**31. What is the first collision during a car crash also called?**

*A. Vehicle collision*

B. Human collision

C. Internal collision

D. None of the above

Section 2.2, “The First, Second, and Third Collisions That Happen During a Car Crash” states, “When you think of car crashes, you probably think of a vehicle crashing into another vehicle or object as a single, major event. But that’s only the first collision during a crash — the part commonly referred to as the ‘vehicle collision.’”

**32. What is the second collision during a car crash also called?**

A. Vehicle collision

*B. Human collision*

C. Unsecured objects inside the vehicle

D. None of the above

Section 2.2, “The First, Second, and Third Collisions That Happen During a Car Crash” states, “The second collision involves the person and/or objects colliding within the vehicle — also called the ‘human collision.’”

**33. What is the law of inertia helpful in understanding?**

A. Only the first collision

B. Only the second collision

*C. The series of three collisions that happen during a car crash*

D. None of the above

Section 2.2, “The First, Second, and Third Collisions That Happen During a Car Crash” states, “Newton’s second law, the law of inertia, is helpful in understanding the series of three collisions that occur during a car crash.”

**34. True or False: Wearing a seat belt is essential for safety.**

*True*

Section 2.2, “The First, Second, and Third Collisions That Happen During a Car Crash” states, “Because an object in motion will stay in motion until an outside force acts on it, unsecured objects inside the vehicle will continue to move until they hit something, which causes the second collision. This includes your body if you are not wearing a seat belt — which is why wearing a seat belt is essential for safety.”

**35. What is the most serious potential outcome of the third collision during a car crash?**

A. No injuries

B. Minor injuries

*C. Severe internal injuries*

Section 2.2, “The First, Second, and Third Collisions That Happen During a Car Crash” states, “During the third collision . . . passengers’ internal organs continue moving at whatever speed the car and its occupants were moving before the collision until the organs hit their body frames, other organs, or the skeletal system. This can lead to severe internal injuries.”

**36. What is Newton's First Law of Motion?**

*A. An object at rest will remain at rest unless acted upon by a force.*

B. Force equals mass times acceleration.

C. When two objects interact, they apply forces to each other that are equal in magnitude but opposite in direction.

Section 2.1, A, i, “Newton’s First Law: The Law of Inertia” states, “Newton’s first law states that an object at rest will remain at rest, and an object moving at a constant speed in a straight line will continue doing so indefinitely unless a force acts upon the object.”

**37. What is the relationship between speed and the severity of a car crash?**

A. Speed is not related to the severity of a car crash.

*B. Speed is a highly significant factor in the severity of a car crash.*

C. Speed is a somewhat significant factor in the severity of a car crash.

Section 2.1, A, “Explaining Speed and Impact Severity in Terms of Newton’s Three Laws of Motion” states, “Speed is a highly significant factor in the severity of car crashes — as you might have guessed, the faster your car is moving at the time of a collision, the more serious the accident is likely to be.”

**38. What is the relationship between mass and the force of a car crash?**

A. The force of a car crash is independent of mass.

B. The force of a car crash decreases if the mass of the car increases.

*C. The force of a car crash increases if the mass of the car increases.*

Section 2.1, A, ii, “Newton’s Second Law: The Law of Force and Acceleration” states, “Newton's second law also means that if a larger car (a car with greater mass) crashes, it generates more force and damage than a smaller car moving at the same speed.”

**39. What happens to the passengers in a car crash according to Newton's First Law?**

*A. Passengers will continue to move unless a force stops them.*

B. Passengers will stop moving immediately.

C. Passengers will move in a straight line indefinitely.

Section 2.1, A, i, “Newton’s First Law: The Law of Inertia” states, “In a car crash . . . passengers will continue to move unless they’re stopped by something, whether that’s a seat belt, the seat in front of them (if seated in the backseat), the dashboard, etc.”

**40. What is Newton's Third Law of Motion?**

A. An object at rest will remain at rest unless acted upon by a force.

B. Force equals mass times acceleration.

*C. When two objects interact, they apply forces to each other that are equal in magnitude but opposite in direction.*

Section 2.1, A, iii, “Newton’s Third Law: The Law of Action and Reaction” states, “According to Newton’s third law, when two objects interact, they apply forces to each other that are equal in magnitude but opposite in direction.”

**41. How does the speed of a car affect the amount of force it exerts on an object in a collision according to Newton's Third Law?**

A. The speed of a car has no effect on the amount of force it exerts on an object in a collision according to Newton's Third Law.

B. The slower the car, the more force it exerts on an object in a collision.

*C. The faster the car, the more force it exerts on an object in a collision.*

Section 2.1, A, iii, “Newton’s Third Law: The Law of Action and Reaction” states, “Newton’s third law states that the amount of force the car exerts onto the wall when crashing into it is equal to the amount of force that the wall exerts back onto the car. This means that the faster the car is going, the more the car and its passengers will be damaged by the impact.”

**42. Is slowing your driving speed likely to make car accidents less severe according to the text?**

A. No, slowing your driving speed is not likely to make car accidents less severe.

B. The text does not mention the effect of slowing driving speed on car accidents.

*C. Yes, slowing your driving speed is likely to make car accidents less severe.*

Section 2.1, A, iii, “Newton’s Third Law: The Law of Action and Reaction” states, “Slowing your driving speed can lower the likelihood of an accident and make accidents less severe — and, most importantly, less likely to cause serious injury or death.”

**43. True or False: The chance of a fatality increases by 4 percent for every 1 percent increase in driving speed.**

*True*

Section 2.1, B, “Statistics That Illustrate the Relationship Between Speed and Car Crashes” states, “Every 1 percent increase in driving speed increases a driver’s chance of an accident by 2 percent, the chance of a serious injury by 3 percent, and the chance of a fatality by about 4 percent.”

**44. True or False: Newton’s Second Law is expressed mathematically as *F = ma* (“force equals mass times acceleration”).**

*True*

Section 2.1, A, ii, “Newton’s Second Law: The Law of Force and Acceleration” states, “Newton’s second law states that when a force acts upon an object, the object’s acceleration depends on the amount of force being applied and the mass of the object being acted upon.[[1]](#footnote-0) This is expressed mathematically as *F = ma* (‘force equals mass times acceleration’).”

**45. True or False: Speeding contributes to more injuries than we can track in the U.S.**

*True*

Section 2.1, B, “Statistics That Illustrate the Relationship Between Speed and Car Crashes” states, “Speeding contributes to almost 10,000 deaths annually in the U.S. and more injuries than we can track.”

**46. True or False: According to Newton's Second Law of Motion, the force of a car crash increases if the speed of acceleration increases.**

*True*

Section 2.1, A, ii, “Newton’s Second Law: The Law of Force and Acceleration” states, “The force of a car crash is equal to the mass multiplied by acceleration. Therefore, the force of a car crash increases if the speed of acceleration increases.”

**47. True or False: It causes less damage if a larger car crashes than if a smaller car moving at the same speed crashes.**

*False*

Section 2.1, A, ii, “Newton’s Second Law: The Law of Force and Acceleration” states, “Newton's second law also means that if a larger car (a car with greater mass) crashes, it generates more force and damage than a smaller car moving at the same speed.”

**48. True or False: Newton's Third Law of Motion states that for every action (force) in nature, there is an equal and opposite reaction.**

*True*

Section 2.1, A, iii, “Newton’s Third Law: The Law of Action and Reaction” states, “According to Newton’s third law, when two objects interact, they apply forces to each other that are equal in magnitude but opposite in direction. This means that ‘for every action (force) in nature, there is an equal and opposite reaction.’”

**49. True or False: If you are involved in a collision on level ground at a speed of 65 mph, the force of impact is roughly equivalent to driving your car off of the roof of a 12-story building and hitting the ground.**

*True*

Section 2.1, B, “Statistics That Illustrate the Relationship Between Speed and Car Crashes” states, “The force of impact of a collision on level ground at 65 miles per hour is about the same as if you drove your car off the roof of a 12-story building and hit the ground.”

**50. True or False: Every 1 percent increase in driving speed increases the chance of a serious injury by 1 percent.**

*False*

Section 2.1, B, “Statistics That Illustrate the Relationship Between Speed and Car Crashes” states, “According to a study from the University of California Berkeley, every 1 percent increase in driving speed increases a driver’s chance of . . . a serious injury by 3 percent.”

**51. True or False: Increasing their driving speed from 60 to 80 miles per hour makes a driver four times more likely to get into a fatal car crash.**

*True*

Section 2.1, B, “Statistics That Illustrate the Relationship Between Speed and Car Crashes” states, “Increasing your driving speed from 60 to 80 miles per hour makes you four times more likely to get into a fatal car crash.”

**52. True or False: Every 10-mph increase in driving speed doubles one’s risk of dying in a car crash.**

*True*

Section 2.1, B, “Statistics That Illustrate the Relationship Between Speed and Car Crashes” states, “Every 10-mph increase in driving speed doubles one’s risk of dying in a car crash.”

**53. True or False: The likelihood of a pedestrian being killed by a collision is 75 percent at 50 miles per hour.**

*True*

Section 2.1, B, “Statistics That Illustrate the Relationship Between Speed and Car Crashes” states, “The likelihood of a pedestrian being killed by a collision is only 10 percent at 23 miles per hour, but 75 percent at 50 miles per hour.”

**54. True or False: It is 31 percent riskier to drive at a speed of 80 mph when surrounding traffic is going 70 mph.**

*True*

Section 2.1, B, “Statistics That Illustrate the Relationship Between Speed and Car Crashes” states, “It’s especially dangerous to speed faster than surrounding traffic. If you’re driving 80 miles per hour and surrounding traffic is going 70 miles per hour, you increase your risk of a crash by 31 percent.”

**55. What is the most common injury caused by rear-end collisions?**

A. Fractured bones

*B. Whiplash*

C. Bruising

Section 2.3, A, i, “Rear Collision” states, “The most common injury caused by rear-end collisions [is] whiplash, an injury to the neck and occasionally the brain, which occurs when the head is thrown backward suddenly.”

**56. True or False: To reduce the force of a rear-end collision, you should brake immediately.**

*False*

Section 2.3, A, i, “Rear Collision” states, “If you are about to be rear-ended, . . . [and] you’re driving forward, don’t brake immediately; try braking gradually or after the impact. This will reduce the force acting on your body because you and the vehicle hitting yours will be moving in the same direction during the impact.”

**57. What can you do to prevent whiplash from a rear-end collision if you are already at a stop?**

A. Turn your head away from the impact

*B. Plant your foot on the brake and head against the headrest*

C. Duck under the dashboard

D. None of the above

Section 2.3, A, i, “Rear Collision” states, “If you are about to be rear-ended . . . [and] you’re already at a stop (parked or stopped at a light), plant your foot on the brake and your head against the headrest.”

**58. What is the most common location for side collisions to occur?**

A. On the highway

*B. At intersections*

C. In a parking lot

D. On a rural road

Section 2.3, A, ii, “Side Collision” states, “Side collisions happen most often at intersections.”

**59. True or False: To reduce injury in a side collision, you should steer your car so it is hit from the side closest to the driver.**

*False*

Section 2.3, A, ii, “Side Collision” states, “Try to steer your car so it is hit from the rear or another area where there are no passengers. Although your car will probably still be damaged, this strategy can help reduce injuries to passengers and yourself.”

**60. How can you brace yourself in a side collision?**

A. Turn your body away from the impact

*B. Use the steering wheel to brace yourself*

C. Put your arms over your head

D. None of the above

Section 2.3, A, ii, “Side Collision” states, “Use the steering wheel to brace yourself. You now know that Newton’s first law (the law of inertia) means a side collision will send your body sideways. Bracing against the steering wheel can lessen this effect.”

**61. What should you do if you are about to have a head-on collision?**

A. Freeze up and do nothing

*B. Slow down immediately and do your best to turn your car toward the right*

C. Turn your car toward the left

D. None of the above

Section 2.3, A, iii, “Head-on Collision” states, “If there’s a vehicle driving directly toward you, slow down immediately. As you know, accidents at higher speeds can cause more damage than at lower speeds. Do your best to turn your car toward the right if doing so is possible and relatively safe.”

**62. True or False: Head-on collisions are more likely to cause facial injuries than other types of collisions.**

*True*

Section 2.3, A, iii, “Head-on Collision” states, “Head-on collisions are more likely to cause facial injuries due to broken glass from the windshield.”

**63. What can help prevent facial injuries in a head-on collision?**

A. Airbags

B. Seat belts

*C. Both airbags and seat belts*

D. None of the above

Section 2.3, A, iii, “Head-on Collision” states, “Both airbags and seat belts can help prevent these kinds of facial injuries, so make sure to have them installed in your vehicle. One study showed that seat belts with shoulder straps reduced facial injuries by 18 percent and airbags by 43 percent. A combination of seat belts and airbags reduced the likelihood of severe facial injury by more than half.”

**64. True or False: Smaller and lighter vehicles protect their passengers more effectively than larger and heavier vehicles in crashes.**

*False*

Section 2.3, B, “Energy Absorption and Safety by Vehicle Design” states, “In general, larger and heavier cars protect their own passengers from injury during crashes more effectively than smaller and lighter vehicles.”

**65. Why are larger vehicles safer than smaller vehicles in crashes?**

A. They have longer front ends to absorb energy from frontal crashes

B. They are heavier and will continue to move forward in a crash with a smaller obstacle

C. They are lighter and will not continue to move forward in a crash with a smaller obstacle

*D. Both A and B*

Section 2.3, B, “Energy Absorption and Safety by Vehicle Design” states, “Larger vehicles have longer front ends (more space between the front of the vehicle and the occupant compartment), which leaves them with more space to crumple up and absorb energy from frontal crashes . . . Second, a heavier vehicle will most often continue to move forward in a crash with a lighter vehicle or smaller obstacles. This protects its passengers from exposure to more force that would otherwise cause injuries.”

**66. About what percentage of Americans admit to going more than 15 mph over the speed limit in the previous month?**

A. 10%

B. 25%

*C. 50%*

D. 75%

Section 2.1, B, “Statistics That Illustrate the Relationship Between Speed and Car Crashes” states, “About half of Americans admit to going more than 15 miles per hour over the speed limit in the previous month.”

**67. What percentage of passenger vehicle occupant deaths are due to frontal crashes?**

A. Less than 50%

*B. More than 50%*

C. Less than 15%

Section 2.3, B, “Energy Absorption and Safety by Vehicle Design” states, “Frontal crashes ‘account for more than half of passenger vehicle occupant deaths.’”

**68. True or False: Vehicles of all sizes are less safe than they were a few decades ago.**

*False*

Section 2.3, B, “Energy Absorption and Safety by Vehicle Design” states, “Vehicles of all sizes are safer than they were a few decades ago, thanks to improvements in crash protection technology.”

**69. True or False: According to the IIHS, lighter vehicles are always at a disadvantage in collisions with heavier vehicles.**

*True*

Section 2.3, B, “Energy Absorption and Safety by Vehicle Design” states, “Those riding in larger vehicles still have a safety advantage over those in smaller ones. The IIHS concludes that ‘a lighter vehicle will always be at a disadvantage in a collision with a heavier vehicle.’”

**70. True or False: Because automakers have lowered large cars' energy-absorbing structures, large cars like SUVs and pickup trucks are now more hazardous for drivers of smaller cars than they used to be.**

*False*

Section 2.3, B, “Energy Absorption and Safety by Vehicle Design” states, “Because automakers have lowered large cars’ energy-absorbing structures, large cars like SUVs and pickup trucks are less hazardous for drivers of smaller cars than they used to be.”

**71. By what percentage does every 1% increase in driving speed increase the chance of getting in an accident?**

A. 1%

*B. 2%*

C. 5%

D. 10%

Section 2.1, B, “Statistics That Illustrate the Relationship Between Speed and Car Crashes” states, “Every 1 percent increase in driving speed increases a driver’s chance of an accident by 2 percent.”

1. [Encyclopaedia Britannica, Newton’s laws of motion](https://www.britannica.com/science/Newtons-laws-of-motion) [↑](#footnote-ref-0)