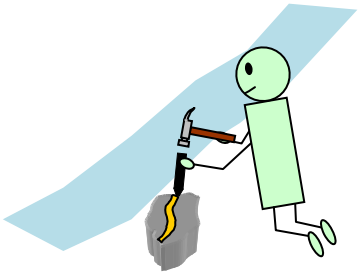
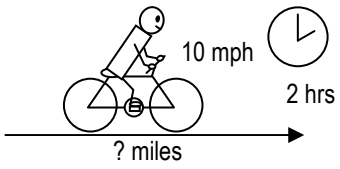
I. D. E. A. S.

For Solving Worry Problems!

Algorithm
Use IDEAS steps to take the worry out of word-story problems!

BrainAid: Imagine that a word problem is a stream filled with rocks (equations) embedded with gold (unknown values). The stream also contains tools (given values, equivalencies) that help, but you'll need creativity and your best IDEAS to extract the gold!

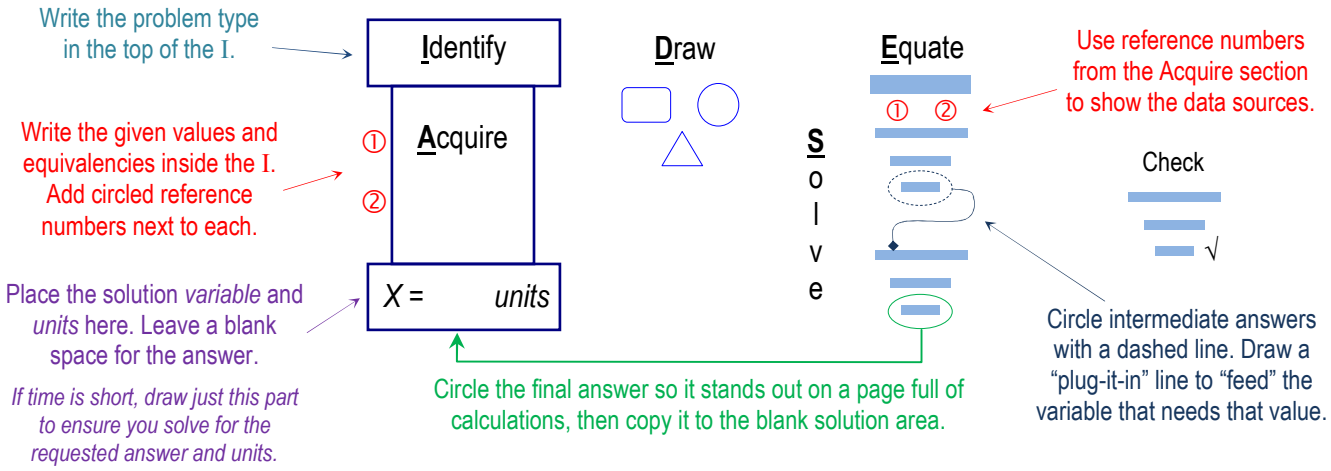


IDEAS	Explanation	Example
Identify	**Identify** the problem type as: • *Freeform:* you create the equations. • *Standard*: you use existing equations.	What distance is traveled by a bicycle rider averaging 10 mph for 2 hours? **Type:** Standard Travel
Draw	**Draw** simple pictures or symbols of the items in the problem. Label known values and units of measure. This will help you "see" beyond the often confusing words.	
Equate	**Equate** the known and unknown items in an equation with meaningful variables and units of measure.	D = distance traveled (miles) R = rate of travel (miles/hour) T = time traveled (hours) **D = R T**
Acquire	**Acquire** given values and equivalencies between variables.	R = 10 $\frac{\text{miles}}{\text{hour}}$ T = 2 hours
Solve	**Solve** for unknown values. • Check that unwanted units divide out leaving the desired units behind. • Keep variables and values vertically aligned as much as possible so you don't omit items as the problem progresses down the page. • Circle the final answer. • Check your answer.	D = R T D = 10 $\frac{\text{miles}}{\text{hour}}$ (2 hours) D = 20 miles **Check** D = R T 20 = 10 (2) 20 = 20 √

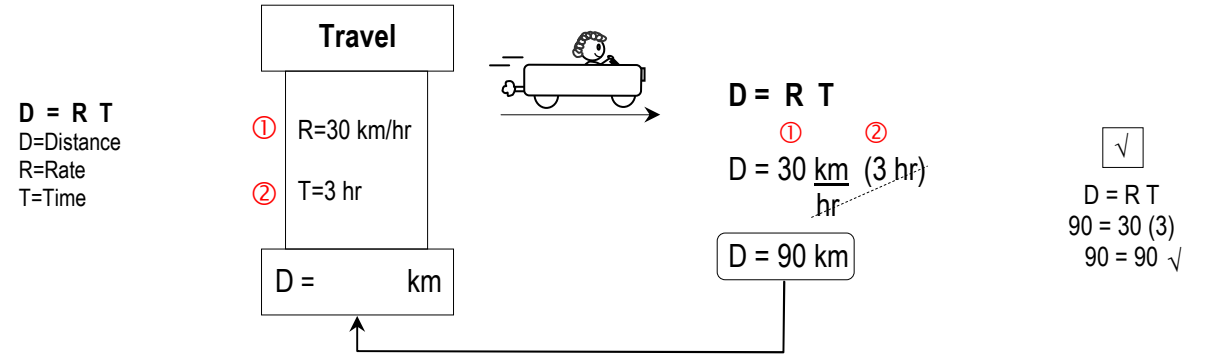
As you gain experience with various types of problems, you may not use each IDEAS step.
But when you're struggling with an unfamiliar problem, IDEAS gives you a sequence to follow.

Organizing IDEAS

Draw a large, hollow "I" to organize the problem elements.



Sue drives 30 km/hr for 3 hours. How many km did she travel?



Timed-Test Shortcuts

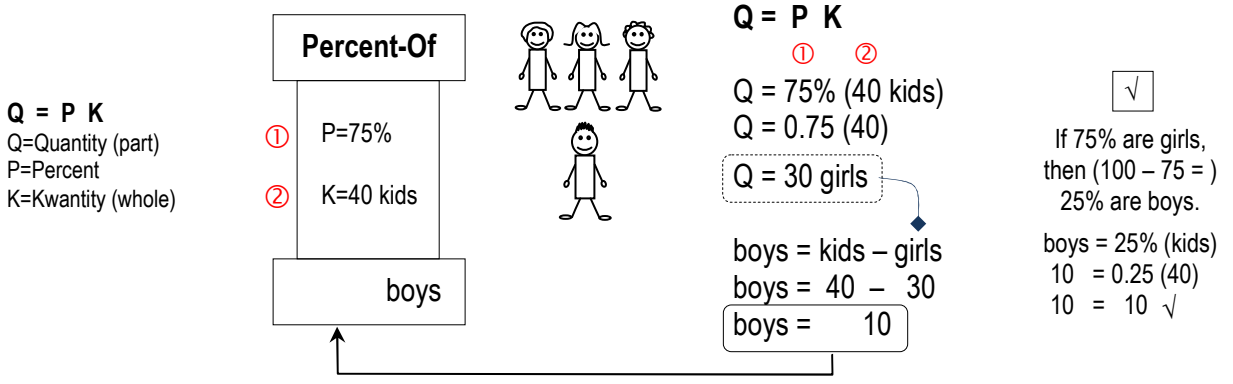
If you're allowed to write on the test sheet, place numbered circles above the given values and underline the requested solution.

① ②
Sue drives 30 km/hr for 3 hours. How many km did she travel?

If you're *not* allowed to write on the test sheet, use only the *bottom* part of the I to ensure you're solving for the requested answer and units.

D = km

Girls make up 75% of the 40 kids in a classroom. How many are boys?



TRash Check: Test for Reasonableness

To ensure that your answers make sense!

It's not uncommon to identify and set up a word problem correctly but still get the wrong answer. With its jumble of words, it's easy to misread a problem, supply an answer other than the one requested, or commit an arithmetic error somewhere along the way. Make sure your answers are reasonable with the following TRash checks:

TRASH CHECK

Test for Reasonableness

Keep your answers out of the garbage bin!

Est*imate* to Trap Mis*takes*

An estimate will let you know whether your answer is reasonable.

Milly rides 9.75 miles per hour. How far will she travel in 0.48 hours?

- ○ .0468
- ○ .4680
- ○ 4.680
- ○ 46.80

D = R T
D = 9.75 • 0.48
D = .4680

Oops! The decimal point is misplaced.

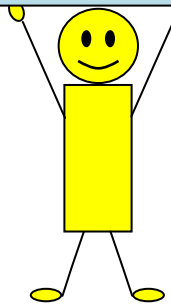
D = R T
D = 9.75 • 0.48
D ≈ 10 • ½ ≈ 5

An estimate shows the answer is close to 5.

Avoid Misdirection Traps

Some problems, or inattentive reading, may misdirect you into providing a different answer than the one requested.

- Estimate
- Avoid Misdirection
- Double-Check



Unit-of-Measure Trap

Tim walked 4 km/hr for 2 hours. How many meters did he travel?

- ○ 8
- ○ 80
- ○ 800
- ○ 8000

D = R T
D = 4 km/hr • 2 hr
D = 8 km

Oops! It asks for *meters*.

$8\ \text{km} \times \frac{1000\ \text{m}}{1\ \text{km}}$

8000 m

You must convert km to meters.

Alternate-Answer Trap

A 100-gallon vat contains 25% alcohol. How much water does it hold?

- ○ 25
- ○ 50
- ○ 75
- ○ 100

V = A T
V = 25% • 100 gal
V = 25 gal

Oops! It asks for *water*.

$V_w = T - V_a$
$V_w = 100 - 25$
$V_w = 75\ \text{gal}$

The volume of water is the total volume minus the volume of alcohol.

Double-*Check* with a 2nd *Tech*nique

Simple errors may lead to unreasonable answers. When time permits, solve a problem *twice*. If possible, use an alternate technique to avoid repeating previous mistakes a second time.

At what point do the lines **x + y = 3** and **x – y = 1** intersect?

Substitution Method

x + y = 3
y = (3–x)

x – y = 1
x – (3–x) = 1
x – 3 + x = 1
2x = -2
x = -1

Oops! It should be 1+3 = 4

x + y = 3
-1 + y = 3
y = 4
(-1 , 4)

Elimination Method

x + y = 3
x – y = 1
2x = 4
x = 2

x + y = 3
2 + y = 3
y = 1
(2, 1)

Since the answers don't agree, plug in the values and see which point satisfies both equations.