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Force and pressure for Grade 8

Practice worksheet - Science · Grade 8 · Predict, model, explain

Name: _____ Date: _____

Show your working. Answers and explanations follow on a separate page.

Show the quantity you are finding, the formula or force combination, the units and a reason. The questions supply force values directly. Use the diagrams for reasoning; no physical experiment is required.

1. A book rests on a table. Does this prove that no forces act on it?

2. Two pushes of 7 N and 2 N act left along the same line. Find their combined force.

3. A horizontal 12 N pull right is opposed by 5 N friction left. Find the net horizontal force.

4. A trolley moves straight at constant speed. Can its net force be zero?

5. A force of 90 N acts perpendicularly over 0.03 m^2. Find the average pressure.

6. Keep the force fixed but make the contact area three times as large. What happens to pressure?

7. Convert 200 cm^2 to m^2.

8. A 30 N load acts over 100 cm^2. Find the average pressure in Pa.

9. Pad X: 50 N over 0.01 m^2. Pad Y: 100 N over 0.04 m^2. Which pressure is greater?

10. Two points are at the same depth in the same connected liquid at rest. One is near a wide side and the other near a narrow side. Under the same surface conditions, which has greater pressure?

11. A learner says: 'A magnet attracts all metals because magnetic force acts without contact.' What needs correcting?

12. Design a fair comparison of two model support pads using supplied force and area data. What should stay the same if you want to isolate the effect of area?

Answers and explanations

Answer key - Science · Grade 8 · Predict, model, explain

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1. No.

Earth pulls the book down and the table supports it upward. If these forces balance, the book can remain at rest.

2. 9 N left.

The pushes act in the same direction, so add their sizes and retain that direction.

3. 7 N right.

Opposite forces subtract: $12 - 5 = 7$. The stronger pull determines the net direction.

4. Yes.

Zero net force means no change in velocity. It does not require zero velocity. The statement assumes the relevant forces balance.

5. 3,000 Pa.

$P = F \div A = 90 \div 0.03 = 3{,}000$ N/m². Multiply the result by 0.03 m² to recover 90 N.

6. It becomes one third as large.

Area is in the denominator of F/A. This conclusion requires the force to remain unchanged.

7. 0.02 m².

Divide by 10,000 because the conversion is for area: $200 \div 10{,}000 = 0.02$.

8. 3,000 Pa.

100 cm² = 0.01 m², so $P = 30 \div 0.01 = 3{,}000$ Pa.

9. Pad X: 5,000 Pa, compared with 2,500 Pa for Pad Y.

Calculate both force-to-area ratios. The larger total force on Y does not by itself establish greater pressure.

10. Neither; the pressures are equal.

For a resting liquid of uniform density, depth and surface pressure control this comparison. Container width is not enough to change it.

11. A magnet does not attract every metal. Non-contact describes how a force can act, not which materials respond strongly.

The learner joins a correct category to an incorrect universal claim. Iron is a suitable example; do not generalise it to all metals.

12. Keep the perpendicular force the same and change only the contact area in the calculation.

Then compare F/A. State the assumed force and both areas, use consistent units and avoid unsafe physical loads; this can be a paper-based comparison.