Conceptual physics chapter 6 review question answers

In the interaction between the hammer and the nail, there is a force exerted on both the hammer and the nail. Newton's third law says that each interaction involves two forces - in this case (1) hammer pushes a nail, and (2) a nail pushes the hammer. When a hammer hits a nail, Newton III's law says that the power of the hammer on the nail is exactly the same as the size of the nail on the hammer. In order to walk across the ground, you are pushing back on the ground with your foot. Newton III's law says that the force of reaction to the workforce is the word that pushes you forward (work: push the earth (backwards). If you are pushing water back is a workforce, the force of the water reaction should be pushing you forward. So, when you swim, the water exerts the force that pushes you along! If the power of the bowstring is pushing the arrow, then the reaction force is the arrow pushes the bowstring. When you jump, you push down on the ground. Call this task force, and notice that this force pushes the earth - not you! According to Newton's third law, the reaction force in this earth reaction must push you upwards, and this is the force that drives you to accelerate in the air. Newton III's law also says that these forces are exactly the same size. Why doesn't the earth seem to be accelerating? Well, remember that Newton II's law says that the acceleration of the body depends on two things: (1) the net force on the object, and (2) body mass (inertia). The earth has a huge mass (about 6 × 1024 kg!), so the strength exerted on it produces only a very small acceleration - barely noticeable. (600 على سبيل المثال، افترض أن القوة التي تمارسها على الأرض هي N = 6 × 102 N. تسارع الأرض، أ = Fnet / 102 × 6) = م N)/(6 × 1024 م 22-10 = (كجم / s2 = 0.000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000 عندما يتم إطلاق مدفع، والقوة التي يمارسها المدفع على مدفع (العمل قوة) هو بالضبط نفس حجم القوة التي تمارسها الكرة على المدفع (رد فعل قوة). ومع ذلك، فإن تسارع كرة المدفع أكبر بكثير من تسارع المدفع! ينص قانون نيوتن الثاني على أن تسارع الجسم يعتمد على القوة الصافية التي تدفع على الجسم وكتلة الجسم (الجمود). منذ مدفع لديه كتلة صغيرة، فإنه يحصل على تسارع كبير (a = Fnet/m) (Acannonball = Fcannonball/ mcannonball). يجب أن تكون قوة رد بما أن الكتلة من المدفع (نسبيا) كبيرة, يحصل المدفع تسارع صغيرة ([أكانون] = [ا] [موكنون]/[موكنون]). الصواريخ لا تدفع ضد الهواء!!! صممت الصواريخ بحيث تجبر محركاتها غازات العادم على الخروج من الجزء الخلفي من الصاروخ بسرعة عالية للغاية. هذه هي قوة العمل - الصاروخ يدفع غازات العادم. فعل القانون الثالث لنيوتن في هذا التفاعل العادم Pushing missiles. This is the power that accelerates the rocket! Note that the rocket is a completely self-contained system - no air is necessary. In fact, all the air is not providing air resistance (clouds) to slow down the rocket. Rockets are much more efficient where there is no air! (See Figure 6-10 on page 79 of the text.) In the interaction between apples and oranges, there is one force exerted on the apple. It's the orange force pulling the apple. In the interaction between apples and oranges, there is one force exerted on oranges. It's the power of apples pulling oranges. Yes, these forces are equal in size and opposite in direction, because they form the reaction force pair of Newton's Third Law. Note that these forces do not cancel! The orange work force pulls the apple works to speed up the apples, and the apple reaction force pulls the orange works to speed up the oranges. Note that this question treats apples and oranges as separate objects, so the workforce/reaction pair of Newton's Third Law is not revoked. (See Figure 6-10 on page 79 of the text.) First, consider the orange system to mean look at what happens to orange, and ignore all the other things. In this system, the action forces and reaction do not cancel! First of all, there is only one force working on oranges - the power that the apple exerts on it. This is the only force that affects the movement of oranges. The strength of orange pulls apples does not affect the movement of oranges - it speeds up apples (what is pulling on). Yes, oranges are accelerating -- because there is a net force working on it. (The force is the apple pulls oranges.) (See Figure 6-10 on page 79 of the text.) First, consider the orange and apple system. I mean counting apples + rope + oranges to be one object (after all, they're connected). In this case, the apple forces pull orange and orange pulls the apple cancel, because they work on different parts of the same object. No, apples and oranges don't accelerate away from each other (why do they?). Apples and oranges are accelerating towards each other, but the orange apple system, as a whole, is still at rest. After all, the net strength on it is zero! (See Figure 6-13 on page 80 of the text.) Click here to discuss the full horse/cart problem.) (a) There are two horizontal forces that push/pull the cart, bearing the name P and f. Force P is the force of the horse pulling a cart, and the force of friction is the ground pushing vehicle. (b) The net force on the cart is the difference in the two forces you push/pull on: P-F. Therefore, if the horse pulls harder on a vehicle than the friction force pulls it back, the cart accelerates. If the two forces (balance) are abolished exactly, it does not. (See Figure 6-13 on page 80 of the text.) (a) Looking at the graph, there are two horizontal forces on The horse, named F and P. Force F is the force of the earth pushes the horse, and P is the power of a cart that pulls the horse. (b) The net force on the horse must be the difference in the two forces you drive/pull: P-P. If the ground pushes forward on the horse is harder than the cart pulls back on it, and the horse accelerates. If the two forces (balance) are abolished exactly, it does not. (c) Since there are two forces on the horse, the horse must have two powers (Newton III Law). The power horse cart pulls the Newton law third act/reaction partner of the power vehicle pulled horse. The horse power pushes the ground work/reaction partner of the force pushes the ground horse. (See Figure 6-13 on page 80 of the text.) (a) First, remember that the horse cart system means considering the horse and the cart as a single being, bearing in mind that, there are two forces working on the horse cart system, called F and F. Force F is the ground pushes the horse + the cart forward, and the force is the force of ground friction pushing the horse + the cart backwards. (b) Since there are two forces working on the horse + cart system, the net force on it is F-f. As long as the ground pushes forward on the horse + the cart is harder than the friction force pushes backwards on it, the horse + the cart accelerates forward. If the balance of power (cancel), the horse + cart does not accelerate. In order for the horse to increase its speed, it must accelerate. In order for the horse to accelerate, there must be zero net strength on the horse. Looking back at the question #13b, there are 2 forces on the horse - the cart pulls back on the horse (Force P), and the ground pushes forward on the horse (Force F). Therefore, the net strength on the horse is F-P, the difference in ground strength and strength of the cart. If both forces are equal (F = P) the net strength on the horse will be zero, and the horse will not accelerate. We don't want it for the horse to speed up, the power that exercises the ground on the horse must be greater than the power exerted by the cart. How can a horse arrange the ground to push harder on him/her? Easy! Newton's third law says that horse forces push the ground back and the ground pushing the horse forward is a working/reaction pair, which means they are always equal in size. If the horse pushes harder on the ground, then the ground automatically pushes harder on the horse. Voila! Pure power on the horse, and the horse accelerates! If you hit a wall with a force of 200 N, the wall hits you with a force of 200 N (ouch!). The forces you hit the wall and the wall hits you are Newton's third act act/reaction strength pair, so they are always equal and vice versa. You can't hit a feather in the air with a 200 N power because the feather is unable to exercise the power of 200 N on you. forces you hit the feathers and Hits you are Newton's third act act/reaction strength pair, so you must always be quite equal in size. If your body is not strong enough to exercise a certain amount of force on you, then you cannot exercise that much force on it. Your weight is the force of the earth pulls you down, so the reaction force in this reaction is you pull the ground up. When you pull up on the steering wheel, the steering wheel pushes down on you with equal and opposite power. This power is transmitted through you to the pedals, as well as the power you exert on the pedals with your legs. (a) Yes, the forces are equal and opposite - otherwise, there will be net force on you and will be accelerated vertically! (b) No, the troops are not a reaction spouse. The force of reaction to pull down gravity (= earth pulls you down) is you pulling the earth to the top. The reaction force on the upward support force of the floor (= the word pushes you up) is you pushing the floor down. Just because two forces are equal and vice versa does not make them the force pair react. In this case, the guide abandons the fact that both forces mentioned in the problem law on the same object - you. (You may not have much experience walking on floating logs, but walking on a cart or skateboard is almost the same.) So, why is the record moving backwards? Because you're pushing it back, that's why! In order to walk on the record, your foot must exercise strength back on the record. The force of reaction in this interaction is a record that pushes you forward, and this is the power that accelerates you forward. The power you exert on the record accelerates the record back. In order to walk on a floor (or any other surface), you must push your foot back on the ground (force), so that the ground pushes you forward (the force of reaction). The force that the foot (and ground) exerted on each other is the force of friction (between the soles of the shoe and the floor). Therefore, more friction between your foot and the floor means more power available to push you forward, which means easy walking. Because there is generally more friction between the carpet and your foot than a soft floor and your foot, it is easier to walk on a carpeted floor. On the other hand, less friction means less power available to push you forward, which means walking harder. This, of course, is why it can be very difficult to walk on an ice or spot, wet floor. If you step off the edge, both you and earth speed up! You are accelerating down because the net force on you is your weight (the force of the earth pulls you), so, by Newton's second law your acceleration is: you are in free fall, of course. Less abstract, suppose you have a mass of 60 kg and weight (= mg) than about 600 Nm, which is a net force on you. Your accelerometer when you step off the edge, a = Fnet/m = (600 kg) = 10 m/ 2. The earth is accelerating upwards because the net force on Earth (assuming that you are the only object that interacts with the Earth at the moment) is the reaction force of Newton's third law you pull the earth, which is equal to your weight as well (since Newton's Third Act Act/Reaction Forces is always exactly the same size). Ground acceleration, then it is: The Earth has a mass of about 6 × 1024 kg. If you have a mass of 60 kg, this gives an acceleration to the earth about: no wonder you don't notice it! When you are standing on the bathroom scale and pushing on the sink, there are many interactions taking place at the same time - between you and the ground, between you and the range, between you and the sink, etc. Clear and systematic thinking is required to sort out all of this. The way to do this is to look at each object individually and clearly indicate what push/pull forces on any object. (a) A diagram of the situation in which you press the basin on the right is drawn. In the interaction between you and earth there are two forces forces (red arrows in the chart) ground pulls you down (your weight) and you pull the ground is Newton's third act law/reaction strength pair. The force of the earth pulls you down attached to you, because it affects your movement. The force you pull the ground up is glued to the ground, as it affects the movement of the earth. In the interaction between you and the scale, there are two forces. Forces (blue arrows in the chart) you can push the scale down and the scale pushes you up are also Newton's third act act/reaction strength pair. The power scale that drives you is attached to you in the chart because it affects your movement. The strength you can push the scale down is attached to the scale in the graph because it affects the movement of the scale. In the interaction between you and the basin, there are two forces. Forces (green arrows in the chart) you push the sink down and the sink pushes you up are also Newton's third act act/reaction strength pair. The power sink pushes you is attached to you in the chart because it affects your movement. The strength you're pushing the sink down is attached to the sink in the graph because it affects the movement of the sink. In this problem, we are only interested in your suggestion. Since you are in balance, the upward and downward forces you have to balance (cancel) exactly. This means that Fearth = Fscale + Fsink or Fscale = Ferith- Fsink. So, if your weight is 500 N and you are pushing down on the sink with a strength of 50 N, you should provide a strength of only 450 N to support you, and you will read on a scale of 450 N. (b) the situation in which you are pulling up on the sink is displayed on the right. Here, you can pull the sink up, so the sink pulls you down. Again, since you are in balance, the upward and downward balance forces (cancel) must exactly, so Fscale = Ferith + Fsink. If you weigh 500 N and you pull up on the sink with a strength of 50 N, you should provide an ascending strength gauge of 550 N, and on a range that reads 550 N. When the high jump starts its jump, it pushes down against the ground. Newton III's law says that if the earth is pushed down, the earth must be pushed to the highest force of reaction. This force (the earth pushes it) is responsible for its upward acceleration. In fact, there are two forces on it - the ground pushes upwards (the force of reaction to push it) and the ground withdraws (its weight). The net strength on them is the difference: Fnet = Fground- Firth. So, if she weighs 500 n, she must push down on the ground with a force greater than 500 N in order to jump (accelerate) to the top. After it leaves the ground it can no longer be pushed, so the only force it works on is its weight (the ground pulls its = mg). So it's a projectile! Earth forces pull the satellite and the earth's satellite pulls is Newton's third act act/reaction force pair, which means they must be exactly the same size at all times. Therefore, if the Earth pulls a satellite with a force of 1000 N, the satellite pulls the Earth with a force of 1000 N is the force of reaction. The Earth has accelerated with the power of the satellite! However, Newton's second law says that body acceleration depends on both the pure strength on the body and body mass. The earth's mass is so enormous that this force causes very little acceleration of the Earth. See The Answer to Problem 24 for some typical numbers. The forces of pushing a bicycle truck and pushing a bicycle push truck are Newton's third act act/reaction force pair, which means they must be exactly the same size at all times. However, Newton's second law says that body acceleration depends on both the pure strength on the body and body mass. Since the truck receives a very large mass (compared to the bike) it gets a relatively small acceleration of this strength. The bike has a relatively small mass, so the strength gives it relatively large acceleration. The smaller acceleration of the truck will cause a smaller change in the movement of the truck (speed), and the larger acceleration of the bike will cause a greater change in the movement of the bike (speed). In the interaction between bus and bug, we can call the bus force pushing the action force bug. Then the power of the bug pushes the bus is the force of reaction. Since these forces Newton's third law act/reaction power pair, they are exactly the same size. However, the acceleration of the bus and the impurities are certainly not equal. Newton's second law says that the acceleration of the body depends on both the pure force and the mass (immobility) of the object. Since the mass of the bus is enormous compared to the mass of the bug, the same power will speed up the bus much less than it will speed up the bugs. Missiles don't push against the air!!! The rockets are designed to force exhaust gases from the back of the rocket at very high speed. This is the work force - the rocket pushes exhaust gases. The reaction force in Newton's third law in this exhaust gas reaction must be rocket propelling. This is the power that accelerates the rocket! Note that the rocket is a completely self-contained system - no air is necessary. In fact, all the air is not providing air resistance (clouds) to slow down the rocket. Rockets are much more efficient where there is no air! (This is the same chapter 6 review of question #8.) Since cannon forces push cannon and cannon pushing cannon are Newton's third act act/reaction pair strength, it is true that they are perfectly equal and vice versa. However, they do not cancel out to produce zero net strength! The power cannon cannon affects movement cannon. The power cannon cannon affects the movement of the cannon. The forces do not cancel because they work on different objects. Forces that operate on the same object can cancel! If the refrigerator moves at a constant speed, its acceleration is zero. If its acceleration is zero, the net force on the refrigerator is zero (Newton's first law), which means that all the forces that push and pull on the refrigerator must be eliminated exactly. Therefore, if you push a force of 200 N on the refrigerator, there should be a friction force of 200 n running on the refrigerator that eliminates your strength. Yes, the forces are equal (200 n) and vice versa (in the direction). No, the force of friction is not the force of Newton's reaction to the third law, your strength is you pushing the refrigerator, so the power of Newton's third law reaction must be a refrigerator that drives you. The force of friction is the ground pushes the refrigerator. Even the force of Newton's third law reaction because it must be a refrigerator pushes the ground. Note that the forces that cancel (push the refrigerator and the floor pushes the refrigerator) both work on the refrigerator. No, it can't be done. Newton's third law says that the two forces you pull a friend and a friend pull you must be equal in size and opposite in the direction. One end of the cord cannot be under greater tension than the other. The spring scale reads 50 N. Tables of tension in the spring - not the pure force on it - the total strength on it. (We set up a similar case in class, remember?) (a) The tension in the arms of a strong man is the same when one rope is tied to the tree. As the pure power on the zero man (since it is in balance), and the same force exerted to the right (by the horse), the force strained by the tree must be the same as force strained by the horse in the upper diagram. (Suppose a horse can pull a force of 500 N. what Tension in a man's arms? 500 n. See Ch 6 review #13) (b) in the bottom chart, pulls two horses to the right. It is reasonable to assume that two horses can be towed with twice the strength of one horse, so the pull of strength to the right on the man is twice as much as before. Therefore, the tension in a man's arms will be twice as high as in the two top charts. (Yes, the tree is making twice the strength to the left, too.) In order to climb up, the airship pulls down on the rope, so as the balloon moves up, the balloon moves down. When you get up from the sitting position, your feet must push down against the ground with greater strength than your weight. As you accelerate upwards, there must be a net force rising on you. Therefore, you should push the floor up on you with greater strength than your weight. How does the floor know how to do that? Newton's Third Law! You can push down on the ground with greater strength than your weight, so the ground automatically pushes you up with greater strength than your weight. When the weight lifts jerks on his head, the strength he exerts on the bell must be greater than the weight of the bell. As the bell accelerates upwards, there must be a pure upward force on the bell. This means that the force you must exert up must be greater than the weight of the bell (the ground pulls the bell down). (e) Lower).

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