



WINTER HOLIDAY LASER ADVENTURE

Study Guide

A Dazzling Celebration of Science, Music & Winter Fun!

Light • Lasers • Color • Optical Illusions • Music • Imagination

Welcome!

Thank you for downloading this guide to accompany Winter Holiday Laser Adventure. Explore how science, technology, music, and art work together to create a spectacular seasonal experience.

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Please note the performance name on correspondence.

ABOUT THE SHOW

Winter Holiday Laser Adventure is a spectacular sing-along show combining colorful animation, beloved seasonal music, and audience participation.

This inclusive, secular program celebrates the start of winter and the holiday season while introducing the fascinating world of light and lasers. Students discover the physics behind laser effects, explore optical illusions, and see how science and art combine to create dazzling entertainment.

FESTIVE + FUN + EDUCATIONAL

Be ready to sing, observe, wonder, and celebrate together!

KEY LEARNING GOALS

Students will:

- Understand what a laser is and how it differs from ordinary light.
- Learn about reflection, refraction, dispersion, and color.
- Explore optical illusions and how the brain interprets images.
- See science and technology used in entertainment.
- Celebrate winter through an inclusive musical experience.

What are you most curious to see or learn?

SCIENCE CONCEPTS

1. WHAT IS A LASER?

"LASER" stands for Light Amplification by Stimulated Emission of Radiation. Laser light is:

COHERENT	Waves stay in step
MONOCHROMATIC	Usually one color
DIRECTIONAL	Travels in a narrow beam

2. PROPERTIES OF LIGHT

Reflection: light bouncing from a surface, like a mirror.

Refraction: light bending as it passes between materials, like a straw appearing bent in water.

Dispersion: white light separating into colors, like a rainbow.

3. OPTICAL ILLUSIONS

Optical illusions happen when the brain interprets visual information in a surprising way. Examples include motion illusions, impossible shapes, afterimages, and pictures with two meanings.

Look closely! What we think we see is not always the same as what is really there.

DISCUSSION QUESTIONS

Think like a scientist, artist, and audience member!



1. What makes laser light different from flashlight light?

2. How might lasers create shapes and patterns?

3. Why do some optical illusions trick our brains?

4. How does science combined with music make learning exciting?

5. Why is it important for seasonal celebrations to welcome everyone's traditions?

HANDS-ON SCIENCE ACTIVITIES



MAKE A RAINBOW

Use water, a flashlight, and white paper to explore dispersion. Adult supervision recommended.

DIY OPTICAL ILLUSION

Draw a bold spiral on a paper disc, attach it safely to a pencil, and spin it to observe motion effects.

LASER SAFETY POSTER

Design a poster reminding everyone never to aim a laser at eyes, people, animals, vehicles, or aircraft.

SONG & SCIENCE MASH-UP

Choose a familiar seasonal tune and write original science words about light. Do not copy existing lyrics.

LIGHT PATH EXPERIMENT

Use only a flashlight, mirrors, and shiny objects to bounce light. Ask an adult to help darken the room safely.

SAFETY FIRST: Classroom investigations use flashlights, not laser pointers. Never look directly into a laser or bright beam.

VOCABULARY

✱ Laser	a highly focused beam of light produced by stimulated emission
Coherent Light	light waves moving together in step
Reflection	light bouncing from a surface
Refraction	light bending between different materials
Optical Illusion	an image interpreted differently from reality
Spectrum	the range of colors produced when light is separated

POST-SHOW REFLECTION

My favorite laser pattern or animation was...

One new science fact I learned...

The show made me feel...

Science can make celebrations exciting by...

ACTIVITY: LASER FACTS

Use what you learned in the show or research with a trusted source.

1. What does LASER stand for?

2. How is laser light different from sunlight?

3. What are three uses of lasers in everyday life?

1.

2.

3.

Possible places to investigate: medicine • manufacturing • communication • scanners • measurement • entertainment

Safety Reminder: Research laser uses, but never experiment with a laser pointer. Classroom light experiments should use flashlights.

CREATE AN OPTICAL ILLUSION

Draw a spiral, a pattern that seems to move, an impossible shape, or an image that can be seen in two different ways.

Design Tips: Use bold lines • Repeat shapes • Try contrasting colors • Leave some white space • Ask a partner what they see

DRAW YOUR ILLUSION HERE

How does your illusion trick the viewer?

MAKE A RAINBOW

With adult supervision, shine a flashlight through a clear glass of water toward white paper. Adjust the angle until colors appear. Draw and label what you observe.

Remember: Use a flashlight only. Keep water away from electrical cords and devices.

DRAW & LABEL YOUR SPECTRUM

DESIGN YOUR OWN LASER SHOW

If you could design a laser show, what music, colors, shapes, winter images, and science ideas would you include?

MUSIC / MOOD	COLORS / SHAPES
WINTER IMAGES	SCIENCE IDEA

SHINE • WONDER • DISCOVER • CREATE!