

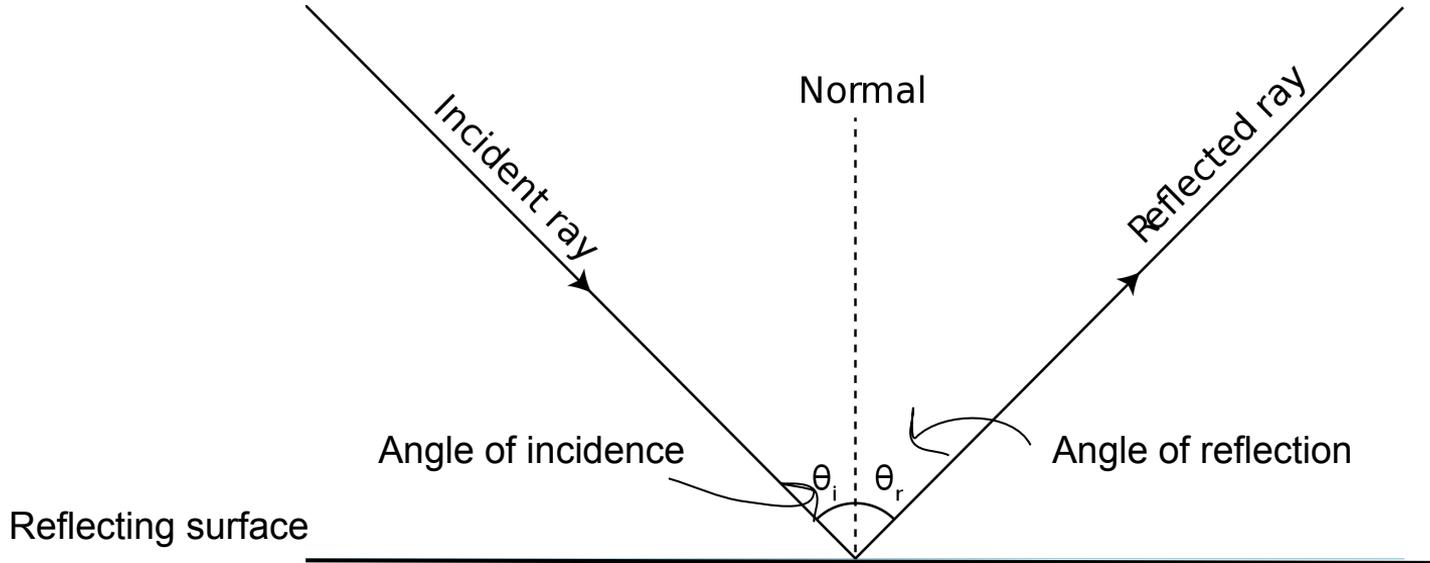
Reflection

Reflection of light allows us to see the world around us

- If there was no reflection we would only see luminous objects.
- Light travels from a light source and reflects off a non-luminous object towards our eyes and allows us to see the object.

Last Class

- Drew ray diagrams to model reflection of light off a plane mirror.



Ray Diagrams

What have you noticed through your investigation of drawing ray diagrams?

How are the angle of reflection and angle of incidence related?

The Laws of Reflection

The angle of incidence = the angle of reflection

The incident ray, the normal, and reflected ray all lie in the same plane

Reflection off a plane mirror

The reflection you observed in the last class was off a plane mirror. This type of mirror has a smooth and shiny surface and is an example of regular reflection.

Regular reflection: reflection of light off a smooth, shiny surface. An image can be seen.

Examples: mirrors, shiny metal, surface of still water, glossy paint

Reflection off an irregular surface

A lot of surfaces are not smooth and shiny - they are irregular

Diffuse reflection: Reflection of light off an irregular surface. Light is reflected in many directions.

Examples: cardboard, water on a windy day, a wooden table, clothing

Reflection

Light acts in predictable ways and always follows the law of reflection, which states that the angle of incidence is equal to the angle of reflection.

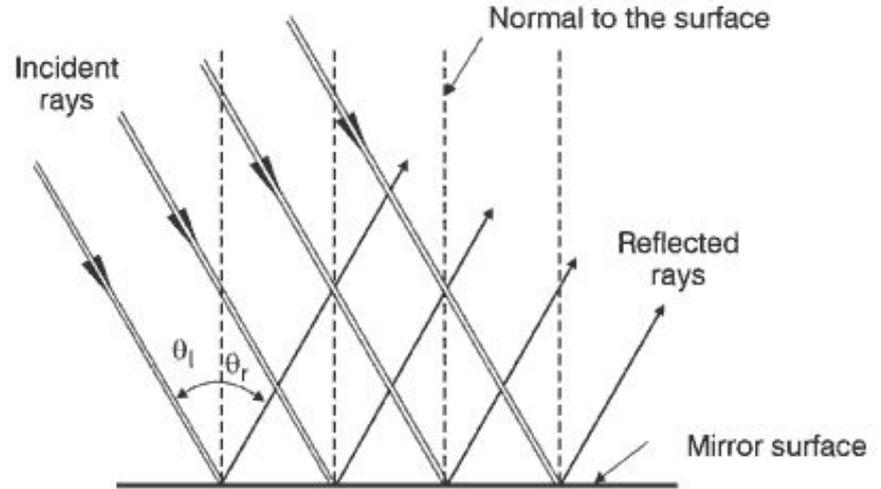
This is true for both regular and diffuse reflection.

Regular Reflection – smooth surface

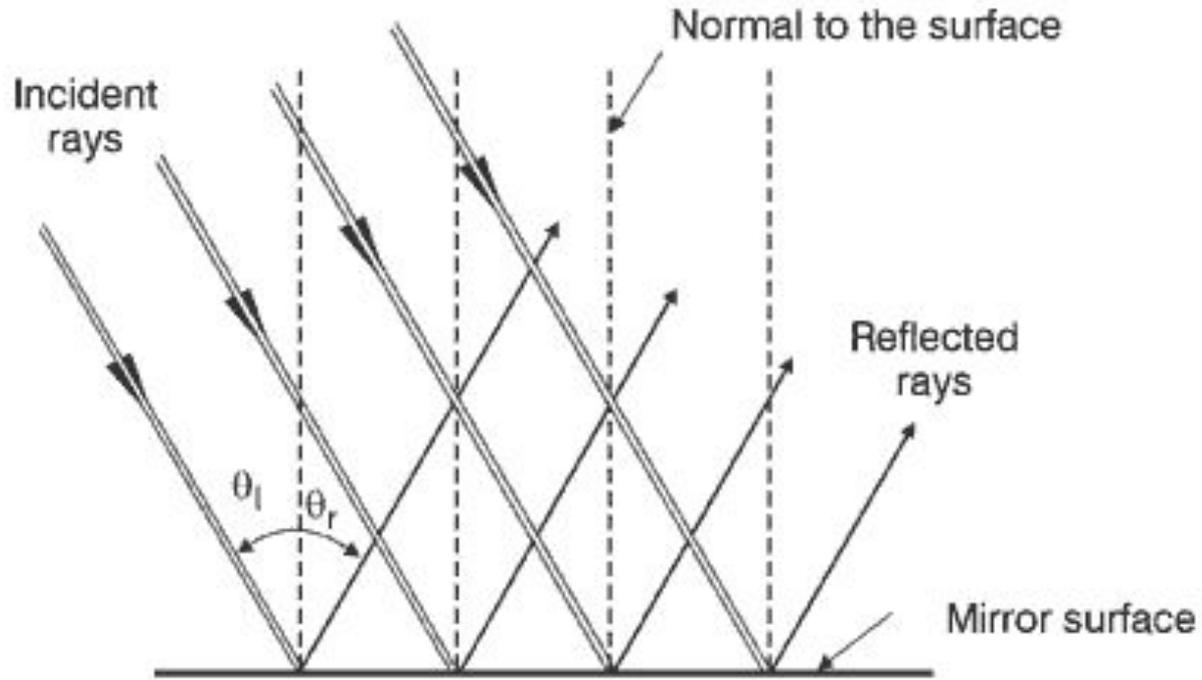
Normal lines are parallel along the reflecting surface at the points of incidence

The angle of reflection depends on the position of the normal, and since they are all positioned the same, when the parallel incident rays hit the surface, they will reflect so that the angles of reflection are all the same.

The reflected rays are also parallel.



Regular Reflection

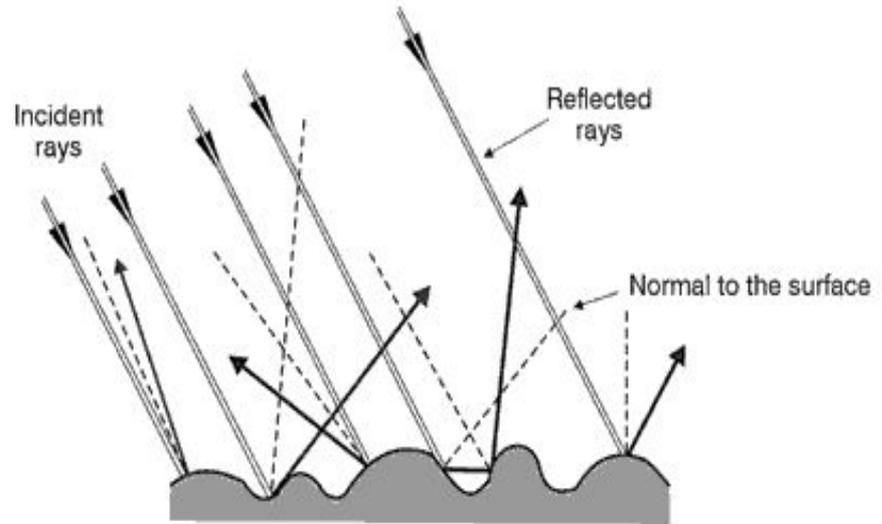


Diffuse Reflection

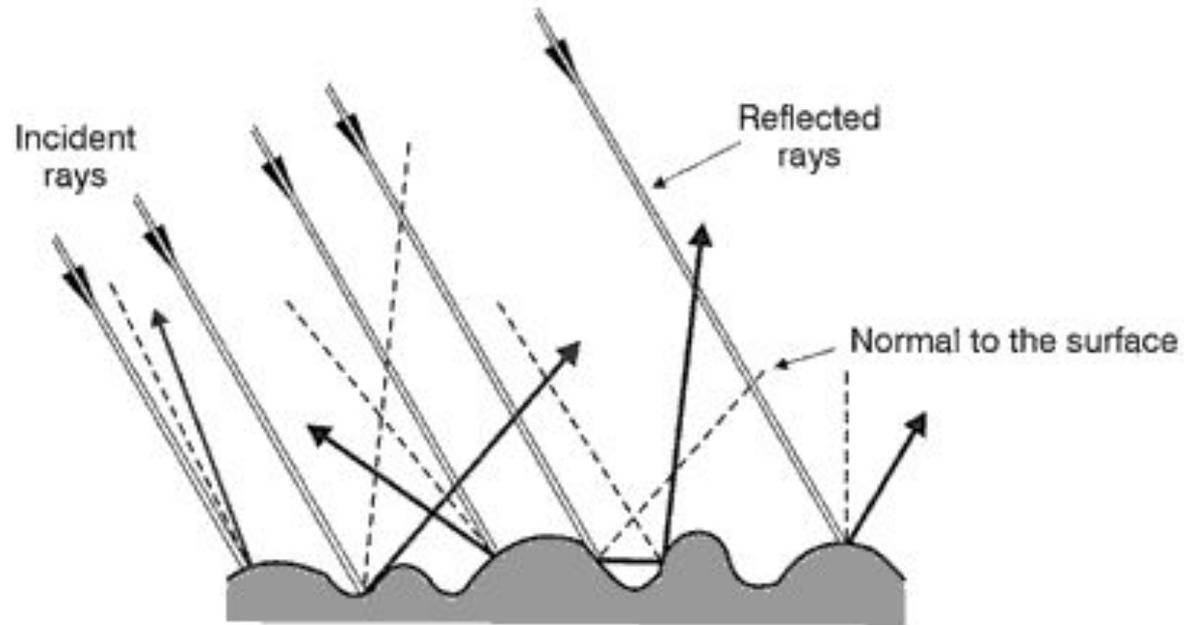
The normal lines are not parallel because the surface is rough. They are still perpendicular to the surface, but there is variation.

The angle of incidence depends on the position of the normal line at the place where the light hits, so the incident angles for parallel rays will be different, since the position of the normal lines is different. Each reflected ray has a different angle.

The reflected rays scatter and are not parallel.



Diffuse Reflection



In Summary...

Regular reflection: the normal lines along a surface are parallel, which means the incident rays and reflected rays are parallel.

Diffuse reflection: the normal lines are not parallel along a surface, which means the incident rays are parallel but the reflected rays are scattered in different directions.

Examples & Applications of Reflection

Regular Reflection

- Mirrors, cameras, some plastics, glossy pictures

Diffuse Reflection

- Clothes, paper, walls of most rooms, some flooring
- Some objects may feel smooth to touch, but at the microscopic level they are rough
- Allows us to see objects
- Rooms are designed with diffuse reflection in mind; easier on the eyes

To Do:

1. Finish the investigation *reflecting light off a plane mirror* - **due next class**
2. Worksheet *Regular and Diffuse Reflection*