Eschenbach Low Vision Training Program

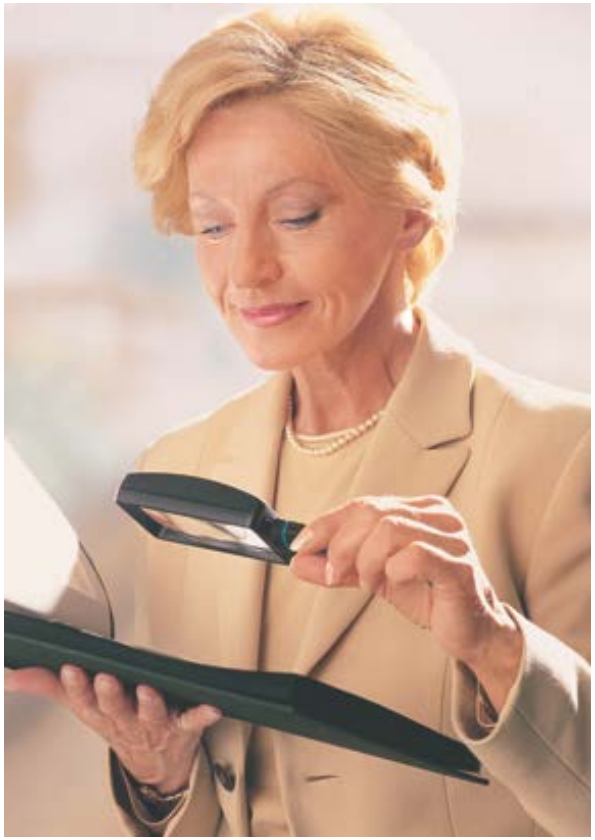
Module 3: Hand-held Magnifiers

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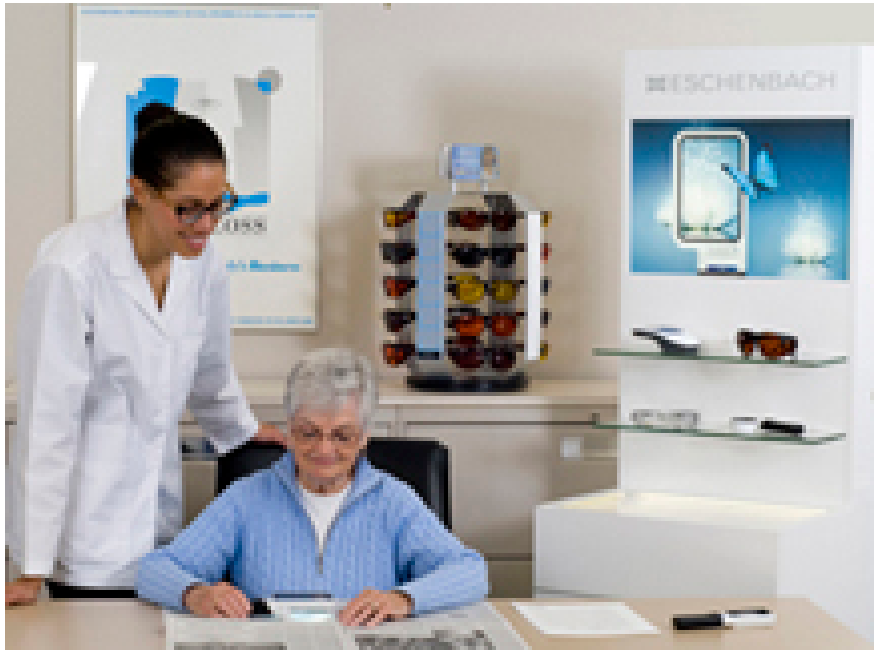
Low Vision Training Module #3

- Introductory comments
- What they are
- How they work
- How to use them
- What types are available
- What are they made for



Introductory comments

- Before we talk about any category of low vision device, need to see how it fits into an evaluation protocol



The Seven Steps to Dispensing Low Vision Aids®

1. Make sure the patient is under the current care of an eye doctor and has a current refraction
2. Identify the patient's visual goals
3. Determine the magnification required
4. Demonstrate the impact of illumination
5. Select the appropriate vision aids for the goals identified
6. Train the patient in the use and care of the chosen vision aid
7. Schedule a follow-up visit

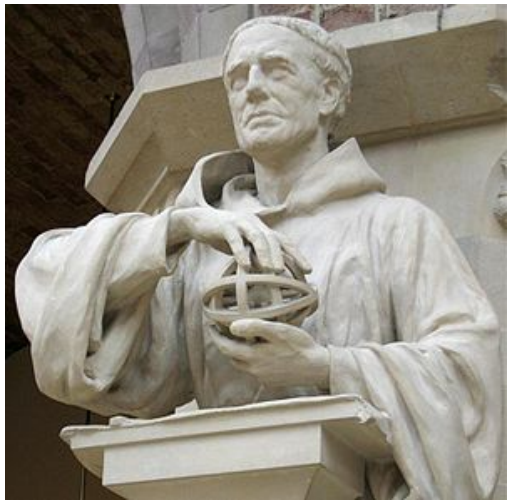
What is a hand-held magnifier?



A plus (+) lens and a handle

Hand-held Magnifiers…

1) Have been used to enhance vision for hundreds of years (invented in the 1200s by Roger Bacon, a professor at Oxford University)
2) Are the most widely used type of low vision device



Roger Bacon

Low Vision Training Module #3

Hand-held magnifiers are just one type of low vision device

- Hand-held Magnifiers 
- Stand Magnifiers 
- Spectacles 
- Telescopes 
- Video Magnifiers 
- Absorptive Filters 
- Non-optical devices 

- May be marked with a times magnification rating (X) or diopter rating (D)
- Relationship:

1X = 4D (ANSI Standard)

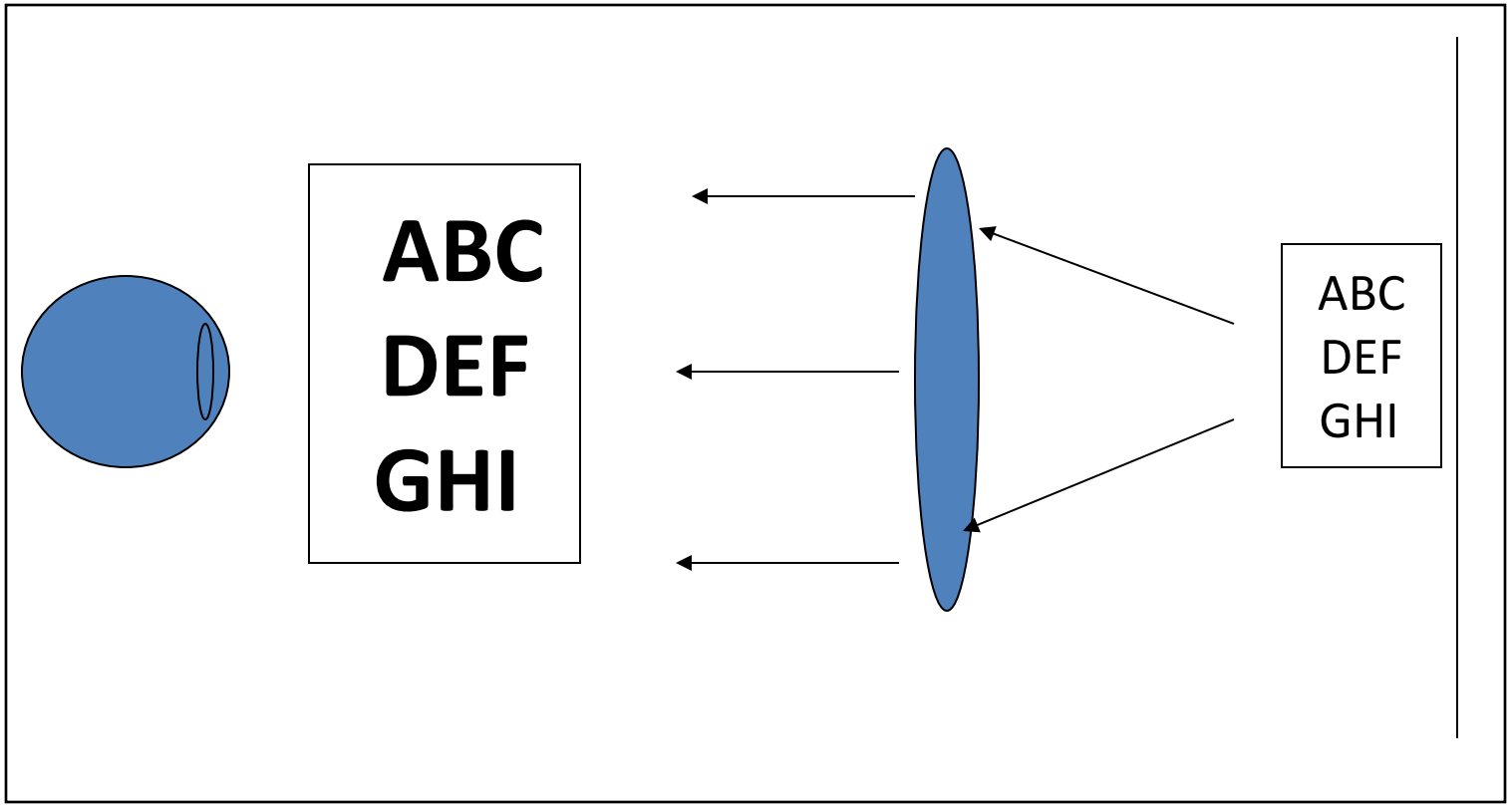
- **Note the markings on the handle…**





Times magnification (X)/Diopter equivalent (D)/ eye-to-lens distance (mm)

How do hand-held magnifiers work?

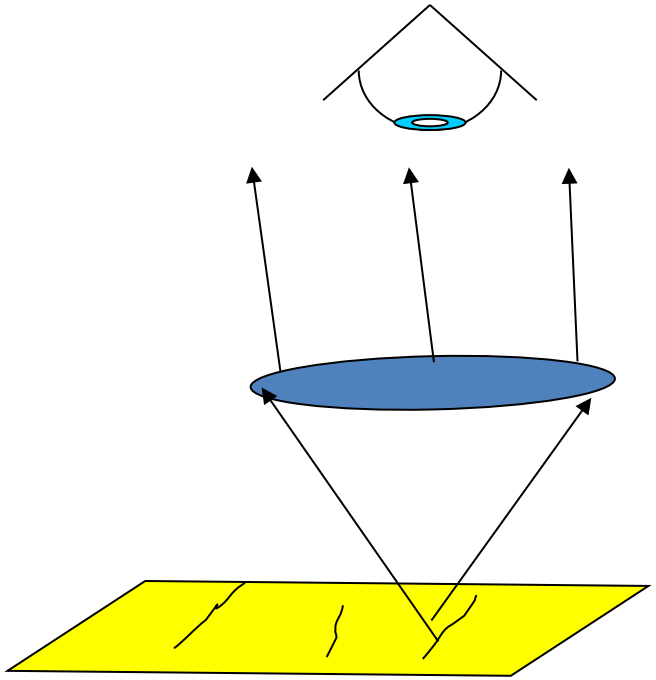


Rules for using hand-held magnifiers properly:

1. Hold the lens parallel to the object to be viewed

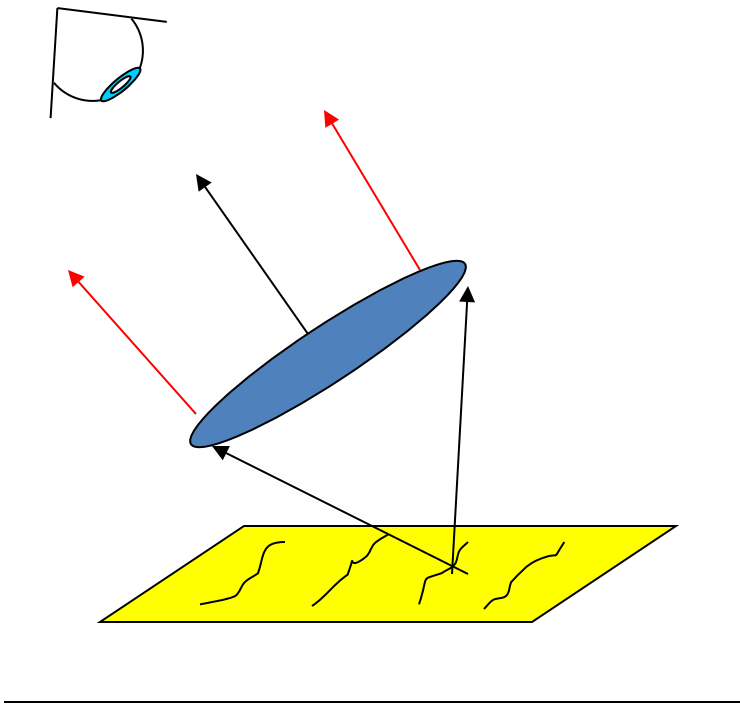
Correct use of a hand-held magnifier:

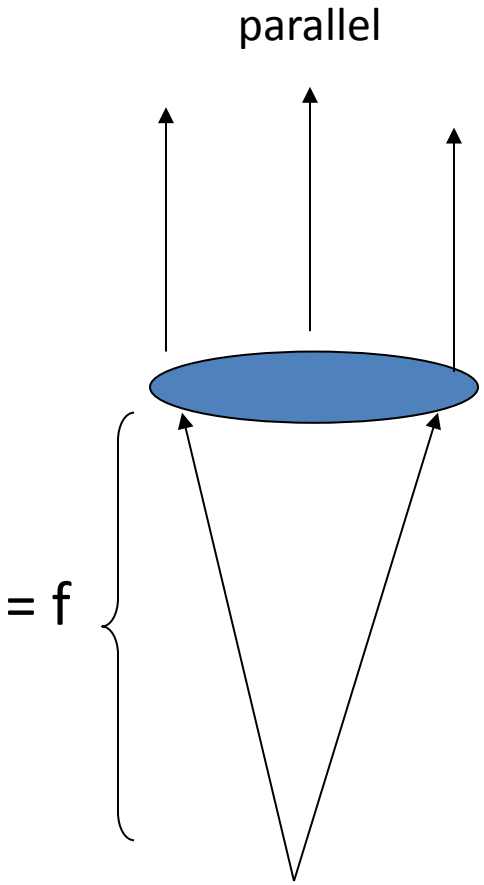




Incorrect use of a hand-held magnifier:







2. Hold the lens at its focal length

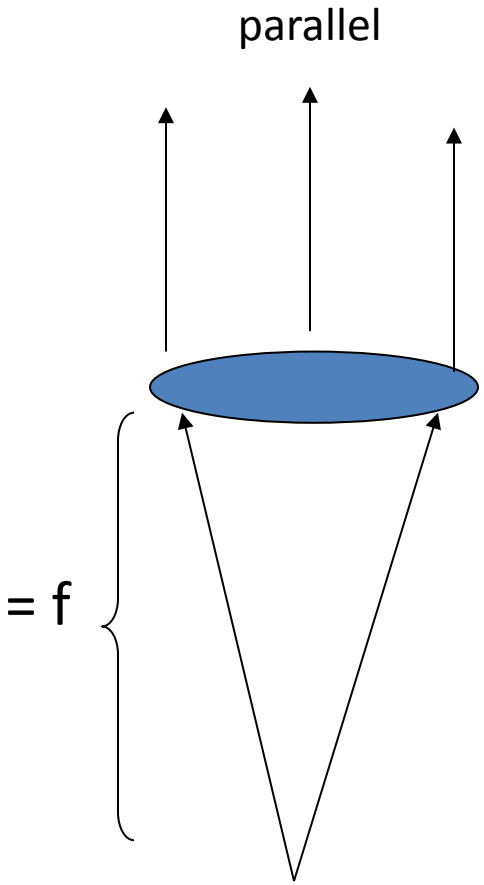
$$f = 1 / D$$

Where:

f = the focal length of the lens

1 = 1 meter

D = the dioptric power of the lens



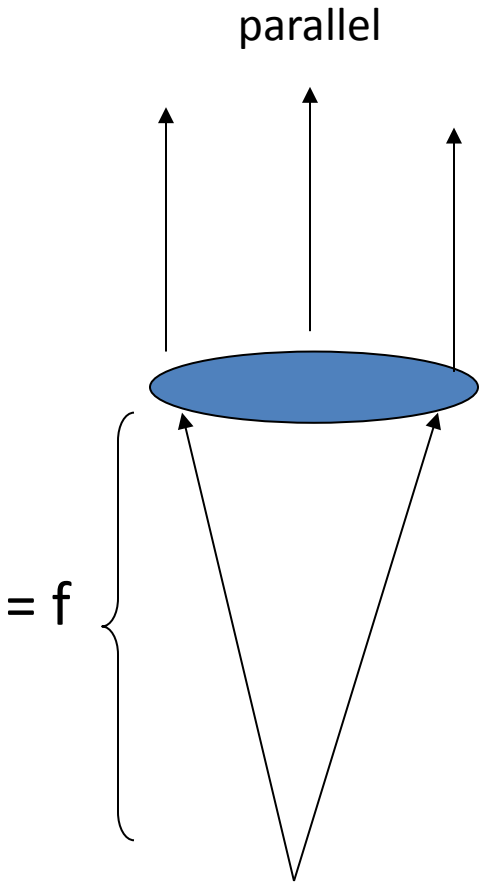
2. Hold the lens at its focal length

$$f = 1 / D$$

Example:
A 20 diopter (5x) hand-held magnifier focuses at what distance from the object?

Answer: 5 cm

(f = 1m/20D = 100cm/20D = 5cm)



2. Hold the lens at its focal length

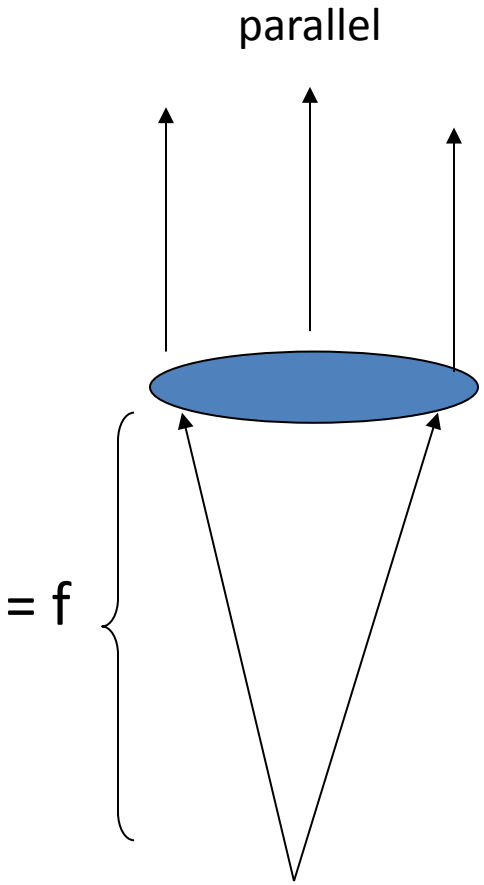
f = 40” / D

Example:
A 20 diopter (5x) hand-held magnifier focuses at what distance from the object?

Answer: 2”

(f = 40”/20D = 2”)

KEY: 1 meter ~ 40” and 1” ~ 2.5cm or 25mm



2. Hold the lens at its focal length

$$f = 40” / D$$

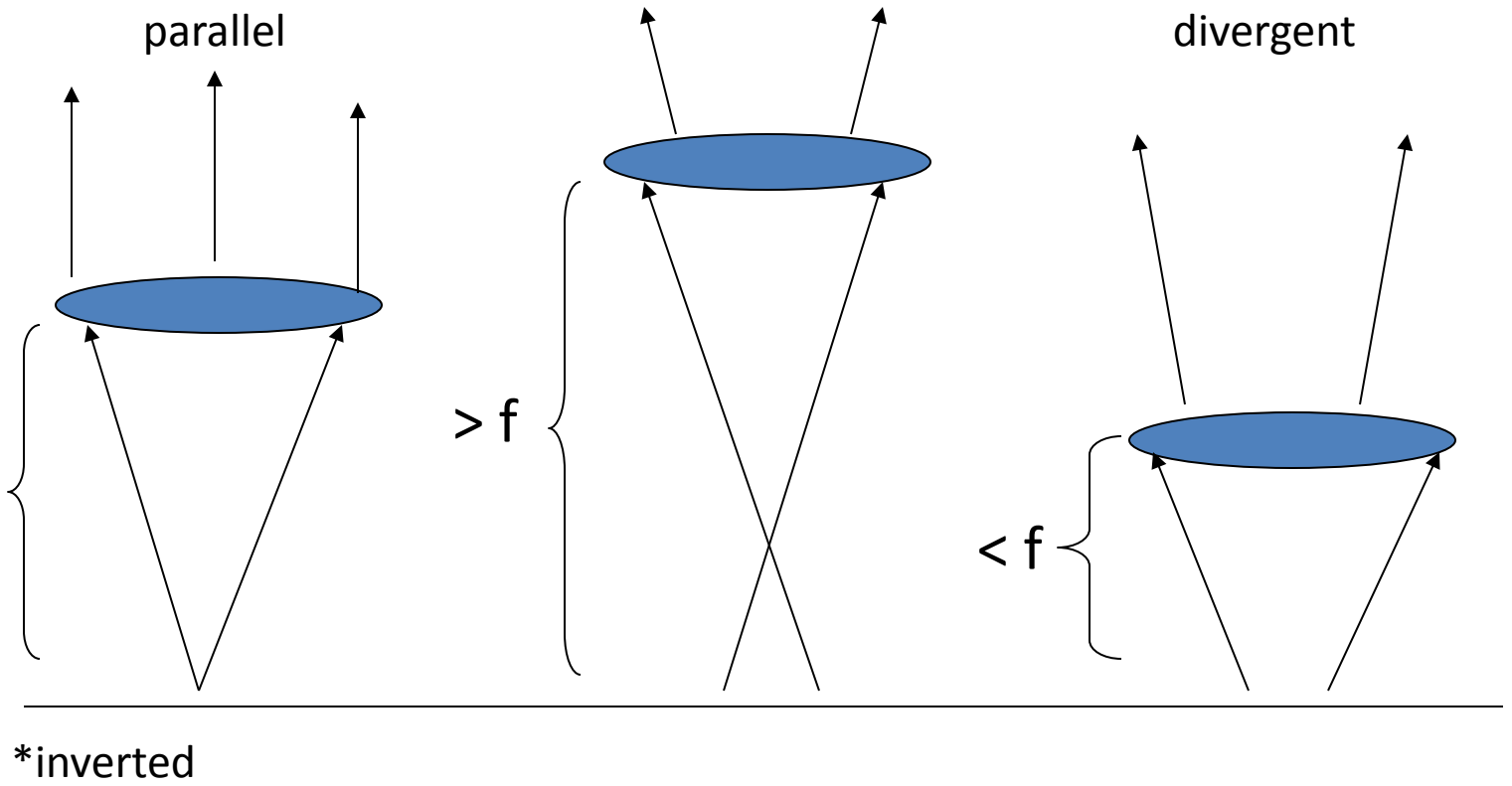
Example:
A 10 diopter (2.5x) hand-held magnifier focuses at what distance from the object?

Answer: 4”

(f = 40”/10D = 4”)

KEY: 1 meter ~ 40” and 1” ~ 2.5cm or 25mm

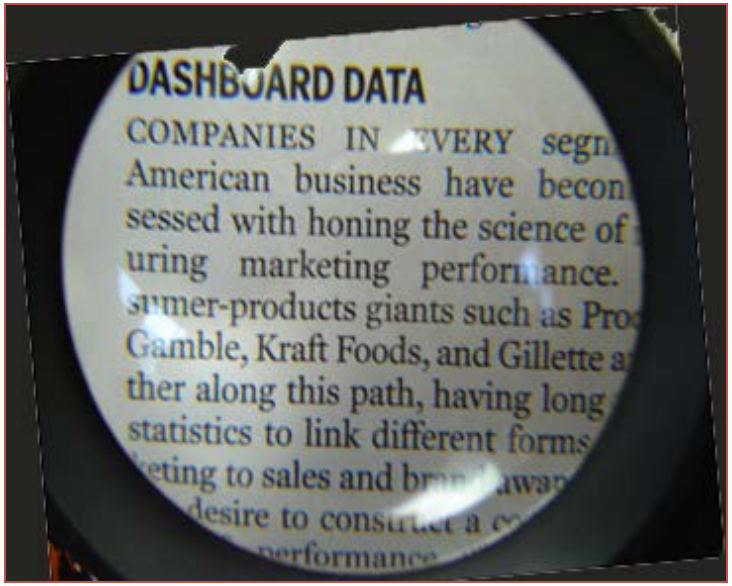
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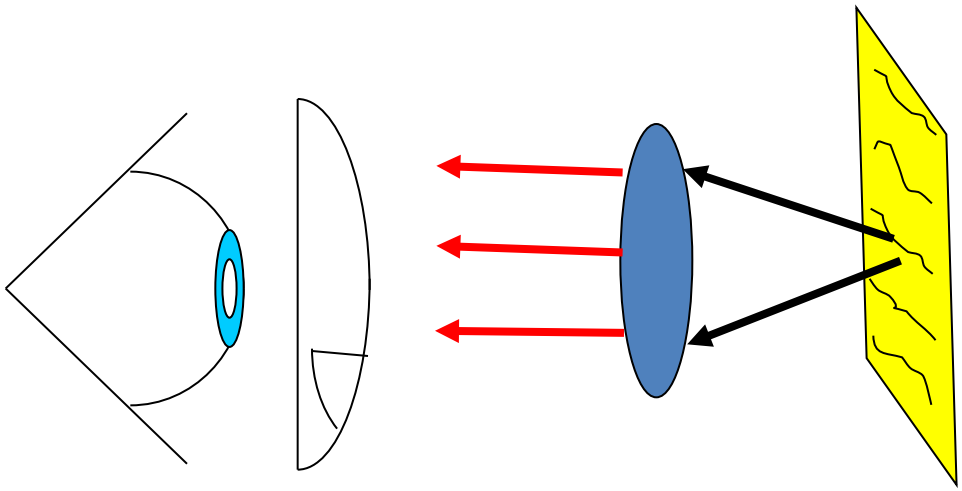


*inverted

Also, hold at the proper eye-to-lens distance (provides larger field of view)









What about users who have a bifocal?

Low Vision Training Module #3

Initial Training Tips:

1. Hold hand-held magnifier against spectacles*
2. Hold material against hand-held magnifier
3. Pull material/object away until it is at focal length of lens
4. Move hand-held magnifier and object away together to maximize working distance



Lens options for hand-held magnifiers

-4 major lens designs typically used

Lens options for hand-held magnifiers

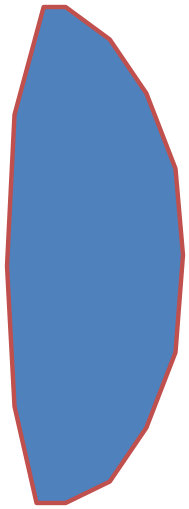


Biconvex Lens

Biconvex lenses

- Curves of equal radius
- Spherical curves
- Limited power range
- Usable at long eye-lens distance

Lens options for hand-held magnifiers

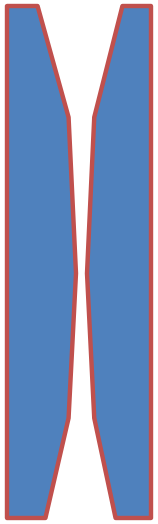


Aspheric Lens

Aspheric lenses

- Curve has different radius if measured at different points
- Highest power range
- Minimal distortion in periphery

Lens options for hand-held magnifiers

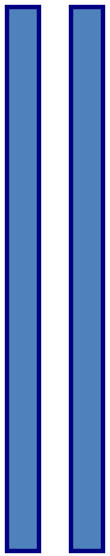


Aplanatic Lens

Aplanatic lenses

- Plano-convex lenses positioned with curves inward
- Distortion free from edge-to-edge
- Limited power range

Lens options for hand-held magnifiers



Diffractive Lens

Diffractive lenses

- Based on the principle of diffraction, not refraction
- No curves – thinner and lighter than any other lens design
- Limited power range
- Rapidly improving technology

Illuminated Hand-held Magnifiers

Illumination

- Enhances contrast of object
- Reduces required magnification



Illuminated Hand-held Magnifiers

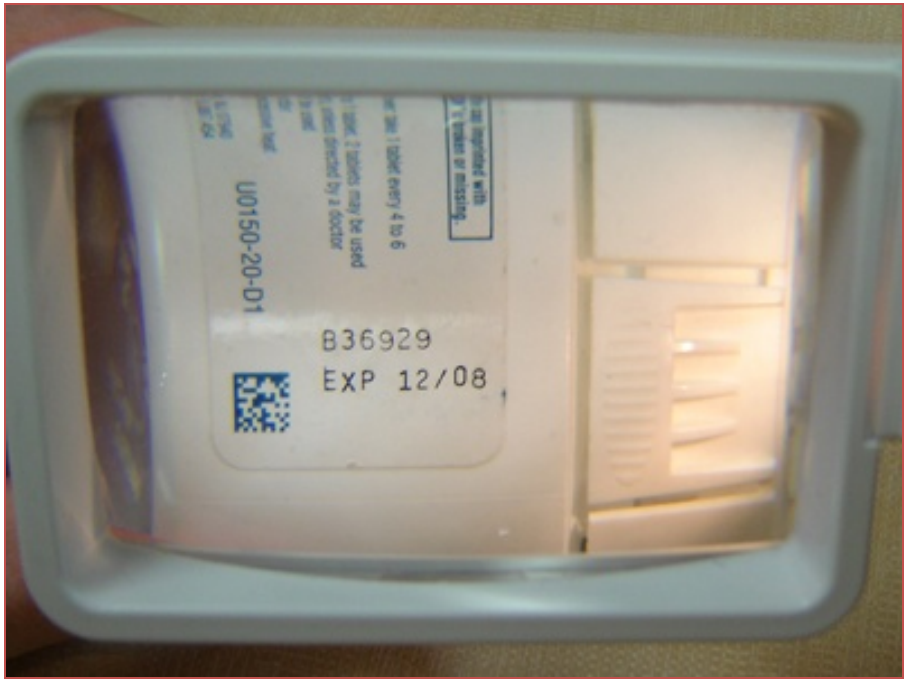


Incandescent



Light Emitting Diodes (LEDs)

Illuminated Hand-held Magnifiers



Incandescent

- Less blue light in spectrum
- Economical

Illuminated Hand-held Magnifiers

Light Emitting Diode (LED)

- Bluer spectrum
- Energy efficient
- Long life



Advantages:

- Familiar
- Versatile
- Economical
- Portable

Disadvantages:

- Not hands-free
- Fatiguing
- Affected by tremors

Low Vision Training Module #3

Hand-held magnifiers are designed for short-term spotting of near objects

	Near Spotting	Near Extended	Inter-mediate Spotting	Inter-mediate Extended	Distance Spotting	Distance Extended
Hand-held	√					
Stand		√				
Spectacles		√				
Telescopes	√	√	√	√	√	√
Video	(√)	√	(√)	√		√

Short-term spotting tasks of near objects:

Reading the phone book





Reading menus

Short-term spotting tasks of near objects:

Reading labels / price tags





Checking thermostats

Low Vision Training Module #3

- What they are
- How they work
- How to use
- Types available
- What are they made for

Questions?

Thank You!