

31 DIFFRACTION AND INTERFERENCE

Objectives

- Describe what Huygens stated about light waves. (31.1)
- Describe what affects the extent of diffraction. (31.2)
- Explain how interference affects wave amplitudes. (31.3)
- Describe what Young's interference experiment demonstrated. (31.4)
- Explain how the colors seen in thin films are produced. (31.5)
- Describe how laser light is emitted. (31.6)
- Explain how a hologram is produced. (31.7)

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MATERIALS construction paper, container of water, clear nail polish

EXPECTED OUTCOME Students will see a pattern of iridescent colors on the nail polish film.

ANALYZE AND CONCLUDE

1. A pattern of iridescent colors
2. Different colors will be observed at different viewing angles.
3. Light incident on thin films is reflected from the top and bottom surfaces of the film. The interference of the reflected light as it exits the film gives rise to the iridescent colors.

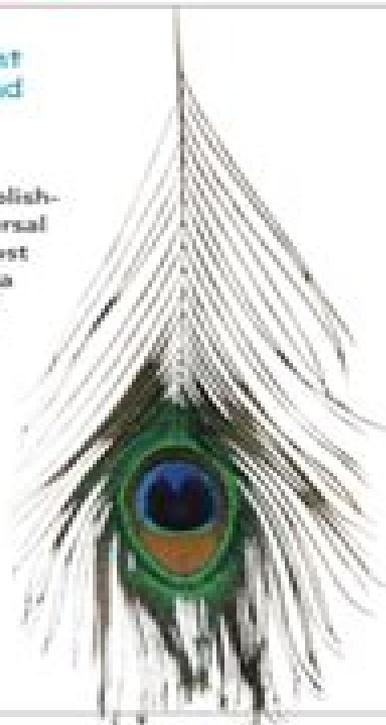
31 DIFFRACTION AND INTERFERENCE



THE BIG IDEA

The wave model of light explains diffraction and interference.

Today Isaac Newton is most famous for his accomplishments in mechanics—his laws of motion and universal gravitation. Early in his career, however, he was most famous for his work on light. Newton pictured light as a beam of ultra-tiny material particles. With this model he could explain reflection as a bouncing of the particles from a surface, and he could explain refraction as the result of deflecting forces from the surface acting on the light particles. In the eighteenth and nineteenth centuries, this particle model gave way to a wave model of light because waves could explain reflection, refraction, and everything else that was known about light at that time. In this chapter we will investigate the wave aspects of light to explain two important phenomena—diffraction and interference.



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What Produces Iridescent Colors in Thin Films?

1. Submerge a piece of construction paper in a container of water.
2. Apply one drop of clear nail polish to the surface of the water and watch it spread out over the surface of the water.
3. After the nail polish has stopped spreading, slowly lift the construction paper out of the water. The nail polish should adhere to the surface of the paper.
4. Allow the paper to dry.

Analyze and Conclude

1. **Observing** What do you observe as you view the dried film on the surface of the paper?
2. **Predicting** What do you think you will see if you view the film from various angles?
3. **Making Generalizations** How would you explain the colors produced by thin films?

Chapter 31 Diffraction And Interference Exercises Answers

Michal Rosen-Zvi



Chapter 31 Diffraction And Interference Exercises Answers:

The Top Books of the Year Chapter 31 Diffraction And Interference Exercises Answers The year 2023 has witnessed a remarkable surge in literary brilliance, with numerous engrossing novels enthraling the hearts of readers worldwide. Lets delve into the realm of popular books, exploring the engaging narratives that have charmed audiences this year. Chapter 31 Diffraction And Interference Exercises Answers : Colleen Hoover "It Ends with Us" This touching tale of love, loss, and resilience has captivated readers with its raw and emotional exploration of domestic abuse. Hoover masterfully weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can succeed. Uncover the Best : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This spellbinding historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids captivating storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Chapter 31 Diffraction And Interference Exercises Answers : Delia Owens "Where the Crawdads Sing" This evocative coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens crafts a tale of resilience, survival, and the transformative power of nature, captivating readers with its evocative prose and mesmerizing setting. These popular novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of compelling stories waiting to be discovered. The novel begins with Richard Papen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is an exceptional and suspenseful novel that will keep you wondering until the very end. The novel is a warning tale about the dangers of obsession and the power of evil.

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