

# Honors Physics Optics Project - Spring 2009

**Project Objective:** To explain the cause and effects of light phenomena that clearly illustrates one or more of the concepts of reflection, refraction, or diffraction.

Two class days will be allowed for research. Establish your plan. If your project requires any technical equipment that is available on campus, make sure you let me know *in advance!*

## Project Timeline:

Topic Selection date: Monday May 11, 2009  
Outline and procedures: Friday May 15, 2009  
Presentation dates: Thursday/Friday May 21/22, 2009

Your project will have three parts and the sum will be a major grade:

### I. Written Report (90 points)

Your written report must contain a **minimum of 500** words plus required diagrams. It will include an introductory paragraph that states the purpose. The body of the report (several paragraphs) will define and illustrate with diagrams the nature of light, concepts of reflection, refraction and diffraction. The body of your report will also describe the phenomena and refer to the specific concept(s) of light that apply. The report must contain a concluding paragraph that restates the primary objective of the project and how the provided visuals tie in to the phenomena.

Your project must have a minimum of three references in **MLA format only**. Reference any and all diagrams, images, animations and/or video clips used in your project. **Note:** Encyclopedias or wikipedia references are not permitted. **If the references are excluded your team will loose 50 points from the project grade**

**Do not plagiarize.**

**II. Visual Aids** (40 points) - This is to assist the audience to understand the topic. It should be a clear and concise graphical representation of your optical phenomena and how the respective concept(s) of light ties in to the phenomena. It will consists of a poster with sketches, photographs, or diagrams and at least one of the following:

Animation	PowerPoint
Demonstration	Video

### III. Oral Presentation (30 points)

A 3 - 6 minute presentation with duties equally shared by the team

The presentation should indicate a clear understanding of your topic. The presentation should hold the audiences' interest and entice questions from the audience. I will draw names and your team must be ready to present. If your team is not ready to present, your team will incur a 50% point deduction.

# Physics Optics Project

## Possible Topics:

Primary and Secondary Rainbows	Blue Moons
Animal Navigation & Polarized Light	Coronas
Heiligenschein	Sky Polarization
Crown Flash (Flachenblitz)	Cloud maps (Ice Blink)
Sun Pillars	Zodiacal Light (Gegenschein)
Dew Bows	Brocken Bows (glory; anticorona)
Supernumerary Bows	Sprites
Rainbow Pillars	Sunset Colors
Lunar Rainbows	Liquid Crystals
Fog Bows	Star Colors
Sundogs (Parahelia)	Luminescent Organisms
Green Flash	Black Light
Northern Lights (Aurora Borealis)	Purkinje Figures & Color Effects
Red Shift	3-D Movies
Nichols Prism	Snow blindness
Blue Hazes	Phosphenes
Mirages	Polarized Sunglasses
Sunburn Through Clouds	Holograms
Lasers	Lens Flares
Noctilucent Clouds	

Name: \_\_\_\_\_  
 Name: \_\_\_\_\_

Topic: \_\_\_\_\_  
 Date: \_\_\_\_\_

### Honors Physics Optics Project - Grading Rubric – Spring 2009

<b>I. Introduction (5 points)</b>				
A.	Cover page that includes title, names, course, and teacher		1	0
B.	Topic Sentence that clearly indicates light phenomena	2	1	0
C.	Sentence that clearly indicates the light characteristic	2	1	0
<b>II. Details the Light Phenomena (15 Points)</b>				
A.	Physical description of the light phenomena (what it looks like)	10	5	0
B.	Where this may be observed	5	3	0
<b>III. Characteristics of Light with explanation and diagram of each type (30 points)</b>				
A.	Reflection from flat mirror, concave mirror, convex mirror	10	5	0
B.	Refraction through flat lens, concave lens, convex lens	10	5	0
C.	Diffraction	10	5	0
<b>IV. Paragraph that describes the formation of the phenomena (20 Points)</b>				
A.	Clear description of physical conditions to form the phenomena	10	3	0
B.	Describe how the light phenomena and the characteristic of light interact	10	3	0
<b>V. Conclusion (15 points)</b>				
A.	Restatement of purpose and project description	5	3	0
B.	Definition of terms	5	3	0
C.	Proposal for future study	5	3	0
<b>VI. Over all format and neatness (5 points)</b>				
A.	Written in 3 <sup>rd</sup> person / Grammar / Spelling / typographical errors	2	1	0
B.	Overall neatness and organization (sections labeled, properly divided)	2	1	0
C.	Form (full justification), margins (1"), page numbers		1	0
D.	<b>Note:</b> Bibliography (MLA format only; minimum of three)			

- 50 from project grade

<b>I. Visual Aids (40 points)</b>					
A.	Shows a clear example of the light phenomena	10	7	4	0
B.	Illustrates and defines the characteristic of light that applies	10	7	4	0
C.	Illustrates how this characteristic ties with the phenomena	10	7	4	0
D.	Two or more illustrations		10	5	0

<b>I. Presentation (30 points)</b>					
A.	Phenomena clearly defined to audience		5	3	0
B.	Light Characteristic clearly defined		5	3	0
C.	How occurrence of phenomena depends on the light characteristic		10	5	0
D.	Organized		5	3	0
E.	Held the audiences interest		5	3	0

Total points \_\_\_\_\_ out of 160