**HOW TO SOLVE THE MATHEMATICAL PROBLEMS IN SCIENCE**

**STEP 1 - Identify** what you have to calculate. Circle this and **label** it with

|  |  |  |
| --- | --- | --- |
| **QUANTITY** | **SYMBOL** | **UNITS** |
| **Distance** | **d** | **metres, m** |
| **Displacement** | **s** | **metres, m** |
| **Time** | **t** | **seconds, s** |
| **Speed** | **S** | **metres/second,**  **m/s** |
| **Velocity** | **v** | **metres/second,**  **m/s** |
| **Acceleration** | **a** | **metres/sec/sec,**  **m/s2** |
| **Initial Speed** | **Si** | **m/s** |
| **Final Speed** | **Sf** | **m/s** |
| **Initial velocity** | **vi** | **m/s** |
| **Final velocity** | **vf** | **m/s** |
| **Kinetic Energy** | **KE** | **joules, j** |
| **Mass** | **m** | **kilograms, kg** |
| **Force** | **F** | **newtons, N** |
| **Height** | **ht** | **metres, m** |
| **Gravity** | **g** | **9.8 m/s2** |

- correct **symbol** (from the list on the right) - and a **question** **mark**.

**STEP 2 –** Write down a formula to calculate this. Check the Formula sheet or your notebook. Remember you are looking for the symbol you identified in step one.

**STEP 3 –** identify what information you need to calculate using the formula. This means what are the symbols on the other side of the formula.

**STEP 4 –** Find this information in the question and circle it all – Label with the correct symbol from the formula.

**STEP 5 -** Check that the information has the correct units you need. Do conversions for units which are not correct (see below for unit conversions)

**STEP 6 –** Put your information (numbers) from the question into your formula (use a new line) and calculate your answer (put in on a third line).

**STEP 7 –** Put the correct units with your answer.

**UNIT CONVERSIONS**

**m/s to Km/hr** is: Multiple by 3.6

**Km/hr to m/s** is: Divide by 3.6

**kg to grams** is: multiply by 1000

**grams** **to** **kg** is: divide by 1000

**tonnes** **to** **kg** is: multiply by 1000

**mins to secs** is: multiply by 60

**mins to hrs** is: divide by 60

**EXAMPLE Question**

**Bronwyn was running late for a job interview. She was stuck in traffic, and when it finally cleared she had 4 kilometres left to drive and only 3 minutes left to get there. If the speed limit was 80 km/hr, could she make it without breaking the speed limit?**

**Solution:**

**Think** - There are several ways to do this problem. Your teacher may model the other ways to you, but I think this question is asking me to calculate Bronwyns speed and compare it to 80 km/hr.

**STEP 1 –**

Bronwyn was running late for a job interview. She was stuck in traffic, and when it finally cleared she had 4 kilometres left to drive and only 3 minutes left to get there. If the speed limit was 80 km/hr, could she make it without breaking the speed limit?

S ?

**Speed, S = d**

**t**

**STEP 2 -** Found a formula for S…

d =

t =

**Speed, S = d**

**t**

**STEP 3 -** To calculate S, I need to know d and t

Bronwyn was running late for a job interview. She was stuck in traffic, and when it finally cleared she had 4 kilometres left to drive and only 3 minutes left to get there. If the speed limit was 80 km/hr, could she make it without breaking the speed limit?

S ?

t

d

**STEP 4 –** Find d and t in the question

**STEP 5 –** Do I have correct units… no….t should be in seconds and d should be in metres… so convert.

d – 4 km = 4 x 1000m = 4000m

t – 3 min = 3 x 60sec = 180 secs

**Speed, S = d**

**t**

**Speed, S = 4000 m**

**180 s**

**STEP 6 –**

**S = 22.2**

**S = 22.2 m/s**

**STEP 7 –**

**EXTRA STEP** – compare Bronwyn’s speed to speed limit

**Speed limit** of 80 km/hr, convert to m/s for comparison

80km/hr ÷ 3.6 = **22.2 m/s**

Bronwyn’s speed exactly matches the speed limit, meaning in theory she does not have to break the speed limit to make the interview on time.