Science Skills

Level 3

Reading Tables Book 2

Drink	*Alcohol* (units)
1 bottle of alcopop	2·0
1 pint of lager	2·3
1 glass of wine	2·1
1 pint of cider	3·0
1 measure of spirits	1·4

Name: _____

Class: _____

Tables

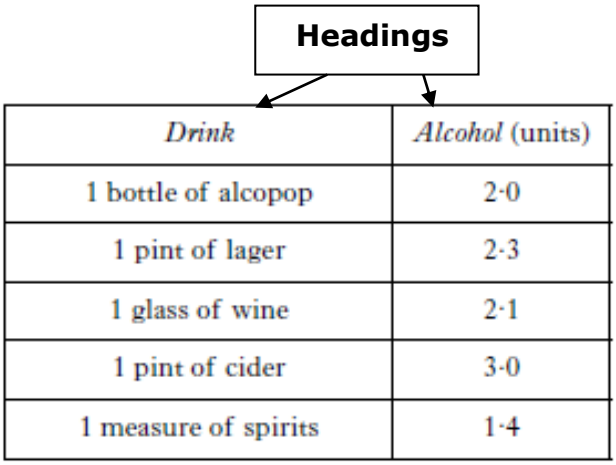
Tables are used to display the results of an investigation.

Tables are used to **compare** things.
They show the **relationship** between two or more things.

It is very important to read the headings carefully.

The table below shows the number of units of alcohol in some common drinks.
The things being compared are the **drinks** and the **number of units of alcohol**.
You know what things are being compared because they are in the **headings.**

In this table the headings are in italics.



Drink	*Alcohol* (units)
1 bottle of alcopop	2·0
1 pint of lager	2·3
1 glass of wine	2·1
1 pint of cider	3·0
1 measure of spirits	1·4

Before you begin to look at the question, you should **read** the **whole table**. You should put it into **sentences**, building in the **headings**. Read it aloud if this helps.

Example:

In the drink 1 bottle of alcopop there are 2.0 units of alcohol.
In the drink 1 pint of lager, there are 2.3 units of alcohol.
In the drink 1 glass of wine, there are 2.1 units of alcohol.
In the drink 1 pint of cider, there are 3.0 units of alcohol.
In the drink 1 measure of spirits, there are 1.4 units of alcohol.

Once you have done this it should be very easy to **find** any information that you need for the questions.

Since you are working at **Level 3**, you are expected not only to find information in a table, but also to use the information to do a **calculation**.

Some of the most common types of calculation are on the following page.

Remember:
Look very, very closely at the questions. Some of them can be tricky.

Interpreting the Tables

You are expected to do the following:

1. **Extract information** directly from the table.

2. Find the relevant information and then **add**, **subtract** or **multiply**.

3. **Divide**.
   Questions which start "*How many times greater…*" or "*How many times more…*" usually require you to divide.

4. **Percentages.**
   Remember that *per cent* means *out of a hundred*. The symbol is **%**.
   So 54% means 54 out of a hundred.

   The calculation should be as follows:
   The number you have been asked about ÷ the total number x 100

   Example:

   Calculate the percentage of students studying biology in the student group below:

Subject	*Number of Students*
Medicine	8
Biology	2
Engineering	4
Mathematics	6

   Number of students studying biology 2
   Total number of students 20
   (The number you have been asked about (**2**) **÷** the total number (**20**) **x 100**)
   2 ÷20 x 100 = **10%**

5. **Averages**
   Add up all the numbers in the category and divide by the number of entries.

   Example:

   Calculate the **average** mark achieved by Brian in the tests.

Name of student	*Test 1*	*Test 2*	*Test 3*	*Test 4*	*Test 5*
Linda	55	62	60	64	64
Brian	39	39	45	48	49
Melanie	46	51	53	59	65
John	76	79	79	81	85

   Brian's marks were 39 + 39 + 45 + 48 + 49 = 220
   (There were 5 tests)
   219 ÷ 5 = **44**

6. **Draw Conclusions**

Draw conclusions means ***write what you have found out*** from the table.

Example:

A student carried out an investigation to fine out how long it took two substances to dissolve first in water at 30ºC, then at 60ºC, then at 80ºC.

The results are in the table below.

Substances	*30 ºC*	*60ºC*	*80ºC*
A	20 minutes	15 minutes	8 minutes
B	11 minutes	9 minutes	3 minutes
C	30 minutes	22 minutes	14 minutes
D	15 minutes	10 minutes	4 minutes
E	35 minutes	21 minutes	13 minutes

What conclusion can you draw from the table?

You have to compare the substances and the times.

*As you **read the table** aloud in **sentences**, you become aware that as the temperature is getting higher, the number of the minutes is getting smaller.*

Since the student wanted to know how quickly the substances dissolved, the conclusions will include the words
***fastest, slowest, faster than, slower than, largest, smallest, increase, decrease**, etc.*

***The conclusion is what you found out**. There are lots of things you could write.*
All the answers below are correct.
*The more '**scientific**' ways of writing the conclusions are in **red**.*

- Substance B dissolved faster than all the rest at 30ºC
- Substance E was the slowest to dissolve at 30ºC
- All the substances dissolved at a different rate, no matter what the temperature was.
- Substance A took longer to dissolve at 60ºC than Substance B and Substance D.
- All the substances dissolved faster as the temperature increased.
- **The lower the temperature, the more slowly the substances dissolve.**
- **As the temperature increases, all the substances dissolve more quickly.**
- **The greater the temperature, the faster the speed of dissolving.**

7. **Predict**

Tables are used to **predict**.

'<u>Predict'</u> means use the information in the table to make an intelligent guess about something which is <u>not</u> in the table.

After you have read the table in sentences, you will have noticed that the numbers are going up, going down or staying more or less the same.

Example:

A student carried out an investigation to fine out how long it took two substances to dissolve first in water at 30ºC, then at 60ºC, then at 80ºC.

The results are in the table below.

70ºC

Substances	*30 ºC*	*60ºC*	*80ºC*
A	20 minutes	15 minutes	8 minutes
B	11 minutes	9 minutes	3 minutes
C	30 minutes	22 minutes	14 minutes
D	15 minutes	10 minutes	4 minutes
E	35 minutes	21 minutes	13 minutes

<u>Predict</u> the number of minutes Substance C would have taken to dissolve if the temperature of the water was 70ºC.

What to do:

1. Find the data for Substance C in the table. (now coloured)

2. Decide where in the table 70ºC would be. (now marked)

3. *The answer at Level 3 is* "**Between 22 minutes and 14 minutes**".
You do not have to guess an exact number. (If you did, it would be 18ºC or 19ºC.)

If you are asked to predict the number of minutes Substance C would have taken to dissolve at **100ºC**, the answer would be "**Less than 14 minutes**".
If you wanted to be more exact (though this is not usually necessary at Level 3) the answer would be 6ºC or 7ºC.

1.

Starlings are birds which are often found living in rough grass farmland areas.

The table shows how the number of starlings has changed over 25 years.

Year	*Number of starlings* (millions)	*Area of rough grass farmland* (hectares)
1970	3·6	1 300 000
1975	3·4	1 000 000
1980	3·2	700 000
1985	2·8	110 000
1990	2·3	100 000
1995	1·9	90 000

Use the information in the table to answer the question below:

Predict the number of starlings when the area of rough grass farmland was 850 000 hectares.

_____ millions

2. The blood groups of **200 students** are shown in the table below.

Blood Group	*Number of Students*
O	94
A	84
B	16
AB	6

What percentage of the students have Blood Group A? (Tick)

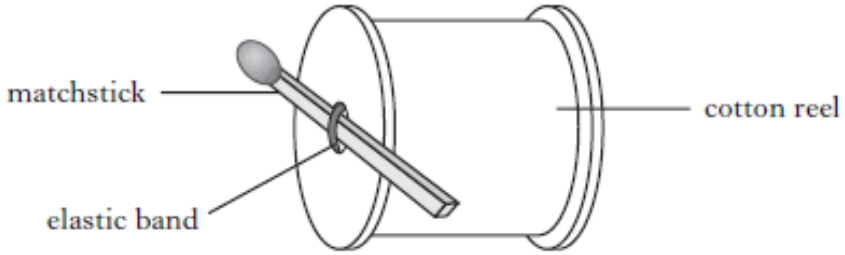
a) 42%

b) 45%

c) 84%

d) 90%

3. Edward made a model tank from a cotton reel, an elastic band and a matchstick.



When he turned the matchstick and let go, the tank moved forward.

He investigated how far the tank travelled using different numbers of turns of the matchstick and different thicknesses of elastic band.

His results are shown below.

Number of turns of the matchstick	*Thickness of elastic band*	*Distance travelled* (cm)
5	thick	35
10	thick	69
15	thick	101
5	thin	23
10	thin	44
15	thin	69

Draw two conclusions from these results.

_____
_____
_____

_____
_____
_____

4. The table shows the energy used to heat a building during the months July to November. It also shows the average outdoor temperature during these months.

Month	*Energy used* (kWh)	*Average outdoor temperature* (°C)
July	450	18
August	500	17
September	700	14
October	850	12
November	1000	10

a) Calculate the **total** energy used in the months when the average outdoor temperature was **less than 15ºC**.

_____ kWh

Working

b) Complete the conclusion below by circling the correct answer in the box.

As the average outdoor temperature falls, the energy used…

stays the same
decreases
increases

c) Predict the energy used in May when the average outdoor temperature was 15ºC.

_____ kWh

5.

The table shows how the volume of air in the lungs and the lung pressure change during warm-up exercises.

Exercise time (minutes)	*Volume of air in the lungs* (cm^3)	*Lung pressure* (kPa)
2	2400	100
4	2750	99
6	3000	98
8	3200	97

a) Complete the conclusion by circling the correct answer.

As exercise time increases, the volume of air in the lungs…

increases
decreases
stays the same

b) Draw one other conclusion from these results.

_____

_____

c) Predict the volume of air in the lungs after 3 minutes.

_____cm^3

6.

A student tested four foods for the presence of glucose and starch.

The tests used were:

Glucose – blue Benedict's solution turns orange if glucose is present.

Starch – brown iodine turns black if starch is present.

The results are shown in the table below.

	Colour produced	
Food	*Glucose test*	*Starch test*
A	orange	brown
B	blue	black
C	blue	brown
D	orange	black

Which food contained both starch and glucose?

_____

7.

A student tested four types of seeds for the presence of starch, sugar and protein.

The tests used were:

Starch present – iodine solution turns from brown to black
Sugar present – clinistix turns from pink to purple
Protein present – albustix turns from yellow to green

The results are shown in the table below.

	Colour produced		
Seed type	*Starch test*	*Sugar test*	*Protein test*
barley	black	pink	yellow
pea	black	pink	green
cabbage	brown	purple	yellow
mustard	brown	purple	green

Which type of seed stores **only sugar**? (Tick)

A Barley B Pea C Cabbage D Mustard

8. The table below shows information about different varieties of lily.

Variety of lily	*Time of first bud appearing*	*Time of first flower appearing*	*Time of last flower appearing*
Angel's Braid	Mid June	Late June	Early October
Baby Blanket	Mid June	Late June	Mid July
Mexican Siesta	Early June	Early July	Mid July
Milano Maraschin	Early June	Mid June	Early July
Octavian Orchid	Early June	Mid July	Early October

a) In which variety of lily is there one month between the first bud appearing and the first flower appearing?

_____

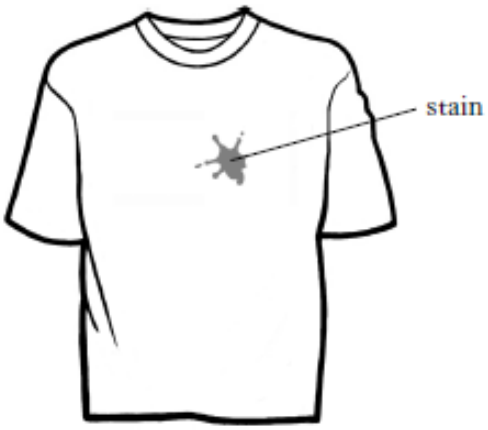
b) Which variety of lily has flowers for the longest time?

_____

c) How many varieties of lily would be expected to have flowers in late June?

_____

9. A student carried out an investigation to compare the effectiveness of detergents on stain removal.
He used two types of detergents on two different materials at two different temperatures.



The results are shown in the table below.

Type of detergent	*T-shirt material*	*Temperature (°C)*	*Percentage stain remaining*
Biological	Cotton	30	10
Non-biological	Polyester	40	15
Biological	Cotton	40	0
Non-biological	Cotton	30	25

a) Which **conditions** left the t-shirt with most stain remaining?

Type of detergent _____

T-shirt material _____

Temperature _____

b) What percentage of stain was removed by the biological detergent from the cotton t-shirt at 30ºC?

Working

_____%

10. The table below shows the number of new plants growing on five spider plants and five Mother of Thousands plants.

	Number of new plants				
Type of plant	*Plant 1*	*Plant 2*	*Plant 3*	*Plant 4*	*Plant 5*
Mother of Thousands plant	12	19	15	8	36
Spider plant	2	8	5	3	2

Which of the following shows the **average** number of new plants on each type of plant? (Tick the correct line)

	Average number of new plants	
	Mother of Thousands plant	*Spider plant*
A	4	18
B	18	4
C	20	90
D	90	20

11. The tables below show information about some fuels.

(*b*) Information about some fuels is shown in the tables.

Number of carbon atoms	Energy released in kilojoules
1	891
2	1560
3	2220
4	2877

Name of fuel	Number of carbon atoms
methane	1
ethane	2
propane	3
butane	4

a) Complete the sentence:

As the number of carbon atoms increases, the energy released _____.

b) Name the fuel which releases 1560 kilojoules of energy.

_____

12. A group of students investigated the effects of exercise on pulse rate.
The results are shown in the table below.

Student	*Sex*	*Pulse rate* (beats per minute)		
		Before exercise	*After 15 minutes exercise*	*After 5 minutes rest*
Laura	Female	70	110	70
Erin	Female	70	116	79
Bibiana	Female	82	124	85
Robbie	Male	83	120	91
Jack	Male	85	131	85

a) The average pulse rate for males before exercise is 84 beats per minute.

Calculate the average pulse rate for the females in the group before exercise.

Working

Average pulse rate for females is _____ beats per minute.

b) How many students had a recovery time which was greater than 5 minutes?

_____ students

13. Coal contains mainly carbon.
The table shows the percentage of carbon in different types of coal.

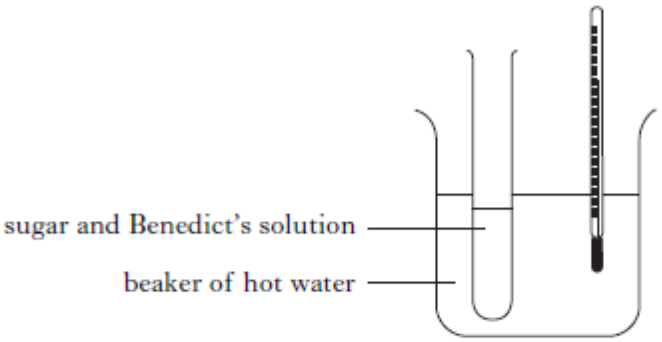
Type of coal	Percentage of carbon
lignite	50
bituminous	65
anthracite	90

Calculate the mass of carbon present in **200 kilograms** of anthracite.
Show your working clearly.

Working

_____ kilograms

14. A student carried out an investigation to show how temperature affects the speed of the reaction between a sugar, found in syrup, and Benedict's solution.



The results are shown.

Temperature of water in °C	Time for reaction to take place in seconds
50	118
60	64
70	37
80	18

a) How does increasing the temperature affect the speed of the reaction?

_____

b) Predict how long the reaction would take at 65ºC

_____ seconds