

## 7. Optics – The Pinhole Camera

### Classroom Activity:

Construct a pinhole camera and take black and white negatives. Students demonstrate understanding of the properties of visible light, reflection, refraction and how the properties are used in optical devices.

### Grade: 4

**Strand (s):** Understanding Matter and Energy

This task addresses the following overall expectations:

- investigate the characteristics and properties of light and sound;
- demonstrate an understanding of light and sound as forms of energy that have specific characteristics and properties.

and the following specific expectations:

- use technological problem-solving skills to design, build, and test a device that makes use of the properties of light;
- use scientific inquiry/research skills to investigate applications of the properties of light or sound;
- use appropriate science and technology vocabulary, including natural, artificial, beam of light, pitch, loudness, and vibration, in oral and written communication;
- describe how different objects and materials interact with light and sound energy;
- identify devices that make use of the properties of light and sound.

### Assessment Categories:

- Knowledge and Understanding
- Thinking and Investigation
- Application

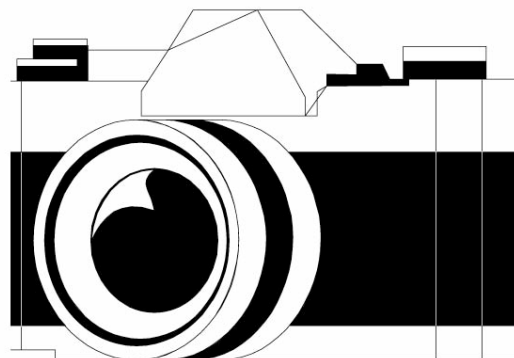
**Type of Activity:** Classroom - small group work

**Preparation:** (approx. 90 minutes)

Prepare a model pin-hole camera to show students. Time needed to complete the task: 300 minutes

### Materials/Resources for teachers:

Detailed instructions for building the pinhole camera can be obtained from the EIR program office at (416) 481-7070.



Nelson optics text (1999)  
matt black paint and paint brushes  
aluminium sheets (10 cm X 5 cm)  
cardboard boxes  
#7 sewing needle  
photographic paper  
red safe light  
cardboard or bristleboard  
tongs (4)  
plastic trays (4)  
film-developing fluid (developer, stop bath, fixer)  
water  
black tape  
double-sided tape  
scissors  
x-acto knife  
timer  
ruler/meter stick  
mat and squeegee (optional)  
tables

### Materials/Resources for students:

Same as for teachers

### Activity Description:

Explain in simple terms the workings of a camera

Divide students into small groups to construct a pinhole camera and take a black and white negative, which is then developed into a photograph.

### Tips:

A minimum of two adults is required during the supervision of the picture taking and development of the negatives. (1 in the darkroom and 1 in the classroom).

As a follow-up written activity, students could be asked to compare a camera to the human eye