



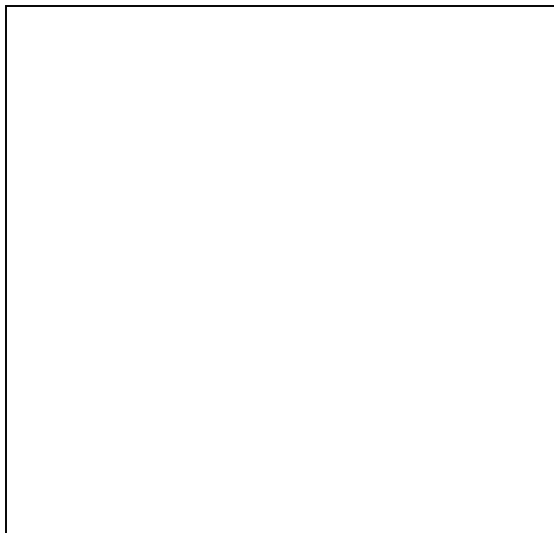
Grade 9 Lab Notebook
Science in Action 8

Index of Investigations, Challenges and Activities

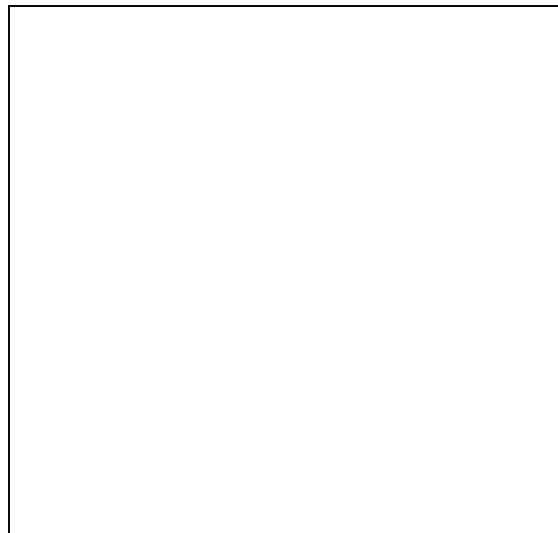
Light and Optical Systems

Investigations	Activity	Title	Page Ref.
Give It A Try		Twisted Rays	175
1.0 Our knowledge about light and vision comes from explanation, inventions and investigations.			
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2.0 Light behaves in predictable ways.			
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Give it a **TRY Twisted Rays!** (p.175)



Side to Side View



Up and Down View

Explanation _____

Activity C-1 *Inquiry* **LIGHT UP YOUR LIFE** (p. 178-179)

Problem: What are some properties of light?

Hypothesis:

Station A

Color Filter	Observation
Blue	
Red	
Green	
Blue/Red	
Blue/Green	
Red/Green	
Blue/Red/Green	

Station B

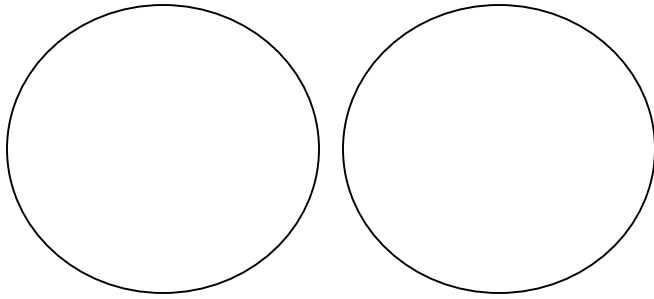
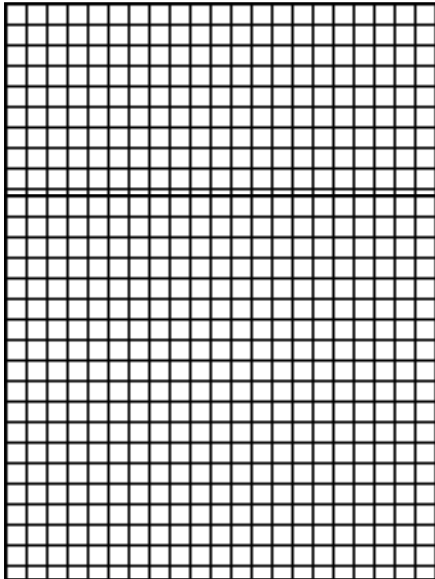


Image Before

Image After

More or Less

Station C



Away
Toward

Convex Lens

Away
Toward

Concave Lens

Station D



Demo 1

Identify Source and Draw Rays

Observations _____



Demo 2

Identify Source and Draw Rays

Observations _____

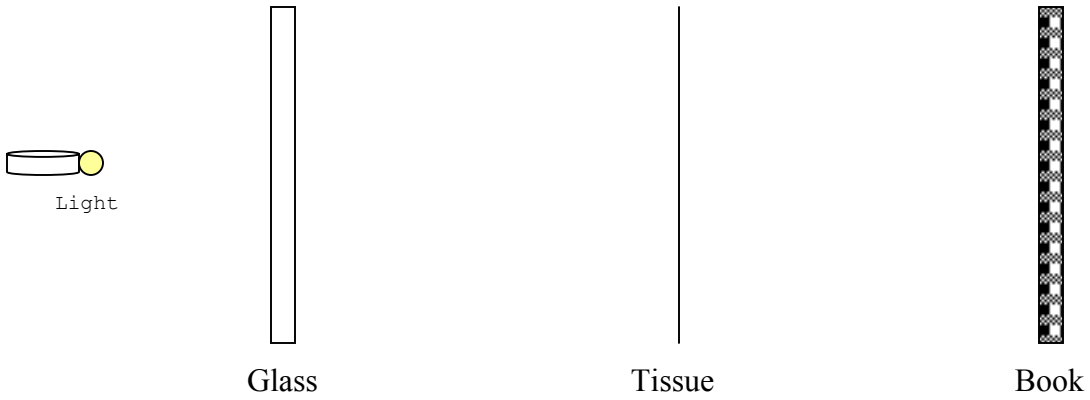


Demo 3

Identify Source and Draw Rays

Observations _____

Station E



Station F

Light is Energy because _____

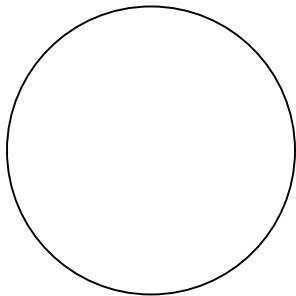
Observation when amount of light is changed _____

Activity C-2 *Inquiry* **MAKE A PINHOLE CAMERA** (p. 185)

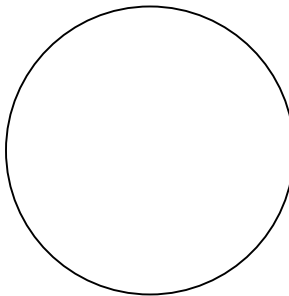
Problem: How does a Pinhole Camera work to form an image?

Hypothesis:

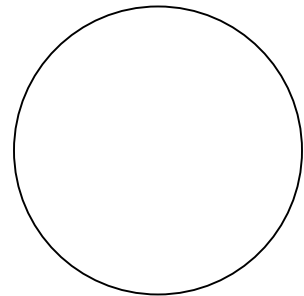
Data Collection:



Image



Closer

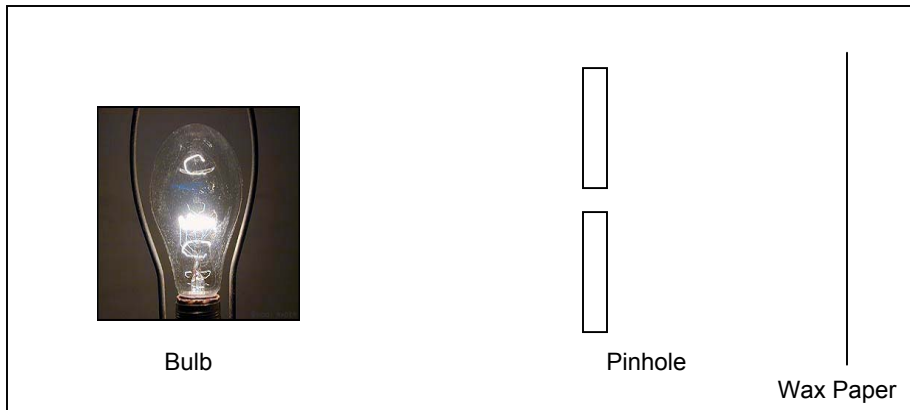


Farther away

Analysis and Interpretation:

7.

8.

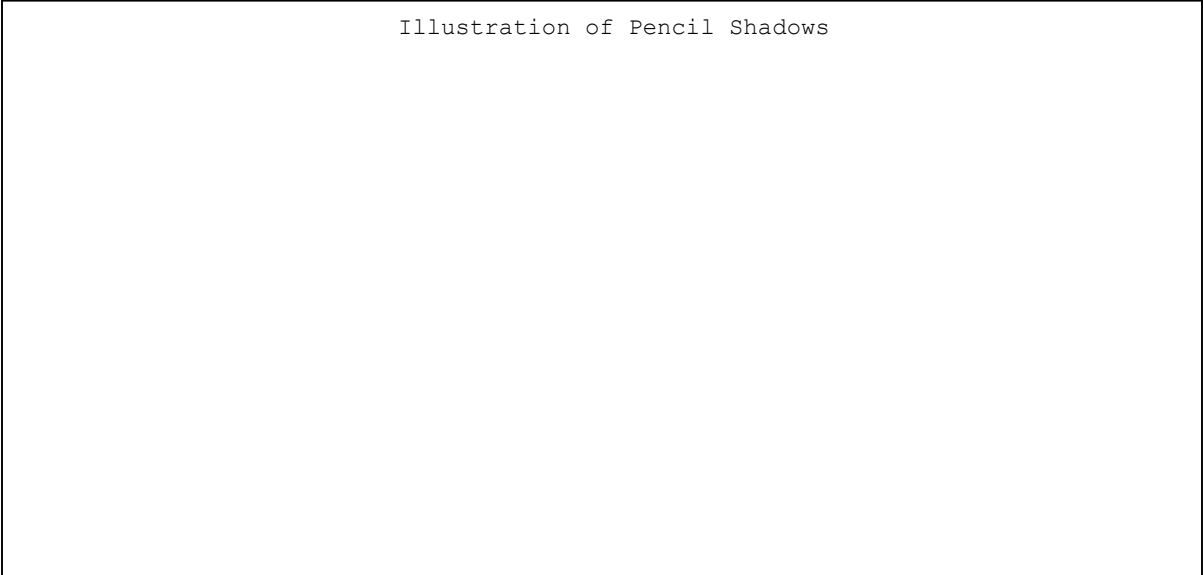


9. & 10. (Draw the lines in the diagram above)

Forming Conclusions:

Give it a **TRY PENCIL SHADOWS** (p.189)

Illustration of Pencil Shadows



- ---

- ---

- ---

Activity C-3 *Inquiry* **LIGHT REFLECTION** (p. 192)

Problem: What material is the best reflector of light?

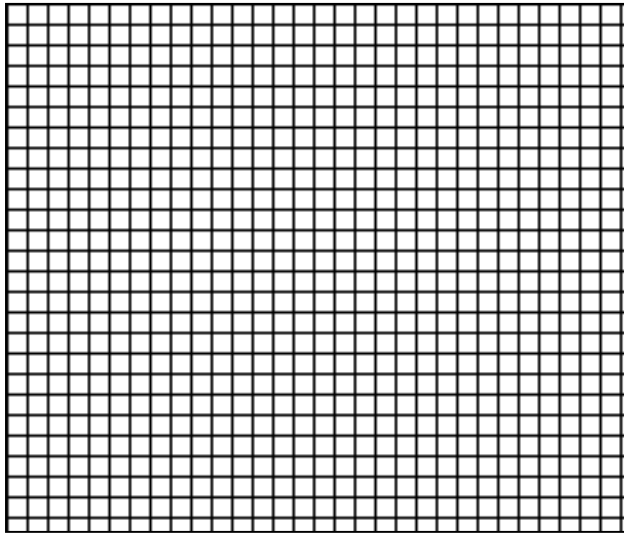
Hypothesis:

Data Collection:

Material	Qualitative	Quantitative (Light Meter)

Analysis and Interpretation:

5.



6.

7.

8.

Forming Conclusions:

Give it a **TRY WHICH SIDE IS WHICH?** (p.194)

Activity C-4 *Inquiry* **THE LAW OF REFLECTION** (p. 195)

Problem: What rule can you make that describes how light reflects off a mirror?

Hypothesis:

Data Collection:

Figure 1.



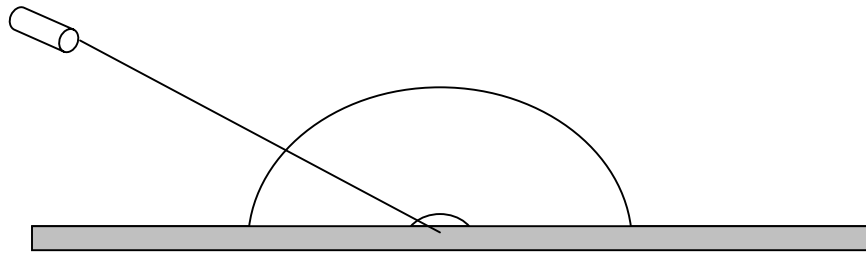


Figure 2.

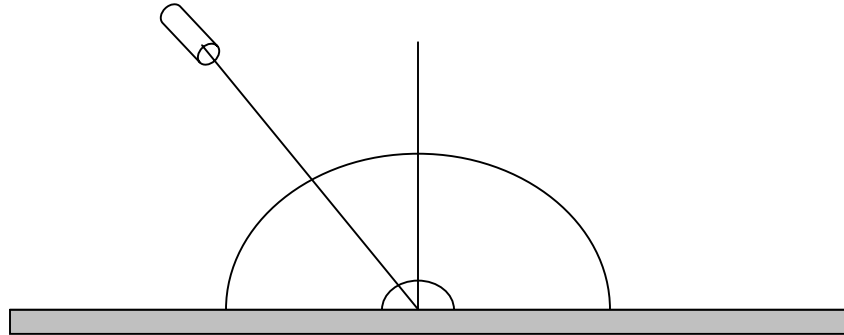
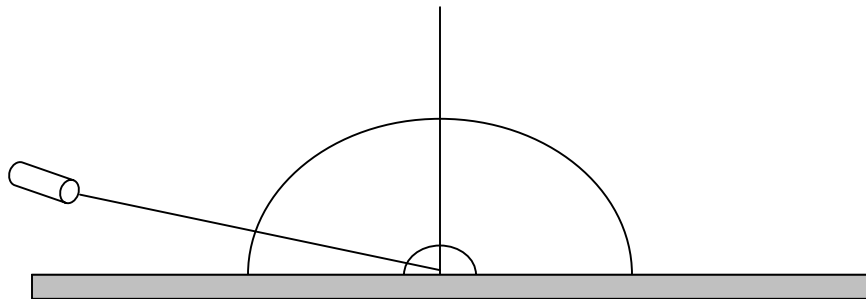


Figure 3.



7. Measurement of Angles

Figure	Angle of Incidence	Angle of Reflection
1		
2		
3		

Analysis and Interpretation:

8.

9.

Forming Conclusions:

10.

Device: _____

Illustrate your Device



Give it a **TRY** **CONCAVE MIRROR IMAGES** (p.198)

Image in a Concave Mirror - **Upside down - Upright - Bigger - Smaller**

Object Location	Prediction What the object will look like.
Closer	Upside down - Upright - Bigger - Smaller - No image
Farther Away	Upside down - Upright - Bigger - Smaller - No image
Very Far Away	Upside down - Upright - Bigger - Smaller - No image

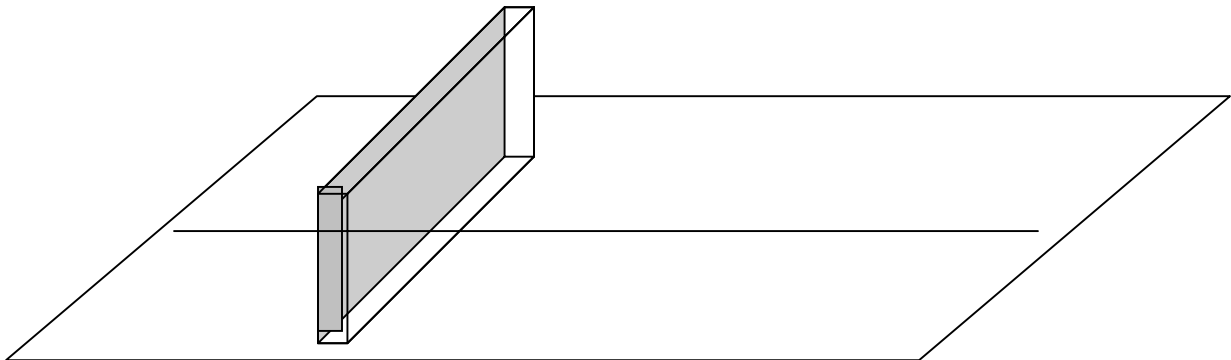
Object Location	Test - Observations What the object looked like.
Closer	Upside down - Upright - Bigger - Smaller - No image
Farther Away	Upside down - Upright - Bigger - Smaller - No image
Very Far Away	Upside down - Upright - Bigger - Smaller - No image

Activity C-5 *Inquiry* **FROM AIR TO SOLIDS** (p. 202)

Problem: What happens to light when it passes from air through different transparent solids?

Hypothesis:

Data Collection:



Data Collection: 7., 8.,

<i>Figure 1. (Glass)</i>	<i>Figure 2. (Plastic)</i>

Figure	Angle of Incidence	Angle of Reflection
1		
2		

9. Prediction

Analysis and Interpretation:

10.

11.

12.

13.

Forming Conclusions:

14.

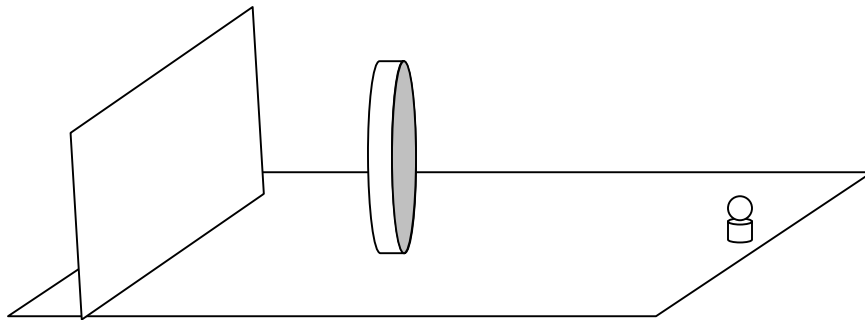
15.

Activity C-6 *Inquiry* **CHECKING OUT IMAGES** (p. 206-207)

Problem: How does the distance between an object and a convex lens affect the image formed?

Hypothesis:

Data Collection: Bulb height _____ Focal Length (of the lens you are using)



Distance from bulb to lens (cm)	Image position (upright or upside down)	(cm)

Analysis and Interpretation:

10.

11.

12.

Forming Conclusions:

13.

Activity C-7 *Inquiry* **LENS SWITCH-A-ROO** (p. 209)

Problem: How does the image formation vary when two convex lenses are used?

Design and Conduct Your OWN Experiment

Hypothesis:

Materials / Equipment needed

<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
---	---

Safety

Procedure

- ---

- _____

- _____

- _____

- _____

- _____

- _____

- _____

- _____

Predictions (Using 2 convex lenses)

Size of Image	Location of Image
---------------	-------------------

_____	_____
_____	_____

Data Collection (Using 2 convex lenses)

Size of Image	Location of Image
---------------	-------------------

_____	_____
_____	_____

Comparisons (Using 2 convex lenses)

Size of Image	Location of Image
---------------	-------------------

_____	_____
_____	_____

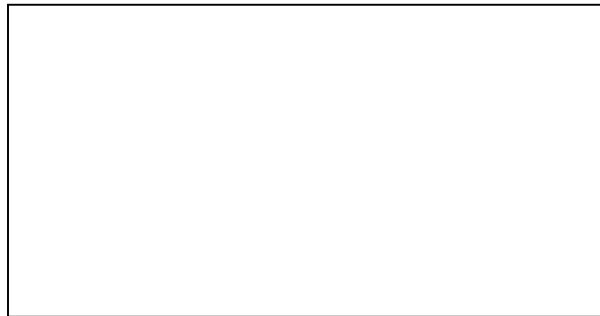
Conclusion

Evaluating Procedures

Strengths	Weaknesses
_____	_____
_____	_____
_____	_____
_____	_____

Feedback

Give it a **TRY** **WHAT IS WHITE LIGHT MADE OF?** (p.214)



Shine a light through a prism and illustrate what you see

Answer the questions on p. 214

- _____
- _____
- _____

- _____

Give it a **TRY GIVE IT A GLOW** (p.219)

Observations

Incandescent Light	Black Light
_____	_____
_____	_____
_____	_____
_____	_____

Glowing

TRY This At Home **THE LOOK OF LIGHT** (p.223)

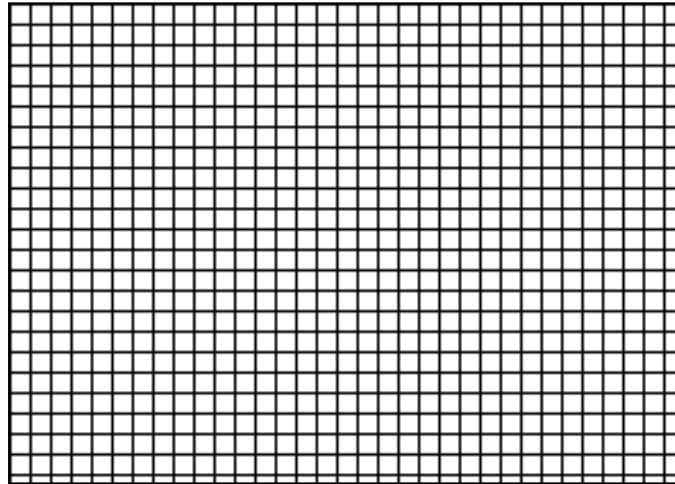
Observations of Light Sources

House Lighting	Observations ... What the light looks like (warm, cool, color, reflection, etc.) compared to sunlight

3:00				
3:30				
4:00				
4:30				
5:00				

Analysis and Interpretation:

8.

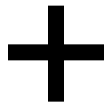


Forming Conclusions:

9.

10.

Give it a **TRY** **WHERE'S YOUR BLIND SPOT?** (p.233)



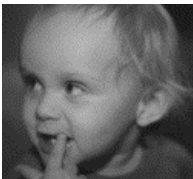
Why the dot disappears is because _____

Why it has no photoreceptors is because _____

Give it a **TRY** **ANIMAL EYES** (p.242)

	Octopus	Frog	Bee	Owl	Hare
Predator or Prey					
Lives In Water On Land In the Air					
Lightness or Darkness					
Survival Features Of the eyes					

Give it a **TRY** **IMAGE QUALITY, PIXEL BY PIXEL** (p.242)





SCIENCE  **WORLD**
Case Study

Optics In Space