Name: Answer Key **Date:**_____ **Physical Science Period:** ____

Mixed Word Problem Practice

Measurement	Symbol	Unit
Distance	d	m
Time	t	s
Velocity	v (or s)	m/s
Mass	m	g or kg
Acceleration	a	m/s^2
Weight	w	N newton
Force	F	N
Volume	V	cm^3 or mL
Heat	Q	J
Specific heat	c	J/g °C
Temperature	T	K or °C
Current	I	A amps
Resistance	R	Ω ohms
Voltage	V	V volts
Energy	KE or PE	J jouls

Solve the following problems. *Show your work with units.*

1. During a race, a runner runs at a speed of 6 m/s. 2 seconds later, she is running at a speed of 10 m/s. What is the runner's acceleration? Show your work.

   Vf = 10m/s **a = $\frac{Vf - Vi}{t}$** **$\frac{(10\ m/s - 6m/s)}{2s}$** → **2 m/s^2**
   Vi = 6m/s
   t = 2s

2. If you ride your bike at an average speed of 4 km/h and need to travel a total distance of 28 km, how long will it take you to reach your destination? Show your work.

   avg. v = 4 km/h **v = $\frac{d}{t}$ OR t = $\frac{d}{v}$** **$\frac{28\ km}{4\ km/h}$** →**it will take you 7 hours**
   total d = 28 km
   t =?

3. A tow truck exerts a net horizontal force of 1050 N on a 760-kilogram car. What is the acceleration of the car during this time? Show your work.

   F = 1050 N **F= m*a OR a = $\frac{F}{m}$** **$\frac{1050N}{760\ kg}$** → **1.38 m/s^2**
   m = 760 kg
   a = ?

4. The mass of a newborn baby is 3.5 kilograms. What is the baby's weight? (The acceleration due to gravity at Earth's surface is 9.8 m/s^2.) Show your work.

   m = 3.5 kg **W = m*g** **3.5 kg * 9.8 m/s^2 →** **34.3 N**
   g = 9.8 m/s^2
   w = ?

5. A small engine causes a 0.3-kg model airplane to accelerate at a rate of 11 m/s^2. What is the net force on the model airplane? Show your work.

   F = ? **F= m*a** **0.3 kg * 11 m/s^2 →** **3.3 N**
   m = 0.3 kg
   a = 11 m/s^2

6. A worker uses a cart to move a load of bricks weighing 680 N a distance of 10 m across a parking lot. If he pushes the cart with a constant force of 209 N, what amount of work does he do? Show your work.

   F = 209 N **W = F*d** **209 N * 10 m →** **2090 J**
   d = 10 m
   W = ?

7. A girl lifts a 160-N load to a height of 1 m in 0.5 s. What power does the girl produce? Show your work.

   F = 160 N **P = $\frac{W}{t}$ OR $\frac{(f*d)}{t}$** **$\frac{(160\ N * 1\ m)}{0.5\ s}$ →** **320 W**
   d = 1 m
   t = 0.5 s
   P = ?

8. The input force of a pulley system must move 8.0 m to lift a 3000-N engine a distance of 2.0 m. What is the IMA of the system? Show your work.

   IMA = ? **MA = De / Dr** **8.0 m / 2.0 m → 4**
   ***De* = 8.0 m**
   ***Dr* = 2.0 m**

9. A 20-N force applied to the handle of a door produces a 44-N output force. What is the AMA of the handle? Show your work.

   Fr = 44 N **MA = Fr / Fe** **44 N / 20 N → 2.2**
   Fe = 20 N
   MA = ?

10. What is the kinetic energy of a 72.0-kg sky diver falling at a terminal velocity of 79.0 m/s? Show your work.

    KE = ? **KE = ½*m*v²** **(½)(72.0 kg)(79.0 m/s)²**
    m = 72.0 kg **= (36) * (6241) → 224, 676 J**
    v = 79.0 m/s

11. A 0.47-kg squirrel jumps from a tree branch that is 3.5 m high to the top of a bird feeder that is 1.2 m high. What is the change in gravitational potential energy of the squirrel? (The acceleration due to gravity is 9.8 m/s².) Show your work.

    GPE = ? **GPE = mgh** **(0.47 kg)(9.8 m/s²)(2.3 m) → 10.59 J**
    m = 0.47 kg
    g = 9.8 m/s²
    h = 3.5 m – 1.2 m = 2.3 m

12. A small dog is trained to jump straight up a distance of 1.2 m. How much gravitational potential energy does the 7.2 kg dog need to jump this high? (The acceleration due to gravity is 9.8 m/s².) Show your work.

    GPE = ? **GPE = mgh** **(7.2 kg)(9.8 m/s²)(1.2 m) → 84.67 J**
    m = 7.2 kg
    g = 9.8 m/s²
    h = 1.2 m

13. How many kilojoules of heat must be transferred to a 480-g aluminum pizza pan to raise its temperature from 22°C to 234°C? The specific heat of aluminum in this temperature range is 0.96 J/g·°C. Show your work.

    Q = ? **Q = mcΔT** **(480 g)(0.96 J/g·°C)(212 °C) → 97689.6 J**
    m = 480 g
    c = 0.96 J/g·°C
    ΔT = 234°C - 22°C = 212 °C

14. As 390 g of hot milk cools in a mug, it transfers 30,000 J of heat to the environment. What is the temperature change of the milk? The specific heat of milk is 3.9 J/g°C. Show your work.

    Q = 30,000 J **ΔT = Q / mc** **30,000 J / (390g)(3.9 J/g °C)** **→ 30,000J / 1521 J/°C → 19.72 °C**
    m = 390 g
    c = 3.9 J/g·°C
    ΔT = ?

15. What is the acceleration of a car that goes from 20 km/h to 100 km/h in 2 hours?

    a = ? **a = Vf – Vi / t** **100 km/h – 20 km/h / 2 hrs → 40 km/h**
    Vf = 100 km/h
    Vi = 20 km/h
    t = 2 hrs

16. An object moves 20 km in 5 h, what is its speed?

    v = ? **v = d / t** **20 km / 5 hr → 4 km/hr**
    d = 20 km
    t = 5 hr

17. If the force on an object is 14 N and the object has a mass of 3.5 kg what is its acceleration?

    F = 14 N **F = m*a OR a = F / m** **14N / 3.5kg → 4 m/s²**
    m = 3.5 kg
    a = ?