

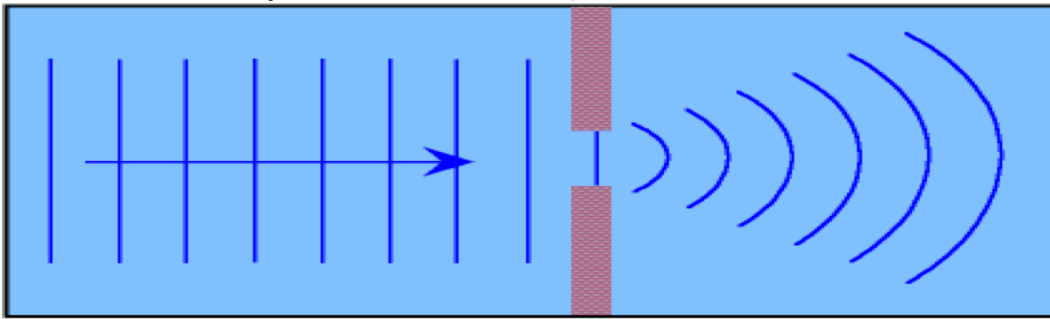
The following are the answers
for Monday, Tuesday and
Wednesday work

Please review your work and make necessary changes.

Question

1. When does diffraction occur?
Does the spreading become more or less pronounced for narrower opening?

2. What is this spreading called?



• Answer

- 1. a. Diffraction occurs when waves pass and bend through or around an opening. More pronounced (more spreading of the waves)

- 2. Diffraction

Question

3. Does diffraction aid or hinder radio reception?

4. What kind of waves diffract easier?

Answer

3. It aids radio reception because the bending and spreading of waves causes the waves to reach more places.

4. Larger waves diffract easier

Question

5. Is it possible for a wave to make another wave smaller?...Cancel out? Defend your answer.

6. What is iridescence? What are some real world examples

Answer

5. Yes, by destructive interference. Destructive interference is the result of 2 waves meeting at the same place, at the same time. The crest of one wave overlaps the trough of the other wave.

6. Iridescence is the interference of light waves of mixed frequencies which produces a spectrum of color. Examples: Soap, Opal, some Sea Shells, etc.

Question

7. When we see a colorful oil spot, do we see colors that constructively interfere, or destructively interfere?

8. Why is gasoline that is spilled on a wet surface so colorful?

Answer

7. Display of colors produced by destructive interference

8. That is because of the destructive interference of light that is reflected from the gasoline and water surface.

What are characteristics of different behaviors of light?

Wave Behaviors

Reflection (Specular)

When a wave meets a smooth surface and bounces back in one direction (predictably).

Light bouncing off of a mirror
Light bouncing off a wet road

Refraction

The bending of a wave as it crosses a boundary, changes medium, and changes speed.

A pencil or paper that looks broken in a cup of water
A fish that appears closer to the surface than it really is

Diffuse Reflection

When a wave meets a rough surface and bounces back in many directions (randomly).

Light bouncing off of paper
Light bouncing off of dry road

Total Internal Reflection

When the angle of incidence is larger than the critical angle, there will be complete reflection of light back into the original medium.

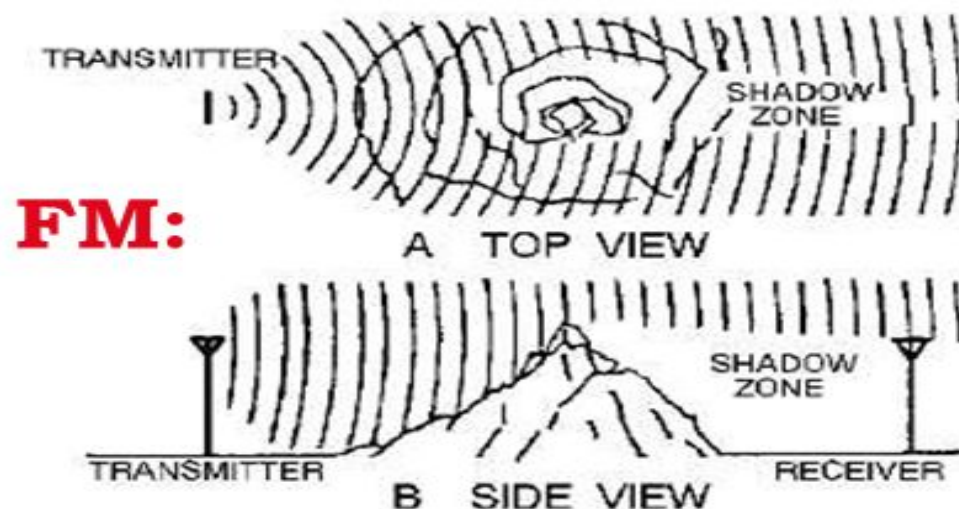
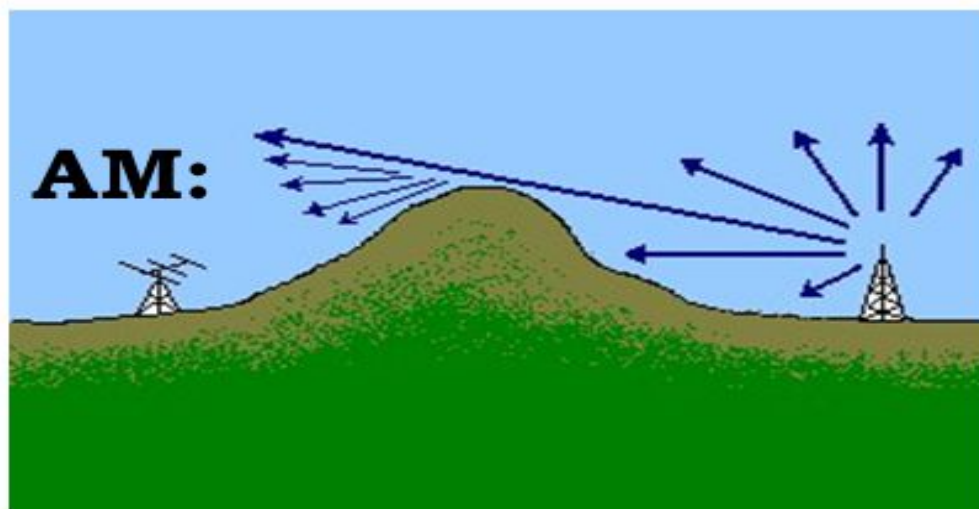
The brilliant sparkle of a diamond

Diffraction

When a wave bends around objects or through openings

AM/FM radio waves traveling to your car
How light and sound waves come through a door to fill a room
Carrying information (internet, cable) through optical fibers at the speed of light.

AM vs FM: which diffracts more?
Is that good or bad for reception?



→ typical AM frequency: $1000 \text{ kHz} = 1 \times 10^6 \text{ Hz}$
→ typical FM frequency: $100 \text{ MHz} = 1 \times 10^8 \text{ Hz}$

AM → lower f → longer λ → more diffraction

Because AM diffracts more, it can bend around
obstacles, so there are less "shadow" zones .

FM radio waves are not received as well as AM radio waves are in mountain and between buildings because they have shorter wavelength therefore they have less diffraction