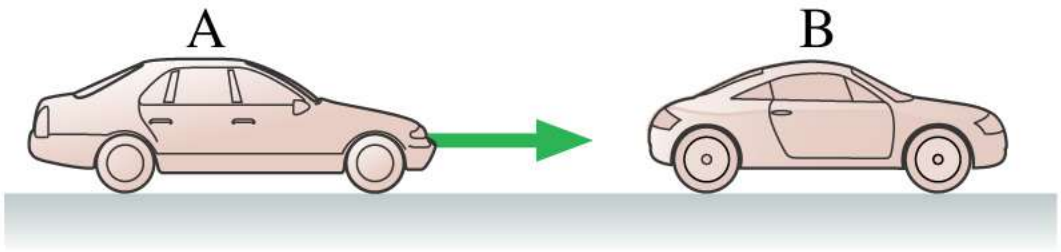
Car B is stopped for a red light. Car A, which has the same mass as car B, doesn't see the red light and runs into the back of B. Which of the following statements is true?




1. B exerts a force on A but A doesn't exert a force on B.
2. B exerts a larger force on A than A exerts on B.
3. B exerts the same amount of force on A as A exerts on B.
4. A exerts a larger force on B than B exerts on A.
5. A exerts a force on B but B doesn't exert a force on A.

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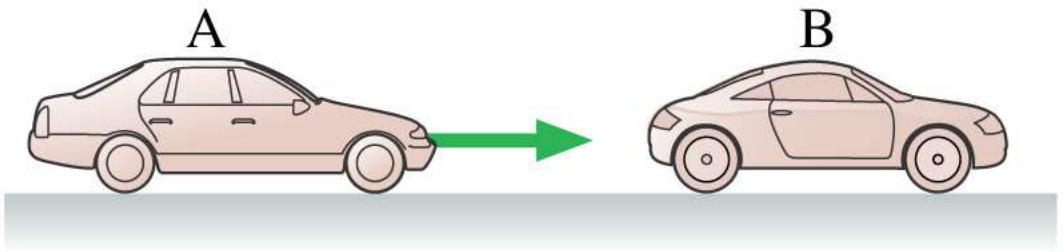


1. B exerts a force on A but A doesn't exert a force on B.
2. B exerts a larger force on A than A exerts on B.
3. **B exerts the same amount of force on A as A exerts on B.**
4. A exerts a larger force on B than B exerts on A.
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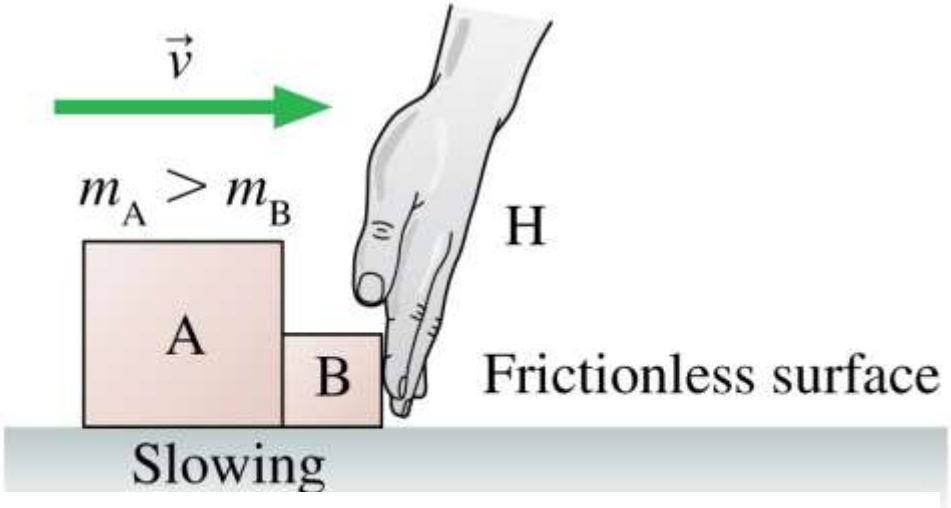
Boxes A and B are sliding to the right across a frictionless table. The hand H is slowing them down. The mass of A is larger than the mass of B. Rank in order, from largest to smallest, the *horizontal* forces on A, B, and H.




1. $F_{\text{B on H}} = F_{\text{H on B}} = F_{\text{A on B}} = F_{\text{B on A}}$
2. $F_{\text{B on H}} = F_{\text{H on B}} < F_{\text{A on B}} = F_{\text{B on A}}$
3. $F_{\text{B on H}} = F_{\text{H on B}} > F_{\text{A on B}} = F_{\text{B on A}}$
4. $F_{\text{H on B}} = F_{\text{H on A}} > F_{\text{A on B}}$

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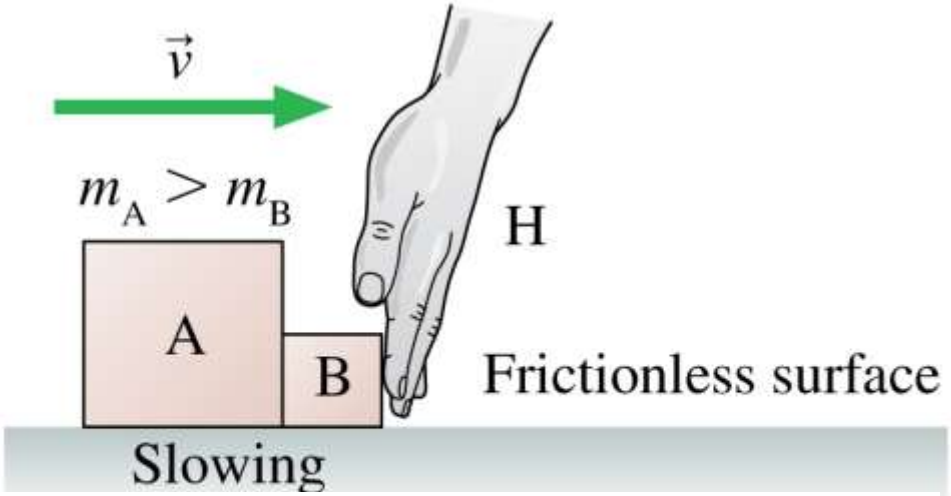


1. $F_{\text{B on H}} = F_{\text{H on B}} = F_{\text{A on B}} = F_{\text{B on A}}$
2. **$F_{\text{B on H}} = F_{\text{H on B}} < F_{\text{A on B}} = F_{\text{B on A}}$** ✔
3. $F_{\text{B on H}} = F_{\text{H on B}} > F_{\text{A on B}} = F_{\text{B on A}}$
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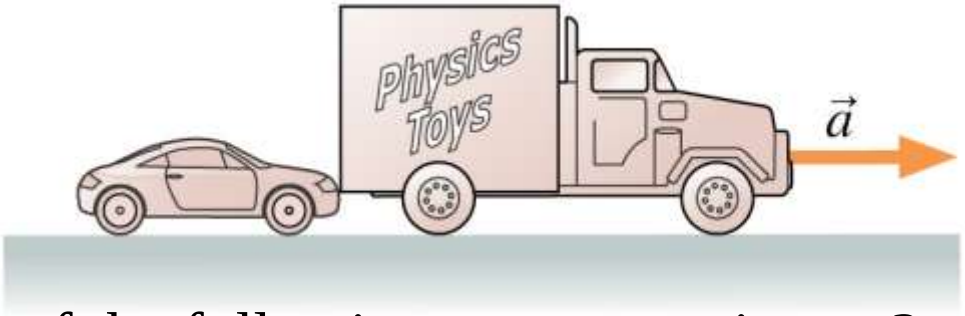
A small car is pushing a larger truck that has a dead battery. The mass of the truck is larger than the mass of the car. Which of the following statements is true?




1. The car exerts a force on the truck but the truck doesn't exert a force on the car.
2. The car exerts a larger force on the truck than the truck exerts on the car.
3. The car exerts the same amount of force on the truck as the truck exerts on the car.
4. The truck exerts a larger force on the car than the car exerts on the truck.
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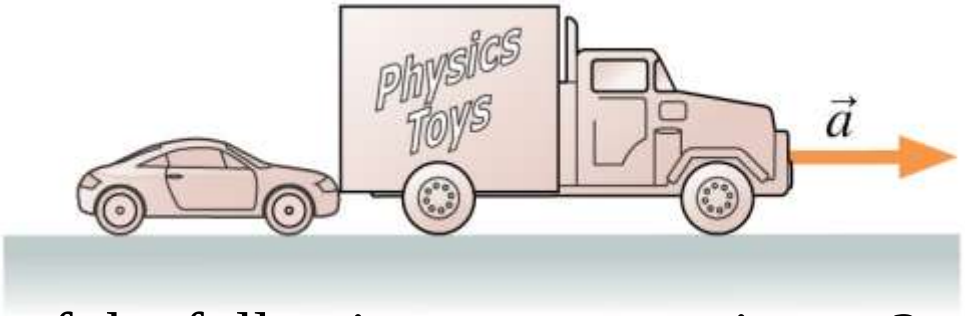


1. The car exerts a force on the truck but the truck doesn't exert a force on the car.
2. The car exerts a larger force on the truck than the truck exerts on the car.
3. **The car exerts the same amount of force on the truck as the truck exerts on the car.**
4. The truck exerts a larger force on the car than the car exerts on the truck.
5. The truck exerts a force on the car but the car doesn't exert a force on the truck.

An astronaut on Earth kicks a bowling ball and hurts his foot. A year later, the same astronaut kicks a bowling ball on the Moon with the same force. His foot hurts...

1) **more**
2) **less**
3) **the same**

The *masses* of both the bowling ball and the astronaut remain the same, so his foot feels the same resistance and hurts the *same* as before.


**Follow-up: What is different about the bowling ball on the Moon?**

When you climb up a rope, the first thing you do is pull down on the rope. How do you manage to go up the rope by doing that?

1) **this slows your initial velocity, which is already upward**
2) **you don't go up, you're too heavy**
3) **you're not really pulling down – it just seems that way**
4) **the rope actually pulls you up**
5) **you are pulling the ceiling down**

**When you pull down on the rope, the rope pulls up on you!! It is actually this upward force by the rope that makes you move up! This is the "reaction" force (by the rope on you) to the force that you exerted on the rope. And voilá, this is Newton's Third Law.**