

## 11.6 – Laws of Reflection

#1 – angle of incidence = angle of reflection

#2 – the incident ray, reflected ray and the normal are all in the same plane (2D space – ie: will all be on your piece of paper when you are drawing ray diagrams)

These 2 laws help us to draw and predict where images will be.

Object = real 'thing'

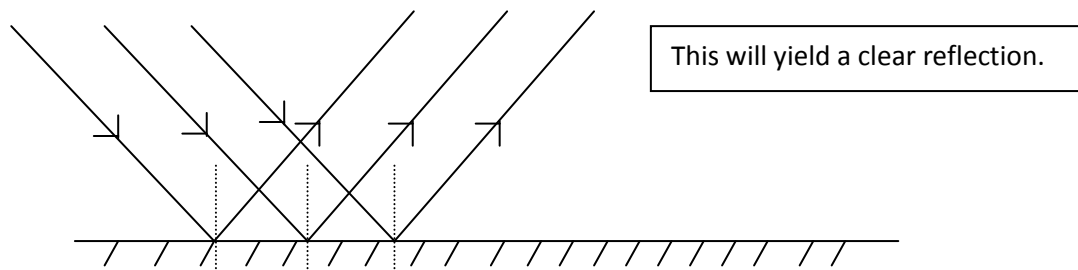
Image = reproduction of an object by using light.

**Types of Reflection:** generally there are 2 types of reflection: specular and diffuse.

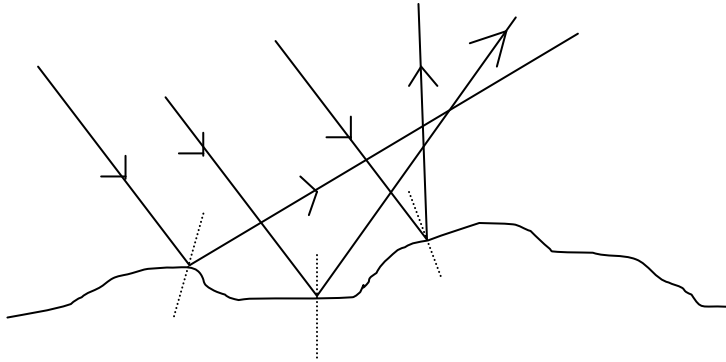
A) specular reflection – occurs off a smooth, shiny surface and the result is a clear image. When we see an image in a very still lake, this is specular reflection. The image is a 'mirror' image of the object. (see text for a great picture of this) . Of course our reflection in a mirror is also an example of specular reflection.

B) diffuse reflection – occurs of an irregular, not smooth surface such as water that is 'ruffled' by wind or by crinkly tinfoil. Again, there is a great picture of this in the text book.

We can use our 2 rules of reflection to show why smooth surfaces give us specular reflection (and a great image) and rough surfaces give us diffuse reflection. Note: although diffuse reflection gives us a blurry or no image, it does reflect off light. The reflecting surface is bright.



**Specular** reflection – note that all of the incident rays are parallel and so are the reflected rays. The dashed lines are the imaginary normal lines we draw so we can show angle incidence = angle of reflection (always measure to the normal).



**Diffuse** reflection – note that all the incident rays are parallel to each other but the reflected rays are not. The normals are drawn  $90^\circ$  to the surface which is not flat. Each normal is at a different angle. We still follow the rule that angle of reflection is equal to the angle of incidence. The reflection does not yield a clear image because all the normals are not parallel to each other. They are scattered.

Although specular reflection gives us nice, clear images, there are times when we want brightness, but don't want a clear image projected. (Think about foggy windows in your bathroom! We want light coming into our bathroom, but we don't want a clear image of our unclothed body projected outwards to the outside world!)