Newton’s Laws of Motion — Worksheet

Name: _____ Date: _____

Part A — The Three Laws

Complete the sentences using the words below.

inertia — acceleration — equal — opposite — force — rest

1. Newton’s First Law states that an object at _____ will remain at rest, and an object in motion will continue moving unless acted on by an unbalanced _____.

2. The tendency of an object to resist a change in its motion is called _____.

3. Newton’s Second Law explains the relationship between force, mass, and _____.

4. Newton’s Third Law states that when one object exerts a force on another object, the second object exerts an _____ and _____ force back.

Part B — Which Law?

Write **First Law, Second Law, or Third Law** for each situation.

5. A passenger moves forward when a car suddenly stops.

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6. An empty shopping cart accelerates more easily than a full shopping cart when pushed with the same force.

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7. A swimmer pushes water backward, and the water pushes the swimmer forward.

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8. A soccer ball remains still until a player kicks it.

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9. A rocket pushes exhaust gases downward while the gases push the rocket upward.

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10. Kicking a soccer ball harder causes it to accelerate more.

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Part C — Balanced and Unbalanced Forces

11. A book is resting on a table.

Gravity pulls downward with 10 N.
The table pushes upward with 10 N.

Are the forces **balanced or unbalanced**?

What is the resultant force?

_____ N

Will the book accelerate?

Yes / No

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12. A box has two horizontal forces acting on it.

40 N right → [BOX] ← 25 N left

Are the forces balanced or unbalanced?

Calculate the resultant force.

Give its direction.

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13. What happens to an object's motion when the forces acting on it are balanced?

A. It must accelerate
B. It must stop
C. Its motion does not change
D. It must move faster

Answer: _____

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Part D — Newton’s Second Law

Use: **F = ma**

where:

F = force (N)
m = mass (kg)
a = acceleration (m/s²)

14. A 5 kg object accelerates at 3 m/s².

Calculate the force.

Working:

Force = _____ N

15. A 4 kg cart is pushed with a resultant force of 20 N.

Calculate its acceleration.

Working:

Acceleration = _____ m/s²

16. Two carts are pushed with the same force.

- Cart A has a mass of 2 kg.
- Cart B has a mass of 8 kg.

Which cart will have the greater acceleration?

Explain why.

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Part E — Predict the Motion

17. A stationary object has balanced forces acting on it. Predict what will happen.

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18. An object is moving at constant speed in a straight line. The forces acting on it remain balanced. What happens next?

A. It immediately stops
B. It continues at constant velocity
C. It accelerates
D. It changes direction

Answer: _____

19. A moving bicycle experiences a greater force forward than backward. Predict what will happen to its motion.

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20. A car is traveling forward when the driver suddenly applies the brakes. Use **inertia** to explain why passengers tend to move forward.

Part F — Apply Your Understanding

21. A student says:

“If an object is moving, there must always be an unbalanced force pushing it forward.”

Is the student correct?

Yes / No

Explain your answer using Newton’s First Law.

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