What is macro? Macro usually is considered to be 0.5x or 1x magnification or greater.

**“Magnification” in photography**

Magnification is a number to express the size of an object as it is projected onto the sensor of the camera.

For example on a standard DSLR sensor that is 24mm across, at 1x magnification an object that is 24mm will fill the whole frame. At 0.5x magnification it will fill ½ the frame, and at 2x magnification, only ½ the object fits in the frame.

Also expressed as a ratio eg: 1x = 1:1, 2x = 2:1, and 0.5x = 1:2

At increased magnification, Depth of field (DoF) decreases (shallower)
Effective aperture decreases (gets narrower)

Practical consequences
- you need to ‘stop down’ (make your aperture narrower) to increase your DoF (if not your picture will have 1mm DoF).
- you need to increase ISO or increase exposure time to get sufficient light, or use flash power.

Flash is usually used for 1x magnification and greater as long exposures (eg. 1 second + are required to get enough light, even in full sun!)
Light in macro
Like most areas of photography, getting the correct light is essential for a good looking macro image.

A common mistake that is made when taking photos in natural light is photographing in full sun. The sun is powerful and creates harsh shadows that are undesirable. To create light that is ‘soft’ without harsh shadows, and more balanced exposure across the frame light must be ‘diffused’.

Diffusion of light is essentially causing light to scatter in many directions. To get the most diffuse light the diffusing surface is held as close as possible to the subject.

You can diffuse flash light as well as sunlight using cheap materials. (eg: Opaque white plastic bag held together by a forked stick, or packing foam over a flash head). The closer the diffusing material is held to the subject the more pleasing the light.

Tripods in macro
There is a common misconception that tripods are essential for macro work. This is untrue. Tripods have their place in macro however you can achieve good results without a tripod. Using a flash it is easy to hand hold, and if shooting in sunlight, sufficient shutter speed can be achieved for handheld at 1x and less to get good results.

Focusing a macro lens (or a kit lens at min focus distance).
To get the highest magnification of any lens, the focus can be set to minimum focus distance on the focus ring. AUTOfocus is usually not needed in macro work (autofocus is inaccurate at very close distance).

How to focus: set manual focus – set the focus to min focus distance, then move your camera back and forward to focus (while looking through the viewfinder). This can be tricky in the beginning, but practise you will become very accurate.
**Getting close to bugs**

A lot of macro photography is done on insects and other arthropods. Insects can be difficult to approach, especially at minimum focus distance (~10cm-30cm).

**Tips-**

**Do not** make sudden movements. Waving your hand, or moving in quickly can scare off flies and butterflies. Move smoothly and slowly.

**Do not** cast your shadow on insects while approaching, this can scare them off, try to approach so you do not black the sun (also helps to have more light to focus).

Try not to bump/move whatever the insect is sitting on, this may scare them off as well as making it hard to focus on a moving object.

Try to focus quickly and do not hesitate when taking pictures – bugs can fly away suddenly if you linger too long trying to focus.

Flash power can scare off insects (flies, butterflies), so if you only have one shot at the picture try to get it right the first time.

In general insects take practise to approach, locate in viewfinder, focus and take the picture quickly and smoothly. With some practise it can be done with not too much trouble.

**Note!** Some insects are a pain in the A to get close to: butterflies, some flies, dragonflies, wasps. I do not recommend spending too much time chasing these insects in the beginning. You may lose hope.

Insects that are easier to approach- bees (usually not bothered by humans, but are fast moving), spiders in webs, slow moving beetles, praying mantis, some grasshoppers.

This is a general list; in practise some insects will allow approach while the same insect on a different day will not let you 1m near it.
**Equipment:**

Macro lenses: Most ‘macro’ lenses focus to infinity, as well as having a max magnification of 1:1., focusing down to ~10-15cm.  
1x magnification is good for larger insects and flowers, however to get fine details, 2x magnification or greater is required, this can be done using extension tubes.

Extension tubes:  
These are tubes that contain no optics, their function is to bring the lens further from the lens mount, and allow the lens to focus closer than normal. By focusing closer, magnification is increased. Extension tubes can be used on all lenses to bring the minimum focusing distance closer.  
The longer the length of extension (mm), the closer the focus and the greater the magnification. You can achieve close to 2x magnification by adding ~65mm of extension to a 100mm lens, and close to 3x magnification when adding 65mm to a 60mm lens.  
Most kit lenses can get close to 1x with a ~65mm of extension (Kenko sells 62mm extension tube set). This way you can achieve greater magnification with your kit lens.

Flash: Flash may be necessary to take pictures at greater than 1x magnification. Macro flashes require diffusion to produce good lighting.  
Specialised macro flashes usually mount to the end of the lens: this is good to get the light close to the subject; In my experience, at 1x magnification on most macro lenses, the working distance is far, meaning the flash light is poorly diffused once it reaches the subject. Lens mounted macro flashes work best when the flash head is less than 5cm from the subject.  
Bracket rigs: Some people use a bracket to hold a speedlight flash closer to the subject, this is good however it means the light always come from one side, also cumbersome to carry.  
Hand held set up: Hand holding a flash gives great versatility in direction and distance from subject.