Like Terms

Let's take an apple as an example. If we have one apple and add one more apple. We now have two apples.

Let us use the same example but use words now.
One Apple + One Apple = Two Apple

Let us say we are a little lazy today and do not want to write the word 'Apple.' Instead, we will write 'a'

One a + One a = Two a

Let us say we are even lazier and instead of writing 'One' we write 1 and instead of writing 'Two' we write 2.

1 a + 1 a = 2 a

<u>Practice</u>

4 a + 9 a =

How many apples do we have?

We could have used 'x' or any other variable to stand in for the word 'Apple' e.g. 1x + 1x = 2x

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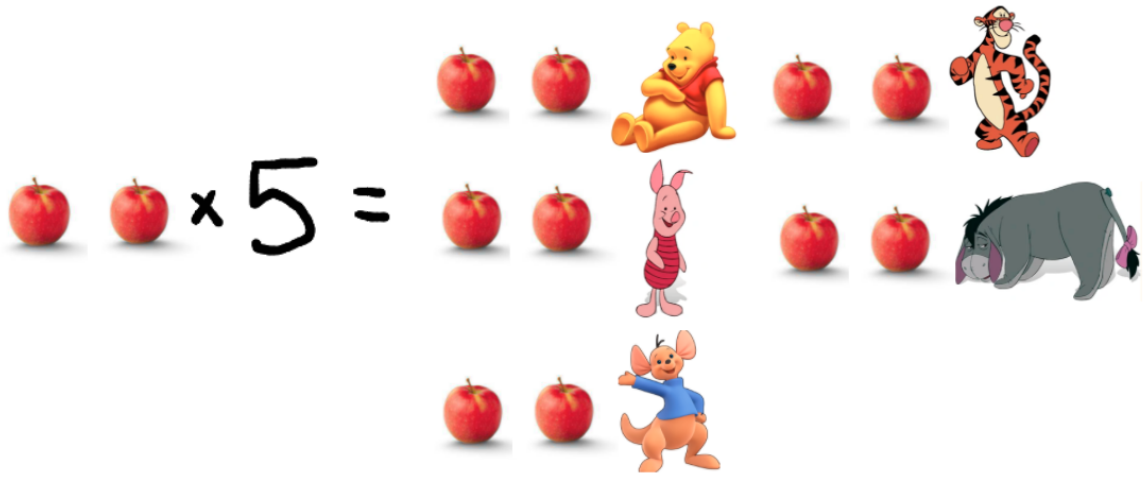
I like apples so we will do another apple example. We want to give two Apples to five of our friends.



Like Terms

We could have understood this problem in two different ways as
'We have five friends and each friend has 2 Apples' = 2 a + 2 a + 2 a + 2 a + 2 a = 10 a
OR
'We have five friends and each friend has 2 Apples' = 5 * 2 a = 10 a

We have 10 total Apples. (Note: * means multiply)

So,

2 Apples * 5 = 10 Apples
5 * 2 Apples = 10 Apples

2 a * 5 = 5 * 2 a

<u>Practice</u>

3 a * 2 =

How many apples do we have?

We could have used 'y' instead of 'a' for Apple e.g. 4y * 3 = 12y
We are using Apples but we could have also used Mangos, Squash, Potatoes, etc.

When adding, our friends are allowed to be picky. We make them drinks. Apple juice for Pooh. Mango juice for Piglet. Apple Mango juice for Tiger. Pooh only likes Apple juice. Piglet only likes Mango juice. Tiger only likes Apple Mango juice.

After putting it through a juicer we have three juices.

Like Terms

After putting One apple through the juicer we will have a cup of Apple juice. After putting One Mango through the juicer we will have a cup of Mango juice. After putting One Mango and One Apple through the juicer we will have a cup of Apple Mango juice.

Look below.
How many cups of apple juice and mango juice do we have?

Apple juice: 2 cups of Apple juice
Mango juice: 3 cups of Mango juice

Using words we can write

One Mango juice + One Apple juice + One Apple juice + One Mango juice + One Mango juice

= Three Mango juices + Two Apple juices

Let's say we are lazy and instead of writing 'Mango juice' we write 'm' and instead of writing 'Apple juice' we write 'a'

One m + One a + One a + One m + One m = Three m + Two a

Again, we are lazy so instead of writing 'One,' 'Two,' and 'Three' we write 1, 2, and 3 respectively.

1 m + 1 a + 1 a + 1 m + 1 m = 3 m + 2 a

If we give these drinks to Pooh, Piglet, and Tiger, how many cups of juice will each friend get?

Pooh: 2 cups of Apple juice

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Piglet: 3 cups of Mango juice
Tiger: 0 cups of Apple Mango juice

Tiger will get no juice because he only likes Apple Mango juice.

We wrote ‘a’ for Apple juice and ‘m’ for Mango juice. We will write ‘am’ for Apple Mango juice.

Can we give these two cups to Piglet?
No, Piglet only likes Mango juice.

Can we give these two cups to Pooh?
No, Pooh only likes Apple juice.

Can we give these two cups to Tiger?
Yes, there is both Apple and Mango in the cup.

Let’s combine these cups so that we know which cups to give to Pooh, Piglet, and Tiger.

1 am + 1 am + 1 a + 1 m + 1 m = 2 am + 1 a + 2 m

We have 2 Apple Mango juices, 1 Apple juice, and 2 Mango juices.

Pooh: 1 cup of Apple juice, Piglet: 2 cups of Mango juice, Tiger: 2 cups of Apple Mango juice

Extra
Let us say ‘x’ stands for Apple, ‘y’ stands for Mango, and ‘xy’ stands for Apple Mango

1xy + 1xy + 1x + 1y + 2y = 2xy + 1x + 3y

Like Terms

We have a NEW drink called ‘Apple Super Mango’ that is made with One Apple and Two Mangos.

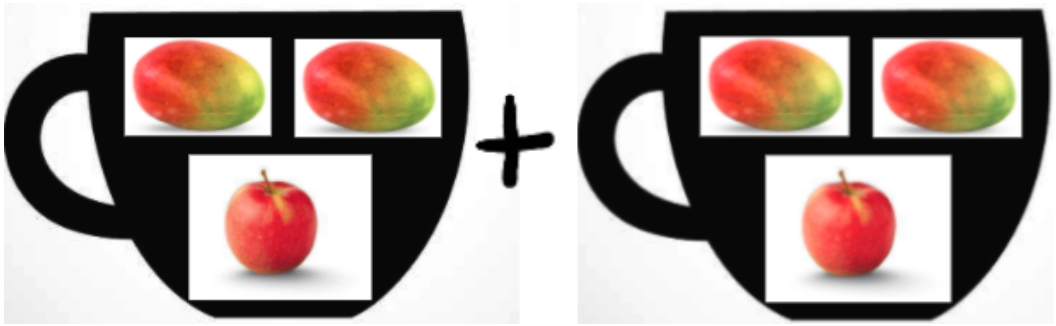
Apple Super Mango = One Apple*One Mango*One Mango

We will replace ‘a’ for Apple and ‘m’ for Mango.

Apple Super Mango = a*m*m = am^2

For now just know a cup of Apple Super Mango will get represented by am^2.

If we have One Apple Super Mango + One Apple Super Mango, how many Apple Super Mangos do we have?



One Apple Super Mango + One Apple Super Mango = Two Apple Super Mangos

1 am^2 + 1 am^2 = 2 am^2

Extra

Note an Apple Mango juice is NOT the same as an Apple Super Mango juice

2am^2 + 3a + 2a + 11m + 1am + 2am + 6am^2 = 8am^2 + 5a + 11m + 3am

<u>Practice</u>

3a + 2a + 4am + 3m =

When multiplying, think about mixing drinks

Like Terms

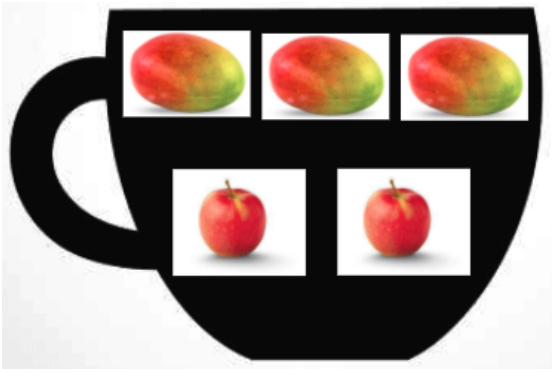
One Mango * One Apple
= 1 m * 1 a
= m*a
= a*m

One Mango * One Apple * One Mango
= 1 m * 1 a * 1 m
= m^2*a
= a*m^2

m^2 means we have Two Mangos in the drink.

Again, multiplying is like mixing drinks. Let's mix the last two drinks together.

Let us **mix** them together now.



One Mango * One Mango * One Mango * One Apple * One Apple
= 1 m * 1 m * 1 m * 1 a * 1 a
= m^3*a^2
= a^2*m^3

We are mixing drinks. We are multiplying.

a^2 means we have Two Apples in the drink
m^3 means we have Three Mangos in the drink

We are NOT adding drinks to give to our friends. We multiply when mixing drinks.

Like Terms

Extra
If we are giving drinks to friends we will add drinks. We do this to know what drinks to give to which friends.

1a + 1a + 1a + 1am + 1am = 3a + 2am

3 Apple juices for Pooh and 2 Mango Apple juices for Tiger.
(Note am = ma they both have One Apple and One Mango)

If we are multiplying, we are mixing drinks.
1a * 1a * 1a * 1am * 1am = a^5*m^2 = a^5m^2

$$1a \cdot 1a \cdot 1a \cdot 1am \cdot 1am = a^5m^2$$

We have five Apples a^5 and two Mangos m^2 in the drink. Putting them together we have a^5*m^2

Extra

2a * 4a = 8a^2

4m*2a = 8ma = 8am

3a^2 * 2m^2 * 4m = 12a^2*m^3 = 12a^2m^3

x*x = x^2

x*x*x = x^3

x + x = 2x

x + x + x = 3x