NAME _____ per ___ date_____ mailbox_____

CALCULATING FORCE WORKSHEET

Calculate the force in the following problems by using the equation:
Force = mass x acceleration **F = m x a**
Be sure to **(1)** ALWAYS write the equation, **(2)** plug in the numbers and units, and **(3)** give the answer with the correct units. (Disregard friction)

Conversion factor – (1000 grams equals 1kilogram) or (1 gram = .001 kilograms)

1. A man hits a golf ball (0.042kg) which accelerates at a rate of 20 m/s^2. What amount of force acted on the ball?

2. You give a shopping cart a shove down the aisle. The cart is full of groceries and has a mass of 18 kg. The cart accelerates at a rate of 3 m/s^2. How much force did you exert on the cart?

3. The wind pushes a paper cup along the sand at a beach. The cup has a mass of 0.25 kg and accelerates at a rate of 5 m/s^2. How much force is the wind exerting on the cup?

4. You push a friend sitting on a swing. She has a mass of 50 kg and accelerates at a rate of 4 m/s^2. Find the force you exerted.

5. How much force would it take to push another, larger friend who has a mass of 70 kg to accelerate at the same rate of 4 m/s^2?

6. A worker drops his hammer off the roof of a house. The hammer has a mass of 2500g. Gravity accelerates objects on earth at 9.8 m/s^2. How much force does the earth apply to the hammer?

7. A boy skips a stone (2.5grams) across the surface of a pond. He throws the stone with 5 newton of force. What was the stone's acceleration?

8. A woman hits a golf ball with a mass of (45g) with a force of 5 newton. What is the acceleration rate of the ball?

9. You give a shopping cart a shove down the second isle. The cart is full of groceries and has a mass of 18 kg. You apply 55N of force. What is the acceleration for the cart full of groceries?

10. You push your friend again sitting on a swing with 200N of force. She accelerates at a rate of 5 m/s^2.What is the friend's mass?

11. A boy drops his toy off the bunk bed. The distance to the floor is 2.5m. It takes one second to reach the floor. Gravity accelerates objects on earth at 9.8 m/s^2. The earth's gravity applies 50 newton of force to the toy? What is the toy's mass?

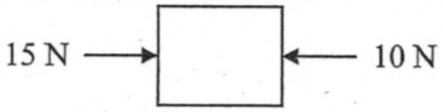
12. Children playing race match box cars across the floor. One car has a final velocity of 5m/s. From start to finish the race is only a second. The mass of the car 4grams. How hard did the child push the car?

Name_____ Date_____ Period_____

Force Practice Problems

1. Describe Force - _____
   _____

2. A box is being pushed by two stellar science students, one on each side of the box. Lindsey is pushing the box with a force of 10 N to the left. Taylor is pushing the box with a force of 15 N to the right. Who is the stronger individual and what is the net force and direction on the box?



3. What is the force of an object with a mass of 20 kg and an acceleration of 5 m/s2?

4. Calculate the acceleration of a 150 kg object that is moved with a force of 300N.

5. What is the mass of an object that is accelerating 60 m/s2 when a force of 3000N is exerted?

6. After shot putter throws the shot, she is no longer accelerating it with a force. The shot now falls into the pit. What is the shot's acceleration as it "falls" to the pit?

7. What net force is required to accelerate a car at a rate of 2 m/s2 if the car has a mass of 3,000 kg?

8. A10 kg bowling ball would require what force to accelerate down an alleyway at a rate of 3 m/s2?
9. Nathan has a car that accelerates at 5 m/s^2. If the car has a mass of 1000 kg, how much force does the car produce?

10. What is the mass of a falling rock if it produces a force of 147 N? (Hint: Gravities Acceleration)

11. What is the mass of a truck if it produces a force of 14,000 N while accelerating at a rate of 5 m/s^2?

12. What is the acceleration of softball if it has a mass of 0.5 kg and hits the catcher's glove with a force of 25 N?

13. Your own car has a mass of 2000 kg. If your car produces a force of 5000 N, how fast will it accelerate?

14. Alex switches his car to run on nitrous oxide fuel. The nitrous oxide allows his car to develop 10,000 N of force. What is Alex's acceleration if his car has a mass of 500 kg?

15. What changes depending on location in the universe, mass or weight? Explain why it changes.

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NAME _____ per ___ date_____ mailbox_____

CALCULATING FORCE WORKSHEET

Calculate the force in the following problems by using the equation: $1\ N = 1\ kg\ (m/s^2)$

Force = mass x acceleration **F = m x a**

Be sure to **(1)** ALWAYS write the equation, **(2)** plug in the numbers and units, and **(3)** give the answer with the correct units. (Disregard friction)

Conversion factor - (1000 grams equals 1kilogram) or (1 gram = .001 kilograms)

Gravity is a force: Accel = 9.8 m/s²

Weight is a measure of force. Mass is not.

Force: $F = M \times A$ units = N

Mass: $M = F/A$ units kg

Acceleration: $A = F/M$ units m/s^2

1. A man hits a golf ball (0.2 kg) which accelerates at a rate of 20 m/s². What amount of force acted on the ball?

$F = m(A)$ | $F = 0.2kg\ (20\ m/s^2)$ | $F = 4\ N$

2. You give a shopping cart a shove down the aisle. The cart is full of groceries and has a mass of 18 kg. The cart accelerates at a rate of 3 m/s². How much force did you exert on the cart?

$F = m(A)$ | $F = 18kg\ (3\ m/s^2)$ | $F = 54\ N$

3. The wind pushes a paper cup along the sand at a beach. The cup has a mass of 0.25 kg and accelerates at a rate of 5 m/s². How much force (in newtons) is the wind exerting on the cup?

$F = m(A)$ | $F = 0.25kg\ (5\ m/s^2)$ | $F = 1.25\ N$

4. You push a friend sitting on a swing. She has a mass of 50 kg and accelerates at a rate of 4 m/s².Find the force you exerted.

$F = m(A)$ | $F = 50kg\ (4\ m/s^2)$ | $F = 200\ N$

5. How much force would it take to push another, larger friend who has a mass of 70 kg to accelerate at the same rate of 4 m/s²?

$F = m(A)$ | $F = 70kg \times 4\ m/s^2$ | $F = 280\ N$

6. A worker drops his hammer off the roof of a house. The hammer has a mass of 2500 grams. convert
Gravity accelerates objects on earth at 9.8 m/s². How much force does the earth apply to the hammer?

convert

$F = M(A)$ | $F = 2.5\,kg \times 9.8\,m/s^2$ | $F = 24.5\,N$

7. A boy skips a stone (2.5grams) across the surface of a pond. He throws the stone with 5 newton of force. What was the stone's acceleration?

$A = F/M$ | $A = \frac{5\,kg\,(m/s^2)}{0.0025\,kg}$ | $A = 2000\,m/s^2$

8. A woman hits a golf ball with a mass of ~~(0.2 kg)~~ 45 g with a force of 5 newton. What is the acceleration rate of the ball?

$A = F/M$ | $A = \frac{5\,N}{0.045\,kg}$ (convert) | $A = 111.\overline{1}\,m/s^2$

9. You give a shopping cart a shove down a second isle. The cart is full of groceries and has a mass of 18 kg. You apply 55N of force. What is the acceleration for the cart full of groceries?

$A = F/M$ | $A = \frac{55\,N}{18\,kg}$ | $A = 3.0\overline{5}\,m/s^2$

10. You push your friend again sitting on a swing with 200N of force. She accelerates at a rate of 5 m/s². What is the friend's mass?

$M = F/A$ | $M = \frac{200\,N}{5\,m/s^2}$ | $M = 40\,kg$

11. A boy drops his toy off the bunk bed. The distance to the floor is 2.5m. It takes one second to reach the floor. Gravity accelerates objects on earth at 9.8 m/s². The earth's gravity applies 50 newton of force to the toy? What is the toy's mass?

$M = F/A$ | $M = \frac{50\,N}{9.8\,m/s^2}$ | $M = 5.1\,kg$

12. Children playing race match box cars across the floor. One car has a final velocity of 5m/s. From start to finish the race is only a second. The mass of the car 4grams. How hard did the child push the car?

$A = 5\,m/s^2$

$F = M(A)$ | $F = (4g)(5\,m/s^2)$ | $F = 20\,N$

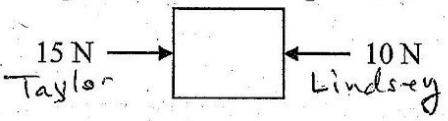
newton (N) international unit of force. { 1N is required to accelerate 1kg to 1m/s².

Name Key Date 2019 Period

Force Practice Problems

1. Describe Force - the energy or strength required to move an object, (displace) and there by having accelerated it.

2. A box is being pushed by two stellar science students, one on each side of the box. Lindsey is pushing the box with a force of 10 N to the left. Taylor is pushing the box with a force of 15 N to the right. Who is the stronger individual and what is the net force and direction on the box?



Assuming they are pushing w/ max effort... Taylor.
(→ 5 N to the right)

3. What is the force of an object with a mass of 20 kg and an acceleration of 5 m/s2?

$F = m(A)$ $F = 20\,kg \times 5\,m/s^2$ $F = 100\,N$

4. Calculate the acceleration of a 150 kg object that is moved with a force of 300N.

$F = m(A)$ $F = 150\,kg \times A$ $\frac{300\,N}{150\,kg} = A$ $A = 3\,m/s^2$

$A = \frac{F}{m}$

5. What is the mass of an object that is accelerating 60 m/s2 when a force of 3000N is exerted?

$F = m(A) \rightarrow m = \frac{F}{A}$ $m = \frac{3000\,N}{60\,m/s^2}$ $m = 50\,kg$

6. After shot putter throws the shot, she is no longer accelerating it with a force. The shot now falls into the pit. What is the shot's acceleration as it "falls" to the pit?

$9.8\,m/s^2$

7. What net force is required to accelerate a car at a rate of 2 m/s2 if the car has a mass of 3,000 kg?

$F = m(A)$ $F = 2\,m/s^2 \times 3000\,kg$

$F = 6000\,N$

$F = m(A)$ $F = 10kg(3m/s^2)$ $F = 30N$

8. A10 kg bowling ball would require what force to accelerate down an alleyway at a rate of 3 m/s2?
9. Nathan has a car that accelerates at 5 m/s^2. If the car has a mass of 1000 kg, how much force does the car produce?

$F = 1000kg\ (5m/s^2)$ $F = 5000N$

10. What is the mass of a falling rock if it produces a force of 147 N? (Hint: Gravities Acceleration) $9.8m/s^2$

$M = \frac{F}{A}$ $M = \frac{147N}{9.8m/s^2}$ $M = 15kg$

11. What is the mass of a truck if it produces a force of 14,000 N while accelerating at a rate of 5 m/s^2?

$M = \frac{F}{A}$ $M = \frac{14,000N}{5\ m/s^2}$ $M = 2800kg$

12. What is the acceleration of softball if it has a mass of 0.5 kg and hits the catcher's glove with a force of 25 N?

$A = \frac{F}{m}$ $A = \frac{25N}{0.5kg}$ $A = 50m/s^2$

13. Your own car has a mass of 2000 kg. If your car produces a force of 5000 N, how fast will it accelerate?

$A = \frac{F}{m}$ $A = \frac{5000N}{2000kg}$ $A = 2.5m/s^2$

14. Alex switches his car to run on nitrous oxide fuel. The nitrous oxide allows his car to develop 10,000 N of force. What is Alex's acceleration if his car has a mass of 500 kg?

$F = m(A) \rightarrow A = \frac{F}{m} \rightarrow A = \frac{10,000N}{50kg}$ $A = 20m/s^2$

15. What changes depending on location in the universe, mass or weight? Explain why it changes.

Mass cannot change -- weight however is the force of gravity on object, & changes dependent on the planet.