concentrating heat energy
84. C — Stories engage the audience emotionally and provide cover for secret actions
85. D — Persistence of vision blending separate drawings into smooth motion
86. B — 30 degrees on the opposite side (the angle of incidence equals the angle of reflection)
87. Trust reduces suspicion, so the audience accepts what they see without scrutinizing
88. If the strobe flashes match the top's spin rate, each flash shows the top in the same position
89. Memory is reconstructed each time it's recalled, not played back from a perfect record
90. The brain has limited processing capacity and must prioritize
    Matching (Impossible Figures And Paradox): 1→C, 2→B, 3→D, 4→A, 5→E
91. D — Artists use them to create depth, motion, and impossible scenes on flat surfaces
92. C — These phenomena reveal how the brain processes attention, memory, and perception
93. B — The magician uses subtle timing and physical control so a specific card is most likely to be taken
94. C — Both want to understand how the brain interprets information — magicians to exploit it, scientists to explain it
95. C — If a trick is too obvious in its method or effect, audiences notice the deception
96. B — Light from the underwater part of the straw refracts as it exits the water
97. It lowers their center of gravity and increases rotational inertia, making balance easier
98. Through controlled experiments measuring behavior, reaction time, and brain activity
99. All three reveal that perception is an active construction by the brain, not a

direct view of reality

100. Repetition lets the audience watch for the method instead of being amazed by the effect
Matching (Color And Brightness Illusions): 1→B, 2→A, 3→C, 4→D, 5→E
101. C — The camera captures frames at a rate that makes spokes look like they move backward between shots
102. D — By continuously shifting their center of gravity over their planted foot
103. A — All three reveal that perception is an active construction by the brain, not a direct view of reality
104. B — Some illusions depend on learned visual cues from experience with the environment
105. D — Their center of gravity is centered over their base of support
106. C — It requires understanding how attention, memory, and perception can be manipulated
107. Light from the pool bottom bends when it leaves the water, making the bottom look closer
108. Their center of gravity shifts forward, and if it goes past their feet, they fall
109. They cancel out and the object doesn't accelerate
110. It is a convex lens that bends light to enlarge the image your eye sees
Matching (Auditory Illusions): 1→B, 2→A, 3→E, 4→C, 5→D
111. B — The magician uses subtle timing and physical control so a specific card is most likely to be taken
112. A — The blank disrupts the motion cues our brains use to detect changes
113. C — Our perception is not complete — we miss a lot, and should be humble about what we 'saw'
114. A — Confident, smooth motion draws attention and hides quick secret actions
115. D — The deck may be set, or the magician forces a card through clever handling
116. A — Its wide base and low center of gravity make it very hard to tip over
117. The brain interprets it as farther away — and since it takes up the same space, it must be larger
118. It requires understanding how attention, memory, and perception can be

manipulated

119. By looking at their hand or an object, they cue the audience to look there too
120. Using psychology, prepared scripts, and cold reading of body language
Matching (Taste Smell And Multisensory Illusions): 1→A, 2→D, 3→C, 4→B, 5→E
121. C — By rehearsing recoveries and having backup methods in case of mistakes
122. D — The angle of the sunlight is shallow, so the shadow stretches out farther
123. D — By using hidden supports that align with their center of gravity, making them appear unsupported
124. B — By looking at their hand or an object, they cue the audience to look there too
125. D — A wider base of support means the center of gravity can shift farther before falling outside the base
126. A — The camera captures frames at a rate that makes spokes look like they move backward between shots
127. It helps you make better decisions and avoid being manipulated by ads, scams, or false claims
128. These phenomena reveal how the brain processes attention, memory, and perception
129. Early framing can shape how a later trick is interpreted
130. Through controlled experiments measuring behavior, reaction time, and brain activity
Matching (Cross Topic Connections): 1→C, 2→D, 3→B, 4→E, 5→A
131. B — Repetition lets the audience watch for the method instead of being amazed by the effect
132. D — Spreading mass outward increases their 'rotational inertia,' making it harder to tip
133. A — Assistants can secretly help, providing extra hands, distraction, or hidden actions
134. D — Likely because nearby objects (trees, buildings) provide depth cues that trick the brain into thinking the moon is farther away
135. A — Artists use them to create depth, motion, and impossible scenes on flat surfaces

136. C — It requires understanding how attention, memory, and perception can be manipulated
137. They make yellow light
138. A faint green square (the complementary color of red)
139. Early framing can shape how a later trick is interpreted
140. Without depth cues, the brain has no reason to interpret the objects as being at different distances
    Matching (Real World Illusions In Medicine Safety): 1→E, 2→C, 3→D, 4→A, 5→B
141. A — To prove the hand is empty or set up false expectations for a later move
142. B — The line with outward-pointing fins (like an open arrow)
143. D — Underestimating how long a task will take, even when you know past tasks took longer
144. B — All tricks use real physical and psychological principles, not real magic
145. B — Doing several tasks at once — but the brain actually switches between them, not truly doing them simultaneously
146. C — The magician uses subtle timing and physical control so a specific card is most likely to be taken
147. It bends light rays so they meet at a point, called the focal point
148. Stories engage the audience emotionally and provide cover for secret actions
149. Their center of gravity shifts forward, and if it goes past their feet, they fall
150. Concave curves inward (thinner in the middle); convex curves outward (thicker in the middle)
    Matching (Misconceptions And Reasoning): 1→C, 2→B, 3→A, 4→D, 5→E
151. B — Their center of gravity shifts forward, and if it goes past their feet, they fall
152. D — Because each frame is still — your brain creates the impression of motion through persistence of vision
153. D — The magician picks someone whose response will help the trick succeed
154. C — By continuously shifting their center of gravity over their planted foot
155. D — The strobe flashes at the same rate as the fan blades, so each flash catches them in the same spot

156. C — Sunlight passes through more air at sunset, scattering away blue and leaving red and orange
157. By clearly showing the starting state and the ending state, with the secret action between them
158. Shortcuts let us interpret the world quickly, which usually works well — illusions are rare exceptions
159. They use understanding of attention, memory, and expectation to fool real minds
160. To prove the hand is empty or set up false expectations for a later move
Matching (Advanced Synthesis): 1→E, 2→A, 3→B, 4→D, 5→C
161. Refraction! That's why a straw in a glass of water looks broken.
162. A prism! Each color bends a different amount as it passes through.
163. The Müller-Lyer illusion! Outward arrows make lines look longer, inward arrows make them look shorter.
164. Center of gravity! It's why a tightrope walker uses a long pole for balance.
165. Persistence of vision! Your brain holds each image for a fraction of a second.
166. Misdirection! It's the magician's most powerful tool.
167. The Ebbinghaus illusion! A circle surrounded by small circles looks bigger than the same circle surrounded by large ones.
168. An impossible figure! Your brain tries to make sense of it but can't.
169. It had too many reflections to deal with!
170. It said, "You're showing your true colors!"
171. Because they always know where to misdirect!
172. "You're so negative -- I always try to focus on the positive!"
173. Because it could always reflect on its accomplishments!
174. Every time it hit the water, it bent the rules!
