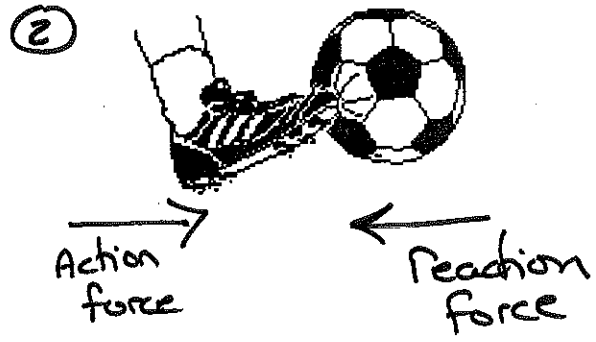
Worksheet: Newton's 3rd Law & Momentum Period_____ Date_____

(Frameworks Code)

Part A: Answer the following questions in the spaces provided:

1. How does the diagram illustrate Newton's 3rd law of motion? In your answer, compare the force of the foot kicking the soccer ball with the force of the soccer ball on the foot. Draw arrows to represent the **size** and **direction** of the action force and reaction force. The foot Pushes (force) on the Ball and the ball pushes (force) equally on the foot



2. If a force that propels a cannonball forward is 500 N, how much force will move the cannon backwards? Explain. 500N, reaction forces are equal & opposite
3. What is momentum? A product of an objects mass & velocity
4. How do you calculate momentum? $P = m \cdot v$
5. Explain the law of conservation of momentum. The total amount of momentum in a system cannot be lost, but maybe transferred
6. What does it mean to say that momentum is *conserved*? momentum maybe transferred between objects
7. Could an elephant have the same momentum as a golf ball? Explain. Yes, if you increase the velocity of the golf ball

Part B: Solve the following momentum problems in the space provided. Show all your work and include labels.

8. What is the momentum of a 20 kg dog running at a speed of 8 m/s?

Given:
$m = 20\,kg$
$V = 8\,m/s$
$P = ?$

Soln: $P = mV$
$= (20\,kg)(8\,m/s)$

$P = 160\,kg \cdot m/s$

9. What is the momentum of a 2-kg toy truck that moves at 10 m/s?

Given:
$m = 2\,kg$
$V = 10\,m/s$
$P = ?$

Soln: $P = mV$
$= (2\,kg)(10\,m/s)$

$P = 20\,kg \cdot m/s$

10. What is the momentum of a 2000-kg truck that moves at 10 m/s?

Given:
$P = ?$
$m = 2000\,kg$
$V = 10\,m/s$

Soln: $P = mV$
$= (2000\,kg \times 10\,m/s)$

$P = 20{,}000\,kg \cdot m/s$

11. Which of the 2 trucks in questions 9 & 10 has more momentum? Why? # 10, the 2000 kg truck, Because it has more MASS