

Newton's Laws of Motion for Kids: the three laws, three experiments and a 15-question worksheet

The three laws in one line each

First law (inertia): a thing keeps doing what it is doing, still or moving, until a force changes it.

Second law: the harder you push, the faster it speeds up; the heavier it is, the less it speeds up ($F = m \times a$).

Third law: every push has an equal push back the other way.

Three experiments with things in the kitchen

1. Coin and card (first law): balance a card on a glass and a coin on the card; flick the card away fast. The coin drops straight into the glass because nothing pushed the coin sideways.
2. Balloon rocket (third law): thread a straw on a string, tape a blown-up balloon to the straw, let go. Air pushes out backwards, the balloon goes forwards.
3. Marble and book (second law): roll a marble and a golf ball with the same flick. The lighter one speeds up more from the same push.

Worksheet: which law? (write 1, 2 or 3)

1. A seatbelt stops you when the car stops suddenly. ____
2. A rocket goes up as hot gas goes down. ____
3. A shopping trolley is harder to push when full. ____
4. A ball keeps rolling on ice for a long way. ____
5. You push a wall and the wall pushes your hands. ____
6. Pedalling harder makes the bike go faster. ____
7. A tablecloth pulled fast leaves the plates in place. ____
8. A swimmer pushes water back and moves forward. ____

Worksheet: fill in the numbers

9. A 2 kg cart pushed with 10 N. Acceleration = ____ m/s^2
10. A 5 kg cart, acceleration 2 m/s^2 . Force = ____ N
11. Force 12 N, acceleration 4 m/s^2 . Mass = ____ kg
12. Same push on a 1 kg ball and a 3 kg ball. Which speeds up more? ____
13. A book rests on a table. The table pushes up with a force ____ (bigger / equal / smaller) than the book's weight.
14. Why does a ball on the floor stop? Name the force. ____
15. In space, far from everything, a thrown ball would ____ (stop / keep going).

Answers

1) 1 2) 3 3) 2 4) 1 5) 3 6) 2 7) 1 8) 3

9) 5 m/s^2 ($a = F/m = 10/2$) 10) 10 N ($F = 5 \times 2$) 11) 3 kg ($m = F/a = 12/4$) 12) the 1 kg ball 13) equal 14) friction 15) keep going, forever, in a straight line

What each law is for, later

The first law is why seatbelts and airbags exist. The second is every physics calculation from Class 9 to A-level. The third is how rockets, swimmers and walking work. A child who can name the law in a situation, not just recite it, has done the hardest part of school physics. 1-on-1 online physics from middle school: sciencewithshobha.com/subjects/physics/