

Physical Science Formulas

If the volume of a rock is 15 mL and the mass is 30 grams, what is its density in g/cm³?

On the Left Side of paper

On the Right Side of paper

**Always use the following format for full credit:
this side**

**Looking for, givens, and conversions on
this side**

<p>1. Formula $d=m/V$</p> <p>2. Labeled work $d=30 \text{ g} / 15 \text{ cm}^3$</p> <p>3. Labeled answer $d= 2 \text{ g/cm}^3$</p> <p>Always place full answer with identifying variable on the answer line if there is one</p> <p style="margin-top: 20px;">Answer Line <u>$d = 2 \text{ g/cm}^3$</u></p>	<p>Looking For: d in g/cm^3</p> <p>Given: $V = 15 \text{ mL} = 15 \text{ cm}^3$ (conversions go in given)</p> <p style="margin-left: 100px;">$m = 30 \text{ g}$</p>
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- 1 - Labels are necessary for an answer to be correct 5 minutes does not equal 5 miles
- 2 - Calculators are allowed on most tests, but they may not be your own
- 3 - All answers must be rounded to the thousandth (third place to the right of the decimal - thousandth place) to be correct unless otherwise instructed

	Most often used units	Formula
acceleration	m/sec/sec m/sec ²	$a = \frac{v_f - v_i}{t}$ $v_f = v_i + at$ $v_i = v_f - at$ $t = \frac{v_f - v_i}{a}$ $v = \text{velocity (m/sec)}$ $a = \text{acceleration (m/sec}^2\text{)}$ $t = \text{time (sec)}$ $i = \text{initial}$ $f = \text{final}$
acceleration Newton's Second Law	m/sec/sec m/sec ²	$a = \frac{F}{m}$ $F = \text{force (N)}$ $m = \text{mass (kg)}$
current	amps	$I = \frac{V}{R}$ $R = \text{resistance } (\Omega)$ $V = \text{voltage (volts)}$
density	g/cm^3 g/mL	$D = \frac{m}{V}$ $m = \text{mass (g or kg)}$ $V = \text{volume (cm}^3\text{ or mL)}$
distance, horizontal	m	$d = vt$ $v = \text{horizontal velocity (m/sec)}$ $t = \text{time (sec)}$
distance, free fall	m	$d = v_a t$ $v_a = \text{average velocity (m/sec)}$ $t = \text{time (sec)}$ $d = \frac{g t^2}{2}$ $g = \text{acceleration due to gravity (m/sec}^2\text{)}$ $t = \text{time (sec)}$ or $d = \frac{1}{2} g t^2$
distance, free fall	m	$d = \frac{1}{2} g t^2$
efficiency	%	$e = \frac{W_o}{W_i}$ $W = \text{work (J)}$ $o = \text{output}$ $i = \text{input}$
energy, electrical	kWh	$E_e = p \cdot t$ $p = \text{power (kW)}$ $t = \text{time (hr)}$
energy, kinetic	J	$E_k = \frac{1}{2} m \cdot v^2$ $m = \text{mass (kg)}$ $v = \text{velocity (m/sec)}$

energy, potential	J	$E_p = F_g \cdot h$ $F_g = \text{weight (N)}$ $h = \text{height (m)}$ $E_p = mgh$ $m = \text{mass (kg)}$ $g = (\text{acceleration due to gravity} = 9.8 \text{ m/sec}^2)$
force	N	$F = m \cdot a$ $m = \text{mass (kg)}$ $a = \text{acceleration m/sec}^2$
force, gravity (weight)	N	$F_g = m g$ $m = \text{mass (kg)}$ $g = \text{acceleration due to gravity (m/sec}^2 \text{ or N/kg)}$
frequency	Hz	$f = \frac{1}{T}$ $T = \text{period (sec)}$
mechanical advantage using forces	times	$MA = \frac{F_o}{F_i}$ $F = \text{force (N)}$ $o = \text{output}$ $i = \text{input}$
mechanical advantage, lever	times	$MA_l = \frac{l_i}{l_o}$ $l = \text{length (m or cm)}$ $i = \text{input}$ $o = \text{output}$
mechanical advantage inclined plane	times	$MA = \frac{l}{h}$ $l = \text{length (m)}$ $h = \text{height (m)}$
momentum	kg·m/sec	$P = mv$ $m = \text{mass (kg)}$ $v = \text{velocity (m/sec)}$
period	sec	$T = \frac{1}{f}$ $f = \text{frequency (Hz)}$
power	Watts (W)	$p = \frac{W}{t}$ $W = \text{work (J)}$ $t = \text{time (sec)}$
power, electric	Watts (W)	$p_e = V \cdot I$ $V = \text{voltage}$ $I = \text{current in amps}$
pressure	N/m ²	$\text{Pressure} = \frac{F}{A}$ $F = \text{force (N)}$ $A = \text{area (m}^2\text{)}$
resistance	Ohms Ω (omega)	$R = \frac{V}{I}$ $V = \text{voltage}$ $I = \text{current in amps}$
speed, see velocity		
stress	Pa	σ (sigma) = F/A $F = \text{force (N)}$ $A = \text{area (m}^2\text{)}$
temperature °F to °C	°C	$T_C = (T_F - 32) 5/9$
temperature °C to °F	°F	$T_F = (T_C \times 9/5) + 32$
temperature °C to K	K	$T_K = T_C + 273$
time	sec	$t = \frac{v_f - v_i}{a}$ $v = \text{velocity (m/sec)}$ $a = \text{acceleration (m/sec}^2\text{)}$ $t = \text{time (sec)}$ $i = \text{initial}$ $f = \text{final}$
time	sec	$t = \frac{d}{v}$ $d = \text{distance (m)}$ $v = \text{velocity (m/sec)}$
time (free falling object)	sec	$t = \sqrt{\frac{2d}{g}}$ $\sqrt{} = \text{square root}$ $d = \text{distance (m)}$ $g = \text{acceleration of gravity}$
velocity, speed	mi/hr m/sec	$v = \frac{d}{t}$ $d = \text{distance (m)}$ $t = \text{time (sec)}$ velocity: add direction to answer
velocity, speed average	mi/hr m/sec	$v_a = \frac{v_f + v_i}{2}$ $f = \text{final (m/sec)}$ $i = \text{initial (m/sec)}$ $v_a = \frac{d_f - d_i}{t_f - t_i}$ $v = \text{velocity (m/sec)}$ $t = \text{time (sec)}$ $d = \text{distance (m)}$

velocity, speed _{final} free fall	m/sec	$v_f = gt$ $g = \text{Acceleration due to gravity m/sec}^2$ $t = \text{time (sec) (Assumes starting from standstill)}$
velocity	m/sec	$v = \sqrt{2gd}$ $\sqrt{} = \text{square root}$ $d = \text{distance (m)}$ $g = \text{Acceleration due to gravity m/sec}^2$
volume – Irregular Shape	mL	$V_t = V_f - V_i$ $V = \text{volume (mL or cm}^3\text{)}$ $i = \text{initial}$ $f = \text{final}$
wave speed	m/s	$v = f \lambda$ (λ) $\lambda = \text{wavelength (m)}$ $f = \text{frequency (Hz)}$
work	J	$W = F \cdot d$ $F = \text{force (N)}$ $d = \text{distance (m)}$
work done against gravity	J	$W = mgh$ $m = \text{mass in kg}$ $g = \text{acceleration due to gravity in m/sec}^2$
weight, force of gravity	N	$F_g = m g$ $m = \text{mass (kg)}$ $h = \text{height (m)}$ $g = \text{acceleration due to gravity (m/sec}^2\text{ or N/kg)}$

Units

$J = 1 \text{ N} \cdot 1 \text{ m}$ for energy and work

$N = \text{kg} \cdot \text{m/sec}^2$ (force required to change the speed of 1 kg by 1 m/sec in 1 sec)

watt (W) = Joule/sec

$c = \text{speed of light (in a vacuum)}$

Greek Letters and what they represent

λ Lambda = wavelength

Δ Delta = change

σ Sigma = stress

Ω Omega = ohms

β Beta = beta particle

τ tau = torque