Educational Outreach:

From Policy to Practice

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Overview

- The Meggers Project Award
- **S**PS **O**utreach **C**atalyst **K**its
- Outreach Demonstration
- Lessons Learned

The Meggers Project Award

- Used to fund projects to enhance physics awareness, particularly in high schools
- Originated with an endowment from Dr. William Meggers to AIP

Award Awareness

- Recently, very few applications have been submitted for the award
- Problem was attributed to lack of publicity
- Meggers Project Award presence on the web will heighten award's visibility

Website Goals

- Increase awareness of the Meggers Project Award
- Provide necessary application materials to potential award recipients
- Highlight the life and career of Dr. Meggers
- Provide historical information about the award

Application Materials

- All necessary information and materials for award candidates are on website
- Focus: to make materials printable, easy to find and use

Meggers Biography

Information about Dr. William Meggers:

- Professional life
- Personal life
- Educational background
- Fun facts

Award Historical Information

Pertinent information about award origin includes original letter from Dr. Meggers to AIP explaining his gift

Project Spotlights

- Site has a list of past projects to help applicants refine their ideas
- Three projects were selected for in-depth spotlight feature
- **S**PS **O**utreach **C**atalyst **K**it for high schools is one of the features

SPS ***O***utreach ***C***atalyst ***K***its

- Denim “sock” containing outreach supplies
- “Rainbow Room” designed summer, 2001
  - -established intern program
  - -focus on outreach by SPS chapters
  - -reporting requirement, including survey
- Successful start for SOCK project
  - -70 SPS members, 1000 community members
  - -Notable use: UNC-Asheville’s Super Saturdays

Super Saturdays and Beyond

"After receiving the SOCKs the ['Light and Visual Phenomena'] class was restructured to include many of the demonstrations in the kits."

-Matthew Fisher, UNC

"As a package, it definitely helped us to **get out there** and **get involved**."

-Gregory Frye, California State-Northridge

Dimensions in Physics

- Focus on geometrical aspects of physics

Polyhedra

Rainbows

Astronomy

Scaling

- Unified format: demo followed by workshop

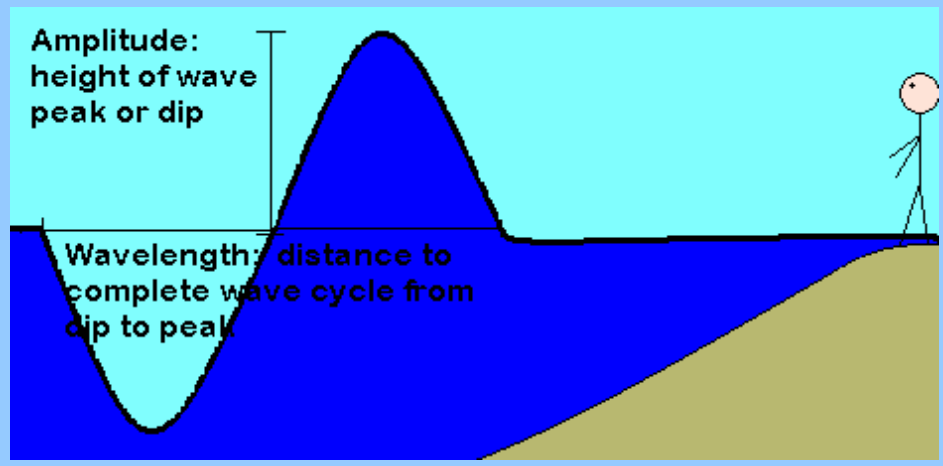
Rainbow

Reversal

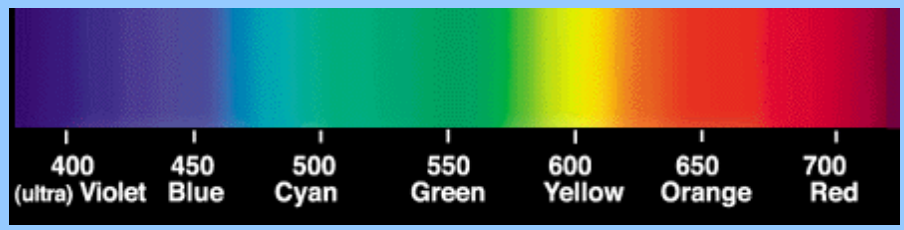
Rainbow Glasses

- Put on rainbow glasses
- Observe the sources around you
  - -What colors do you see?
  - -Which color is closest to the source?
  - -Which color is farthest from the source?

Learning About Light



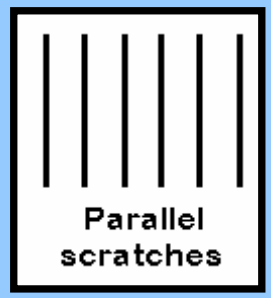
- Light waves: amplitude = brightness, wavelength = color
- Physicists use wavelength to *define* color of visible light

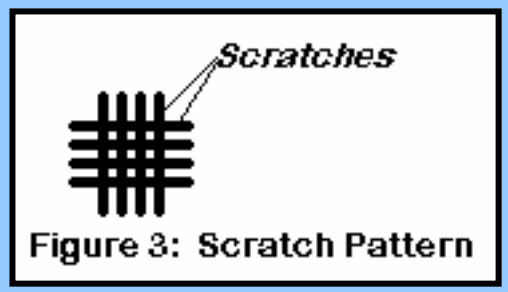


- Sometimes light contains more than one wavelength
- 2 ways to separate the colors: gratings and prisms

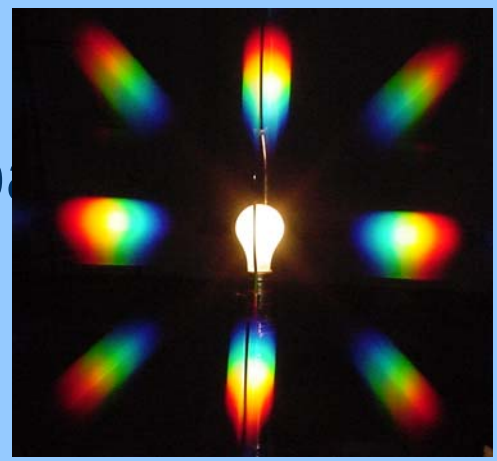
Diffraction Gratings

- Lenses of the glasses are *diffraction gratings*
- Typical grating: parallel scratches/slits cause scattering, produce rainbow pattern





- Our gratings: crossed scratches
  - -scratches are ~4200 nm ap



Diffraction Gratings (Spacing = 1881 nm)

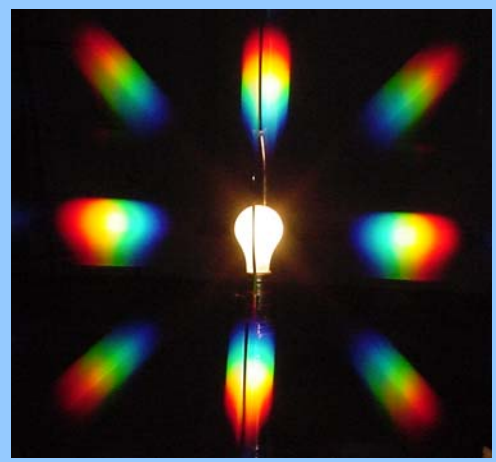
HYPOTHESIS 1: For diffraction gratings, longer wavelengths scatter at greater angles.

HYPOTHESIS 2: For diffraction gratings, shorter wavelengths scatter at greater angles.

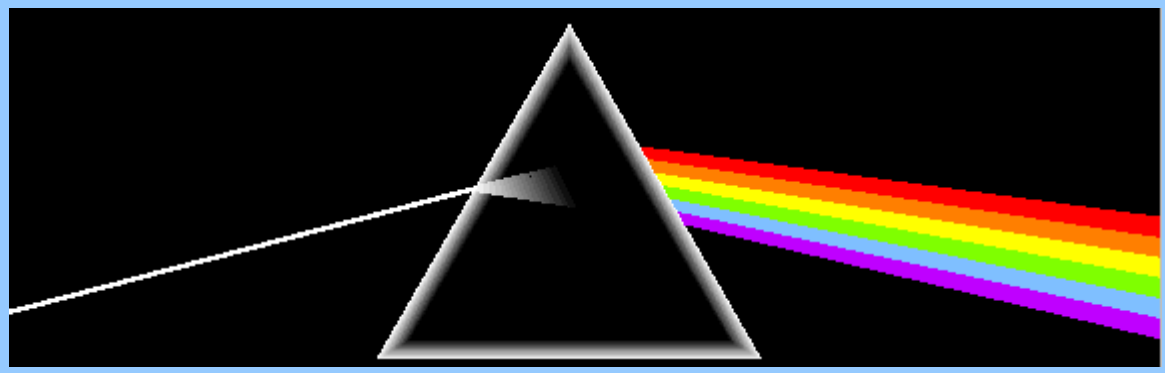
Color, wavelength
Red, 680nm
Orange, 610nm
Yellow, 580nm
Green, 540nm
Blue, 480nm

Test the Hypothesis

Using this image taken through the glasses, which hypothesis do you agree with?



Prisms



- No scratches
- Light bounces off of atoms in prism

Prisms

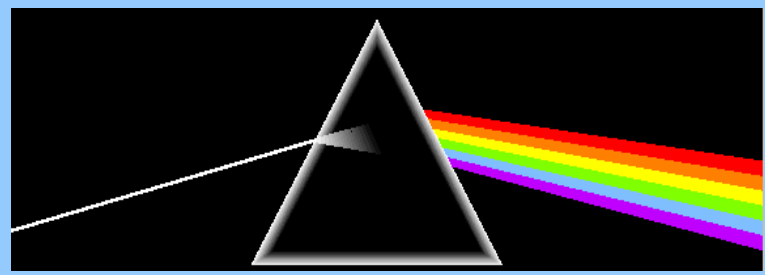
HYPOTHESIS 3: For prisms, longer wavelengths scatter at greater angles.

HYPOTHESIS 4: For prisms, shorter wavelengths scatter at greater angles.

Color, wavelength
Red, 680nm
Orange, 610nm
Yellow, 580nm
Green, 540nm
Blue, 480nm

Test the Hypothesis

Using this cartoon image of a prism (or a real prism, if one is available), which hypothesis do you agree with?



Understanding the Reversal

For diffraction gratings (scratch spacing 1881nm), longer wavelengths (red, ~680nm) scatter at greater angles.

(Hypothesis 1)

For prisms (atom spacing ~10nm), shorter wavelengths (blue, 480nm) scatter at greater angles.

(Hypothesis 4)

Can you think of another hypothesis that combines these two?

Understanding the Reversal

The wavelength closest to the size of the object the light scatters from experiences the largest angle of scattering.*

*Note that this is consistent with the “Coffee Creamer Demo” which shows why the sky is blue and sunsets are red.

Lessons Learned

- Policy constantly being made
  - -positive policies
  - -slow-changing system
- Public perception of physics is important for the future of the science

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