

# See The Light

## Storytelling with Light



### Introductions:

Have you ever seen how light passes through the window? Have you looked at stained glass and wondered how sunlight looks different when it shines through? Have you ever seen light passing through a peephole?

This integrative STEAM project combines scientific core ideas. It looks into the technology used in creating light-based artifacts and how artists from different cultural backgrounds have expressed themselves over time. It also involves applying mathematical concepts and engineering practices when creating.

In this project, students will explore the properties of light and its applications in real-world structures. They will examine surfaces around them for their opacity, transparency, and translucency and determine the reasons behind choosing materials when constructing.

Students will also learn about the history of light structures, mainly stained glass windows, and how they can be used to tell a story or display a pattern.

Students will learn about the importance of choosing a suitable material and designing a light structure using biodegradable or recyclable materials; students will connect their learning to real-world issues of environmental consciousness and responsible design.

Sustainable Design Thinking: [Design Thinking](#)

## **Driving Question or Challenge:**

Driving questions: Have you looked at stained glass and wondered how sunlight looks different when it shines through? What causes it?

Challenge: Create a sustainable display that uses the properties of light to engage the viewer and communicate a message through the art.

## **Real-world Context:**

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**See the Light Slide Deck**  **See the Light**

## **In-depth Inquiry**

This inquiry-based unit will encourage students to ask questions, research, and create a display to tell a story.

Students will engage in hands-on activities such as pin punching, cutting, sketching, and coloring that will hone in on fine motor skills.

They will explore the properties of opaque, transparent, reflective, and filtering materials through experiments and demonstrations.

**KIEWS Chart**  **KLEWS chart - Light.pdf**

## **Student Voice and Choice**

In this project, students will have the choice to choose the illustration they want to create and the materials and colors they want to use. They will also be able to choose how they will present their art piece through storytelling or video.

## **Assessment:**

Students will write a reflection piece to describe the light concepts they learned and the challenges they faced during the construction phase. Through journaling, group discussions, and individual reflections, students will develop an understanding of the qualities of light.

## **Peer review and feedback**

To encourage a culture of receiving feedback and improving and giving constructive feedback, students will share their work with their peers in presentations or gallery walks. Following their presentation, peers and teachers will provide feedback. Students can then reflect on the feedback they receive and make changes.

## **Aligned Standards**

### **NGSS Engineering Standards:**

- K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved by developing a new or improved object or tool.
- K-2-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- 3-5-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- 3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- 6-8-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, considering relevant scientific principles and potential impacts on people and the natural environment.

- 6-8-ETS1-2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- 9-12-ETS1-1: Define the criteria and constraints of a design problem that includes a quantitative statement of the problem's criteria and constraints.
- 9-12-ETS1-2: Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

### **NGSS Crosscutting Concepts:**

- **Patterns:** Identify patterns in the properties of materials used for a light structure and use these patterns to inform the design process.
- **Cause and Effect:** Determine the cause and effect relationships between the choice of materials and the sustainability of the light structure.
- **Systems and System Models:** Analyze the light structure as a system and consider how different components interact and contribute to its overall function.
- **Energy and Matter:** Investigate the transfer of energy through sound, light, and heat in the context of the light structure.
- **Structure and Function:** Examine the relationship between the structure and function of the light structure, considering how its design affects its ability to transmit and manipulate light.

### **ISTE Standards for Students:**

- 1b: Creativity and Innovation - Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
- 2b: Digital Citizen - Students engage in positive and responsible digital interactions, considering the ethical use of resources and intellectual property.
- 3d: Knowledge Constructor - Students critically curate information from digital sources and use that information to construct their own learning artifacts.
- 4c: Communication and Collaboration - Students use digital tools to communicate and collaborate effectively, both locally and globally, with diverse audiences.
- 6a: Creative Communicator - Students communicate clearly and express themselves creatively using various technologies.
- 7a: Global Collaborator - Students use digital tools to connect with others and work collaboratively to solve problems and contribute to the global community.

### **ISTE Standards for Educators:**

- 1b: Facilitator - Educators facilitate and inspire student learning and creativity using digital tools and resources.
- 2a: Leader - Educators model and promote digital citizenship and responsibility.

- 3a: Entrepreneur - Educators create learning experiences that allow students to be creative, innovative, and entrepreneurial.
- 4a: Collaborator - Educators actively collaborate with their peers to improve practice and co-create resources.

**Math Standards:**

Students will create geometric patterns and explore shapes and symmetry.

Geometry:

- CCSS.Math.Content.4.G.A.1: Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
- CCSS.Math.Content.4.G.A.3: Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

**Social Studies**

Students will learn the historical context and cultural influences of stained glass. Students can analyze primary and secondary sources to understand the development and significance of stained glass.

**Geography, People, and the Environment:**

6.3.4.C.3: Analyze the cultural characteristics and spatial distribution of human populations.

6.3.4.C.4: Explain the impact of human activities on the cultural environment.

**History, Culture, and Society**

6.4.4.D.1: Analyze primary and secondary sources to understand historical events and developments.

6.4.4.D.2: Explain how key individuals and groups have influenced historical events and developments.

## Additional Documents

- 1) See the Light Slide deck
  - 📄 See the Light
- 2) Material List
  - [Material List](#)
- 3) Design Thinking, Circular Economy Brainstorm
  - [Design Thinking](#)
- 4) KIEWS Chart
  - 📄 KLEWS chart - Light.pdf