Name: _____

Period: _____

Ch. 1:2

Speed and Experiments

Speed

Speed is how fast something is going. Precisely, it is the amount of distance traveled in a certain amount of time. The standard units are meters per second, but any units of distance/time will work.

Speed (in meter/sec) → $S = \frac{\Delta D}{\Delta T}$ ← Change of Distance (in meters); ← Change of Time (in seconds)

Speed equal change of distance divided by change of time.

$\Delta D = D_2 - D_1$ $\Delta T = T_2 - T_1$

A car 4 meters away for 2 hours has a speed of zero—it hasn't moved. That's why we have to use $\Delta D/\Delta T$ instead of D/T—**the object has to be moving**.

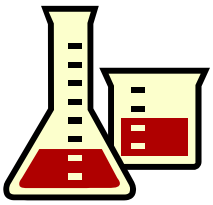
A plane flies 4000 miles in 5 hours. Calculate the plane's speed.		A car travels from 20 meters to 60 meters in 10 seconds. Calculate the car's speed.		A car travels at 60 m/s for 8 seconds. Calculate the distance it travels.	
Step 1: variables S = ? ΔD = 4000 miles ΔT = 5 hours Step 2: formula $S = \Delta D/\Delta T$	Step 3: Solve for unknown variable: Already done: $S = \Delta D/\Delta T$ Step 4: Put in numbers S = 4000 mi/5 hr Step 5: Calculate answer	Step 1: variables Step 2: formula	Step 3: solve for unknown variable: Step 4: Step 5:	Step 1: Step 2:	Step 3: Step 4: Step 5:

The Scientific Method:

Really	**R**	Research
Quiet	**Q**	Question
Hippos	**H**	Hypothesis
Eat	**E**	***Experiment***
Dark	**D**	Data
Chocolate	**C**	Conclusions

Experiments

Experiments are how we gain data (evidence) to prove or disprove a hypothesis.



If experiments are going lead us to knowledge, we better know how to do them correctly so that our data really is proof!

Trials

A **trial** is one time an experiment is run.

Good experiments have several trials. Why? Because to really proof something, and experiment must be repeatable by others. One time through an experiment proves nothing—there might have been a mistake, for instance.

Data from experiments are often recorded in **data tables**.

A Data Table →

Trial	Time (sec)
1	2.5
2	3
3	3.1
4	2.8
5	2.9
Ave Time	**2.86**

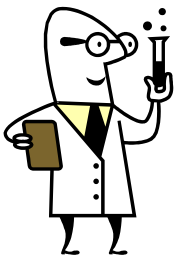
Usually, data changes a bit with each trial. Which one is best?

An **average** is better than an individual trial's data.

Variables

A variable is a part of an experiment that can change.

In most experiments there are many variables. When talking about speed we only need two: distance and time.



Procedures

Your procedure is how you perform an experiment.

Good data requires good experimental procedures. Spending time developing good procedures ensures your data will be accurate and your conclusion believable.

Your procedure is a list of how you did your experiment.

Name: _____

Period: _____

1. Variable	A. How an experiment is actually conducted.
2. Procedure	B. A part of an experiment that can be changed or manipulated.
3. Data Table	C. A setup used to gather data and knowledge.
4. Trial	D. One time an experiment is run.
5. Experiment	E. A list of information from an experiment.

Fill in the math functions

$S\Delta T = S$ _____ ΔT $D_2 - D_1 = D_2$ _____ D_1

$S/T = S$ _____ T $a/\Delta T = a$ _____ ΔT

Match the variables on the left with the quantities on the right

1. a = _____	50 m/s^2
2. S or v = _____	10
3. m = _____	20 meters/sec
4. D = _____	228 meters
5. F = _____	15 kgm/s
6. p = _____	78 sec
7. T = _____	6 newtons
8. E = _____	12 joules
9. MA = _____	36 kilograms

$F = ma$
Solve for "a"

$S = \Delta D/\Delta T$
Solve for "ΔD"

$\Delta D = D_2 - D_1$
Solve for D_2

$a = \Delta S/\Delta T$
Solve for ΔT

A bike moves 50 m in 5 seconds.
Calculate the speed of the bike.

Step 1: variables:
S =
ΔD =
ΔT =

Step 2: Formula:

Step 3: Solve for the unknown variable:

Step 4: Plug in number:

Step 5: Calculate an answer:

A car travels 200 miles in 8 hours.
Calculate the car's speed.

Step 1: _____

Step 2: _____

Step 3: _____

Step 4: _____

Step 5: _____

A car travels 60 m/s for 60 secs.
Calculate how far it traveled.

Step 1: _____

Step 2: _____

Step 3: _____

Step 4: _____

Step 5: _____

On holiday, a family travels from Meyerville (10 miles away) to Sprytown (50 miles away), in 3 hours.
Calculate the family's speed.

Step 1: _____

Step 2: _____

Step 3: _____

Step 4: _____

Step 5: _____