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.
PBL Resources

Resources Provided
Included with this case are:

Launch Video Link:
http://youtu.be/J_SGiGHF_XQ

Entry Document Text
Sample Artist Proposal Submission Guidelines:

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
Entry Event Guide

Launch Video
Indiana Jones - “Staff of Ra” - 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.
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.
# 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.
## What do we need to know about the project?

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<th>PRODUCT</th>
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<td>What is an art installation?</td>
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<td>What are the paths of light?</td>
<td>What does the museum mean by &quot;arrangement&quot;?</td>
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<td>How can paths of light be used in the installation?</td>
<td>What objects can be in the arrangement?</td>
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<td>What is an annotated placard?</td>
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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.

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

Design Process
http://www.sciencebuddies.org/engineering-design-process/engineering-design-process-steps.shtml
Assessment/Presentation

**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
University of Texas at Dallas Project-Based Learning provides essential Project-Based case studies to K-12 teachers across the United States. These cases help support the development of authentic, inquiry-based learning environments to increase student achievement. Access case studies on Math, Science, English Language Arts and other STEM topics online at: WakeProblemBasedLearning.com