#### APPLIED OPTICS LENSES AND MIRRORS

A IS A P	IS A PIECE OF GLASS OR PLASTIC DESIGNED TO LIGHT IN A PARTICULAR					
WAY. THEY COME IN	THREE USEFUL S	HAPES:				
FLAT OR	MIRRORS MAKE IN	MAGES THAT ARE _	, but	·		
THEY CAN ONLY FORM	IMA	GES WHICH ARE A	LWAYS			
A IMAGE	CAN BE FOCUSED	ON A SCREEN AN	D IS ALWAYS			
A IMAGE CAN ONLY BE SEEN BY LOOKING THE MIRROR OR LENS. THE SECOND MIRROR TYPE IS CALLED						
CONCAVE MIRRORS AR	F CURVED INWAR	D AT THE CENTER	AND ARE KNOWN AS			
MIRRORS, SINCE LIGHT RAYS COMING IN PARALLEL CONVERGE ON A POINT CALLED THE						
 Conversely, any light source place <u>AT</u> the focal point will bounce off the mirror and reflect out in a Usefulness? These are the most versatile of the mirror types, as they can form many image types, depending on where the object is in relation to the mirror's focal point.						
Object position	Image Position	Image Size	Orientation of Image	Image Type		
inside f						

RAY DIAGRAMS SHOW WHERE IMAGES FORM

Between f and 2f

at 2f

beyond 2f

THE THIRD MIRROR SHAPE IS A \_\_\_\_\_\_ MIRROR

CONVEX MEANS CURVED \_\_\_\_\_\_ AT THE CENTER, LIKE A PREGNANT WOMAN'S BELLY. THESE ARE KNOWN AS \_\_\_\_\_\_ MIRRORS, AS THEY CAN ONLY SPREAD LIGHT OUT. THESE CAN ONLY FORM AN IMAGE THAT IS \_\_\_\_\_\_ (RIGHT SIDE UP) AND \_\_\_\_\_\_. THESE ARE VALUABLE IN SEEING OVER A MUCH \_\_\_\_\_\_ AREA, BUT ARE A PROBLEM IF YOU DON'T REALIZE THEY ARE CONVEX AND ASSUME YOU ARE SEEING A LIFE-SIZED IMAGE. THE MIRROR FORMULA f = FOCAL I FNGTH

	L 10111	mon	TORMOLA	I = FOCAL LENGTH
	<u>1</u> =	<u>1</u> +	• <u>1</u>	$d_i$ = distance to image
	f	d,	$d_{o}$	$d_o$ = distance to object
ALL DISTANCES ARE MEASURED FROM THE MIRROR				
THE MAGNIFICATION FORMULA	h	= не	EIGHT OF THE IMA	GE

$h_{\rm L} = d_{\rm L} = {\rm magnification}$	$h_o$ = height of the object
ho do	MAGNIFICATION IS HOW MANY TIMES BIGGER IT LOOKS

## A \_\_\_\_\_ IS A PIECE OF GLASS OR PLASTIC DESIGNED TO \_\_\_\_\_ THEY COME IN TWO USEFUL SHAPES: FLAT OR **PLANE** LENSES ARE CALLED WINDOWS!

CONVEX AND CONCAVE LENSES DO EXIST, AND BEHAVE THE OPPOSITELY OF THEIR MIRROR COUNTERPARTS.

A CONCAVE LENS ACTS LIKE A CONVEX MIRROR DID, PRODUCING ONLY A SMALLER, VIRTUAL IMAGE.

# A CONVEX LENS ACTS LIKE A CONCAVE MIRROR DID, PRODUCING THE MULTIPLE IMAGE TYPES, SO THEY ARE MORE IMPORTANT OVERALL.

Object position	Image Position	Image Size	Orientation of Image	Image Type	Use in real life
inside f	behind lens	enlarged	erect	Virtual	
Between f and 2f	in front	enlarged	inverted	Real	
at 2f	in front	life-sized	inverted	Real	
beyond 2f	in front	smaller	inverted	Real	

### RAY DIAGRAMS SHOW WHERE IMAGES FORM

### THE MIRROR FORMULA ALSO WORKS FOR LENSES! As does the magnification formula

WE HAVE A 8.9 CM LENS 9.1 CM FROM A CANDLE WITH A 3.2 CM FLAME. HOW FAR AWAY IS THE IMAGE FORMING? HOW BIG DOES IT LOOK ON THE SCREEN PLACED THERE?

	VISUAL PROBLEMS!	
IF YOU ARE NEARSIGHTED, YOU SUFFER	FROM,	AND YOUR EYE FOCUSES IN FRONT OF
YOUR RETINA.		
WE CORRECT THIS WITH A	LENS.	
IF YOU ARE FARSIGHTED, YOU SUFFER F	ROM, A	ND YOUR EYE FOCUSES IN BACK OF
YOUR RETINA.		
WE CORRECT THIS WITH A	LENS	
ASTIGMATISM AND LOSS OF ACCOMMODA	TION ARE THE OTHEI	R TWO MAIN EYE PROBLEMS.
	For homework	