

Force Balance Lab

Find net force and decide whether forces balance.

GRADE 6 • TEKS 6.7.B

6.7.B "calculate the net force on an object in a horizontal or vertical direction using diagrams and determine if the forces are balanced or unbalanced; and"

NAME _____

DATE _____

FIND THE NET FORCE

Add forces that push or pull in the same direction. Then subtract forces in opposite directions. A net force of 0 N means balanced forces. Any other net force means unbalanced forces and points in the direction of the greater total force.

WORKED EXAMPLE

A cart has a 29 N force to the right and an 8 N force to the left. Find the net force and tell whether the forces are balanced.

1. Rightward force = 29 N.
2. Leftward force = 8 N.
3. $29\text{ N} - 8\text{ N} = 21\text{ N}$.
4. The greater force is to the right, so the net force is rightward.

Answer: 21 N to the right, unbalanced

PRACTICE 6 problems

- 1** A toy car has a 15 N force to the right and a 4 N force to the left. Find the net force. Are the forces balanced or unbalanced?

ANSWER _____

- 2** A lamp has a 6 N upward support force and a 6 N downward gravitational force. Find the net force. Are the forces balanced or unbalanced?

ANSWER _____

- 3** A box is pulled with an 18 N force to the left and a 3 N force to the right. Find the net force. Are the forces balanced or unbalanced?

ANSWER _____

- 4** A basketball is moving downward. Gravity pulls down with 13 N, and air resistance pushes up with 4 N. Find the net force. Are the forces balanced or unbalanced?

ANSWER _____

- 5** Three horizontal forces act on a wagon: 10 N right, 2 N left, and 3 N left. Find the net force. Are the forces balanced or unbalanced?

ANSWER _____

- 6** A drone has two upward forces, 6 N and 1 N. A downward force of 7 N also acts on it. Find the net force. Are the forces balanced or unbalanced?

ANSWER _____

APPLY IT Show your work

- 1** Maya rides an electric scooter. Use the force diagram to find the net horizontal force on the scooter. Then decide whether the forces are balanced or unbalanced.

FORCES ON MAYA'S SCOOTER

Force	Direction	Size
Rider's push	right	24 N
Friction	left	11 N
Wind	left	4 N

ANSWER _____

- 2** At an amusement park, a ride car has a 30 N upward cable force. Gravity pulls down with 22 N, and friction pushes down with 3 N. Find the net vertical force on the car. Are the forces balanced or unbalanced?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A robot delivery cart has a 19 N force to the left and a 12 N force to the right. One more horizontal force will be added to make the forces balanced. What magnitude and direction must the new force have? Explain why.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A toy car has a 15 N force to the right and a 4 N force to the left. Find the net force. Are the forces balanced or unbalanced?	11 N to the right, unbalanced
2	A lamp has a 6 N upward support force and a 6 N downward gravitational force. Find the net force. Are the forces balanced or unbalanced?	0 N, balanced
3	A box is pulled with an 18 N force to the left and a 3 N force to the right. Find the net force. Are the forces balanced or unbalanced?	15 N to the left, unbalanced
4	A basketball is moving downward. Gravity pulls down with 13 N, and air resistance pushes up with 4 N. Find the net force. Are the forces balanced or unbalanced?	9 N downward, unbalanced
5	Three horizontal forces act on a wagon: 10 N right, 2 N left, and 3 N left. Find the net force. Are the forces balanced or unbalanced?	5 N to the right, unbalanced
6	A drone has two upward forces, 6 N and 1 N. A downward force of 7 N also acts on it. Find the net force. Are the forces balanced or unbalanced?	0 N, balanced

PART 2 • APPLY IT

- 9 N to the right, unbalanced** Add the leftward forces: $11\text{ N} + 4\text{ N} = 15\text{ N}$. Subtract 15 N from 24 N, so the net force is 9 N to the right.
- 5 N upward, unbalanced** The total downward force is $22\text{ N} + 3\text{ N} = 25\text{ N}$. Subtract 25 N from the 30 N upward force.

CHALLENGE

7 N to the right. This makes the total rightward force 19 N, equal to the 19 N leftward force, so the net force is 0 N.

Accept equivalent direction wording, such as rightward for to the right and downward for down. Students should identify balanced only when the net force is exactly 0 N.