

# Project-Based Learning

## Lighten Up

Science

5th Grade



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### Science

#### Overview

Students have been contacted by a local art museum to create and submit an art installation that utilizes the path of light. Students will explore how the path of light changes when it strikes an object or travels through one medium to another. Students will demonstrate understanding by communicating how the path of light was used to create different effects within the art installation.

#### Guiding Questions

What path does light travel?

How can the path of light change?

How does an object impact the path of light?

How is the path of light changed when it passes through different mediums?

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## PBL Project Guide

### Timeframe

This project will take approximately twelve 50-minute class periods.

### Step-by-step Guide

Introduce launch video.

Introduce Entry Document.

Facilitate Know/Need to Know activity.

Students engage in an exploration activity.

Groups brainstorm initial design products and assign roles/responsibilities.

Groups alternate between facilitated content experiences and design time.

During design time, groups integrate new content into design and re-evaluate product(s).

Groups finalize product(s) and presentation.

Groups present according to project guidelines.

Content Debrief

Summative Assessment.

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## PBL Resources

### Resources Provided

Included with this case are:

Launch Video Link:

[http://youtu.be/J\\_SGIGHF\\_XQ](http://youtu.be/J_SGIGHF_XQ)

Entry Document Text

Sample Artist Proposal Submission Guidelines:

[http://camraleigh.org/wp-content/uploads/2011/12/Artist-Submission-Guidelines\\_Feb\\_2012.pdf](http://camraleigh.org/wp-content/uploads/2011/12/Artist-Submission-Guidelines_Feb_2012.pdf)

### Resources to Assemble

You may wish to assemble the following resources ahead of time:

Formatted Entry Document to local context

Verify access to technology links

Art installation materials

Select launch video

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## Entry Event Guide

### Launch Video

Indiana Jones - "Staff of Ra" - [http://youtu.be/J\\_SGIGHF\\_XQ](http://youtu.be/J_SGIGHF_XQ)

Purpose: Engagement and introduction to the idea of the path of light. Use video to solicit student responses to the following question:

*How did the path of light change?*

Post student responses.

### Entry Document

Format: *Request for Submissions* from a local art museum. Edit document to include local museum and logistics such as submission dates and presentation requirements.

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## Entry Event Guide cont.

### Entry Document

The local art museum is launching a new community project called “Lighten Up.” This interactive exhibit allows the community to create their own art installations at the museum using an assortment of different objects. They would like to have works of art displayed around the learning environment to promote creativity, discovery, and community. The museum is welcoming art installation submissions for review based on the following requirements.

#### Submission Requirements:

Demonstrate how light responds when it hits an object or medium

Include an arrangement whose image represents creativity, discovery, and community

Be accompanied by an annotated placard that visually represents the paths of light

#### Presentation Requirements:

Each artist must communicate how their contribution addresses the submission requirements and promotes creativity, discovery, and community.

#### Gallery Showcase:

Groups will showcase their art installation along with a 5-minute presentation to museum representatives on due date.

Additional considerations will be given to submissions that demonstrate complexity.

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## What do we know about the project?

### **CONTENT**

Demonstrate how light responds when it hits an object or medium.

Paths of light must be visually represented.

### **PRODUCT**

Include an arrangement whose image represents creativity, discovery, and community.

Installation must be accompanied by an annotated placard.

Each artist must communicate how their contribution addresses the submission requirements and promotes creativity, discovery, and community.

Groups will showcase their art installation along with a 5-minute presentation.

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## What do we need to know about the project?

### **CONTENT**

How does light respond when it hits an object or medium?

What are the paths of light?

How can paths of light be used in the installation?

### **PRODUCT**

What is an art installation?

What does the museum mean by "arrangement"?

What objects can be in the arrangement?

What is an annotated placard?

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## Implementation Guide

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### Websites

Light, Reflection, and Refraction

<http://scienceprimer.com/reflection-refraction>

Reflection, Refraction, and Diffraction

[http://www.physicsclassroom.com/class/waves/  
Lesson-3/Reflection,-Refraction,-and-Diffraction](http://www.physicsclassroom.com/class/waves/Lesson-3/Reflection,-Refraction,-and-Diffraction)

Design Process

[http://www.sciencebuddies.org/engineering-  
design-process/engineering-design-process-  
steps.shtml](http://www.sciencebuddies.org/engineering-design-process/engineering-design-process-steps.shtml)

### Teaching Strategies/Considerations

Consider the guiding questions for the project when selecting content workshops. A combination of research and hands-on activities should be included.

Have students develop an understanding of different paths of light before designing their own art installation.

Consider having students use science notebooks or journals to meet the project expectations of recording their design process, design revisions, etc. Have them create rough drafts of their design and record different effects they were able to achieve with the path of light.

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## Assessment/Presentation

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### Final Product

Art installation that meets submission requirements

Annotated placard that visually represents paths of light within installation

5-minute presentation describing installation and highlighting content

### Individual

Individual assignments as they pertain to each content workshop

Journal entries documenting what the individual has contributed to the product(s)

Each student must communicate how their contribution addresses the submission requirements and creativity, discovery, and community

Summative assessment

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**Project-Based Learning**

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[WakeProblemBasedLearning.com](http://WakeProblemBasedLearning.com)

