

Core Skills Analysis

Art

- Observed how water droplets act as tiny prisms, creating a natural spectrum that can be captured compositionally with a mirror.
- Explored color theory by noting the order of ROYGBIV and how overlapping arcs produce secondary hues.
- Practised visual documentation by sketching the rainbow's shape, intensity, and surrounding environment.
- Considered the aesthetic impact of light direction and angle, informing future mixed-media projects that manipulate reflection.

English

- Developed precise scientific vocabulary (refraction, incidence angle, dispersion) in oral explanations.
- Crafted a concise procedural paragraph describing the set-up, mirroring the structure of lab reports.
- Analyzed metaphorical uses of rainbows in literature, linking the physical phenomenon to themes of hope and diversity.
- Practised peer feedback by reviewing classmates' written reflections for clarity and descriptive richness.

History

- Connected the experiment to the historical study of light, recalling Newton's prism experiments and the development of spectroscopy.
- Identified cultural significance of rainbows across Indigenous Australian stories and global myths.
- Recognised the evolution of optical tools from simple mirrors to modern spectrometers.
- Placed the activity within the broader timeline of scientific inquiry during the Scientific Revolution.

Math

- Measured the angle of incidence between the light source, mirror and water to predict where the rainbow would appear.
- Applied basic geometry to calculate the angle of refraction ($\sim 42^\circ$) that separates each colour band.
- Used ratios to compare the length of the rainbow arc to the distance between mirror and water surface.
- Graphically plotted angle versus colour position, reinforcing concepts of linear relationships.

Science

- Observed refraction and dispersion as white light splits into a spectrum when passing through water droplets.
- Explored how the law of reflection on the mirror directs the refracted light toward the observer.
- Identified the role of the medium's refractive index in determining the spread of colours.
- Formulated a simple hypothesis about how changing water depth or mirror angle would affect the rainbow's width.

Tips

Extend the investigation by (1) varying the water temperature and recording any shift in colour

intensity, (2) building a small dark-room setup to compare artificial versus sunlight sources, (3) writing a creative short story that integrates the physics of the rainbow as a plot device, and (4) collaborating with a peer to design a poster that blends scientific diagrams with artistic renderings of rainbows from different cultures.

Book Recommendations

- [The Prism: A History of Light in 57 Experiments](#) by John J. McElroy: A narrative of how scientists uncovered the nature of light, with hands-on experiments that echo the rainbow activity.
- [Rainbow: A Natural History of Color](#) by John T. McAllister: Explores the physics, mythology, and cultural impact of rainbows, linking science with art and literature.
- [The Art of Seeing: An Introduction to Visual Perception](#) by Ruth Z. Durrant: Guides students through the science of light and colour while encouraging sketching and visual analysis.

Learning Standards

- Science: ACSSU094 – Light and sound; students investigate how light is refracted and dispersed.
- Mathematics: ACMMG047 – Explore relationships between angles and lengths using geometric measurement.
- English: ACELA1642 – Use specialised language to explain scientific processes in written and spoken forms.
- History: ACHASSK084 – Analyse the development of scientific ideas about light from early cultures to modern times.
- Art: ACAVAM095 – Experiment with colour, light and reflective surfaces to create visual compositions.

Try This Next

- Worksheet: Calculate expected rainbow angle using Snell's Law ($n_{\text{water}} = 1.33$) and record actual measurements.
- Quiz: Match key terms (refraction, dispersion, incidence) with correct definitions and real-world examples.