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MIDDLE SCHOOL SCIENCE RESOURCES

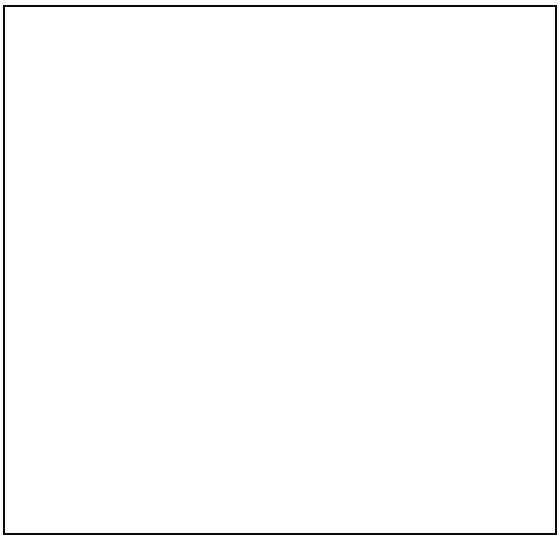
Grade 9 Lab Notebook

Science in Action 8

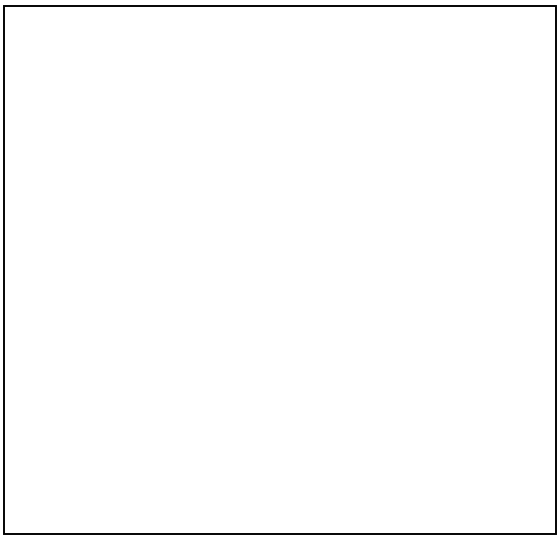
Index of Investigations, Challenges and Activities

Light and Optical Systems

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:

_____

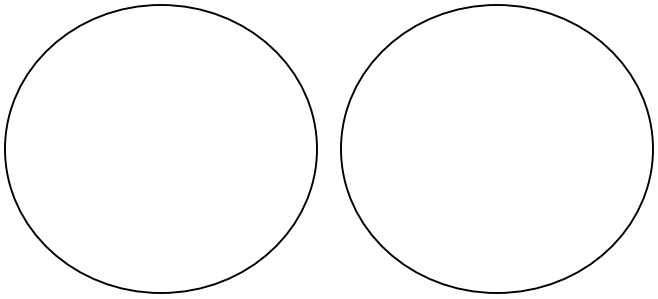
_____

_____

Station A

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

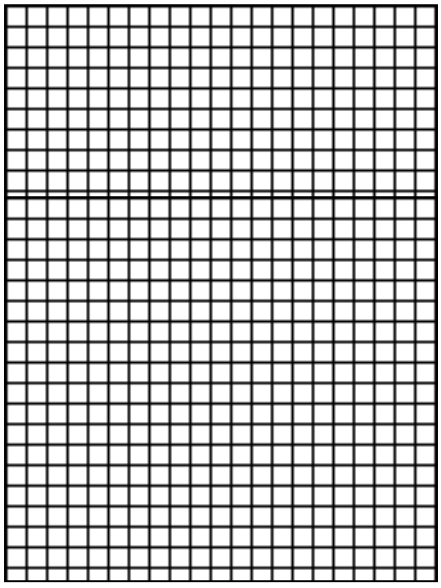
Station B



More or Less

Image Before **Image After**

Station C



Away

Toward

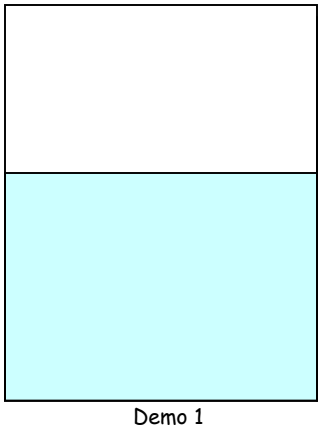
Convex Lens

Away

Toward

Concave Lens

Station D



Demo 1

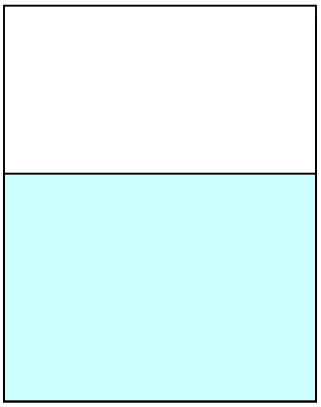
Identify Source and Draw Rays

Observations _____

_____

_____

_____



Demo 2

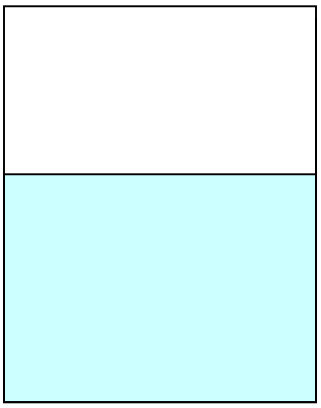
Identify Source and Draw Rays

Observations _____

_____

_____

_____



Demo 3

Identify Source and Draw Rays

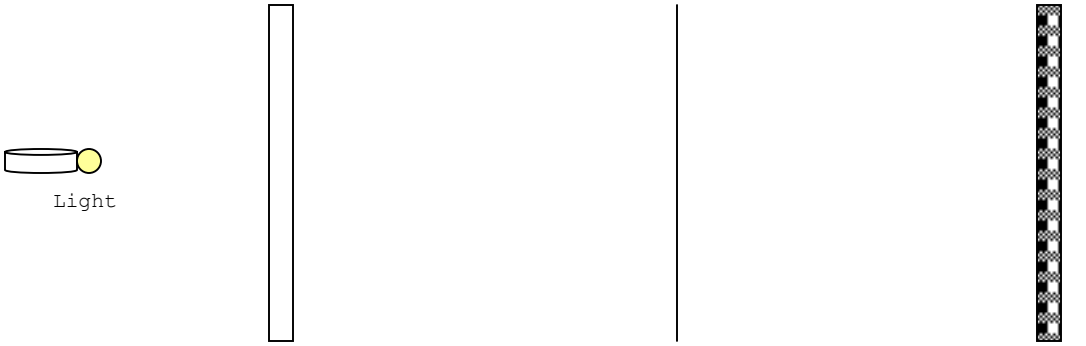
Observations _____

_____

_____

_____

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?

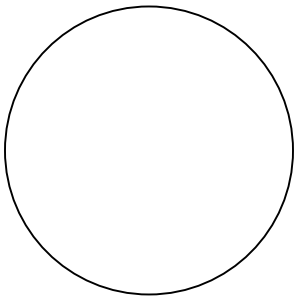
Hypothesis:

_____

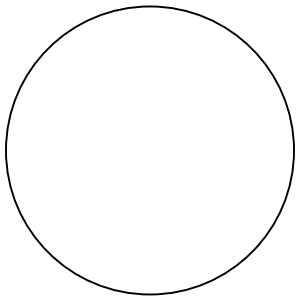
_____

_____

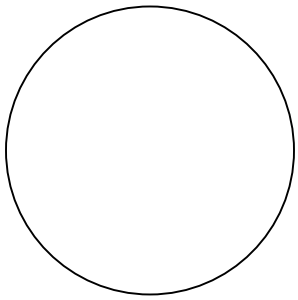
Data Collection:



Image



Closer



Farther away

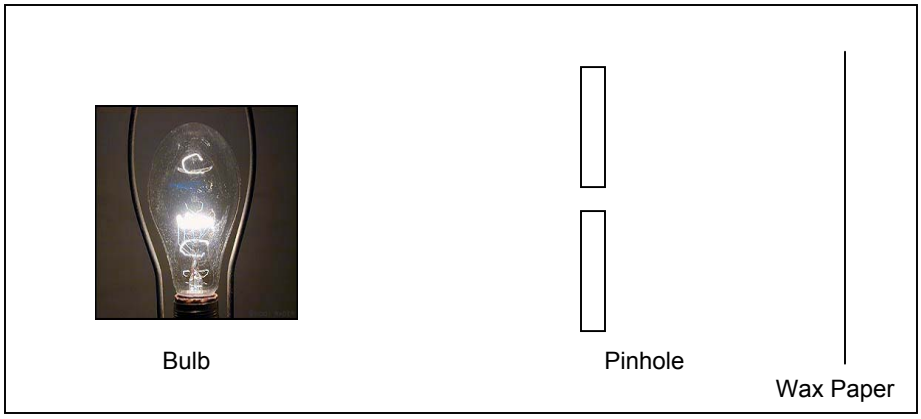
Analysis and Interpretation:

7.

_____

_____

8.



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

Forming Conclusions:

_____

_____

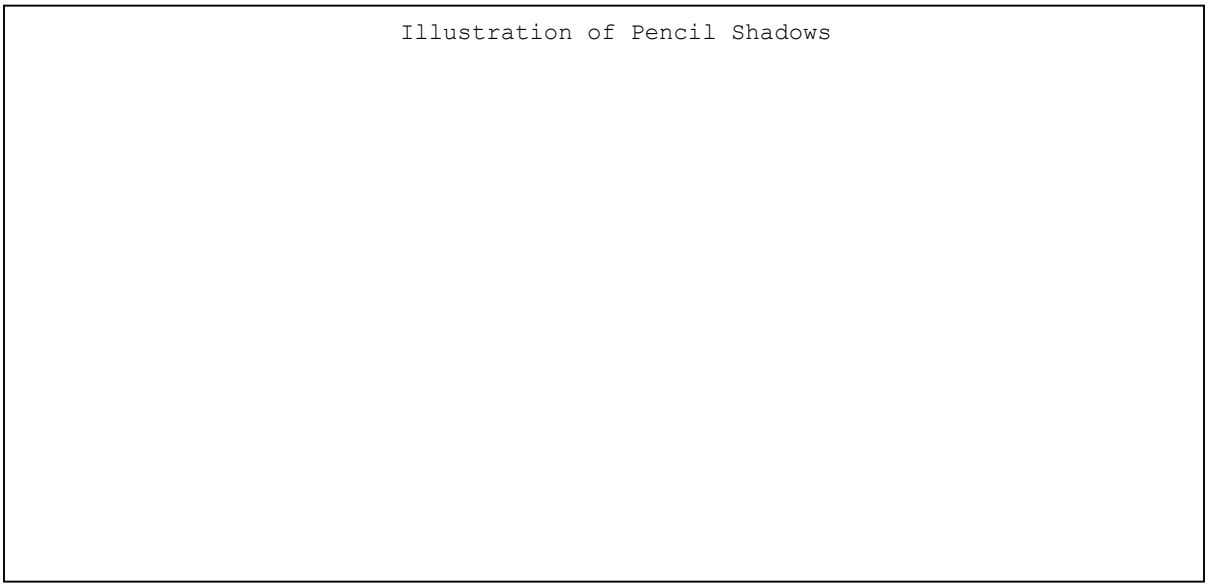
_____

_____

_____

_____

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



- _____
- _____
- _____

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

Problem: What material is the best reflector of light?

Hypothesis:

_____

_____

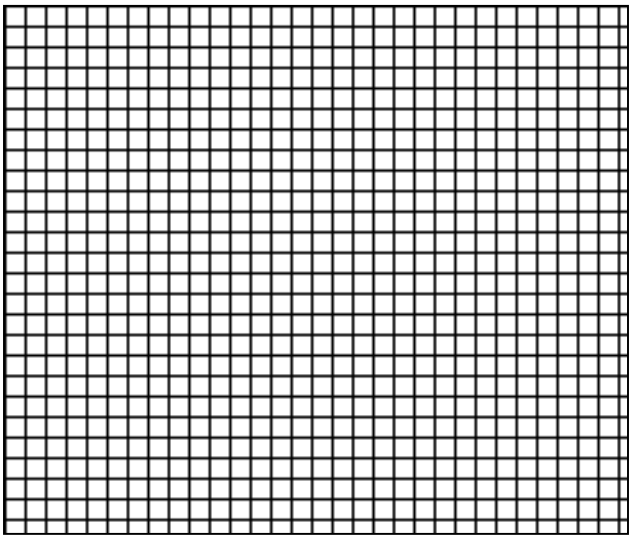
_____

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.

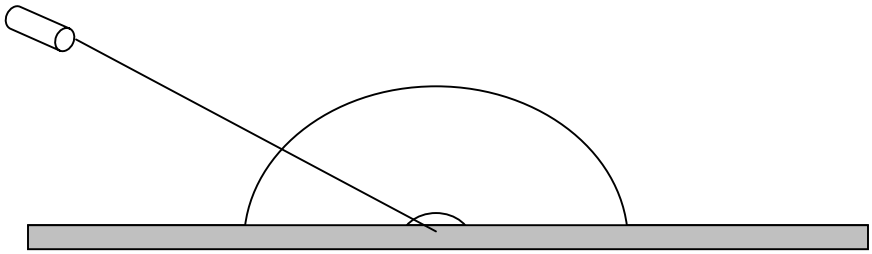


Figure 2.

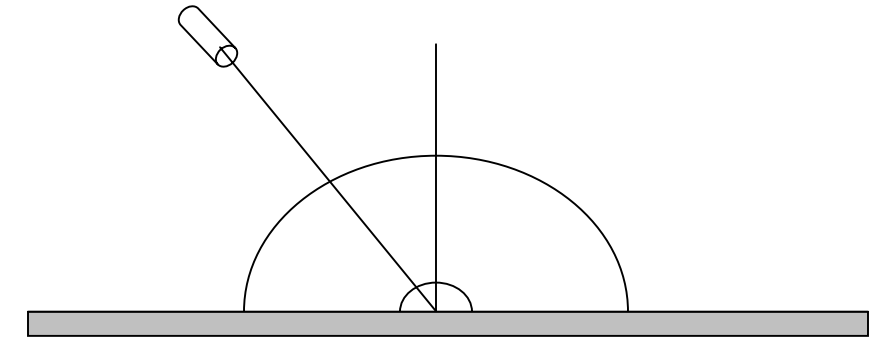
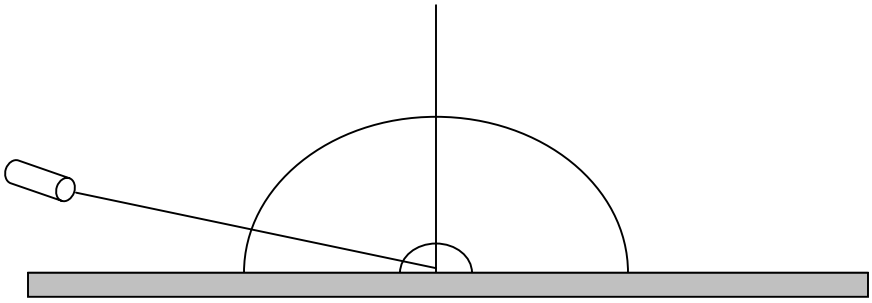


Figure 3.



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?

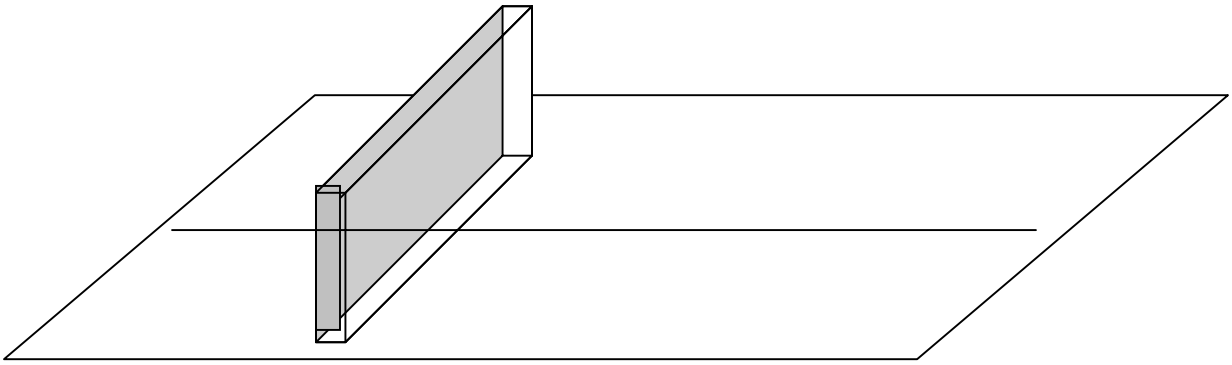
Hypothesis:

_____

_____

_____

Data Collection:



Data Collection: 7., 8.,

Figure 1. (Glass)	*Figure 2. (Plastic)*

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:

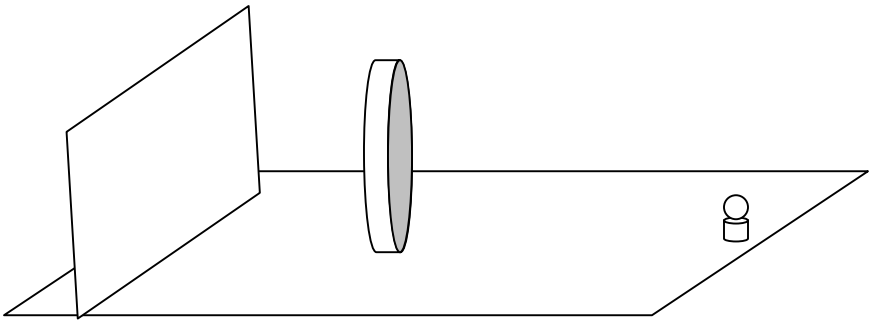
_____

_____

_____

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

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

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

Activity C-8 ***Inquiry***

COMPARING DIFFERENT TYPES OF LIGHT BULBS (p. 224)

Problem: Which type of light bulb gives off the most heat?

Hypothesis:

60W Incandescent **60W Halogen** **15W Florescent** **40W Black Light**

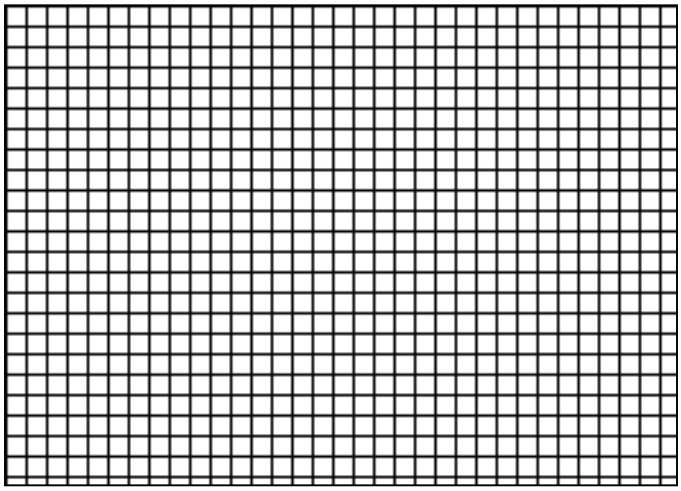
Data Collection:

Time (sec)	60W Incandescent	60W Halogen	15W Florescent	40W Black Light
0:30				
1:00				
1:30				
2:00				
2:30				

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