BASIC OPTICAL TRAINING

Best Spherical Correction

Good Vision

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For all the people around the world
who need a simple pair of eyeglasses
to change their lives

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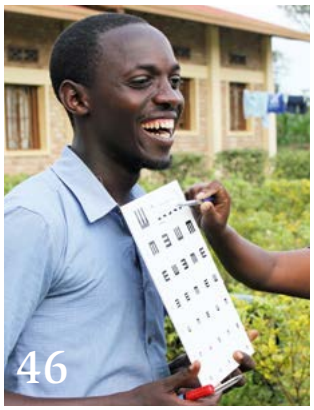


Over

950

million people worldwide still lack access to eyeglasses.

A Global Challenge

According to the World Health Organization (WHO), approximately 950 million people around the world need eyeglasses but can neither afford them nor have access to optical services. Among these, 826 million individuals suffer from uncorrected presbyopia, age-related vision decline correctable with simple reading glasses.

As a result, children are unable to go to school and adults are often unable to work or provide for their families. Consequently, the estimated global income loss exceeds $200 billion per year.

To meet this need, WHO estimates that approximately 57,000 eye care professionals would be required to provide the needed optical services to these individuals.

We are committed to changing this.
Martin Aufmuth, Founder and President

Children often struggle at school because they need eyeglasses

Martin Aufmuth, Founder and President

Training: “Best Spherical Correction”

The Best Spherical Correction (BSC) training course is a one-year program. The goal is to equip students—future GoodVision Technicians (GVTs)—with the skills needed to identify the best spherical correction for individuals with uncorrected refractive errors (URE), visual impairments that can be corrected with lenses. Additionally, they learn to adjust eyeglasses to fit each individual face, raise awareness about the importance of eyeglasses and vision care, and recognize cases that require referral to an ophthalmologist or eye hospital.

This training course is a core component of GoodVision’s mission to provide high-quality, locally produced, and affordable eyeglasses in developing countries. The overarching goal is to establish a basic optical eye-care system that is accessible and affordable for everyone. Working together with ophthalmologists, optometrists, and opticians, GoodVision has developed this comprehensive, year-long training program.

Patients with pathological eye conditions—or cases where the GoodVision Technician cannot achieve a significant improvement in visual acuity—will be identified and referred to hospitals or ophthalmologists. A robust quality-control system ensures compliance with established standards.

The BSC training program focuses on a specific segment of the population and addresses the needs of individuals who require first-time or basic vision care. GoodVision has created this training course as a vital complement to existing healthcare infrastructure.

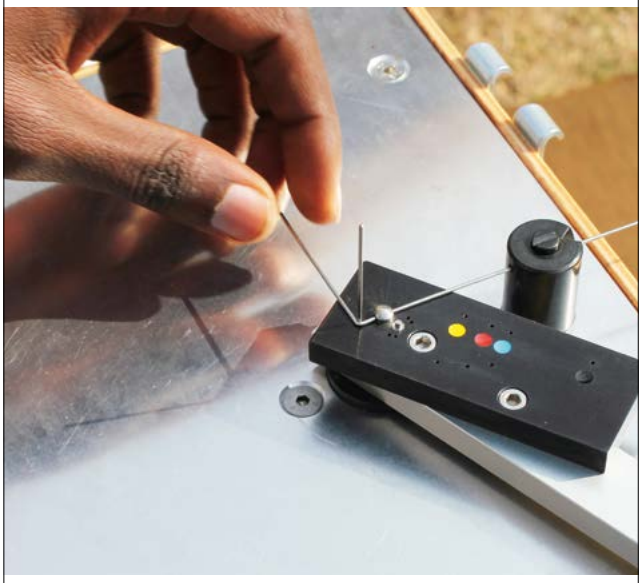
The GoodVision System

The GoodVision Glasses (GVGs)

The Frame: Flexible and Lightweight

The extremely lightweight and flexible spring-steel wire eyeglass frames, which can be decorated with colorful beads, are both attractive and affordable. The material costs are approximately 1 USD. The selling price of the basic model is two to three times the average local daily wage, making these glasses affordable for everyone.

Local Production and Value Creation



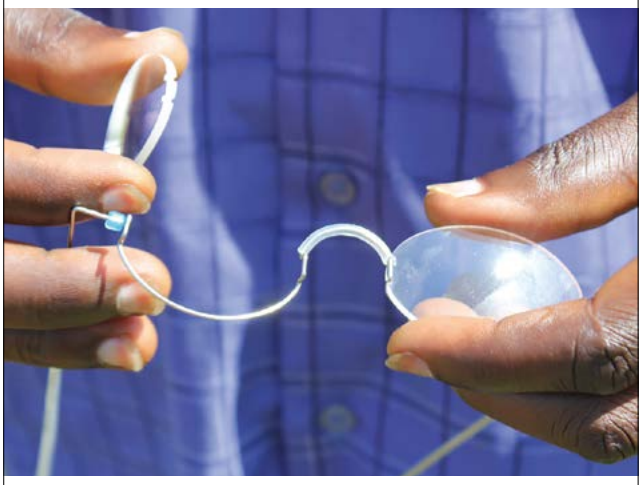
Color-coded markers, which refer to pupillary distance (PD), indicate different frame sizes (Yellow = small, Red = medium, Blue = large)

GVGs have a distinctive design, featuring two colorful glass beads

The bending machine fits into a compact wooden box measuring just 30 x 30 x 30 cm. This box contains all the tools necessary to manufacture the frames.

A small production team can manufacture over 20,000 pairs of glasses per year using this machine.

Fast and Cost-Effective Care



Box with Pre-Cut Lens:
The lenses can easily be clipped into the frame

GoodVision's modular assembly system, comprised of pre-fabricated lenses ranging from -10.0 D to -8.0 D ind 0.5 D increments and pre-cut frames in various sizes and colors, enables fast, individualized, and cost-effective vision care, especially in remote areas.

Immediately after the vision test (provided free of charge), the patient receives their eyeglasses. No expensive grinding equipment is required, and a follow-up appointment for fitting is unnecessary.

Sustainable

Adjusting Eyeglasses

Conducting Vision Tests

People trained by GoodVision in vision testing and eyeglasses production are able to earn a sustainable living through these activities. The goal is to establish permanent and affordable vision care services in developing countries.

Student in India with Her Own Manual

Working in Groups, Students Learning Together

Information for Trainers

The Main Objectives of this Training Course are to:

1. Find the correct spherical lenses for the patient
2. Adjust the eyeglass frame to each patient's face
3. Recognize when a patient should be referred to an ophthalmologist or eye hospital
4. Equip students with the skills to become successful salespeople by teaching marketing techniques and good customer service

Timetable and Content

The GoodVision Technician Training is structured as a year-long program. During the first two months, students learn the content of this manual and receive hands-on training in the production and repair of GoodVision Glasses. This builds essential manual skills for frame adjustments later on. The two-month phase concludes with an exam.

Following these first two months, students enter a hands-on internship phase. After six months, a second exam takes place. The final six months consist of supervised fieldwork, ending with a third and final exam.

Product-Oriented Thinking

To be successful, the frame producer must focus on the final product: How can I achieve the best quality and quantity in the shortest period of time?

Student Activity

Studies show that student concentration drops significantly after 10 minutes of listening. Some students may also struggle due to language barriers or limited educational backgrounds. Therefore, provide very clear, brief introductions and shift quickly to interactive exercises.

Comprehension and motivation increase when students are active. If you spend all your time lecturing, only you are working. But if 20 students are participating interactively, comprehension and motivation increase. Encourage students to talk, explain, draw, and conduct experiments together. Always ask yourself: What can they actively do next? The more eye tests the students perform, the better.

Train the Trainers

Every day, select students to present the day's concepts to their peers, ideally in their local language. The less time you spend in front of the group, the more time students have to engage with each other, which creates a more effective and well-rounded learning environment. When a student can successfully and clearly explain a topic in their own words, it proves they have a complete understanding.

Allowing students to prepare and teach a small section of material provides them with a chance to build confidence and acquire a deeper understanding of the curriculum.

Constructive Criticism: Build Them Up, Don't Break Them Down

Mistakes made during training help avoid errors later in real practice. Mistakes happen, and when they do, it is your job as a trainer to boost the student's confidence and remind them that their mistake is an opportunity to learn. When teaching how to adjust glasses on a patient, don't start by demonstrating yourself. Let a student volunteer to try first. Observe their actions and ask the group to discuss what was done well and what could be improved.

Repetition

Always bear in mind that practice makes permanent! Repeat the most important lessons from the manual every day. Students should perform several eye tests daily so that the correct procedure solidifies in their minds. Repeating key content consistently over 4 to 8 weeks ensures permanent knowledge. Students should periodically revisit topics and exercises covered in this training manual to ensure proper information retention.

Check the Results

When a trainer asks the group, "Does everyone understand?", often one person nods while the others stay silent. This does not show whether the group has really understood the material. It's also important to keep in mind that students often raise their hand and say they understand even when that is not the case. Peer pressure and the desire to avoid embarrassment are real issues. The better question to ask is, "Who can explain this in their own words?" If the students can explain the material in their own words, they understand and you can move on to new information.

Research shows that students usually do better on quizzes before lunch. Their focus and energy are stronger earlier in the day, which makes testing more effective in the first half of the day. More quizzes equal more motivation to succeed!

Speed Learning

Under the right conditions, we can all learn very quickly. For example, when teaching the structure of the eye, you can explain every term, but not everyone will listen. A better method is to give students 10 minutes to memorize the terms and functions themselves while supporting each other. Immediately afterward, conduct a test: each student draws an eye, labels the parts, and writes brief explanations. Then, review the answers together. Apply this technique to other subjects as well. Let the students share learning techniques with their peers.

Transparency

Always explain why you are doing something. Start each day by telling students the daily learning goal. For example: "By this evening, you will know how to perform a refraction and select the correct lenses for your patient."

Be Clear, Explain Simply

Ensure that all learning material is accessible. For instance, "light rays passing through lenses" is a complex concept, especially for students without a physics background. Simplify it by conducting hands-on experiments, allowing students to manipulate lenses, draw diagrams, and explore the concept at their own pace. Prioritize practical understanding and the ability to explain in one's own words over abstract theory.

Manual in Local Language

This training manual should be available to every student in their local language, or in a bilingual version with both local and formal languages, whenever possible.

Self-Written Student Manuals

Provide each student with a workbook alongside the manual. Encourage them to create their own version of the manual in their native language. They can write, draw, and color both in class and during their free time. Content that students create themselves will be much easier for them to remember.

Clear Teaching Style

Whether it's you or a student explaining to the group, ensure they speak loudly, slowly, and clearly enough for everyone to hear and understand. Regularly ask the group: "Who is able to follow along?" or "Who needs a moment to catch up or ask questions?"

Teamwork

Always remember that you and your students share the same mission: helping as many people as possible with high-quality care.

I wish you great success!

Martin Aufmuth—
Inventor and Founder of GoodVision Glasses

Materials for Optical Training

Please check with the program manager regarding the collection and budget for these materials, which will be provided by GoodVision.

1 → 1 per student

- **Graph Paper Notebook** (A4)
- **Blank Workbook** (for writing their own manual)
- **Triangle** (right-angle ruler)
- **Pens**
- **Pencils**
- **Set of Wooden Colored Pencils** (plastic pencils dry out quickly)
- **Pencil Sharpener**
- **Eraser**
- **Substitute Name Tags**
- **Needle and Thread** (for pupillary distance test glasses and vision tests)
- **Frames in Three Sizes:** 1 small, 1 medium, 1 large
- **Long-Nose Pliers** (for adjusting and repairing frames)

1 → 1 per 2 students

- **Distance Vision Charts** (4 m) – two versions: with and without binocular test
- **Polarized 3D Test Glasses**
- **Nails or Blue Tape** for mounting vision charts
- **Pointing Stick**
- **Pair of Lens Bars**
- **Eye Test Card**
- **Water-Soluble Marker**
- **Pocket Ruler** (1 m or longer)

1 → 1 per 4 students

- **Pinhole Glasses**
- **Lens Boxes** containing a variety of powers of minus and plus lenses, including plano
- **GoodVision App for Training**
- **Mirror**
- **Tablecloth** (for a presentable sales table)

2 → 2 per student

- **Steel Wire**

4 → 4 per student

- **Sunglass Lenses**
- **Paperclips**

Miscellaneous

- **Plastic Containers** for soapy water and clean water
- **Toilet Paper** (for drying lenses)
- **Approximately 10 Sheets of Very Sturdy White Paper** (approx. 350 g/m²)
- **Flashlight** (if flashlights are unavailable, use a bright candle for paper eye experiment)
- **1–2 Pairs of Eyeglasses** with cylindrical (or toric) lenses
- **Water-Resistant Marker** (thick tip)
- **Experiment Set:**
  Laser pointers
  Rice with small stones

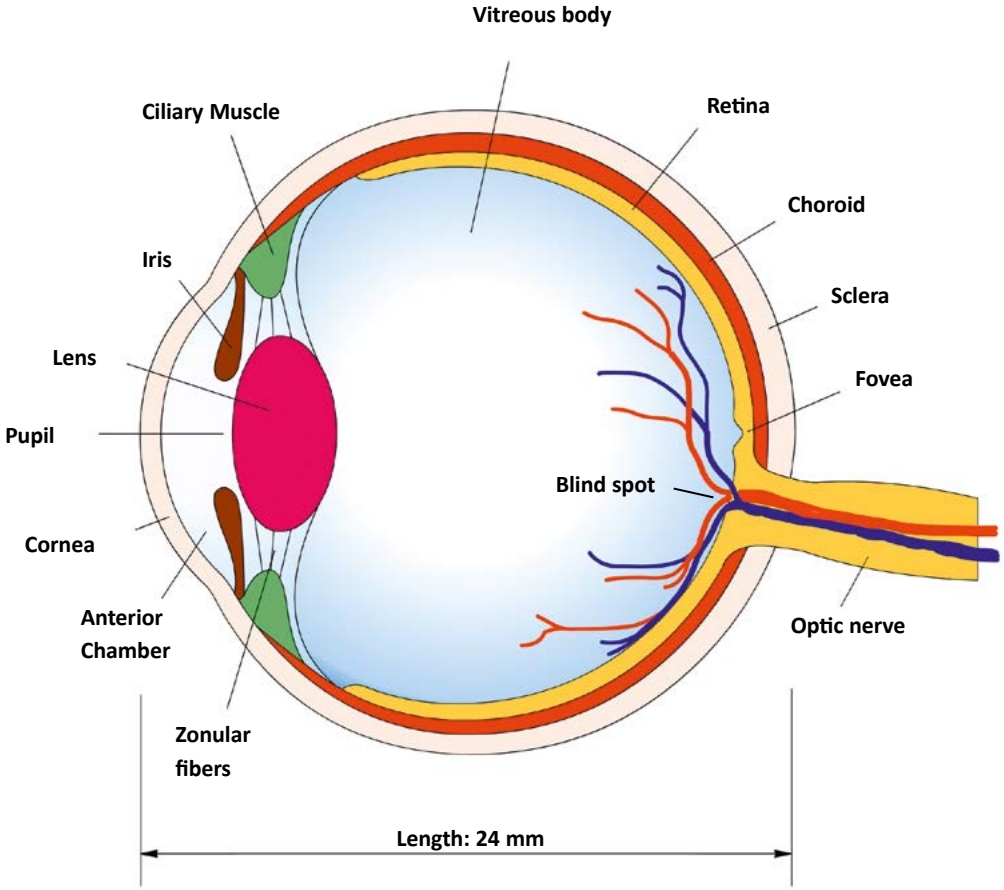
1. Basic Optics

1.1 The Eye

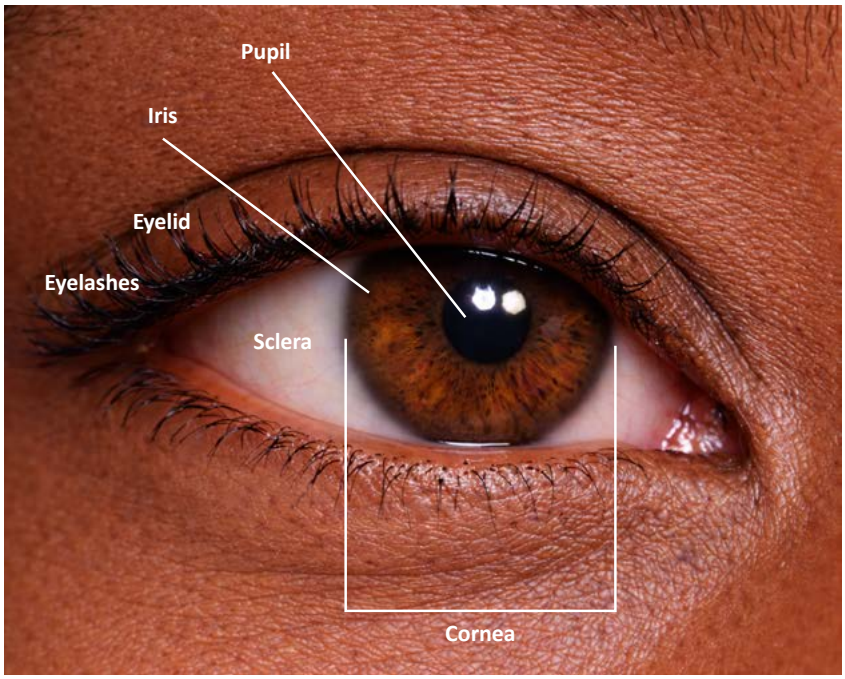
Orange Model

If you cut an orange in half, you can see its internal structure.
Similarly, a drawing of a bisected eye will display its internal structures.

Important Parts of the Eye



Functions of Important Eye Structures



Sclera: The strong, white, protective outer layer of the eye.

Vitreous Body: A clear, gel-like substance that fills the inside of the eye and helps it maintain its shape.

Choroid: A layer of Blood Vessels Between the sclera and retina that supplies oxygen and nutrients to the eye.

Retina: A thin layer at the back of the eye that senses light and sends visual signals to the brain.

Fovea: A small area in the center of the retina where vision is the sharpest.

Optic Nerve: The nerve that carries visual information from the retina to the brain.

Cornea: The clear, front part of the eye that focuses incoming light.

Blind Spot: The part of the retina where the optic nerve exits the eye; no vision occurs here.

Pupil: The dark opening in the center of the eye that lets light in.

Lens: A transparent structure behind the pupil that changes shape to focus light onto the retina (also called the crystalline lens).

Iris: The colored part of the eye that controls the size of the pupil and regulates light entering the eye.

Ciliary Muscle: A muscle that controls the shape of the lens to help the eye focus on near or far objects.

Zonular Fibers: Thin fibers that hold the lens in place and help it change shape for focusing.

Anterior Chamber: The front part of the eye between the cornea and iris, filled with clear fluid.

Functions of the Important Parts

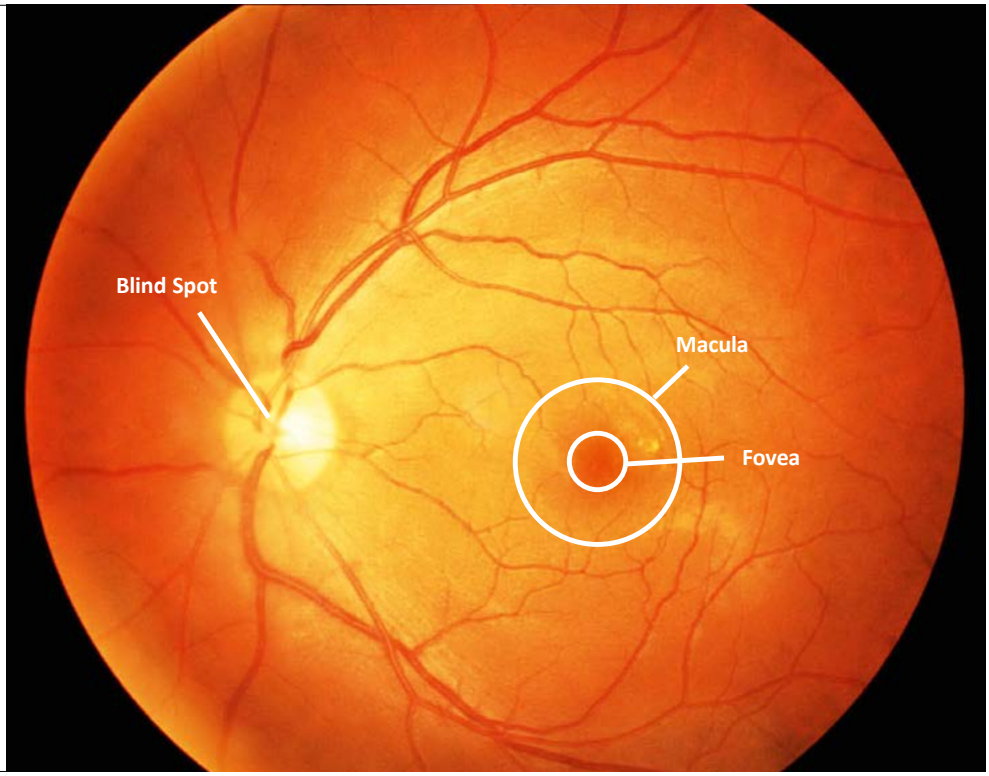
Cornea: The transparent outer layer covering the colored part of the eye (iris). The cornea protects the eye and focuses incoming light. It provides approximately two-thirds of the eye's total refractive power (ability to see).

Group Exercise

- Allow students 20 minutes to memorize all parts of the eye and their functions.
- Afterward, have them close the manual and draw the eye diagram, labeling all parts and their functions from memory. Then let them compare their drawings with the manual to see if they missed anything.

The Retina

Illustration of the retina showing the blind spot, macula, and fovea.



Experiment—Blind Spot

- Close your left eye and focus on the cross with your right eye, maintaining a reading distance of approximately 40 cm.

↘ Slowly move the paper toward your face. At a certain point, the black circle will vanish! This occurs when the image of the black circle aligns with the blind spot of your eye.

Important Facts

Refractive Power of the Eye:
About 60 diopters
(cornea 40 D, lens 20 D).

Sensory Cells on the Retina:
More than 100 million cells send image information to the brain (a camera has roughly 10 million pixels).

Photoreceptors:
The retina contains rods and cones.
Rods (~120 million) are responsible for seeing in low light. Cones (~6–7 million) provide color sensitivity and are concentrated in the 0.3 mm diameter fovea.

Eye Strength:
In darkness, you can see the light of a candle up to 25 km away.

Digital Camera:
~10 million pixels

Human Eye:
>100 million pixels

Experiment—Rods and Cones

- Look straight ahead.
- Bring a colored pencil from the side of your face into your view.
- Try to guess its color.

→ Observation: Before you see the color with the cones in the center of your eye, your rods detect that there is a pencil.

Experiment—Pupil

- Wait until it is dark.

→ Shine a flashlight into your partner's eye.

→ Observation: The pupil will constrict immediately.

Alternative: If a flashlight is unavailable, cover the eye with your hand and remove it quickly to achieve the same effect.

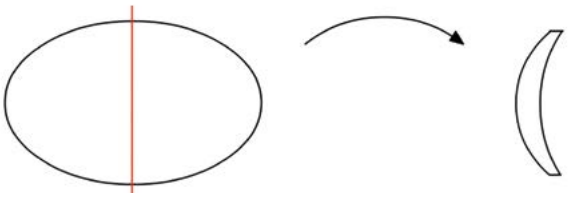
1.2 Lenses

The Lens

Lenses are placed in GoodVision eyeglasses to correct a patient's visual impairment. The lens power depends on the patient's needs. Plus lenses are used for farsighted patients (hyperopia), who cannot see near objects clearly. Minus lenses are used for nearsighted patients (myopia), who cannot see distant objects clearly.

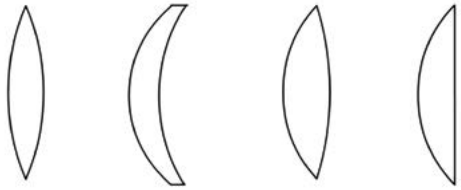
The lens power, plus or minus, is determined during the vision testing process.

If you bisect an optical lens, it looks like this (side view):



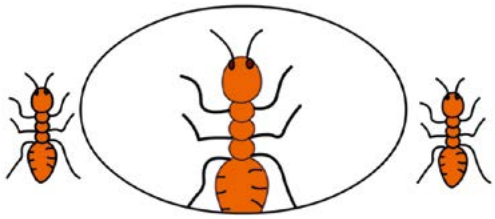
Note: The optical power of a lens is measured in diopters (D).

Plus Lenses



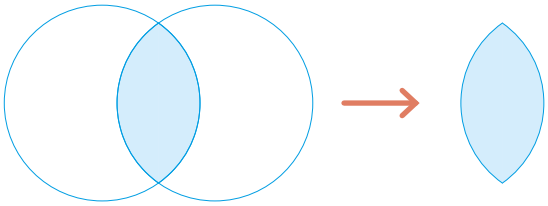
Plus Lenses:
Thick in the center, thin at the edges.

Memory Aid:
If you eat more (plus), you get a big belly.



Optical Power—Plus Lenses
Plus lenses magnify objects, making smaller things appear larger.

Available Powers:
+0.5 D, +1.0 D, +1.5 D, … up to +6.0 D

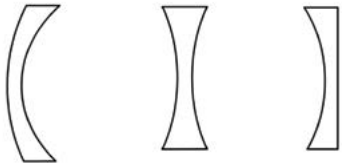


Visualization:
A plus lens can be imagined as the overlapping area of two spheres placed together.

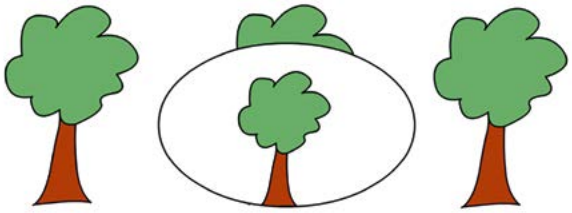
Experiment

- Take various lenses and determine whether they are positive or negative.
- ↘ Examine whether they are thicker in the center or at the edges.
- ↘ Look through each lens to see whether it magnifies or reduces objects.

Minus Lenses

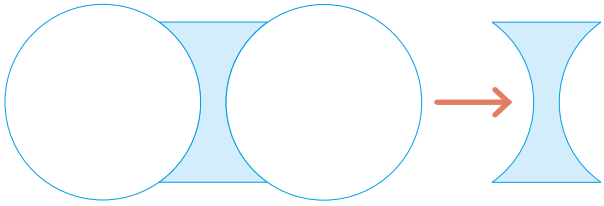


Minus Lenses make far away objects look clear.
They are thin in the center, thick at the edges.



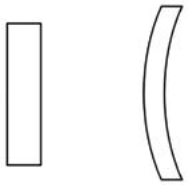
Minus Lenses make things appear smaller.

Optical Power:
-0.5 D; -1.0 D; -1.5 D; ... -6.0 D



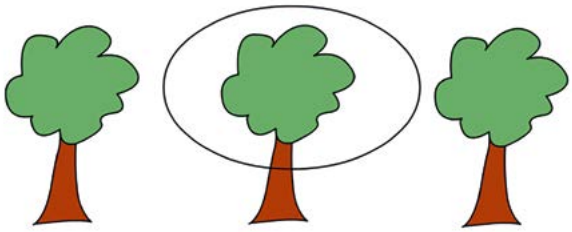
Visualization:
A minus lens can be imagined as the space between two spheres that are next to each other.

Lenses Without Optical Power



These lenses have consistent thickness across their entire surface.

Usually worn for eye protection.



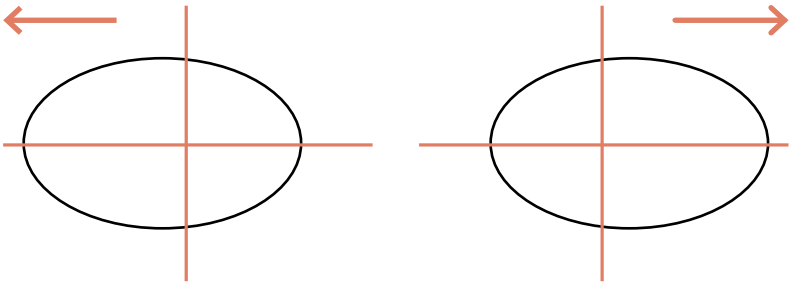
They do not alter the size or clarity of objects.

Optical Power: 0 D

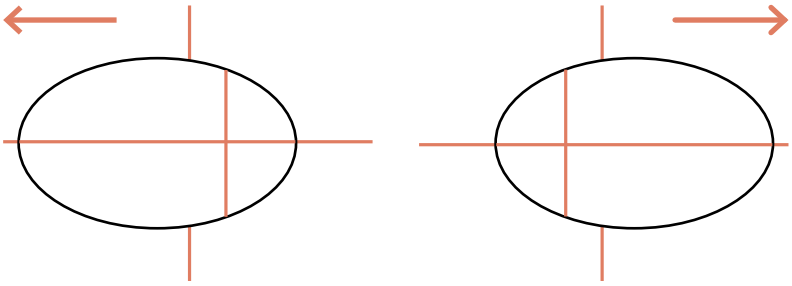
Shift of a Line

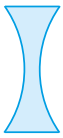
The following methods allow one to determine the type of unidentified lenses:

When viewing two crossed lines through a lens **without optical power** and moving it left or right, the two crossed lines do not shift.

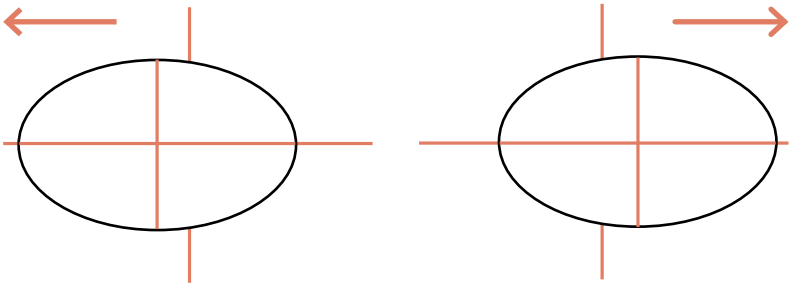


Plus Lens:
The image shifts **opposite** to the direction of the lens movement.





Minus Lens:
The image shifts in **the same direction** as the lens movement.

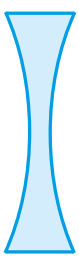


Plus Lenses

- Thickest at the center.
- Magnify objects.
- Shift the image **opposite** to the lens movement.

Minus Lenses

- Thinnest at the center.
- Reduce the apparent size of objects.
- Shift the image **with** the lens movement.



1.3 The Optical Center of a Lens

Key Facts

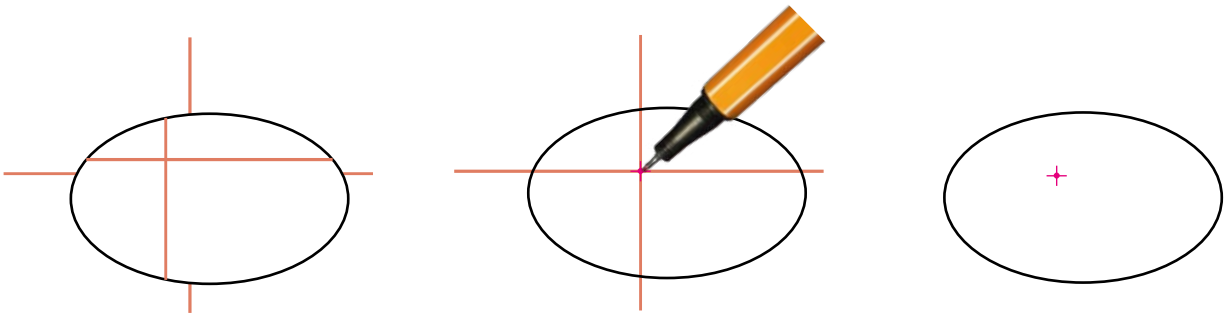
The optical center is the point where light rays pass straight through the lens. This is the point on the lens that should sit directly in front of the pupil and where the lens' refractive (or proper corrective) power is situated. The method described below allows you to locate the optical center of the lens without specialized instruments.

How to Locate the Optical Center of a Lens:

1 Position yourself directly above the lens and hold it 10–20 cm in front of two crossed lines.

2 Align the refracted images of the lines with the actual lines by carefully adjusting the lens position.

3 Mark the intersection point of the lines with a water-soluble pen. This marks the optical center of the lens!



Practical Task

↘ Practice with various lenses to identify and mark their optical centers.

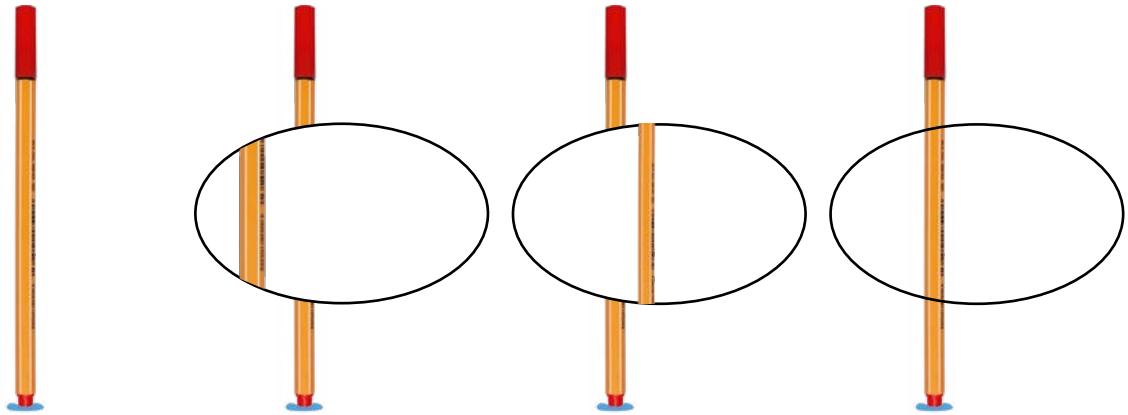
- Remember to use a water-soluble pen!

Demonstration Experiment

- Take two lenses of the opposite power (e.g., +6.0 D and -6.0 D) and hold them in front of your eye. While facing your partner, compare the different visual impressions of each eye by alternatively closing the left then the right eye.
- Place two lenses of +6.0 D in front of your eyes and look around. This simulates the visual impression of someone in need of a high prescription.

1.4 Determining Lens Power

If a len's power is not known, you can use this method to determine the power:



Materials Needed:
- A pen fixed vertically on a table (~1 m distance) using adhesive putty
- Lens of unknown power
- Test lenses (-4.0 D, -3.0 D)

Procedure:
1. Position the unknown lens 40 cm away from your eye.
2. Observe the pen while moving the lens horizontally:
   - If the pen appears **magnified** and moves **opposite** to lens movement → **plus** lens
   - If the pen appears **minimized** and moves **with** lens movement → **minus** lens

Example:
1. The optical characteristics of the unknown lens suggest a +4.0 D lens.
2. Verification:
   - Combine with -4.0 D lens → image minimizes (net power: -1.0 D)
   - Combine with -3.0 D lens → no change (net power: 0 D)

Calculation:

-3.0 D + (+3.0 D) = 0 D

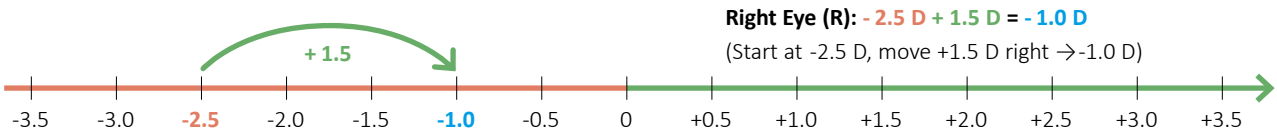
Unknown lens power = **+3.0 D**

Key Notes:
- Always move lens slowly for accurate observation
- Ensure proper lighting conditions
- Hold lenses parallel when combining

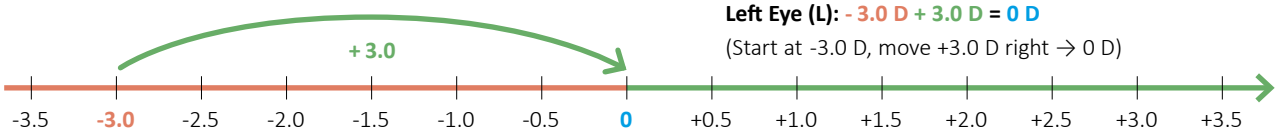
Basic Optics:
Lens Power Calculations

Fundamental Optical Mathematics
Same signs: Add absolute values
(-2.0 D) + (-3.0 D) = -5.0 D
Opposite signs: Subtract smaller from larger
(+3.0 D) + (-1.0 D) = +2.0 D
Equal magnitude cancels:
(+3.5 D) + (-3.5 D) = 0 D

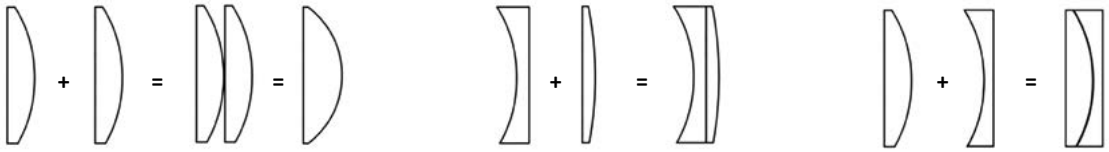
Using Number Lines for Lens Calculations:
Visualize diopter values on this number line to simplify calculations:



Right Eye (R): - 2.5 D + 1.5 D = - 1.0 D
(Start at -2.5 D, move +1.5 D right →-1.0 D)



Left Eye (L): - 3.0 D + 3.0 D = 0 D
(Start at -3.0 D, move +3.0 D right → 0 D)



+2 + (+2) = +2 +2 = +4

-2 + (+1) = -1

+2 + (-2) = 0

Practical Exercise

1. Select unknown lenses from the box.
2. Determine lens type (plus/minus) using movement tests.
3. Calculate exact power using:
   - Addition method with known lenses
   - Verification via lens bar
4. Record all measurements.

Trainer Preparation

1. Mark 20 lenses with identification numbers.
2. Create a master key documenting each lens's actual power.
3. Have students compare their results against the key.

Exercises

+5.0 D + (-4.0 D) = _____

+3.5 D + (-3.5 D) = _____

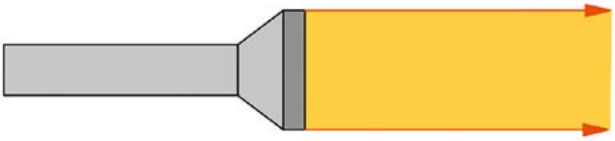
+2.0 D + (-3.0 D) = _____

+2.0 D + (-3.5 D) = _____

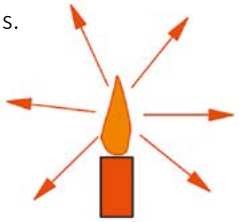
-0.5 D + (-1.5 D) = _____

1.5 Light and Lenses

Light typically travels in straight lines ...



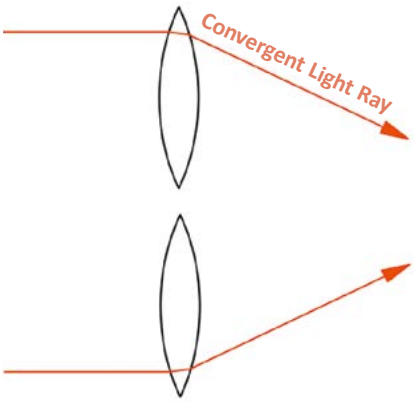
... and radiates outward in all directions.



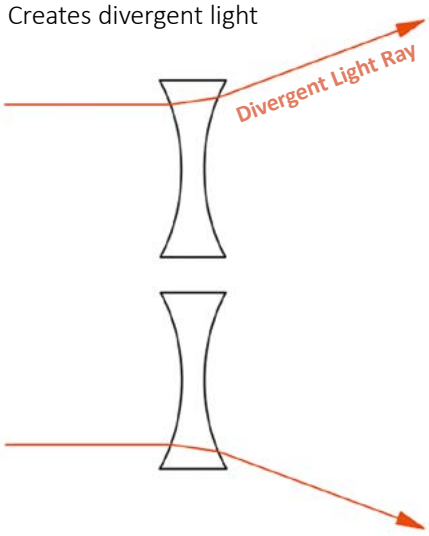
Types of Light Rays:
- Convergent light ray
- Divergent light ray

When a light ray passes through a lens, its direction changes. This phenomenon is called refraction (similar to how a stick appears bent when partially submerged in water).

Plus lens behavior:
- Refracts light rays toward the center
- Creates convergent light



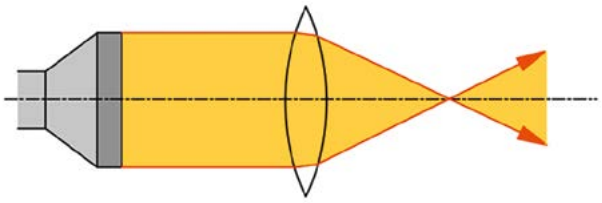
Minus lens behavior:
- Refracts light rays outward
- Creates divergent light



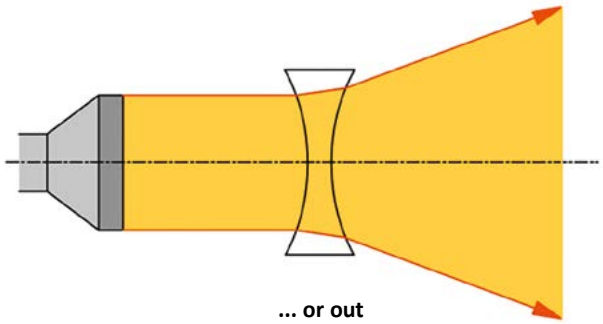
Light Refraction Through Lenses

Behavior of Parallel Light Rays:
When a parallel beam (comprising millions of light rays) passes through a lens:

- All rays undergo refraction
- Positive lens: Rays converge to a single point behind the lens (focal point F)
- Negative lens: Rays diverge outward from each other



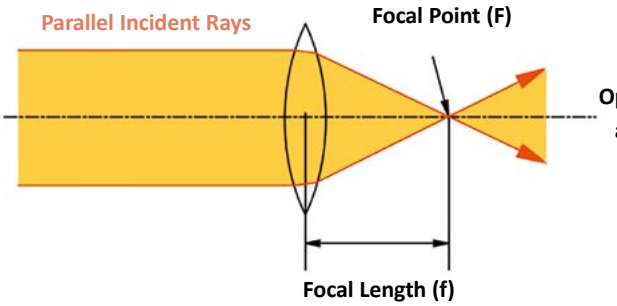
To the Center ...

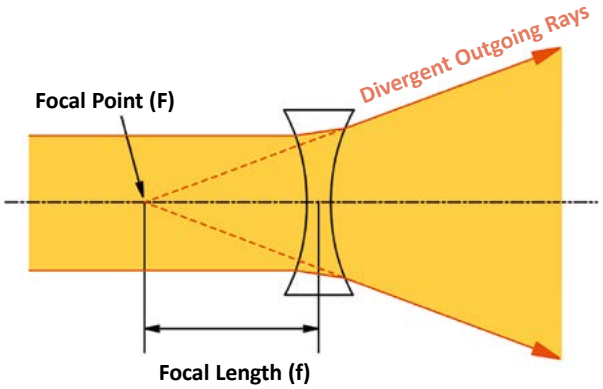


... or out

Key Characteristics:

- Convergent light (positive lens): Rays come together
- Divergent light (negative lens): Rays spread apart





Safety Experiment: Always Wear Sunglasses for this Activity!

1 Take the lens bar outdoors and position it in sunlight.

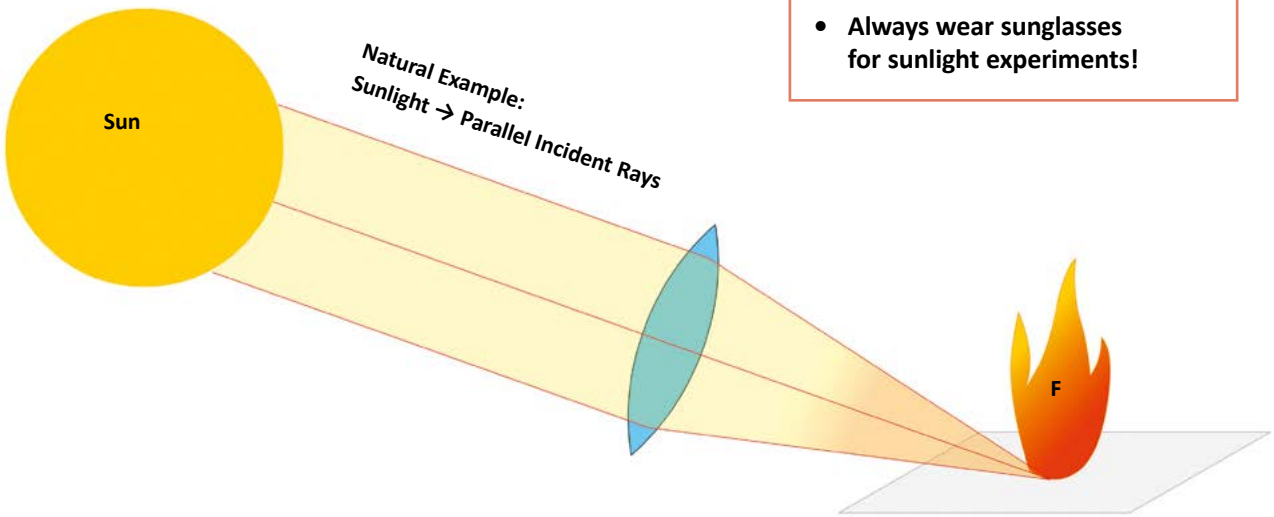
2 Observe light patterns on the ground:
- Bright spots or shadows form
- Pattern varies with:
  - Lens power
  - Distance between lens bar and ground

3 Experimental variations:
- Adjust the lens-to-ground distance (observe changes)
  - Combine a +6.0 D lens with a **minus** lens (note effects)
- Swap the +6D lens with different **minus** lenses (compare results)

1.6 Refractive Power

Safety Warning

- **Always wear sunglasses for sunlight experiments!**



Focal Point Demonstration

When parallel light rays pass through a positive lens:

- They converge on a single point (focal point F or focus)
- At this point, the concentrated light can ignite paper

Experimental Tip

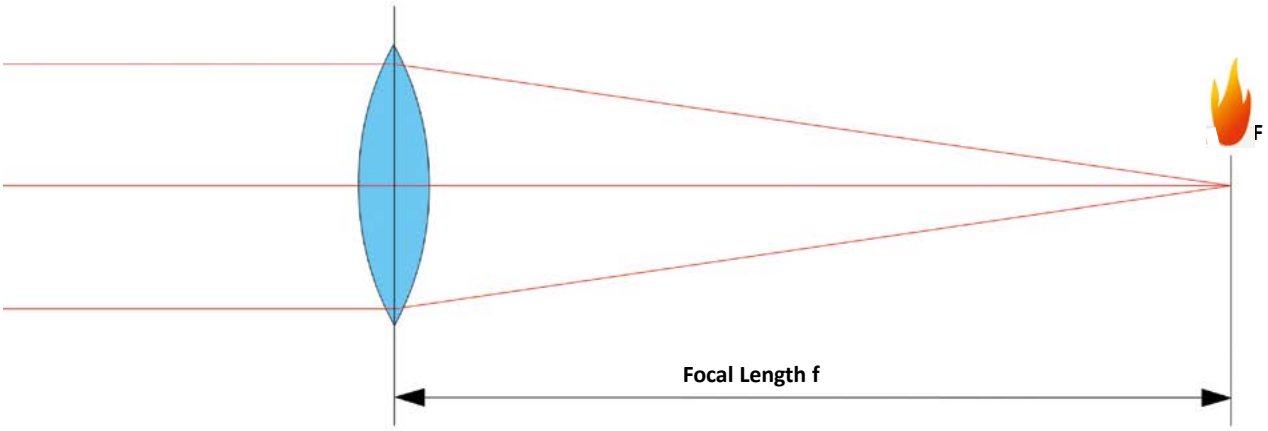
For better results:

1. Mark the paper with a black dot.
2. Rationale: Dark surfaces maximize light absorption.

Key Measurement

Focal length (f) = Distance between:

- The lens's optical center
- The focal point (F)

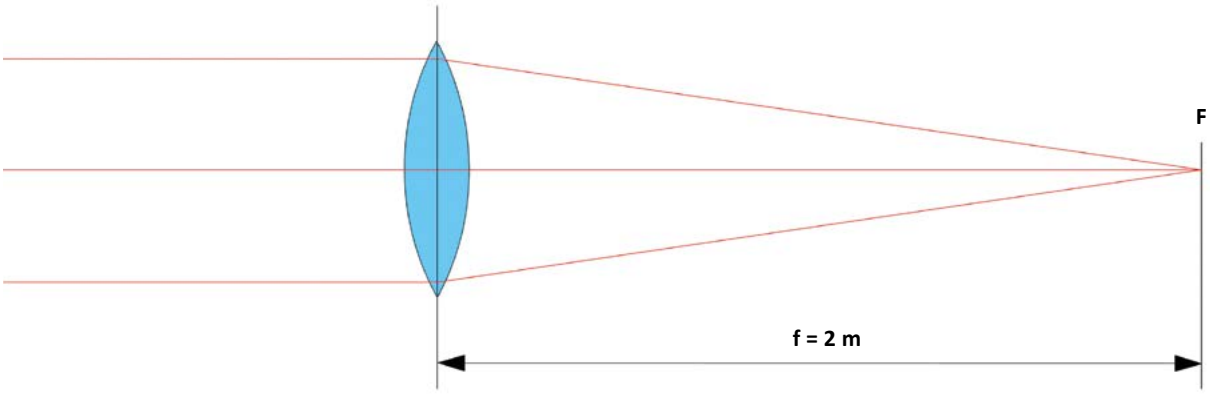


Lens Power and Focal Length

Practice Problems:

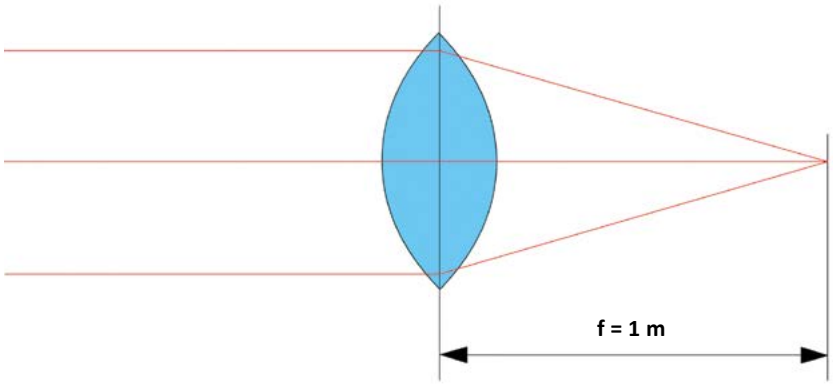
1 Calculate Lens Power (D) for these Focal Lengths:

- f = 3.0 m
- f = 4.0 m
- f = 10 cm
- f = 0.20 m



2 Determine Focal Length (f) for these Lens Powers:

- +20 D
- +2.5 D
- +3.0 D
- +4.0 D



Practical exercise

→ Test different focal lengths using your lens bar in sunlight.

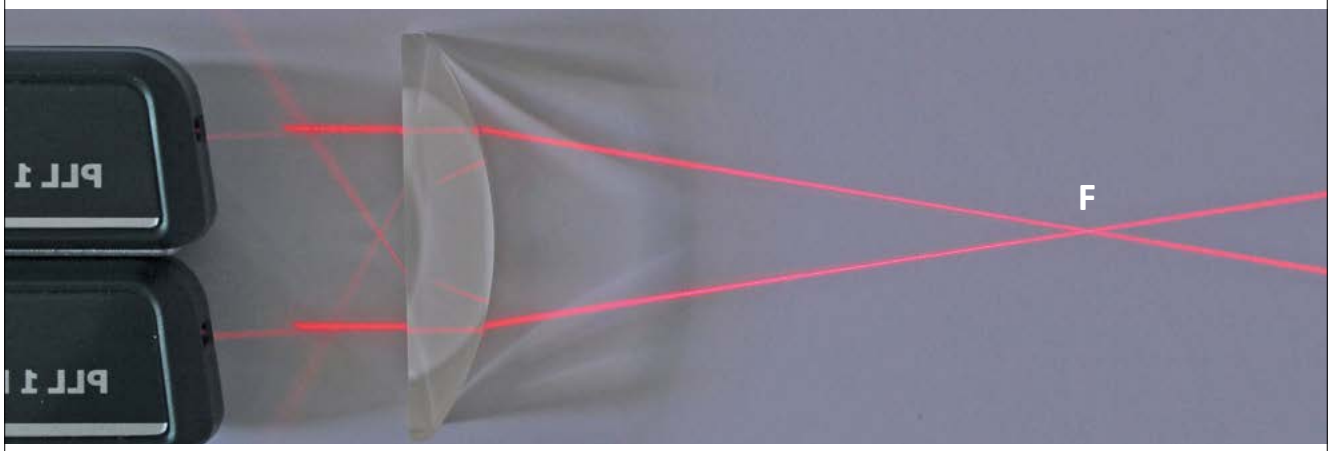
Worked Examples

1 **For f = 2 m:** D = 1/f = 1/2 m = 0.5 D

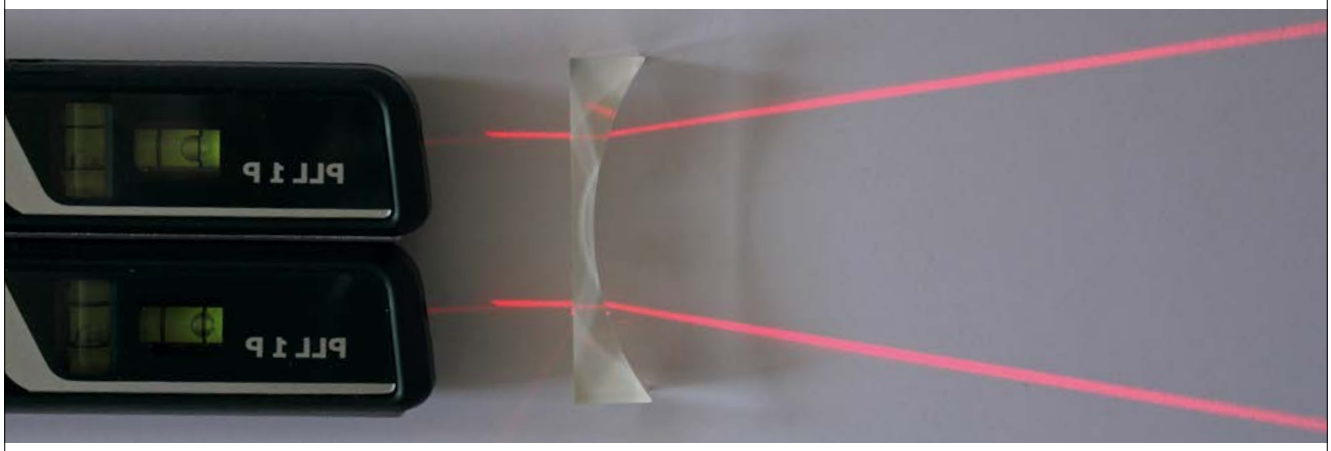
2 **For f = 1 m:** D = 1/f = 1/1 m = 1.0 D

1.7 Laser Experiments

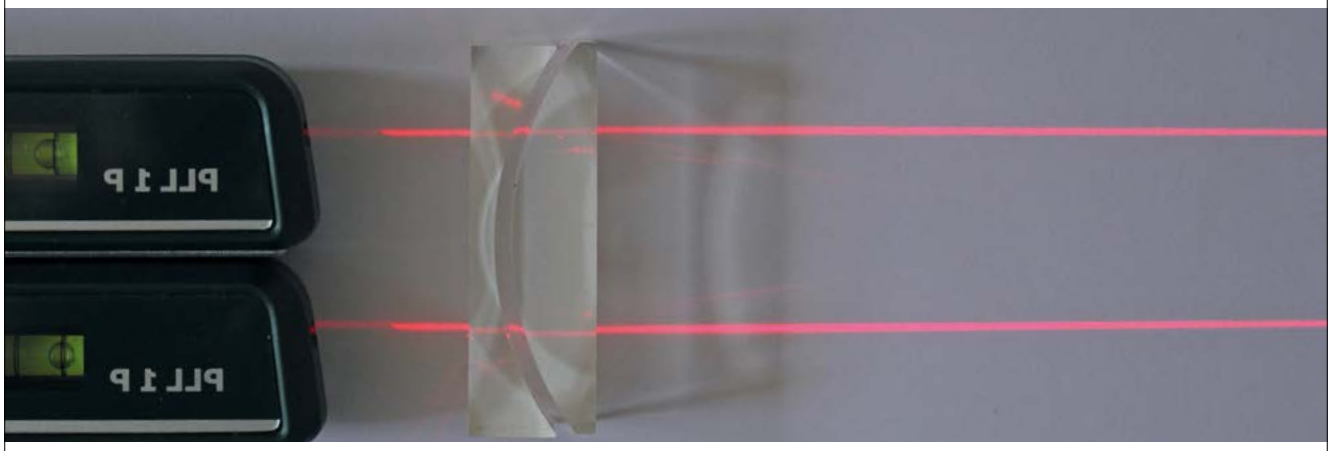
Lens Behavior with Laser Light



Positive lens: Converges laser rays to focal point F



Negative lens: Disperses laser rays outward

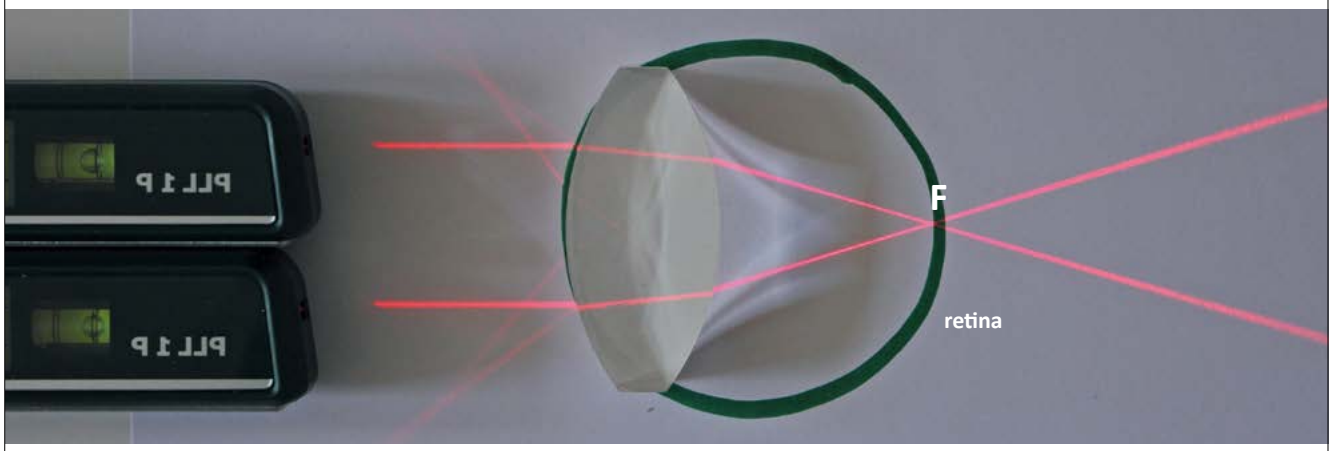


Combined lenses: Positive and negative lenses cancel each other's effects

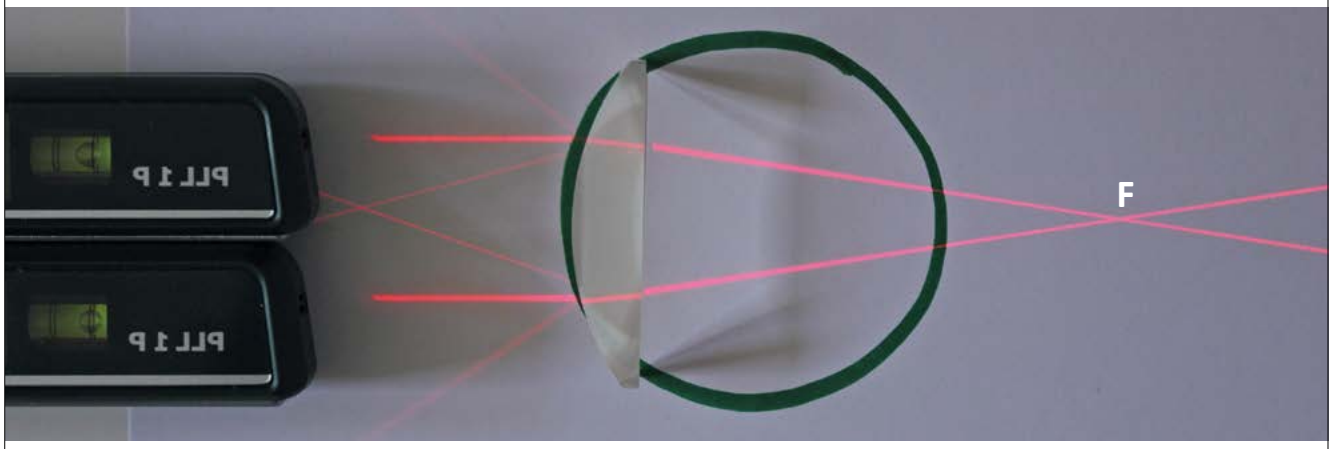
Critical Safety Notice

- Never direct laser beams toward eyes!

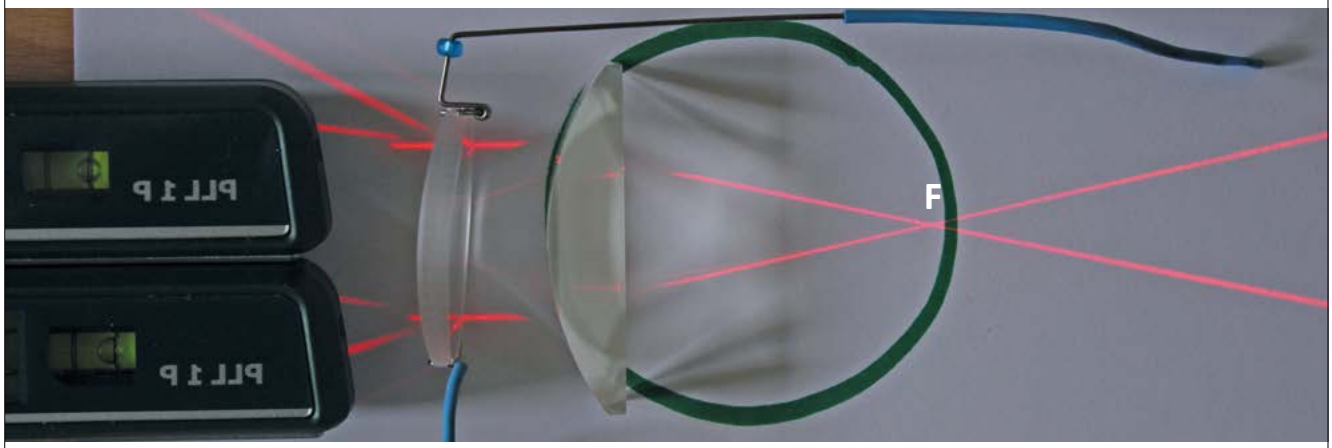
Eye Model with Light Rays



Here the lens focuses the light exactly on the retina. This eye sees clearly



The lens is not strong enough—the focal point (F) is behind the retina and thus the image is unclear



Use a plus lens to bring the focal point to the retina

Measuring Lens Focal Power

Safety Warning

Always wear sunglasses when conducting sunlight experiments!

Measurement Procedure

To determine a lens's optical power:

1. Measure the focal length (distance from lens to focal point)
   - Example: 16 cm (0.16 m) focal length
2. Calculate power using:
   D = 1/f
   = 1/0.16 m
   = +6.25 D

Practical Task

↘ Conduct this experiment yourself to calculate various lenses' powers.

1.8 Optical Imaging

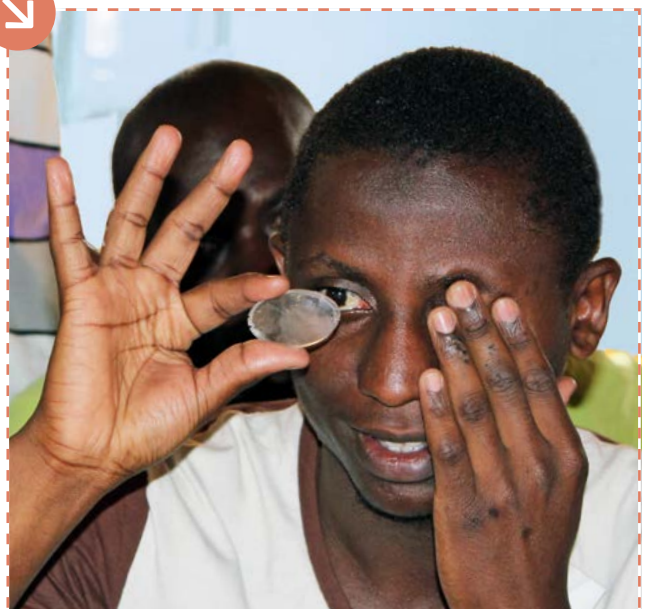
Wall Projection Experiment

Materials:
- High-plus-power lens
- White wall opposite a window

Procedure:
1. Position the lens between wall and window.
2. Adjust distance until wall image becomes sharp.
   → This equals the focal length
3. Observe image characteristics:
   - Reduced in size
   - Inverted vertically
   - Laterally reversed

Natural Optical Phenomenon

Raindrops function as plus lenses (similar shape) and form images exhibiting:
1. Size reduction
2. Vertical inversion
3. Lateral reversal



Direct Observation Experiment

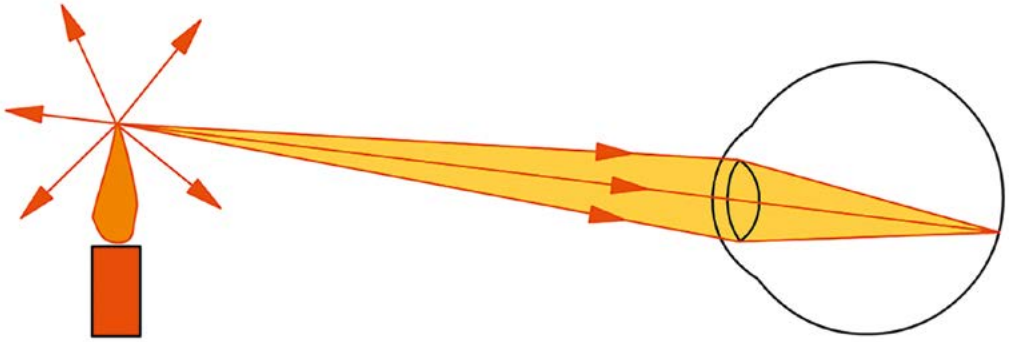
↘ **Technique:**
1. Close one eye.
2. Hold a +6.0 D lens ~30 cm before open eye.
3. View surroundings through lens.

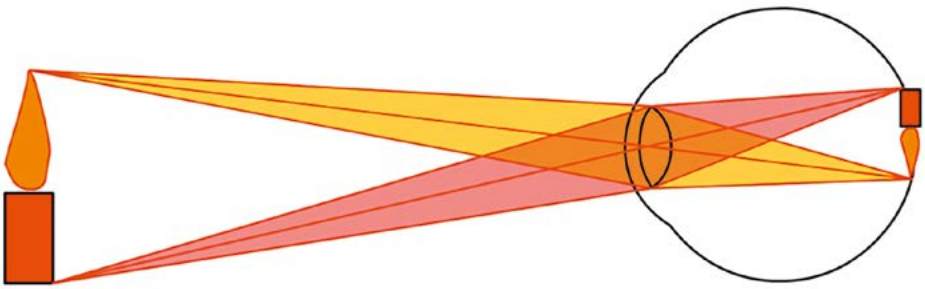
↘ **Observations:**
All objects appear:
- Minimized
- Inverted vertically
- Laterally reversed

1.9 How We See a Candle

Here's How it Works:

1. Light rays spread out from a candle flame in all directions.
2. Some enter your eye through the pupil.
3. Your eye's lens bends (refracts) the light.
4. The rays converge onto your retina.
5. Your optic nerve sends this picture to your brain.





What the image looks like on your retina
(your brain flips the image to its "correct" position):

- Smaller than real life
- Upside down
- Inverted (left and right swapped)

Image of the F

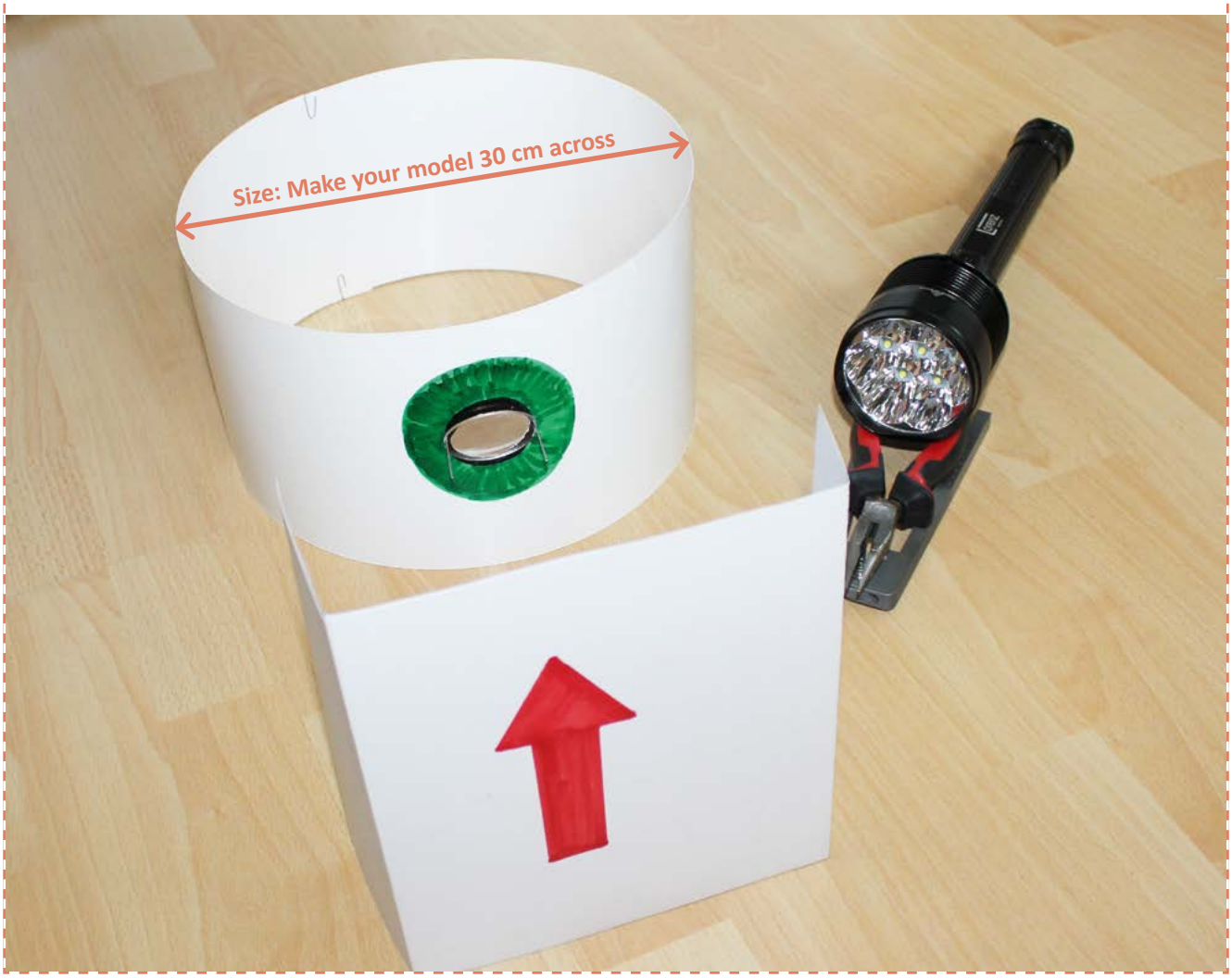
Paper Eye Model (Part 1)

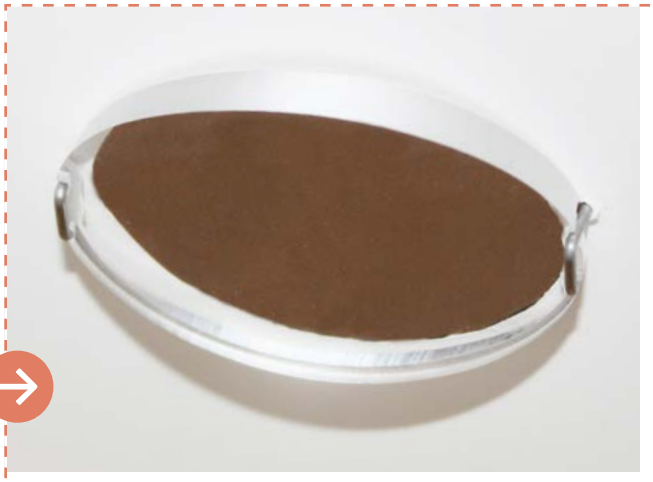
You'll need:

- Flashlight (or phone flashlight)
- 10 sheets thick white paper (350 g/m²)
- Lenses: +6.0 D, +1.0 D, -1.0 D
- Glue
- Paperclips
- Spring steel wire

Build it step-by-step:

1. Cut paper into long strip (100 cm × 15 cm).
2. Make circle, secure ends with 2 paperclips.
3. Cut oval hole on one side (slightly smaller than your lens).
4. Draw red arrow on separate paper (10 cm tall).

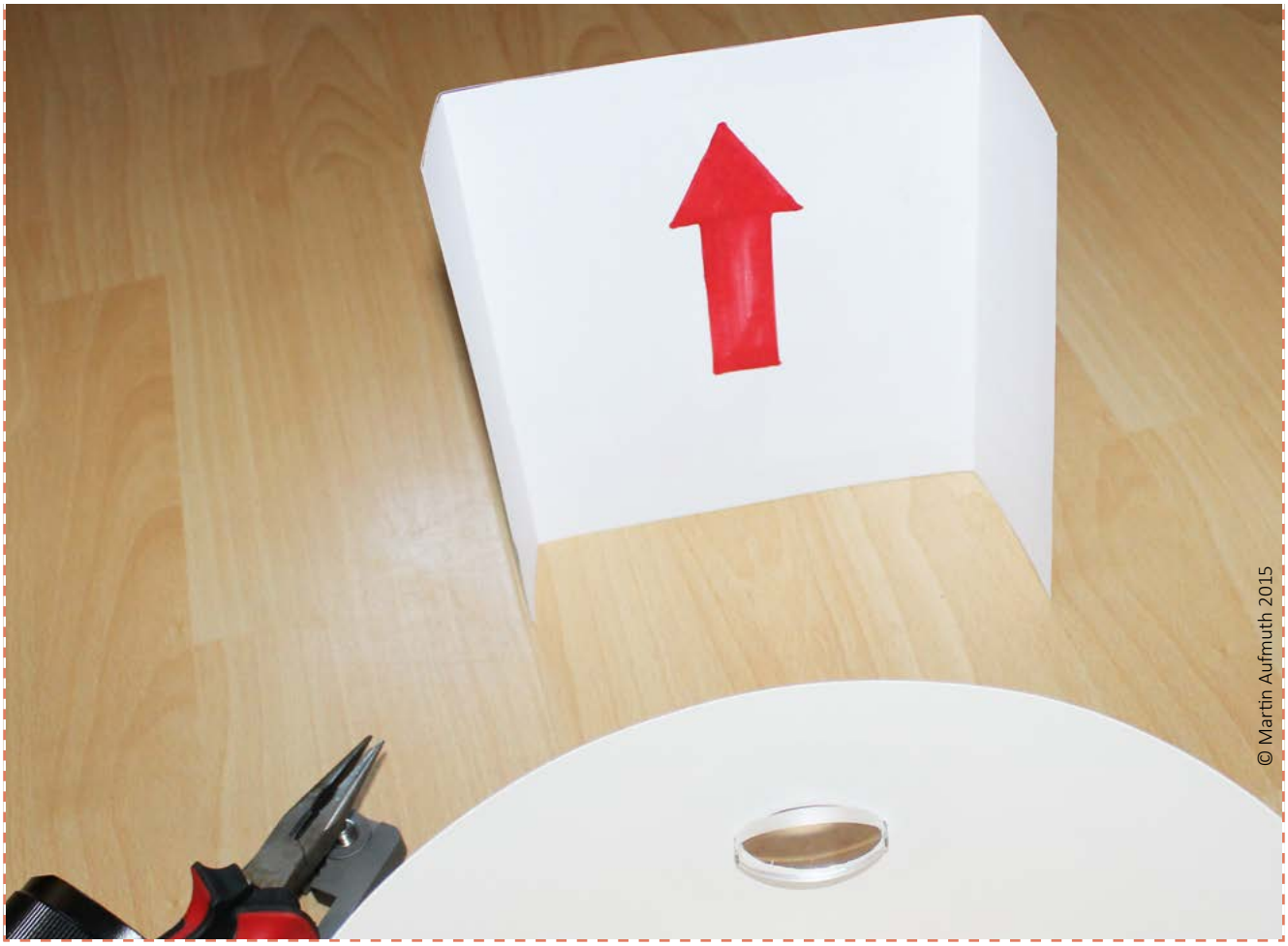




5 Mount the +6.0 D lens:
- Create a half-frame
- Fix it INSIDE the paper ring

6 Mount other lenses onto the ends of the wires.

7 During the evening, turn on flashlight and shine on red arrow.



Like a real eye, the light from the red arrow is passing through the lens into the eye.

There is an image of the red arrow at the back of the eye on the retina.

Alternatively, you can also draw an “F”. You can see that the image of the F is upside down and inverted.

Iris

Simulate the function of the iris by cutting two paper irises: one with a large opening, the other with a small opening.

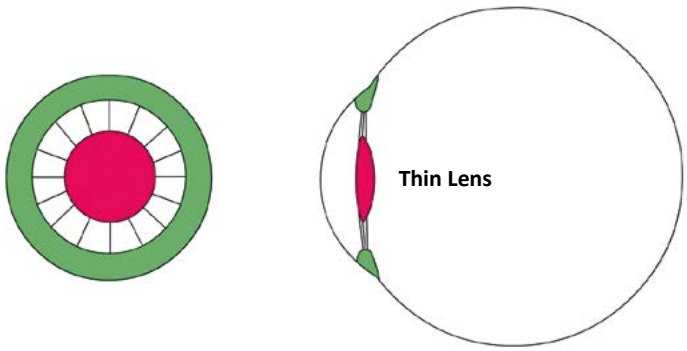
The image brightness will change when the opening is larger (as the eye opens when light dims).

Enlarged and Narrow Irises

1.10 How Your Eye Focuses (Accommodation)

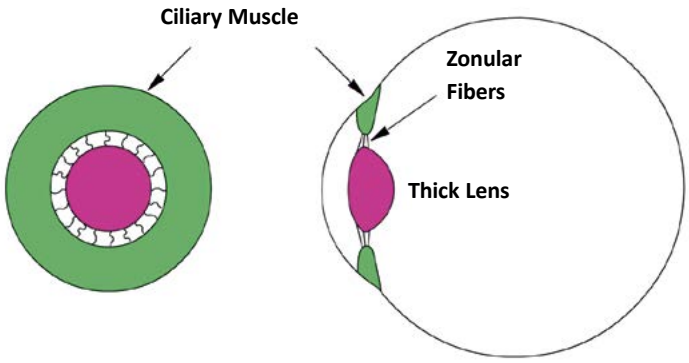
Seeing Far Away

- Your eye lens becomes thin and stretched out
- The ciliary muscle relaxes
- Zonula fibers pull tight
  (Like letting a rubber band stretch out)



Seeing Up Close

- Your eye lens gets thick and round
- The ciliary muscle squeezes
- Zonula fibers loosen
  (Like squeezing a water balloon to make it swell)



Key Facts

- Your eye automatically changes focus power.
- This focus change is called “accommodation”.
- Works for near, middle, and far distances.

What You’ll Notice

→ Just like a real eye, the “lens” changes shape.
→ The activity shows how muscles control your focus.
→ The activity explains why reading too long tires your eyes.

Classroom Activity

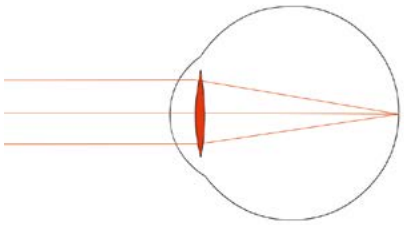
Human Eye Model

1 Form a circle with 12+ people.
2 Ask for volunteers for:
  - Pupil (2 people who can open/close)
  - Ciliary muscle (2 people holding the “lens”)
  - Lens (1 person in middle who gets thicker/thinner)
  - Retina (people in back receiving “images”)
3 Demonstrate:
  - Farsighted vision: Muscle relaxes, lens stretches thin
  - Nearsighted vision: Muscle contracts, lens gets thick

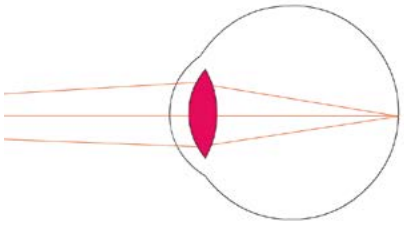
How Your Eye Adjusts to Different Distances

Focusing at Different Distances:

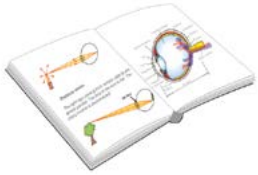
Long Distance
(e.g., mountains, horizon)
- Lens: **Thin and stretched**
- Muscles: **Relaxed** (no extra effort)
- Accommodation: **Not needed**

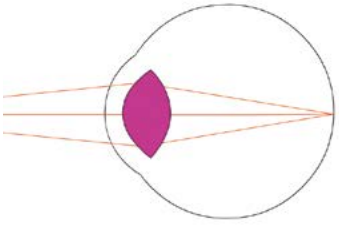


Middle Distance
(e.g., computer screen, person across the room up to two meters away)
- Lens: **Slightly thicker**
- Muscles: **Moderate effort**
- Accommodation: **Medium adjustment**



Short Distance
(e.g., reading, phone, close-up work)
- Lens: **Thick and rounded**
- Muscles: **Strongly contracted** (hard work!)
- Accommodation: **Maximum effort**





Try It Yourself! Finger Test:

1 Look at your finger held close to your eye (but don't touch).
Note that you will feel a sensation as if your eye muscles are straining or working hard (they are).

2 Look at a distant object (tree or building).
Note that your eye muscles will feel relaxed.

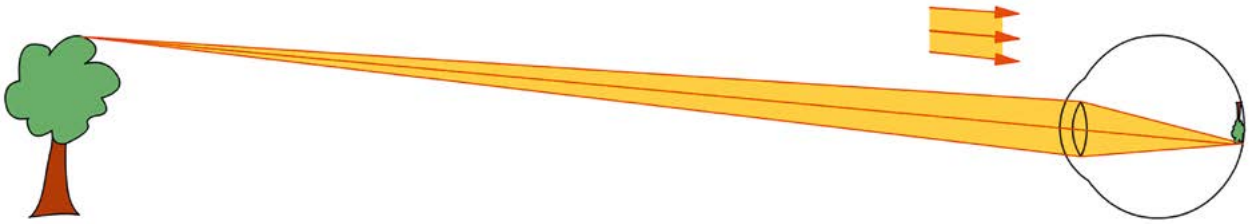
Why?
- Near focus requires eye muscles to squeeze, lens thickens for clear focus (accommodation).
- Far focus does not require accommodation and thus muscles are relaxed and lens remains thin.

Key Takeaways

→ **Accommodation = Your eye's zoom feature!**
→ Close work tires your eyes (muscles can't stay squeezed forever).
→ Looking far away gives your eyes a break.

1.11 Normal Vision (Emmetropia)

How an Eye Lacking Visual Impairment Functions:



→ **Eyeball Length:** approximately 24 mm

→ **Focusing Power:** approximately +60 diopters

→ **Seeing far away:**
Light rays enter almost parallel to each other
- Lens bends light rays perfectly onto the retina
- **Clear sight without assistance of corrective lenses**
- **No extra effort is needed** (muscles relaxed)
- Result: Clear, sharp vision

Quick Test: Simulate Blurry Vision

Try This:

1 Wear strong + (plus) glasses.
- Clear sight without assistance
- No extra effort

2 Look around—things seem blurry and magnified!
- Why? Your eye now over-focuses, like an emmetropic
eye trying to see through the wrong glasses.

Key Facts

- **Emmetropia = Vision that does not require correction**
- No glasses needed for far distances
(the aging eye will need reading glasses)
- The lens and retina work together like a camera

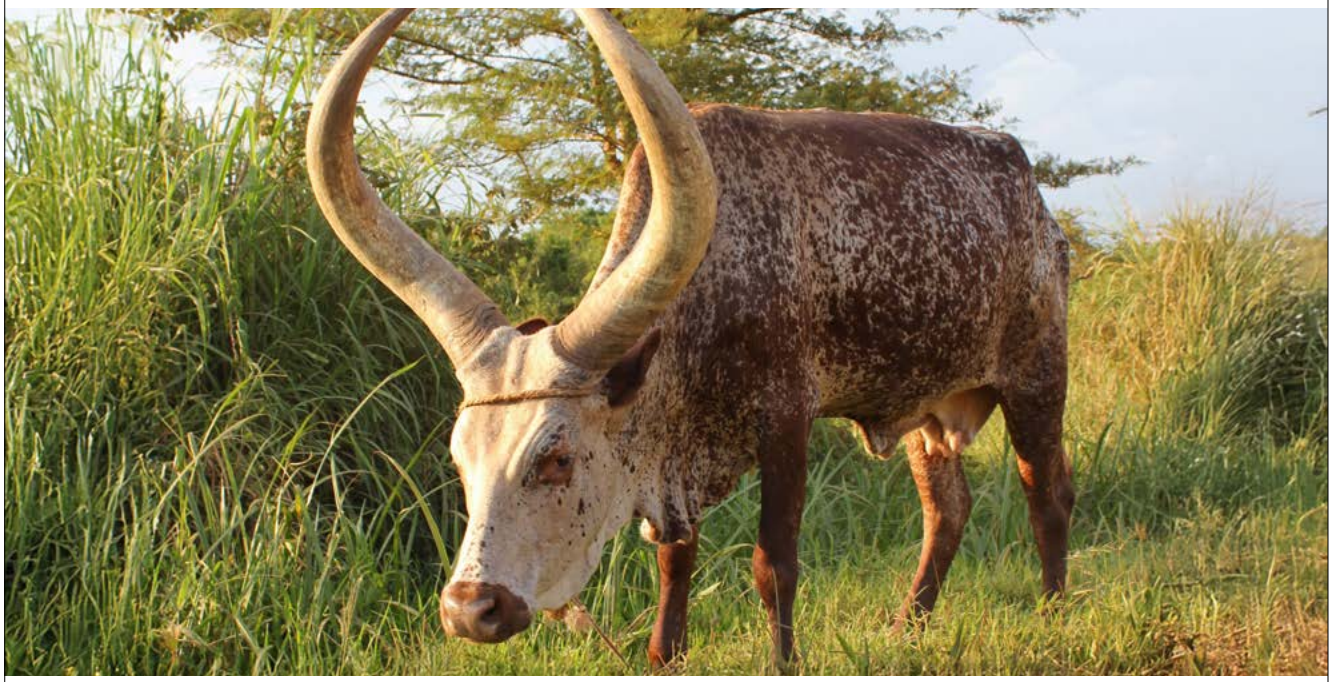
1.12 Vision Problems

Nearsightedness (Myopia) & Farsightedness (Hyperopia)

When the Eye Does Not Focus Correctly

- Ametropia = the eye can't focus correctly on far objects
- It is like a camera that is always slightly out of focus

If you have ametropia and look at a cow without corrective glasses, you will just see a blur

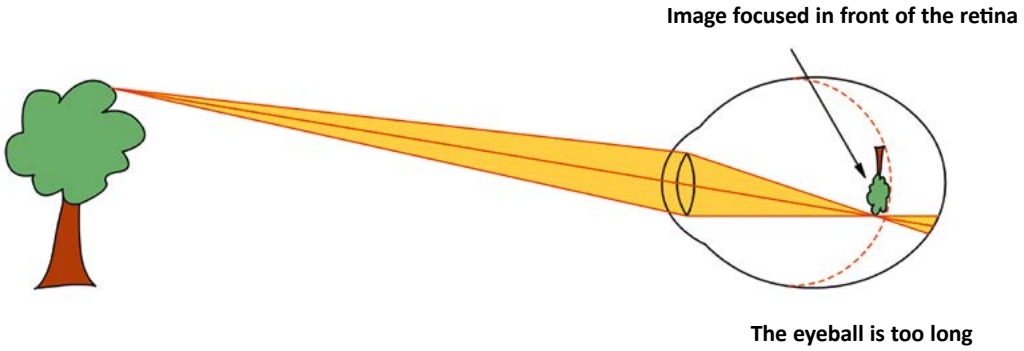


If you wear glasses that correct your ametropia, you will see the cow clearly

Nearsightedness (Myopia)

What's Happening:

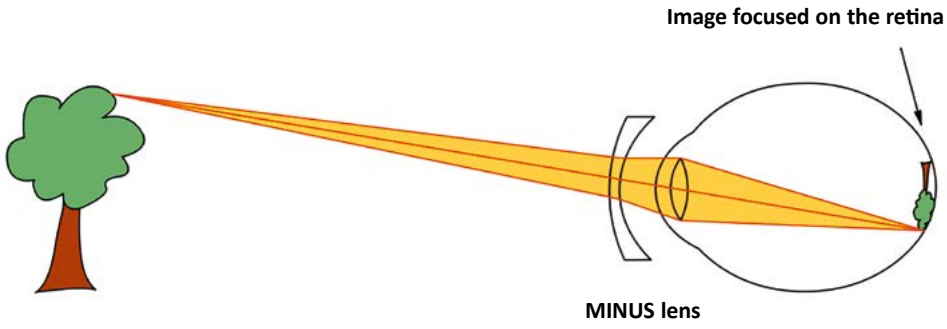
- The eyeball is longer than it should be (more elliptical). The light focuses **in front of** the retina.
- **A myopic eye can see close** objects clearly.
- **A myopic eye cannot see far away objects** clearly.



How to Fix It

Fix Myopia with Minus Lenses

- A minus lens pushes the focus back onto retina
- If you view the retina as a projector screen, it is similar to moving the projector screen closer



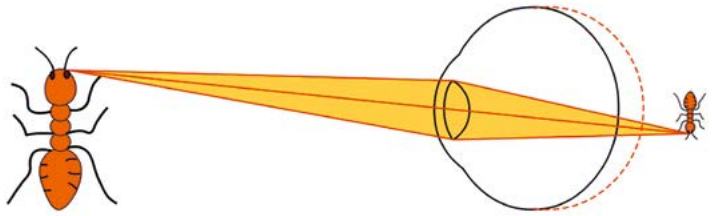
Try It Yourself

↘ Wear +5.0 D glasses → Feel what nearsightedness is like!
(Then try fixing it with minus lenses)

Farsightedness (Hyperopia)

What's Happening:

- The eyeball is shorter than it should be (less elliptical)
- The light focuses behind the retina
- The hyperopic eye can see things that are far away (with effort)
- The hyperopic eye cannot see things that are very near (especially reading)

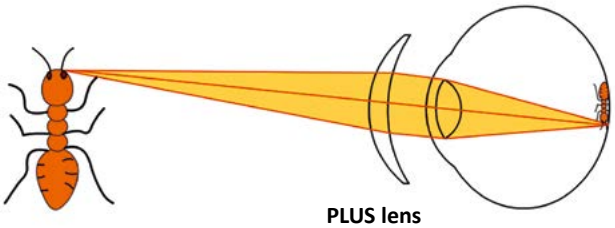


The eyeball is too short

How to Fix It

Fix Hyperopia with Plus Lenses

A plus lens pulls the focus point forward onto the retina. If you view the retina as a projector screen, it is similar to moving the projector screen further away.



PLUS lens

Young People Can:

- Force their eye muscles to compensate for hyperopia (but it's tiring!)

Try It Yourself

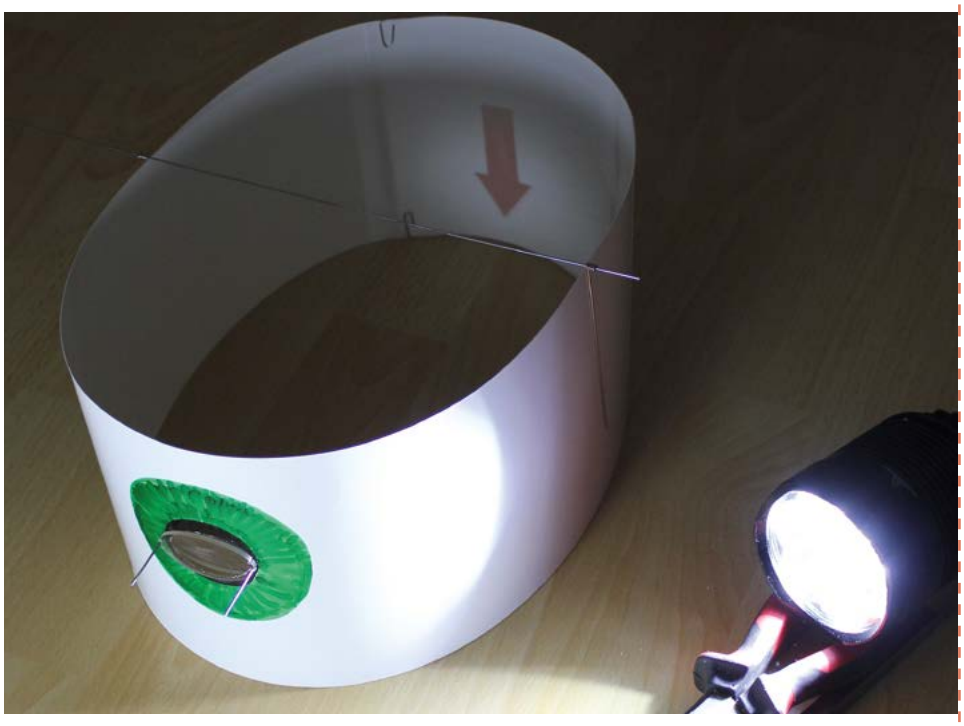
↘ Wear -6.0 D glasses → Feel farsightedness! (Notice how reading becomes significantly more difficult)

Key Differences	Nearsighted	Farsighted
Eyeball	Too long	Too short
Focus	In front of retina	Behind retina
Best Seen	Close-up	Far away
Glasses	Minus lenses	Plus lenses

Paper Eye Model (Part II)

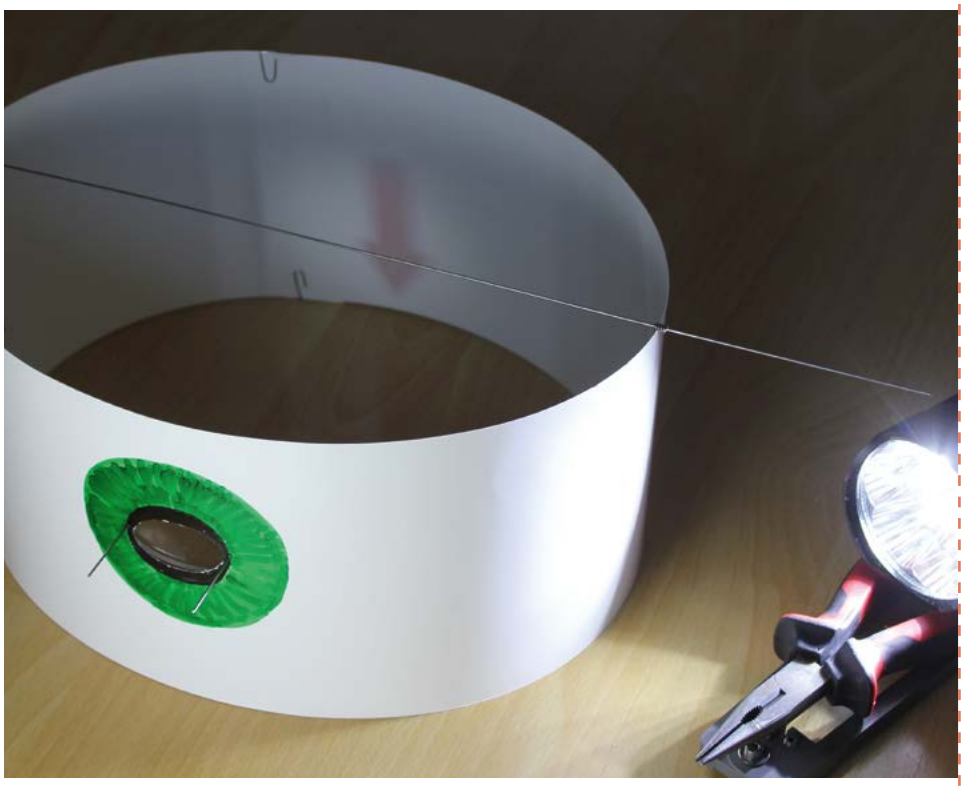
Myopia Simulation:

- Condition:
  Eyeball too long
  → blurred arrow image
- Correction:
  Place -1.0 D lens as eyeglass
  → image sharpens



Hyperopia Simulation:

- Condition:
  Eyeball too short
- Correction:
  Use +1.0 D lens



Cataract Simulation

Cataracts can be recognized by cloudy eyes and will be covered later in the training.

- Pathology: Lens becomes cloudy/grey (opaque)
- Demonstration:
  → Place paper before model's lens
  → Observe: Retinal image darkens/disappears

Stickman Perspective Test

- Procedure:
  1 Illuminate paper stickman.
  2 Move it toward/away from model eye.
- Observation:
  → Nearby objects appear larger on retina
  → Distant objects appear smaller

Presbyopia Demonstration

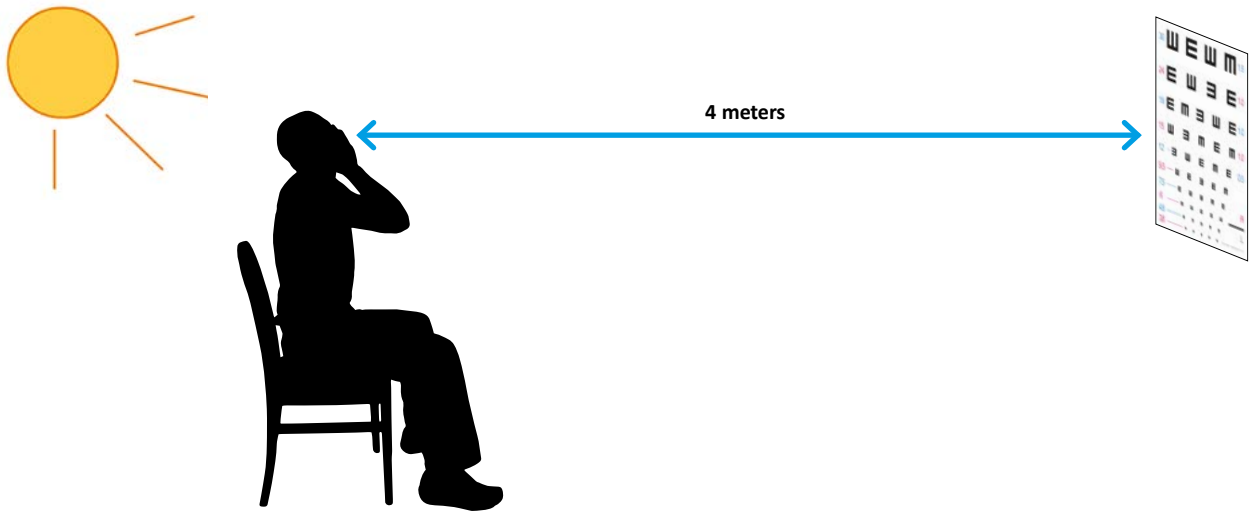
- Scenario: Stickman extremely close → blurred retinal image
- Correction:
  → Apply positive lenses (+1.0 D/+2.0 D)
  → Image sharpens (simulates reading glasses effect)

2. Best Spherical Correction (BSC)

2.1 Eye Test—Preparation

The Right Location & Setup

- Hang the **vision chart** on a wall or tree.
- Measure a distance of **4 meters** from the chart and place a chair at that spot.
- Ensure the **light source comes from behind** the patient.



Do a Self-Test

↘ Sit in the patient's chair and check the setup:

- Can you clearly read the last line on the chart?
- Is there **sunlight reflecting** on the chart?
- Are you disturbed by **sunlight or shadow**?
- Is the vision chart at **eye level**?
- Is there **enough light** in the room or area?

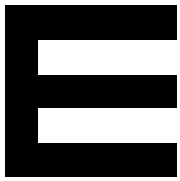
↘ If not: **Adjust the chair or the chart!**

The Vision Chart

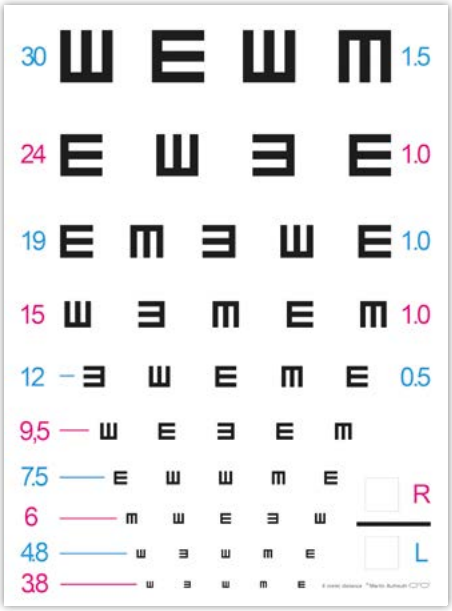
We use the E-chart with the letter “E”
shown in four different rotations (↑ → ↓ ←).

The “E” (also known as the Snellen Hook or “tumbling E”) on the chart is called an Optotype.

It is a symbol-based test, ideal for people who can’t read letters or numbers.



Optotype,
Symbol, “E”



Understanding Visual Acuity (VA)

VAsc = Visual Acuity **without correction**
(Latin: **s**ine **c**orrectione)

VAcc = Visual Acuity **with correction**
(Latin: **c**um **c**orrectione)

Grades of Visual Impairment Visual Acuity Category

6/18	Moderate visual impairment
6/60	Severe visual impairment
6/200 or less	Classified as blind

Example:

Line 12: A person with good vision can read Line 12 from 12 meters away.
→ If your patient sees it only from 6 meters, that’s a **6/12** VA.

Line 6: Standard line for good eyesight
(6/6 = normal vision)

Line 4.8/3.8: For people with **exceptional** eyesight

Note: We adapted the chart for a distance of **4 meters** instead of 6, as this is more practical in smaller rooms.

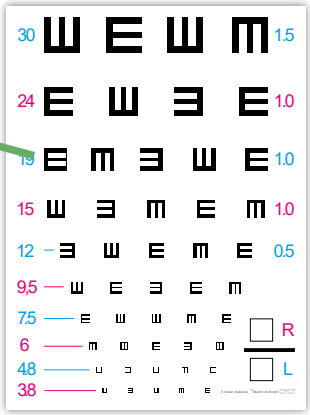
Experiment 1

↘ What’s the **smallest line** you can read **with your own eyes**?

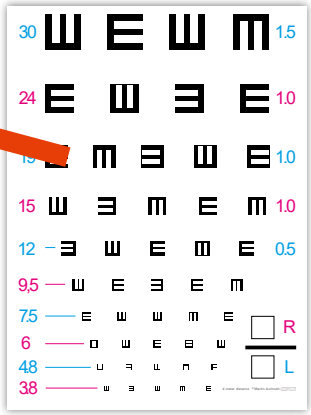
Experiment 2

↘ Try **plus** lenses:
Which lens create a sensation of either **moderate** or **severe** visual impairment or no functional vision **(blindness)**?

Yes



No



- Point to the symbols using only a thin pointer.
- Ensure the patient sees the **entire "E" symbol.**

Additional Vision Chart Experiments

↘ Try out different situations:

- Who in your group has the **best eyesight**?
- What changes if you **double or triple** the viewing distance?
- Test in **shade, sunlight,** and **evening light**.

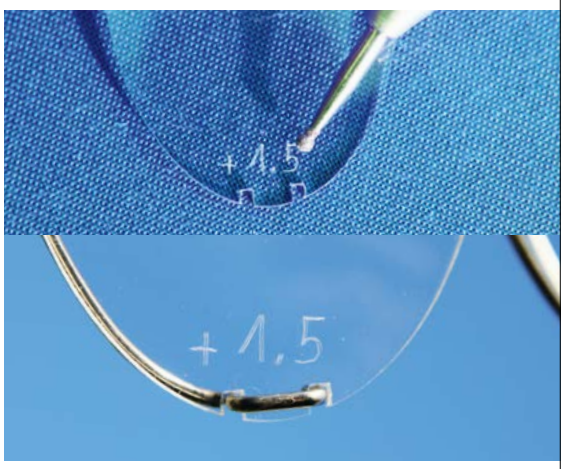
Observe how **visual acuity changes** in different conditions.

The Lens Bar

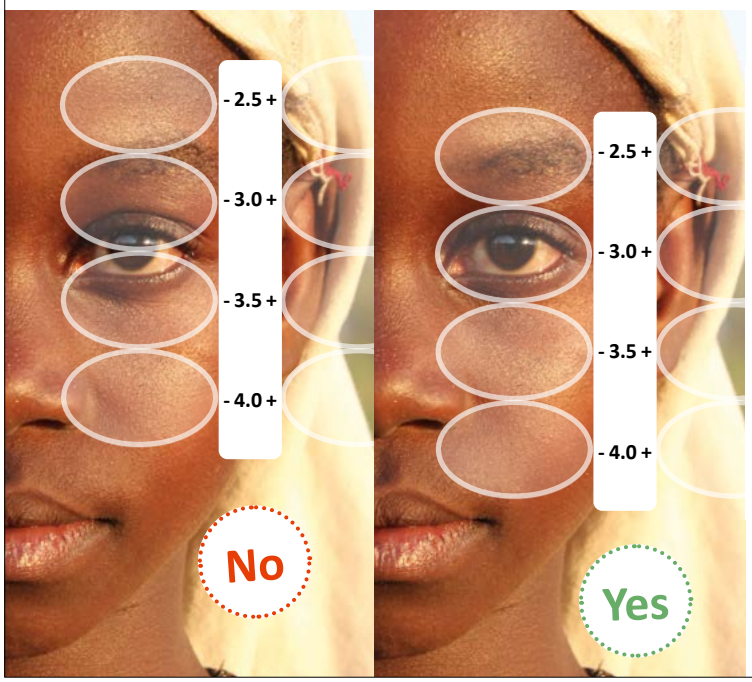
The lens bar is a simple tool used to **compare different lens powers quickly.**

Make sure that the lenses are always clean.

If the lenses are scratched, please replace them.



Engrave the diopters into the lenses so that if they drop out, you will not mix them up.



Make sure the patient looks through the middle of the lens and your hand must be steady as you hold the lens bar.

Recording Patient Information

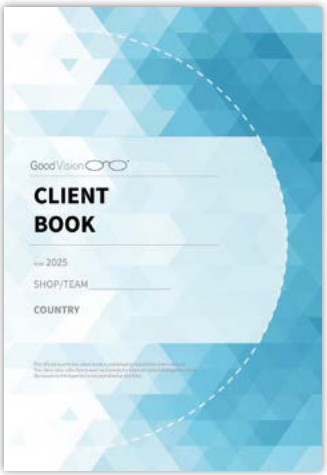
At First Contact:
- Greet the patient warmly
- Introduce yourself by name
- Speak kindly and slowly, they might be nervous
- Go slowly, let them take their time

Personal Details to Collect:
- Full name
- Age
- Home address
- Phone number (or family/neighbor if no phone)
- Job/work

Ask About Their Vision Problems:
- Trouble reading?
- Difficulty seeing close up?
- Problems seeing far away?
- Sensitivity to light?
- Eye pain?
- Any eye diseases (like cataract)?
- Past eye injuries?

Don't Forget to Ask:
Don't forget to ask how long the patient has been experiencing his/her specific visual impairments.

Important:
- Write down all information in your records or app!



Date: 2 0 _ _ - _ _ - _ _ (y y y y - m m - d d) Prescription by: _____

First name: _____ Age: _____

Surname: _____ Male ☐ Fem. ☐

Address: _____

Phone No.: _____ Profession: _____

Problem: _____ Had glasses before: Yes ☐ No ☐

Eye test: VA_{sc} R: L: VA_{cc} R: L: R ____ L ____

Glasses for: reading ☐ seeing far ☐ Sun ☐ PD: _____ (S/M/L)

Selling prize: _____ *Signature:*

I should go to hospital: Yes ☐ No ☐

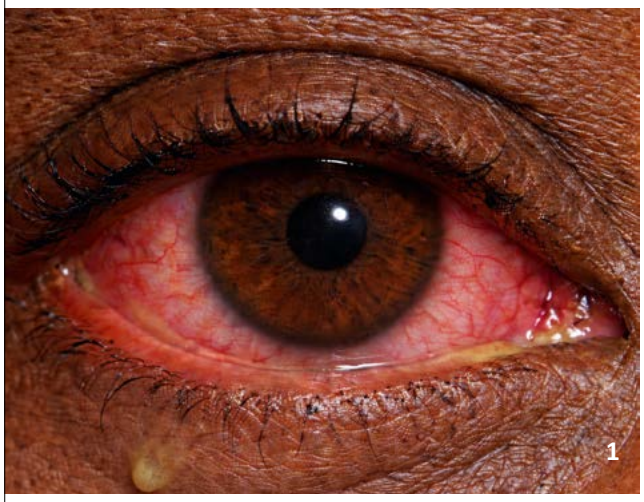
With my signature I declare that the abovementioned data is true. I agree that my personal data may be stored and published.

2.2 Eye Diseases

Characteristics of a Healthy Eye

- Eyelids open and close in an unobstructed fashion
- Conjunctiva is white, not red or irritated
- Cornea is clear, not cloudy
- Pupils are round, black, and equal in size
- Eye movements occur in all directions

Observe the Patient's Eyes



1 **Is the white of the eye red?**

2 **Is the pupil grey or white?**

3 **Does the patient have any of the following:**
- Painful eyes?
- Swollen eyes?
- Watery eyes?
- Abnormal eye movements?
- Anything that looks unusual?

→ If the patient has any of the above symptoms, refer them to a hospital immediately!

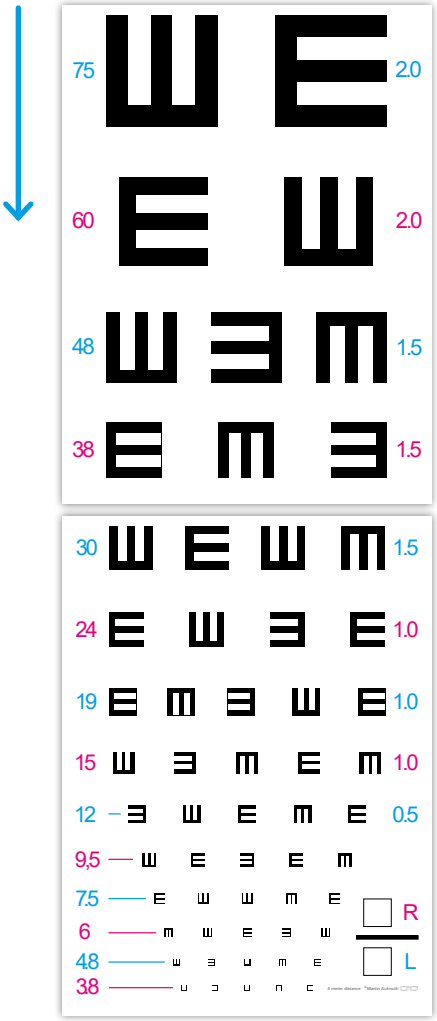
Important Notes

- **Check whether you are legally allowed to give eye drops in your country.**
- **Never touch the eye with your fingers (gloved or ungloved) or any instrument!**

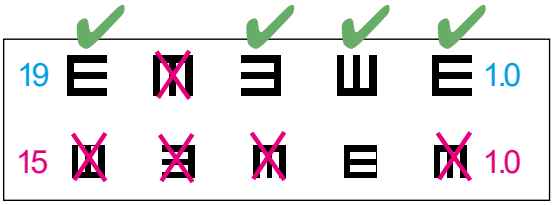
2.3. Eye Test Without Lenses

Testing Both Eyes

- The patient sits 4 meters away from the vision chart
- GVT says: Please read the last line you can see clearly
  → Start testing at that line.
- Continue one line lower.
- If the patient can recognize at least 4 out of 5 symbols (that's 80%) on a line, this can be recorded as seen.
- If the patient is unsure, encourage guessing.



Example



- The patient sees 4 out of 5 symbols on line 19, but can see fewer than 4 symbols in line 15.
  → Visual Acuity (VAsc) = 6/19
  (Someone with 6/6 vision would see line 19 from 19 meters.)
- Ideally, use two charts: one with large symbols, one with small.

Experiment

↘ Try it yourself: Which is the smallest line where you can see at least 4 of 5 symbols?

If the Patient Sees Nothing

1 Move the vision chart closer—to 40 cm (that's 1/10 of 4 meters).
- If they can now read line 30, this equals line 300 at 4 m.
- Example:
  Sees line 30 → VAsc = 6/300
  Sees line 15 → VAsc = 6/150

(Always multiply by 10)

2 If the patient is still unable to see anything:
→ Try holding fingers close to the patient's eyes and ask how many fingers they see.

3 Still no reaction:
→ Refer the patient to an eye doctor or hospital immediately!

2.4 The Golden Rule of Refraction

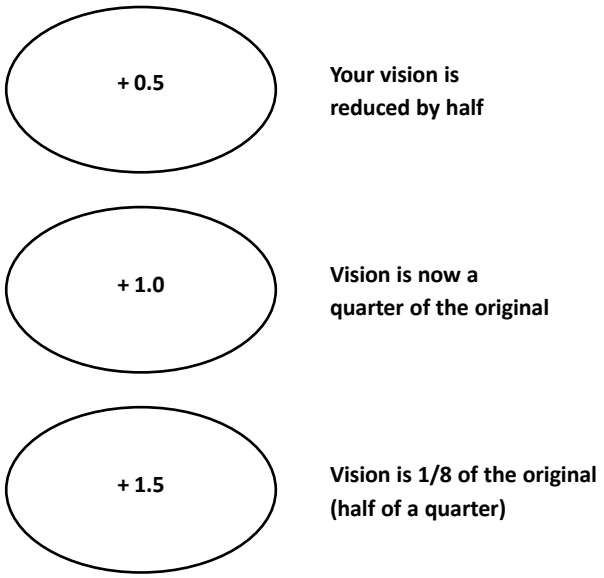
Every increase of + 0.50 D reduces the visual acuity (VA) by half.

This is a powerful rule to understand and estimate vision loss caused by refractive errors — it is especially useful in training and communicating with patients.

Experiment 1
If you can read line 6 (6/6 = VA 1.0)
and you put on a +0.5 D lens,
you will now only see line 12.
→ That's 6/12 = VA 0.5

Experiment 2
You start again with line 6 (6/6 = VA 1.0),
add a +1.0 D lens, yYou can only read line 24.
→ That's 6/24 = VA 0.25

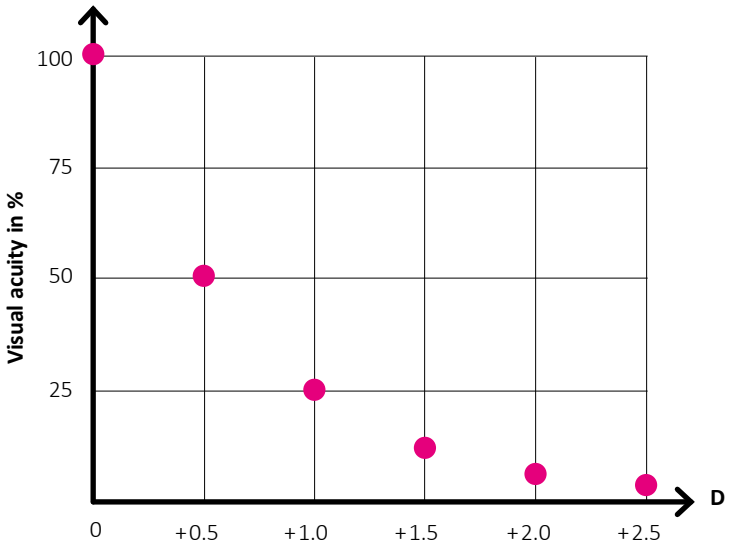
Experiment 3
Start with line 6 (6/6 = VA 1.0),
add a +1.5 D lens, you only see line 48.
→ That's 6/48 = VA 0.125



Summary Diagram

Each step of +0.50 D cuts the vision in half:

Lens Power	Visual Acuity (VA)	Relative Vision
+0.5 D	6/12	Half (0.5)
+1.0 D	6/24	Quarter (0.25)
+1.5 D	6/48	1/8 (0.125)



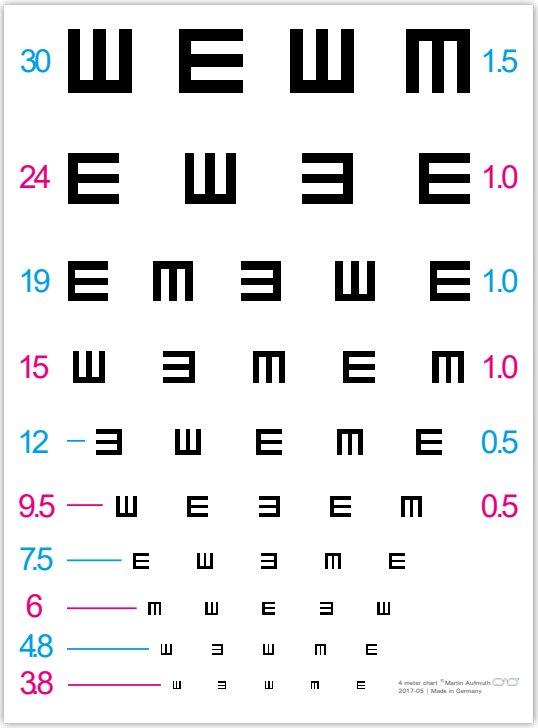
Why is this useful?

This "Golden Rule" helps you to:
- Estimate how well someone can see based on their refractive error
- Explain to patients how much better they will see with proper glasses
- Prioritize treatment for patients with significant uncorrected refractive errors

2.5 Determining the Starting Power

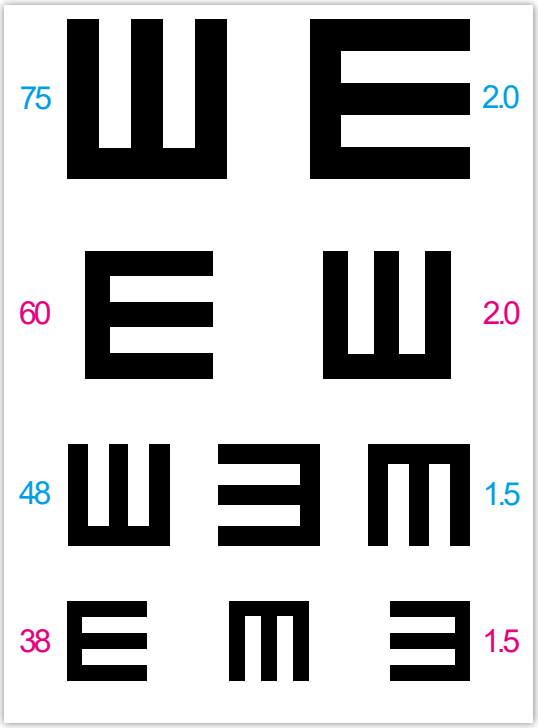
How to Choose the Correct Starting Lens

Starting Power



- If the patient can read until line 12, start with ±0.5 D
  - If +0.5 D makes the vision worse, switch to -0.5 D
  - Expected improvement: VA should double (patient should now see line 6)
- If the patient can read until line 24, start with ±1.0 D
  - Expected improvement: VA should double twice (patient should now see line 6)

Starting Power



- If the patient can read until line 48, start with ±1.5 D
  - Expected improvement: VA should double three times (patient should now see line 6)
- If the patient cannot see even the largest letters, start with ±2.0 D

Remember

- Each line has its own starting power
- Double check VA after each lens change

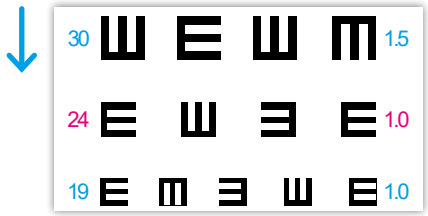
2.6 The Refraction

Step 1: Test Without Lenses

How to cover the eye correctly

Correct: Patient covers left eye with the palm, not the fingers

Incorrect: Cover the eye with the fingers



Testing the right eye:

1. Ask which line is most readable.
2. Move to smaller lines until:
   Fewer than 4 symbols are correctly identified.
3. Record the smallest readable line as
   VAsc Documentation:
   - Write down **VAsc** in patient records/app
   - Example: If last readable line is 6/12, record: VAsc (R): 6/12

Why this matters:
- Ensures accurate starting point for refraction
- Prevents mix-ups between eyes

Name : _____

Optician : _____

	R	L
VA sc	6/19	6
VA cc *temporary*	6	6
Far		
Near		
VA cc *Final test!*	6	6

Step 2: Start with a Plus Lens

Start with plus lens
Wait 3—5 seconds so that the eye can adapt.
Is this worse?
Find the smallest line he can see (4 of 5).

Then take next higher plus lens
Is it worse?
Continue with plus lenses and stop when the patient can no longer read the line.
a) if he can NOT see 4 out of 5
→ remove +0.5 D and test again.

- Take highest **plus** lens with which the patient sees the best.
- If plus lenses are not good, switch minus lenses.

Step 3: Minus

Even if you are testing for minus lenses, you always start with a plus lens just to make sure a minus lens is correct.

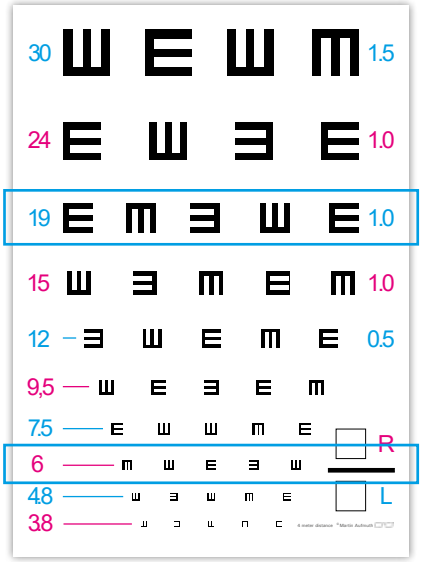
Start with minus a plus lens in the power you determined during visual acuity testing (VAsc). If the patient's vision gets worse, take a minus lens of an equal minus power (If the VAsc was +0.5 D, take a -0.5 D).

Can the patient prove their vision has improved by reading the next smaller line(s)?
If the vision has improved and the patient can read 1 or 2 lines smaller, take next higher minus lens.

Stop when the patient can no longer read the next smaller line. Remove -0.5 D and test again.
Take the lowest **minus** lens with which the patient sees best.
→ Write VAcc in GoodVision App.
→ Write the prescription in GoodVision App.

Example 1

Starting Power ↓



Without a lens, the patient can see 4 out of 5 symbols (or more) in line 19, but not in line 15 → VAsc 6/19.

- **Starting Power +1.0 D**
  Wait 3 seconds.
  Is the patient's vision worse? *No*
  The patient can still see 4 out of 5 symbols in line 19 or can even see symbols in a smaller line.

- **Move on to +1.5 D**
  Is the patient's worse? *No*
  The patient can still see 4 out of 5 symbols in the smallest readable line.

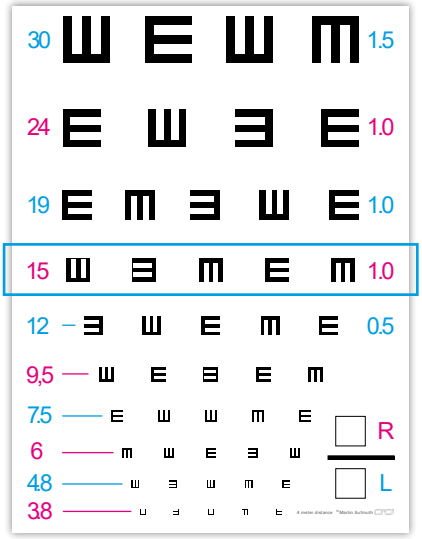
- **Move on to +2.0 D**
  If the patient can still see 4 out of 5 symbols in smallest readable line increase to +2.5 D until the patient cannot see 4 out of 5 symbols in the smallest readable line. If the patient cannot see 4 out of 5 symbols in the smallest readable line with the lens you last tested, go back to the lens before.

→ Write VAcc 6/6
→ Write prescription R +1.5 D

	R	L
VA sc	6/19	6
VA cc *temporary*	6/6	6
Far	+1.5	

Example 2

Starting Power



Without a lens, the patient can see line 15 with their right eye.
→ VAsc 6/15

Starting Power +1.0 D

Check +1.0 D
Is the patient's vision worse? YES (it is worse).

Check -1.0 D
Is the patient's vision worse? YES (it is better).
With this the patient should reach 6/6 or better.

Check -1.0 D
line 15 OK
line 12 OK
line 9.5 OK
line 7.5 OK
line 6 NOT OK
The lens is probably too strong!

Go to -0.5 D
line 7.5 OK
line 6 NOT OK *

Both Lenses are the same
→ Give the smaller minus lens!
→ Give -0.5 D
→ Write down the VAcc 6/7.5
→ Write prescription R -0.5 D

	R	L
VA sc	6/19	6
VA cc temporary	6/7,5	6
Far	-0,5	

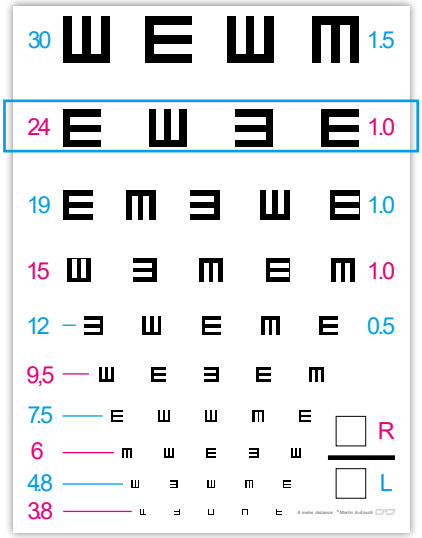
Plus-Minus Rule

- **Plus Refraction:** Use the highest **plus** lens that does not impair the patient's vision. (If a patient sees equally well with two different plus powered lenses, take the higher powered plus lens).
- **Minus Refraction:** Find the lowest powered **minus** lens at which the patient can read the smallest readable line.
  (If a patient sees equally well with two different minus powered lenses, take the lowest powered minus lens).

* The reason that the patient cannot reach line 6 can be an astigmatism.

Example 3

Without a lens, the patient can see line 24 with their right eye.
→ Their right eye has VAsc 6/24. This is assuming they are looking at the chart from 6 meters away.



Starting Power +1.0 D

Start at +1.0 D
Is the patient's vision worse? *No*
Line 19 is readable.

Move on to +1.5 D
Is the patient's vision worse? No
Now even line 12 is readable.

Move on to +2.0 D
Is the patient's vision worse? Yes
It can feel worse for the patient, **but:**

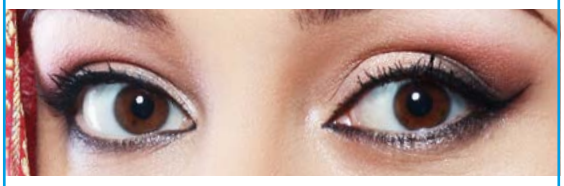
If the patient can still see 4 out of 5 symbols in line 12
→ Increase to +2.5 D until the patient can no longer read 12.

If the patient cannot see 4 out of 5 symbols in line 12
→ STOP and go back to +1.5 D and let the patient read line 12 again.

The best line was 6/12
→ Give +1.5 D.
The conclusion is that the best spherical correction for this patient is +1.5 D.
→ Write down the VAcc 6/12.
→ Write prescription R +1.5 D.

	R	L
VA sc	6/24	6/
VA cc *temporary*	6/12	6/
Far	+1,5	

Don't Confuse the Eyes!



RIGHT eye LEFT eye

- Do not confuse the patient's right and left eyes.

Example 4

Without a lens, the patient can see line 30 with their left eye.
→ VAsc 6/30
→ Starting Power = +1.5 D

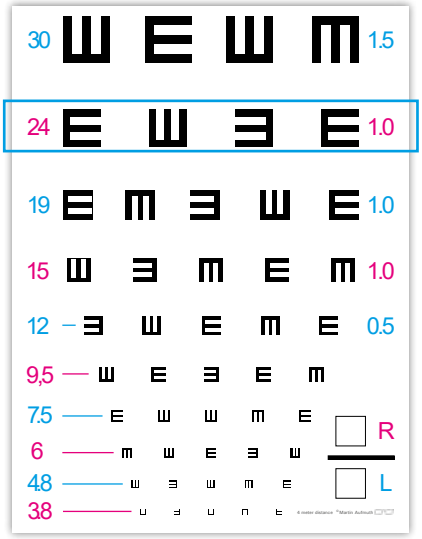
Start at +1.5 D
Is the patient's vision worse? Yes.

Move on -1.5 D
Is the patient's vision better? Yes.
With this lens the patient should reach 6/6 or better.

Check -1.5 D
line 24 OK
line 19 OK
line 15 OK
line 12 OK
line 9.5 OK
line 7.5 OK
line 6 NOT OK
This means that the lens is probably too strong!

Go to -1.0 D
line 7.5 OK

Both lenses are the same
→ Give the lower minus lens!
→ Give -1.0 D.
→ Write down the VAcc 6/7.5.
→ Write prescription L -1.0 D.



	R	L
VA sc	6	6 / 30
VA cc temporary	6	6 / 7,5
Far		-1,0

Rule

- The final myopia prescription should not exceed the starting power by more than -0.50 D.

Example

- The starting power is -1.5 D
- The prescribed maximum can be -2.0 D (less like -1.5 D or -1.0 D would be also possible)

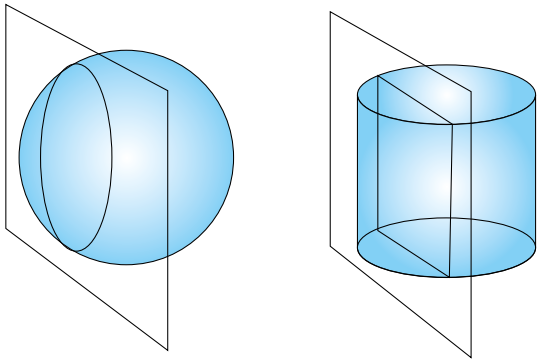
Experiment

↘ Take a pair of glasses with an unknown power. Put the glasses on and ask your training partner to conduct an eye test to determine the power of the lenses.

2.7 Astigmatism

What is an Astigmatism?

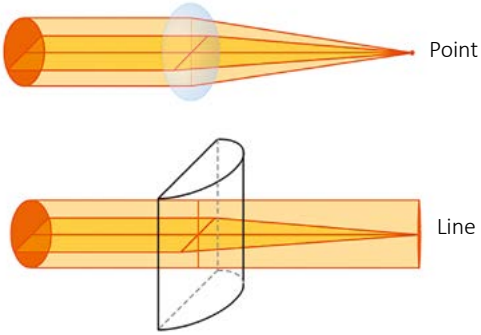
- Astigmatism means that the eye is not perfectly round, so light cannot focus clearly
- Regular glasses (spherical lenses) can't fully correct astigmatism
- Caused by a cornea that is shaped like a cylinder (not a spherical ball)



Spherical Lens **Cylindrical Lens**

How Light Behaves

- Normal eye: Light focuses to one point
- Astigmatism: Light focuses to multiple points (or lines)



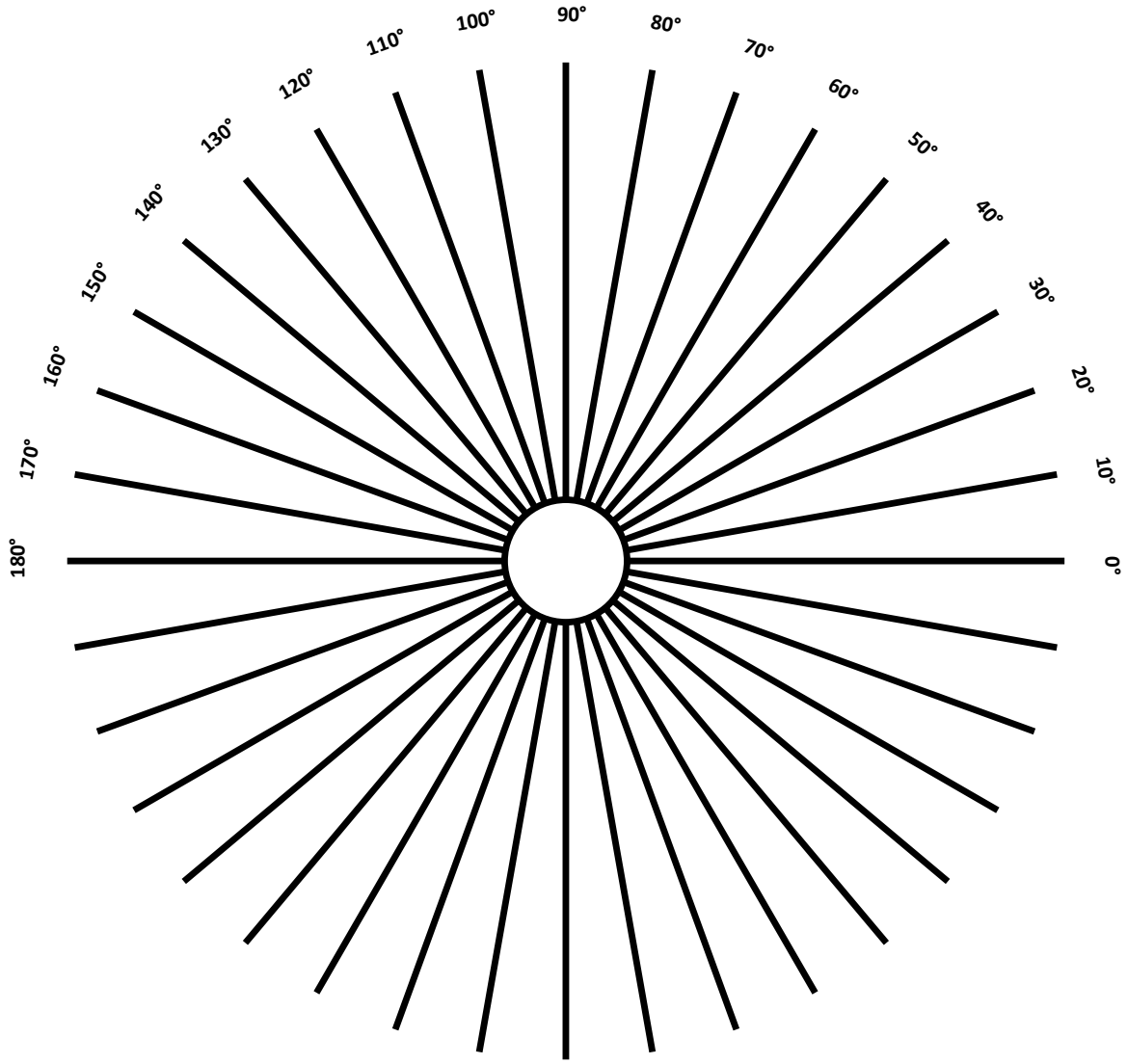
Real-life Example

- At night, stars look like streaks, not sharp dots

Astigmatism Test

Radial Line Test:

- Normal vision: All lines look equally dark
- Astigmatism: Some lines look clear, and other lines look lighter or blurred



Try It Yourself

1. Close your left eye.
2. Hold a -2.0 D lens in front of your right eye and tilt it slightly.
3. Look at the radial lines:

→ Some lines will look more blurred. (This illustrates how astigmatism may affect vision.)

Key Facts

- Astigmatism is different from other vision problems.
- It needs special cylindrical lenses for correction.
- It can be easily checked with simple tests.

The Best Spherical Lens (BSL)

What is BSL?

- BSL is a regular (spherical) lens that helps people with a **mild or no astigmatism**
- They do not correct significant astigmatism as crisply as cylindrical lenses but work well for mild cases.
- For **severe astigmatism,** send the patient to an eye doctor

When to Refer the Patient to a Doctor?

- If the patient can't read **line 12** with BSL
- If the astigmatism is severe

Understanding Cylinder Lenses

- Can be **+ (plus)** or **– (minus)**
- Have an **axis (A)** (shows the angle of the curve)

Example Prescription:
R: sph +2.50 cyl-1.00 A 180°
L: sph +3.00 cyl +2.00 A 180°

Important Rules

1 Rounding Rule:
- **For minus lenses:** Round toward **lower minus** (e.g.,-2.375 →-2.00)
- **For plus lenses:** Round toward **higher plus** (e.g., +1.75 → +2.00)

2 Effect of Cylinder Power:
- **2.00 cyl ≈ 1.00 sph** in how much it blurs vision

3 Always Test After Calculating!
- Check if the BSL actually improves vision

BSL Formula

Calculation:
BSL = Sphere + (Cylinder ÷ 2)

Example 1:
Prescription:
R: sph -2.75 cyl +0.75 A 50°
L: sph -3.00 cyl +0.50 A 160°

Right Eye:
-2.75 + (+0.75 ÷ 2) =-2.75 + 0.375 =-2.375
→ **Round to -2.00 D** (smaller minus)

Left Eye:
-3.00 + (+0.50 ÷ 2) =-3.00 + 0.25 =-2.75
→ **Keep -2.75 D**

Example 2:
Prescription:
R: sph +2.50 cyl-1.00 A 180°
L: sph +3.00 cyl +2.00 A 180°

Right Eye:
+2.50 + (-1.00 ÷ 2) = +2.50 - 0.50 = +2.00 D

Left Eye:
+3.00 + (+2.00 ÷ 2) = +3.00 + 1.00 = +4.00 D

For Trainers

- Spend time teaching how to calculate lens powers (e.g., +1.25—0.50)
- Practice with real prescriptions

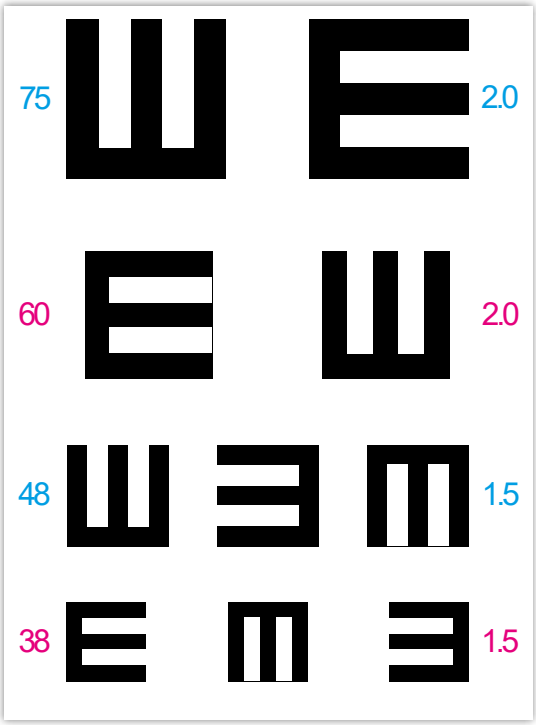
2.8 Testing Patients with Very Poor Vision

Step-by-Step Approach

1 If the patient can't see small symbols:
- Flip the chart and use large symbols only
- Use your fingers to point (more visible than a pen)

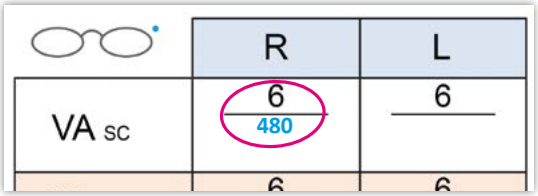
2 If the patient can't see largest symbols at a distance of 4 meters:
- Move the chart to 40 cm away (1/10th distance)
- Recalculate the VA, multiply the line number by 10 (Example: Sees line 30 at 40cm = 6/300 vision)

3 If the patient is still unable to see small symbols:
- Test by having patient count fingers up close.
- **If the patient still sees nothing at all, refer the patient to an eye hospital or clinic immediately**



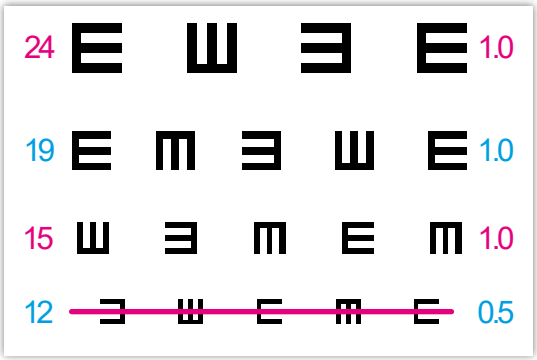
Example Case:
- At 4 meters, the patient sees nothing
- At 40 cm, the patient can read line 48.

→ The VA = 6/480.
- If best correction is worse than 6/12, a referral is necessary.



Important Notes

- Always document the exact testing distance
- Patients may still choose to purchase glasses
- Line 15 or worse = Significant impairment



2.9 The Pinhole Test

When Vision Doesn't Improve with Normal Testing:

Use pinhole glasses or an occluder to check if glasses can help.

Procedure:

1. Have the patient view the chart through the pinhole(s).
2. If the patient's vision improves:
   - Retry the refraction
   - If an improvement in vision is still unsuccessful, the patient likely has a severe astigmatism and should be referred to an eye doctor
3. If the patient experiences no improvement in vision:
   - The patient likely has eye disease and should be referred to an ophthalmologist.

Visual Aids

Pinhole glasses

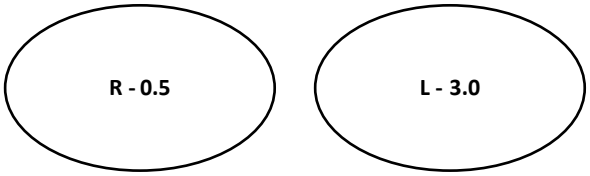
Pinhole 65 occluder

Important

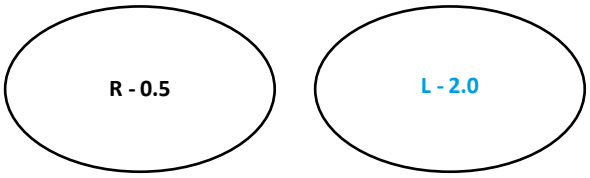
Research local eye specialists for referrals.
↘ List nearest ophthalmologists/clinics here:

2.10 Special Cases

When There is a Big Difference Between the Eyes



Example



Adjusted

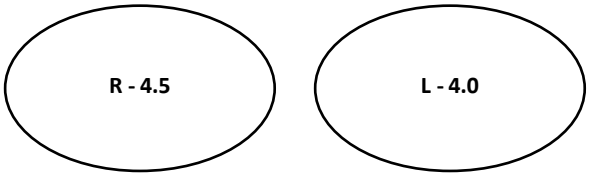
- When the prescription differs by 2+ diopters between the eyes, this may cause headaches.

→ Have the patient wear the glasses for a few hours.

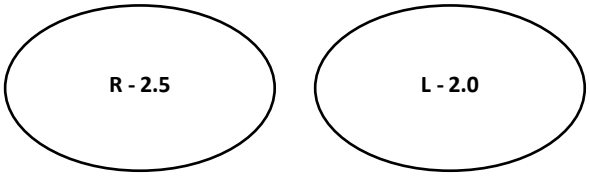
→ If problems occur, reduce the stronger lens (e.g. -3.0 D to -2.0 D).

→ After a few weeks, try the stronger prescription again.

High Prescription Cases



Example



Adjusted

- First-time wearers of strong prescriptions may need an adjustment.

→ Start with equally reduced power in both eyes.

→ Gradually increase to full strength after weeks of wearing reduced power lenses.

2.11 Binocular Balance

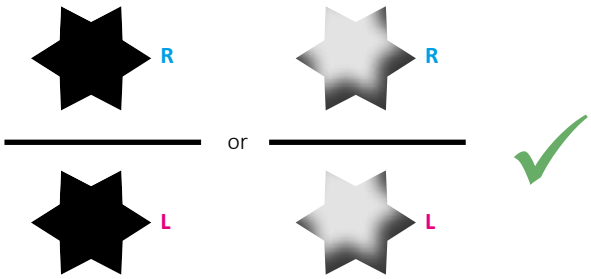
Purpose

- Binocular balance ensures that accommodation is balanced between the eyes
- It is not needed if the patient sees with only one eye
- The patient wears polarized glasses over their prescription glasses

Procedure

- Observe the dark shade:
  If the right (top) and left (bottom) star appear equally dark (black or gray)

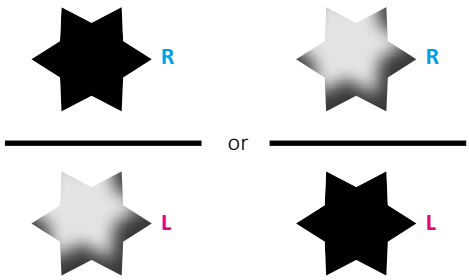
→ No adjustment needed.



- **If either the right (top) or the left (bottom) appears darker**

→ Add +0.50 D to darker eye.
  - Is it getting worse? → If yes, stop and don't change the prescription
  - If there's no change → increase to +1.00 D, +1,50 D and so on until the vision gets worse

→ Repeat for the other eye.



Examples

VA cc *temporary*	6/7.5	6/6
Far	- 1.5	~~-1.5~~ - 1.0

1 Left eye darker (original -1.50 D):

- You add +0.50 D: No change
- You add +1.00 D: Vision worsens

→ Final prescription: -1.50 D + 0.50 D =-1.00 D

VA cc *temporary*	6/7.5	6/6
Far	- 1.5	~~-1.5~~ - 1.0

2 Right eye was the lighter one (original -1.50 D):

- +0.50 D: Worsens immediately

→ Keep original -1.50 D.

2.12 Reading Glasses

Around the age of 40, the eyes slowly lose the ability to focus at a near distance:

- The lens becomes less flexible
  The eye muscles weaken
- This is called presbyopia and reading glasses become necessary

Presbyopia without reading glasses ...

... and with reading glasses

Typical Reading Glasses Prescriptions by Age

Reading Table

age 40	→	+1.0 D
age 45	→	+1.5 D
age 50	→	+2.0 D
age 55+	→	+2.5 D

(May vary per person)

Experiment

↘ Hold this text very close—can't focus?

↘ Now try with +6.0 D lens—the text becomes clear!

Did you know?

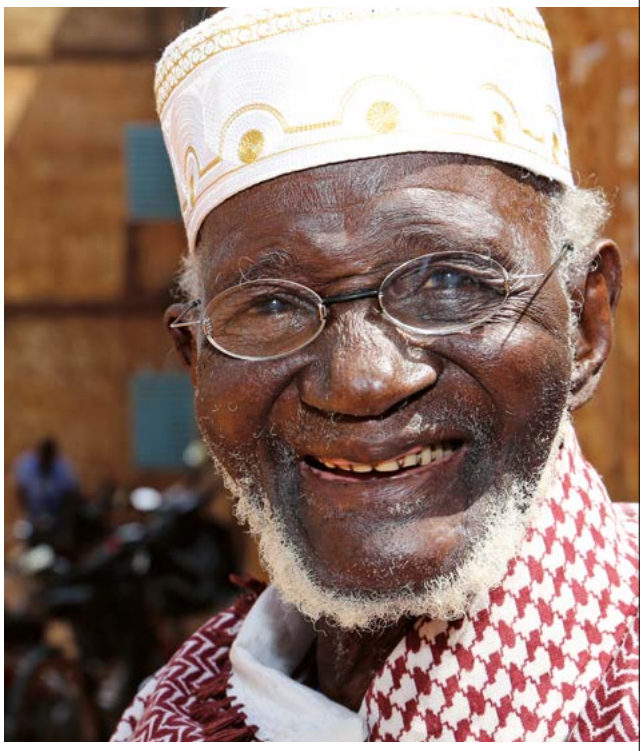
- Due to strong accommodative abilities babies can focus very close to their eye, 5 cm away

↘ Test a child's near vision by asking how close he can see his finger.

Accommodation Examples

This girl: Accommodates > 10 D
→ No reading glasses needed

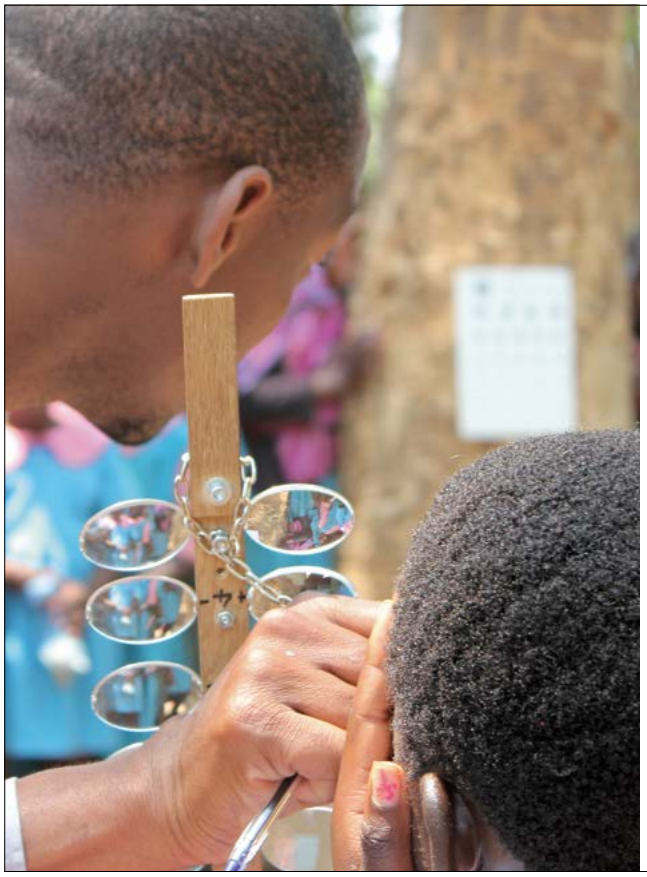
This young woman: Accommodates > 6 D
→ No reading glasses needed



This elder gentleman: Accommodates < 4 D
→ **Needs reading glasses!**

Focusing Ability by Age

- Babies: Focus at 5 cm (= 20 D)
- Age 25: Focus at 10 cm (= 10 D)
- Age 60+: Focus at ~1 m (= 1 D)



Finding the Right Reading Glasses

Step-by-Step:

1 Do a standard distance vision test with your patient.
→ Record R and L prescription

2 Check the patient's age → using a reading table.

3 Calculate the distance prescription and the reading addition.

Reading Table

age 40	→	+1.0 D
age 45	→	+1.5 D
age 50	→	+2.0 D
age 55+	→	+2.5 D

Note:
+ 3.0 D = 33 cm working distance
Higher powers reduce the range of clear vision.

Determining Reading Distance and Adjust Power

- Standard: 40 cm (elbow-length)
- Varies by task (reading, sewing or other)
- Check the range of clear vision with the selected reading prescription

→ The preferred reading distance must be in the middle of this range.

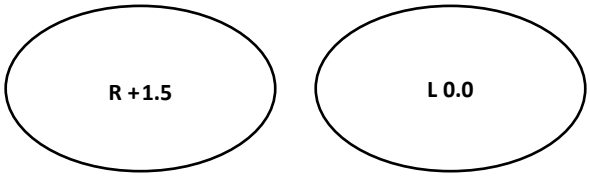
- Adjust the lens power if the patient:
  - Wants to see closer → increase plus
  - Wants to see further away → decrease plus

For Non-Readers

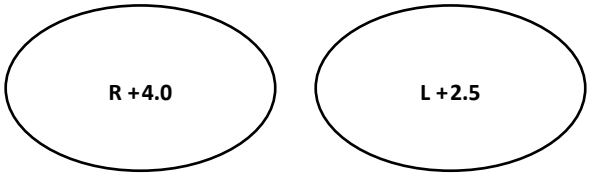
Test with:
- Needle & thread
- Rice/stone sorting
- Mobile phone typing

Example 1

- 70-year-old man's distance prescription:
  R + 1.0 D and **L 0.0 D**
- Reading addition (age 70): +2.5 D
  R = +1.5 D + 2.5 D = +4.0 D
  L = 0 D +2.5 D = +2.5 D
- Verification:
  - If reads comfortably → OK
  - Holds material too far → Increase **plus**
  - Holds too close → Decrease **plus**



Distance glasses

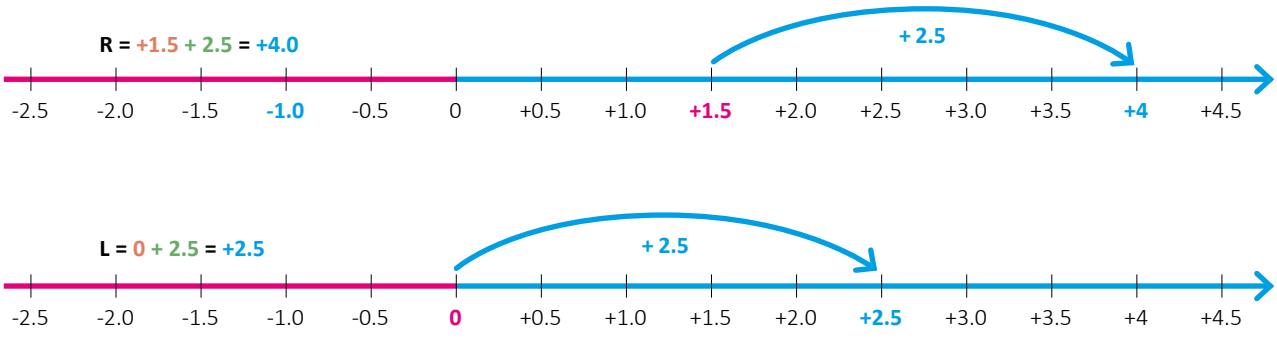


Reading glasses

Remember

- **Patient's LEFT eye is on your RIGHT side!**

Use number line for calculations:



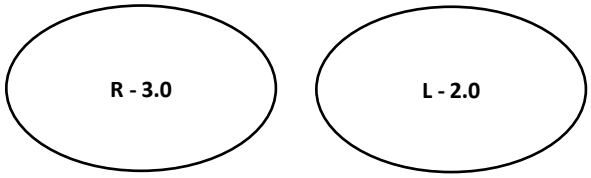
Task

- List 10 + problems people over 40 years old face without reading glasses
  (Consider family, neighbors, different jobs)

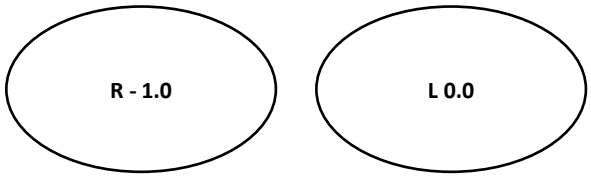
Example 2

- 49-year-old woman's distance prescription: **R - 3.0 D** and **L - 2.0 D**
- Reading addition (age 49): +2.0 D
  R = -3.0 D + 2.0 D = -1.0 D
  L = -2.0 D + 2.0 D = 0.0 D
- Note: Moderately nearsighted people often skip reading glasses

→ Let patient decide.



Distance glasses



Reading glasses

Frame Positioning

- Ask patient about nose pad preference before adjusting

Practice Tasks

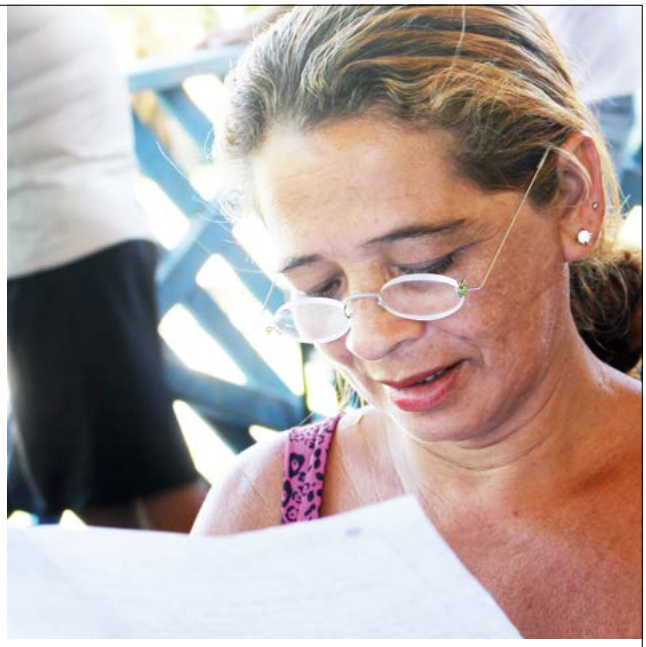
1 Calculate for:
- 55 y.o. female: R -5.5 D and L -6.0 D
- 40 y.o. male: R +0.5 D and L +2.0 D

2 Create more examples.

Not Just for Reading!

Real-Life Examples

Food inspection: Rice/beans mixed with small stones
→ Keep a test box handy



Religious books (Bible/Koran) and hymn books become unreadable
→ Carry samples to demonstrate improvement

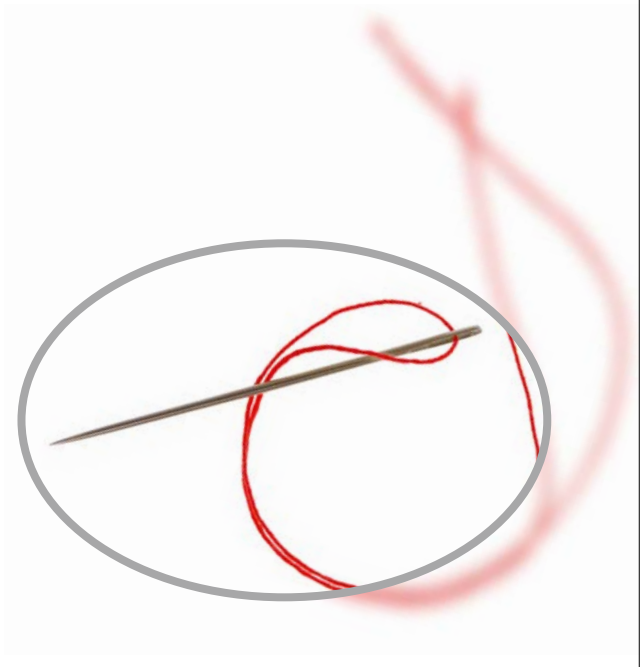
Empathy Exercise

- Wear -5.0 D glasses and try:

1 Threading a needle.

2 Picking stones from rice.

→ Feel what presbyopia is like!



Sewing: Needle and thread
→ Let them experience the difference.

3. Customer Consultation and the Dispensing Glasses

3.1 Process

Be Friendly

- Welcome your customer warmly and be genuine and friendly
- Be sincere, smile, and maintain normal and comfortable eye contact
- Offer to help right away, don't wait to be asked, but don't be pushy if the customer declines your offer
- **Demonstrate the product,** don't just talk about it—walk the customer over to the product displays.

Suggestions

- Don't leave the customer standing alone waiting for help
- Remain polite and use formal language
- Close the distance between yourself and the customer without invading their personal space
- Avoid using your personal phone during working hours, except on breaks

Setup

- Always keep your table **tidy and organized** and covered with a **clean tablecloth**
- Make sure the **glasses are presented in an attractive way**
- Display the **colors and styles clearly and creatively**
- Always have a clean mirror on your table
- Make sure to have a rubbish container

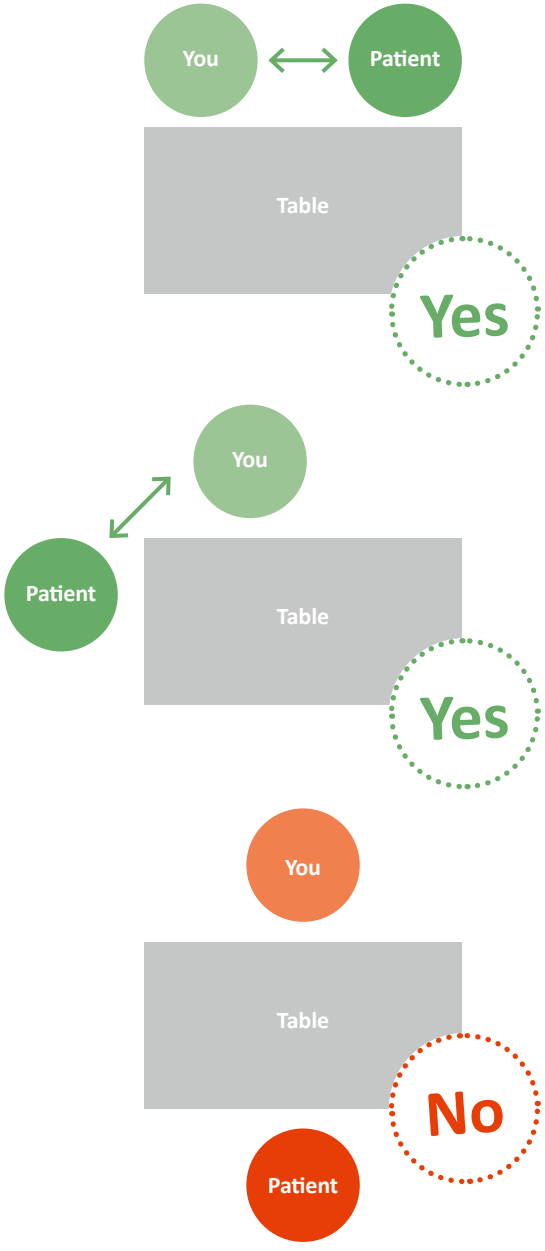
Task

↘ Practice as a group: what are different kinds of professional and friendly greetings?

↘ Role play with your group a successful transaction between GVT and patient.

The Right Position

- **Try not to sit behind the table** when you are adjusting the glasses as it creates a barrier between you and your customer
- **Sit at the corner of the table, next to the customer** to maintain the connection
- This creates closeness and makes the customer feel supported and creates trust



3.2 Prescription Interpretation

What Information Do I Need?

What has been prescribed?

- Are **distance glasses, reading glasses,** or **both** needed?
- What is the **lens power** (diopters)?
- What is the customer's **visual acuity**?
- How old is the customer?

Task

↘ Form groups of 3–4 people.

1 One person plays the role of the customer.
   - Use a sample prescription
   - Invent a background story—age, hobbies, job and possible vision problems

2 The others act as advisors and guide the customer.

→ Afterwards, compare your recommendations and discuss what worked well or could be improved.

Example 1: 18 years old

	R	L
VA sc	6/30	6/24
VA cc *temporary*	6/7.5	6/6
Far	-1.5	-0.5
Near		
VA cc *Final test!*	6/7.5	6/6

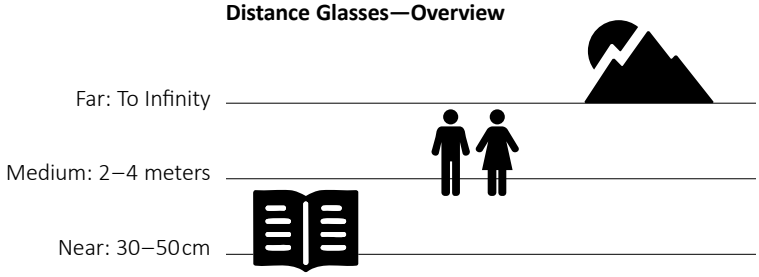
Example 2: 24 years old

	R	L
VA sc	6/30	6/24
VA cc *temporary*	6/4.8	6/4.8
Far	-1.5	-1.5
Near		
VA cc *Final test!*	6/4.8	6/4.8

Up to around age 40, people can usually see clearly at all distances with distance glasses—regardless of whether they are **farsighted or nearsighted**.

As people age, the range at which they see clearly becomes smaller. That's when reading glasses may be needed.

Distance Glasses—Overview



Example 3: 48 years old

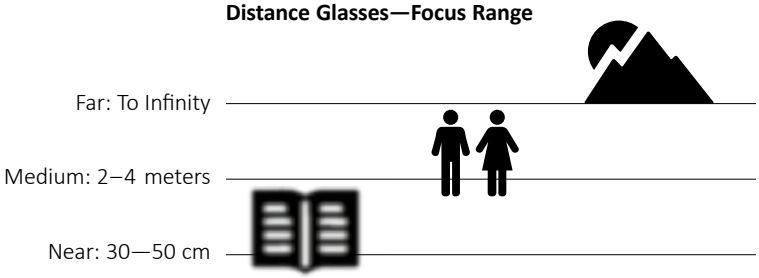
	R	L
VA sc	6/30	6/38
VA cc *temporary*	6/9.5	6/7.5
Far	+2.5	+3.0
Near	+4.0	+4.5
VA cc *Final test!*	6/7.5	6/6

From around age 40, the eye's ability to accommodate (focus at different distances) becomes noticeably limited.

This means that after age 40, people usually cannot see clearly at close distances with distance glasses.

→ The customer will need reading glasses for any close-up tasks like reading, sewing, or using a smartphone.

Distance Glasses—Focus Range



Example 4: 75 years old

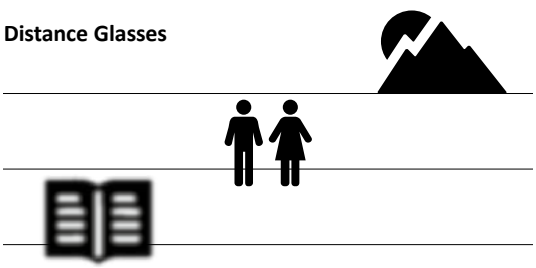
	R	L
VA sc	6/24	6/24
VA cc *temporary*	6/9.5	6/9.5
Far	+4.0	+4.0
Near		
VA cc *Final test!*	6/9.5	6/9.5

People with presbyopia (typically age 40+) can still see clearly at a distance using distance glasses.

However, they will also need reading glasses with a separate prescription for near vision. These reading glasses only work at close range and are not suitable for distance vision.

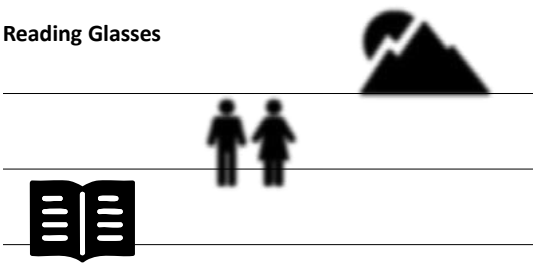
→ **A single pair of glasses will not work for all distances, two pairs for near and far are needed.**

Distance Glasses



Far
Medium
Near

Reading Glasses



3.3 Needs Assessment

At this point, you should know the customer's lens power and visual acuity.
You understand at which distances they can see clearly — with or without glasses.

Now It's Time to Assess the Customer's Daily Visual Needs:

Ask about their everyday life:
- What is their profession?
- What activities do they do at home?
- What are their daily activities:
  reading, driving, farming, socializing, phone usage, TV?

→ Actively listen to uncover important information about lifestyle preferences.
→ Analyze their current situation and habits to offer the best solution.

Examples of vision needs at different distances:
- 30–40 cm: reading, sewing, using a smartphone
- 40 cm and distance: school teaching,
  reading while keeping an eye on children
- 40–80 cm: working on a desk, using a computer

Distance


30–40 cm


40 cm and distance


40 cm and distance


40–50 cm


40–50 cm


40–80 cm

3.4 The Different Types of GoodVision Glasses

Present the Right Eyeglasses Solution to Your Customer:

- Distance glasses
- Reading glasses
- Sunglasses
- Or a combination, depending on their needs

All GoodVision Frames Are Made of Spring Steel:

- High strength steel for long-term durability
- Flexible for maximum comfort
- Durable and reliable
- Available in different colors and sizes

Elliptical

- Ideal for reading
- Easy to look above the top edge of the glasses into the distance
- The classic elliptical shape fits most faces
- The frame is available in various colors

Rectangular

- Suitable for all purposes
- This model comes with a stylish double frame

Enlarged

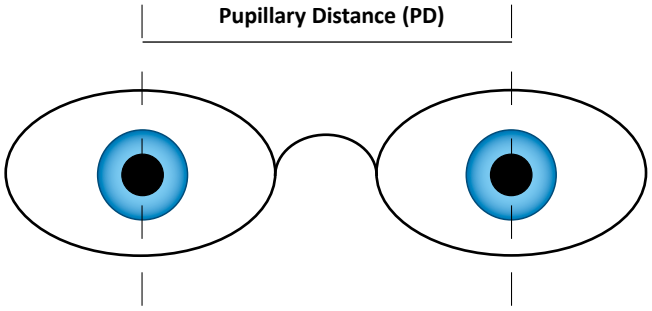
- Optimized for distance vision
- Larger lenses provide a wider field of view
- Improved protection from UV light and dust (due to better coverage)

Sun

- All styles available as regular sunglasses
- With or without optical power
- Designed to fit the standard elliptical frame

3.5 The Pupillary Distance (PD)

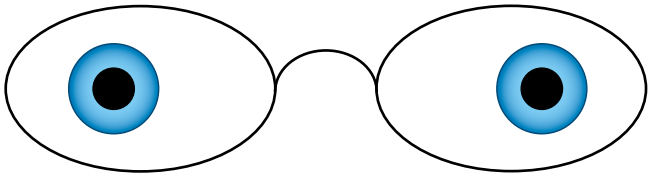
Typical Pupillary Distances



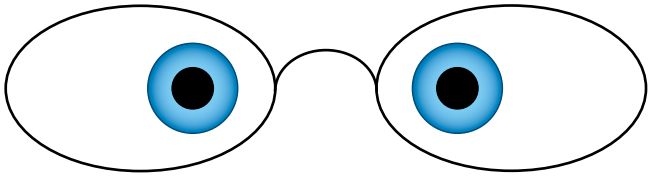
- **Children:** 54 mm
  → Use frame with yellow dot
- **Adult average:** 63 mm
  → Use frame with red dot
- **Adult large:** 69 mm
  → Use frame with blue dot

Choosing the Correct Frame Size

The pupils must be positioned exactly in the center of the lenses



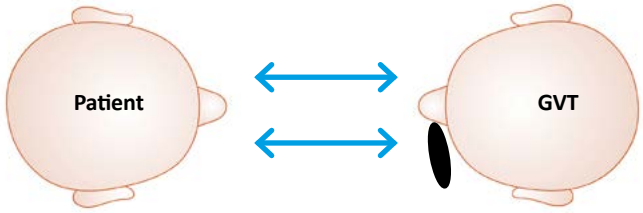
If the frame is too small, use a larger one.

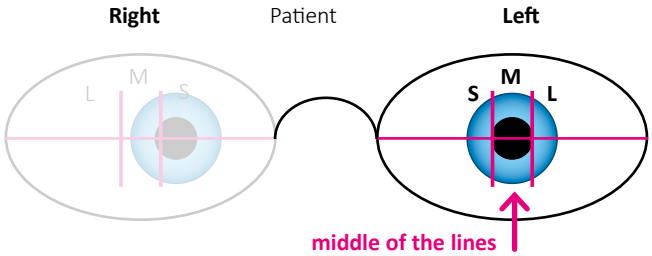


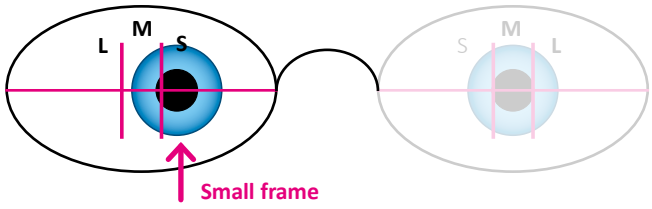
If the frame is too large, use a smaller one.

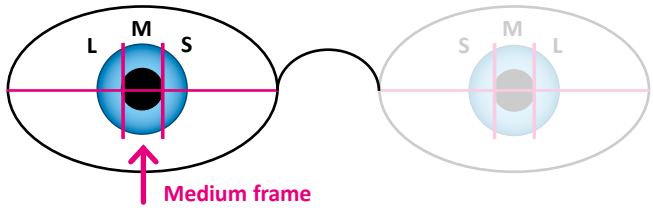
If the frame does not line up with the pupillary distance:
→ The patient is forced to look out of the lenses at an angle and this may lead to eye strain or headaches.

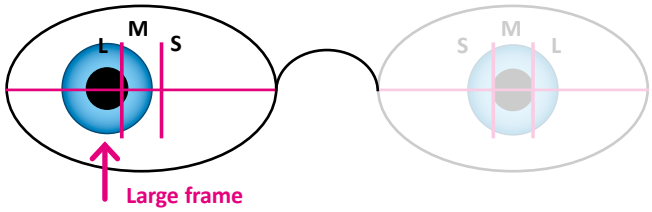
Measuring the PD—7 Steps











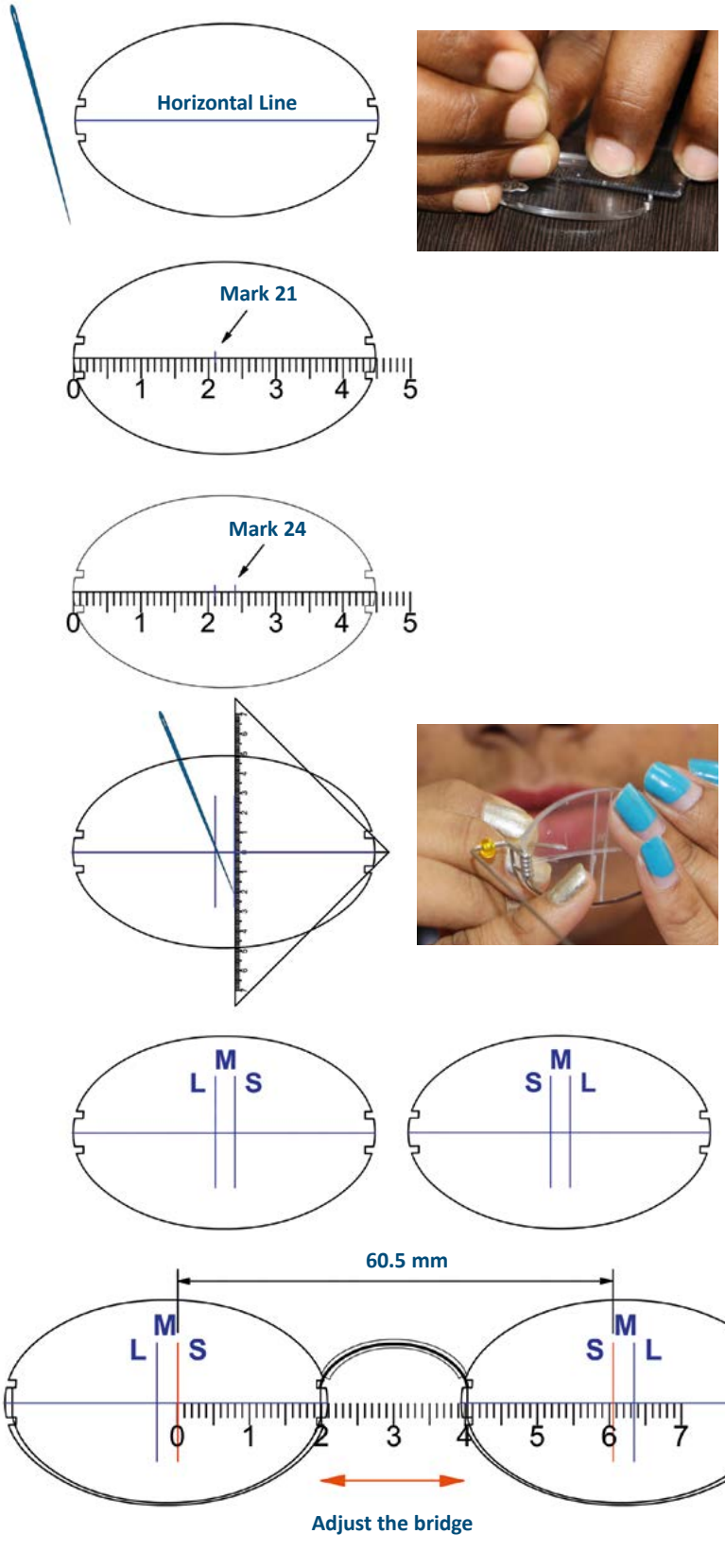
Position: Patient facing GVT (GoodVision Technician)

1. Stand face to face, close to the patient.
2. Cover your left eye with your left hand (GVT).
3. Tell the patient to look into your eye.
4. Move your head slightly to align the pupil of the patient's left eye with the center mark (M) between the two lines of the PD test glasses (see section 3.6).
5. Ask the patient not to move.
6. Close your right eye with your right hand (GVT).
7. With your left eye, observe the position of the patient's right pupil: → **Is it at S, M, or L?**

Trainer's Task

- Every student should practice this measurement at least 10 times.
- Supervise each step and provide the student with correction if needed.
- At the end, let each student determine their own PD to confirm that they understand the process completely.

3.6 Producing PD Test Glasses



Materials

- 2 lenses with 0.0 D (no optical power)
- Needle
- Ruler

Steps

1. Scratch a horizontal line across the middle of the lens. (Tip: Use a dark background to make it easier to see)
2. Make a vertical mark at 21 mm from the left edge of the lens.
3. Make a second vertical mark 24 mm from the same left edge of the lens.
4. These two vertical lines indicate frame size:
   - S (Small)
   - M (Medium)
   - L (Large)

   → Scratch these letters near the appropriate areas on the lens.
5. Repeat the process with the second lens.
6. Take a medium frame and adjust the bridge so that the distance between the two S-marks (left and right lens) measures exactly 60.5 mm.

Tip for Precision:

- Use a ruler to ensure the marks are completely symmetrical
- Double check that the bridge setting is accurate before using the test glasses

Task

↘ Build your own pair of PD test glasses. Test the pupillary distance of at least five colleagues. Write down each result in your book. When you are done, compare your values with others in the group.

3.7 Useful Tools

To properly adjust and repair GoodVision Glasses, the following tools are helpful:

Box Cutter or Razor Blade—
for trimming shrink tubing or plastic parts

Two long-nosed pliers—
for bending wire and holding small parts

Nail (cuticle) scissors—for detailed cutting (e.g., tubing)

Diamond (nail) file—for smoothing sharp edges

Loop-forming pliers—to shape the temple ends

Front cutter—for cutting thicker wire or temple ends

3.8 Long Term Service Policies

All glasses must be properly adjusted before being dispensed

A case for the glasses should always be included

Relevant Details for the Customer

- The price of the glasses
- The importance of proper adjustment
- The inclusion of a sturdy case for the glasses
- The 4-week warranty after purchase
- The conditions of the warranty after 4 weeks

Warranty—First 4 Weeks After Purchase*

- If the lenses are scratched, broken or have other defects, they should be replaced free of charge
- If the lenses are broken due to a frame defect (e.g., oversized U-wires), then the frame must be repaired or replaced free of charge
- Note: Some older frames, produced before the 86.5° angle check, may cause lenses to break due to too large U-wires
- If the frame has a production or material defect, it must also be repaired or replaced free of charge
- Other products (e.g., cases): If the customer does not cause the issue, they should also be replaced free of charge

* Note: This only applies to damage not obviously caused by the customer

Warranty—Beyond 4 Weeks After Purchase

- Each country decides whether to offer free replacements or repairs (e.g., broken lenses or damaged frames) beyond the 4 week warranty
- Continuing free repairs after the original 4 week warranty (e.g., replacing damaged shrink tubing) can be a good marketing tool
  If tools and materials are available, such as spare tubing, scissors, and a lighter.

GoodVision Technician Responsibilities

- Keep the broken parts for quality control
- Report the case to management
- Record the incident in the patient book, including their name, the date, and a description of the issue

3.9 Dispensing Distance Glasses

- Ask the customer to put on the new glasses and look into the distance
- If distance vision is clear, ask them to test at medium and close distances as well
- **Important: Always explain the range of sharp vision the customer can expect, based on their age**

Cleaning Instructions

Instruct the patient on how to best clean their glasses:

1. Rinse under clear water with a little soap.
2. Dry with a piece of clean and new toilet paper.

3.10 Dispensing Reading Glasses

If reading glasses are prescribed, ensure that the customer can see clearly at the desired reading distance.

Additionally, show the customer that their distance vision will be blurred when wearing the reading glasses.

Near vision should be sharp, while distance vision is expected to be blurry

Important!

→ Reading glasses are not suitable for driving. Never drive while wearing them!

3.11 Dispensing Sunglasses

Without sunglasses

With sunglasses

Sunglasses provide several benefits:

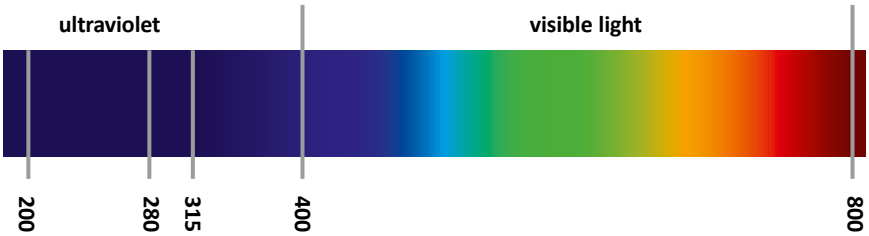
- Protection from dust and wind
- UV protection
- Reduces glare
- Enhances contrast and color perception
- Decreases eye strain
- Prevents wrinkles caused by squinting
- Makes a fashion statement
- Helps to prevent cataract formation

Tips

- Hats also provide excellent sun protection
- Don't forget to protect children's eyes from the sun

Both sunglasses and clear lenses with UV filters protect the eyes from harmful ultraviolet rays. They can reduce the risk of:

- Age-related cataracts
- Pterygium (growths on the surface of the eye)
- Macular degeneration



Although ultraviolet (UV) light is invisible to the human eye, it can cause significant damage.

Eye Damage Risks from Sun Exposure

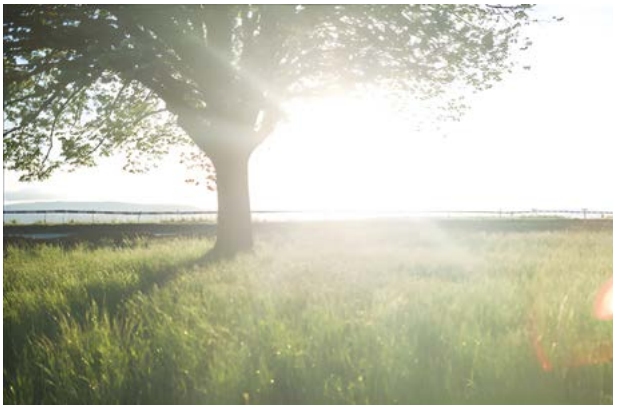
Cataract
→ Clouding of the lens

Pterygium
→ Tissue growth on the eye surface

Macular degeneration
→ Damage to the retina's central area

Various Tinted Lenses

The color of sunglass lenses does not affect UV protection. However, each tint has specific optical characteristics:



Without glasses → Natural vision, no tint effect

Without glasses

Grey lenses → Reduce brightness without altering colors or contrast

Blue lenses → Not permitted for driving!
Distort signal lights and reduce contrast

Brown lenses → Enhance contrast and depth perception, warmer color tones

3.12 Adjustment of the Frame

Closeness and Distance

1 Always ask for permission before coming close to a person's face, because everyone has personal space that must be respected.

2 Explain what you need to do and why, for example: I will move closer now to adjust your glasses. Is that okay?

3 Move slowly and keep the contact brief so that the person feels safe, respected and in control during the adjustment.

From Front to Back

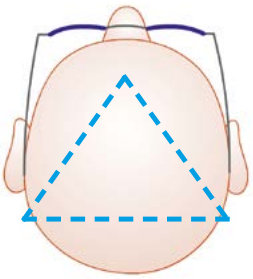
Always adjust the frame from front to back

Start at

1 The Nose (bridge)

2 The Side

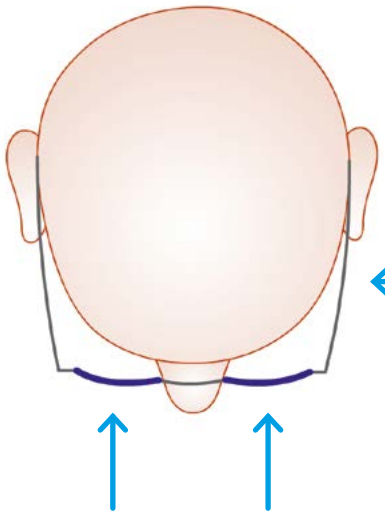
3 The Ear



A properly adjusted frame should touch the patient's head at three points:

- The bridge of the nose
- The sides of the head above and behind the ears
- The top of the ear

Shape of the Glasses



Both lenses should be equally distant from each eye.

- The shape of the frame, when viewed from above, should follow the natural contour of the face.

→ The temples should curve outward and **must not press** into the side of the head.

→ Make sure the temple does not press on the **trigeminal nerve,** located in the temple area, as the pressure on the nerve causes headaches.

GoodVision Glasses are designed with pre-shaped, rounded temples to avoid this issue.

Frame Quality Check

Before making any adjustments,
inspect the frame to ensure it is in perfect condition:

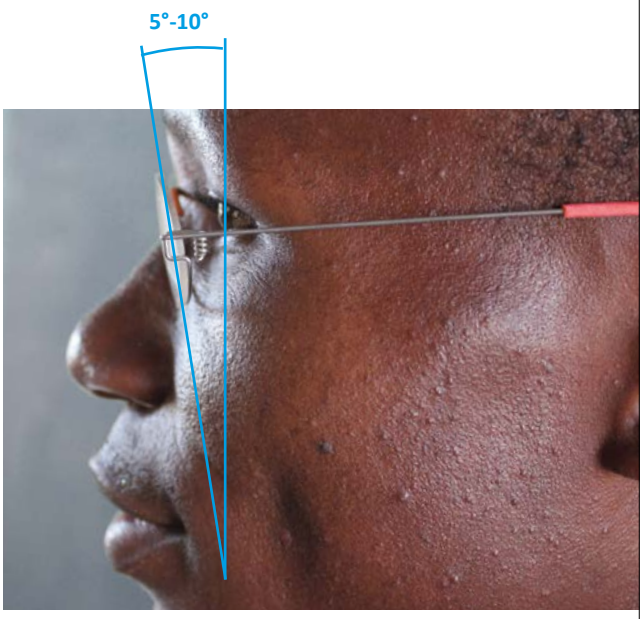
- The front should be symmetrical (no “propeller” effect)
- Both temples must be aligned in a straight line

The Front

- The glasses must sit evenly, with both lenses at the same height.

The Side

- The lenses should tilt inward slightly at an angle of **5° to 10°**
- This angle is known as the **pantoscopic tilt** or **angle**



The Top

- If the eyelashes are touching the lenses, select a frame with longer sidepieces or a higher bridge.

How to Bend the Temples

- The bend should start about **2 mm behind the base of the ear.**

- If the bend starts too early, it will be uncomfortable and reduce the distance between the eye and the lens.

Shape Behind the Ear

- After the initial bend, the temple should smoothly follow the shape of the ear and the curve of the head.

3.13 Final Check

Before the patient leaves, perform a **final quality check** with the newly adjusted eyeglasses:

1 Test the Right Eye:
- Instruct the patient to close their **left eye.**
- With the **right eye,** they must achieve the same **Visual Acuity corrected (VAcc)** level as in the initial test.

2 Test the Left Eye:
- Now ask the patient to close their **right eye.**
- With the **left eye,** they must also reach the previously recorded **VAcc** level.

→ Record the final VAcc results in the **GoodVision App** under "Final Check."

→ Ensure that **all required fields** in the GoodVision App are completed. No field should be blank.

Name : _____

Optician : _____

	R	L
VA sc	6/30	6/24
VA cc *temporary*	6/7.5	6/6
Far	- 1.5	- 0.5
Near		
VA cc *Final test!*	6/7.5	6/6

Date: 20 y y y y - m m - d d Prescription by: _____

First name: _____ Age: _____

Surname: _____ Male ☐ Fem. ☐

Address: _____

Phone No.: _____ Profession: _____

Problem: _____ Had glasses before: Yes ☐ No ☐

Eye test: VA_{sc} R: L: VA_{cc} R: L: R ____ L ____

Glasses for: reading ☐ seeing far ☐ Sun ☐ PD: _____ (S/M/L)

Selling prize: _____ *Signature:*

I should go to hospital: Yes ☐ No ☐

With my signature I declare that the abovementioned data is true. I agree that my personal data may be stored and published.

Task for Every GVT

↘ Constantly ask yourself:
What can I improve next time?

3.14 Executive Summary

A Structured Approach for Every Consultation

1 Greet the Customer with Small Talk—Create a friendly atmosphere

2 Interpret the Prescription—Understand the customer's visual needs

3 Needs Assessment—Determine specific requirements (e.g., reading, distance, sunlight)

4 Present Solutions—Offer appropriate lens and frame options

5 Measure Pupillary Distance (PD)—Ensure accurate fitting

6 Present the Offer—Explain pricing, warranty, and added value

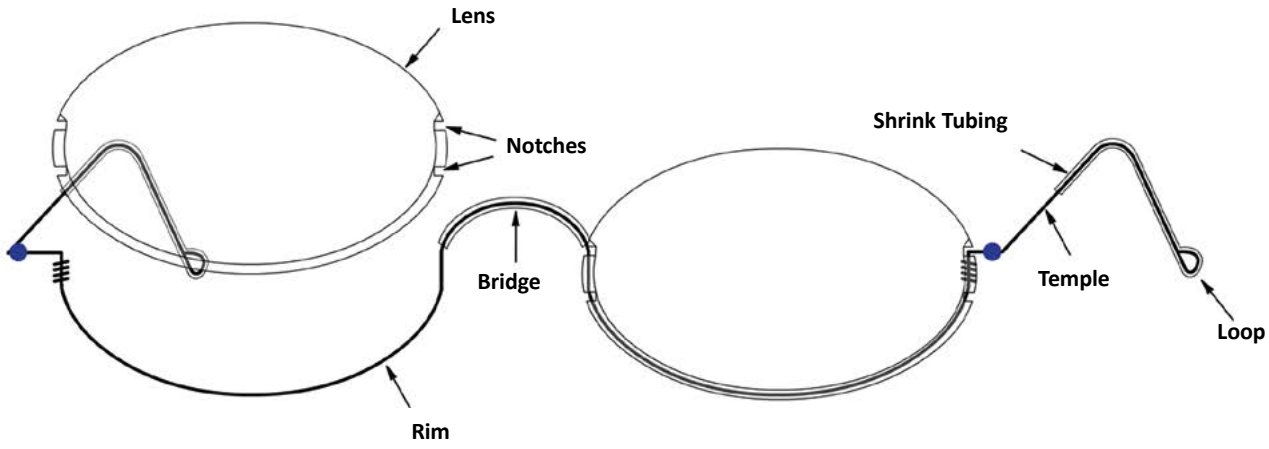
7 Adjust the Frame—Fit the glasses properly to the customer's face

8 Dispense the Glasses—Hand over the eyeglasses, explain proper use and offer support in case of problems

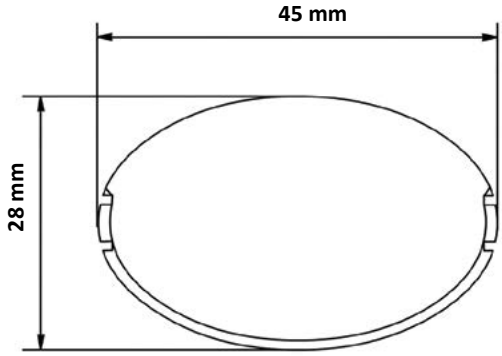
9 Final Check—Ensure the customer can see correctly through both eyes

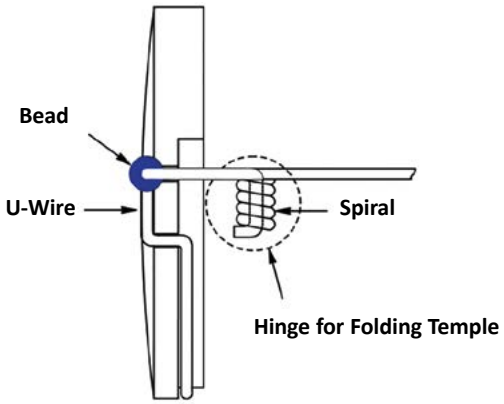
4. The Glasses

4.1 The Glasses: Technical Terms



Lens Measurements

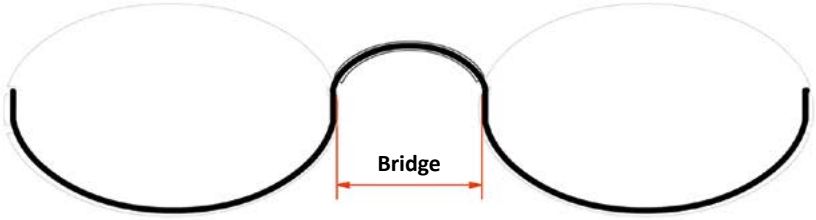




Task

- **Learn and memorize** all the parts of the glasses (5 minutes).
- Close your book and write them down. Did you forget any?

The Size of the Bridge



Measure the size of the bridge inside between the wire!

Small

PD: 54—60.5

Medium

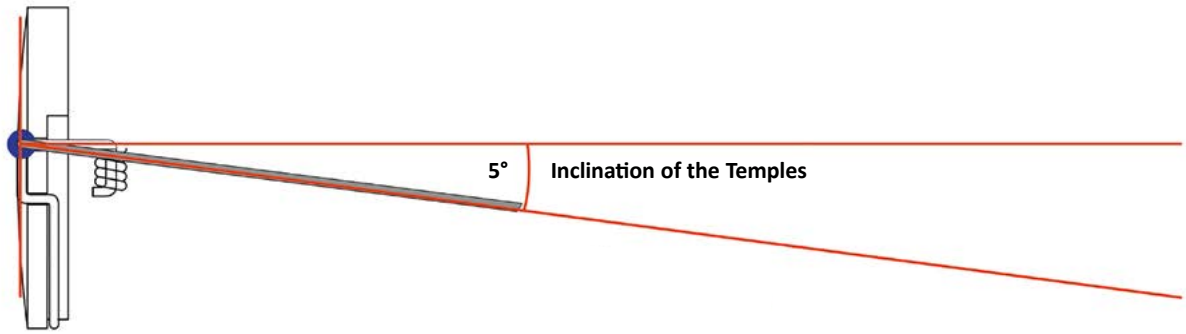
PD: 60.5—66

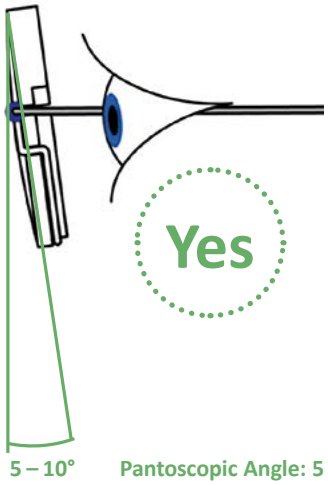
Large

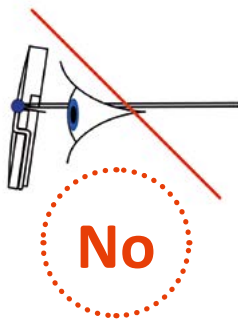
PD: 66 –71

(PD: Pupillary Distance)

Inclination and Pantoscopic Angle







5 – 10°

Pantoscopic Angle: 5 – 10°

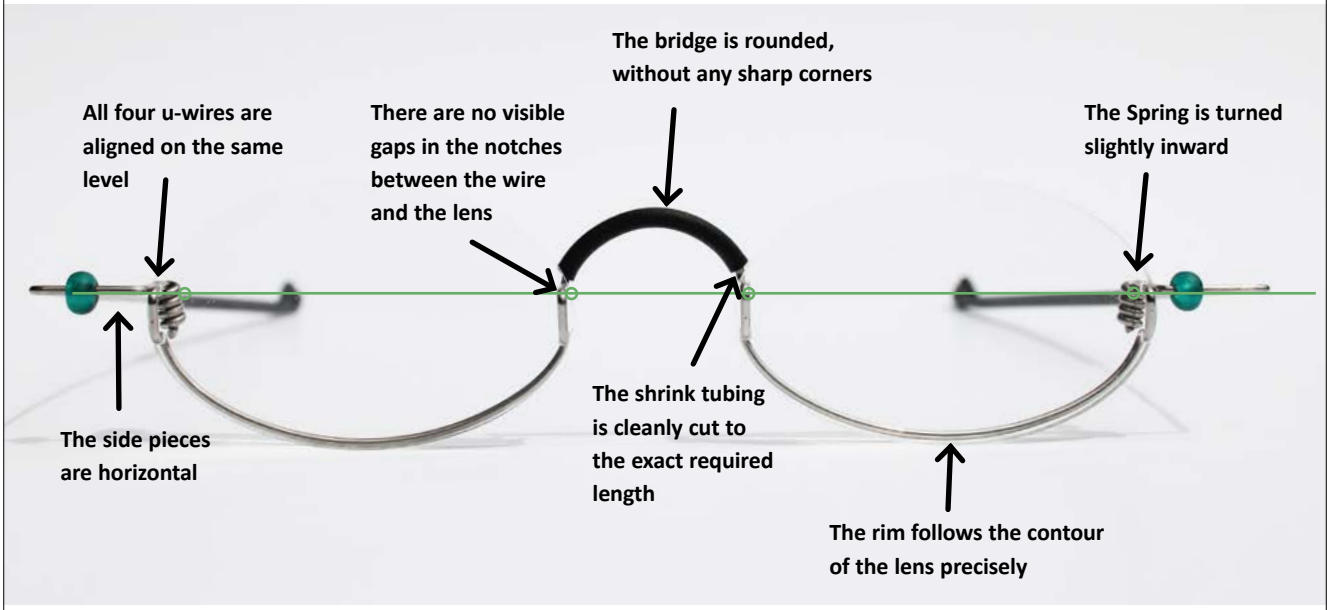
The Pantoscopic Angle

- The Pantoscopic Angle is the angle between the lens and the 90 degree vertical position when wearing the glasses.
- The Pantoscopic Angle should be 5—10°.
- You can adjust it by changing the inclination of the temples.

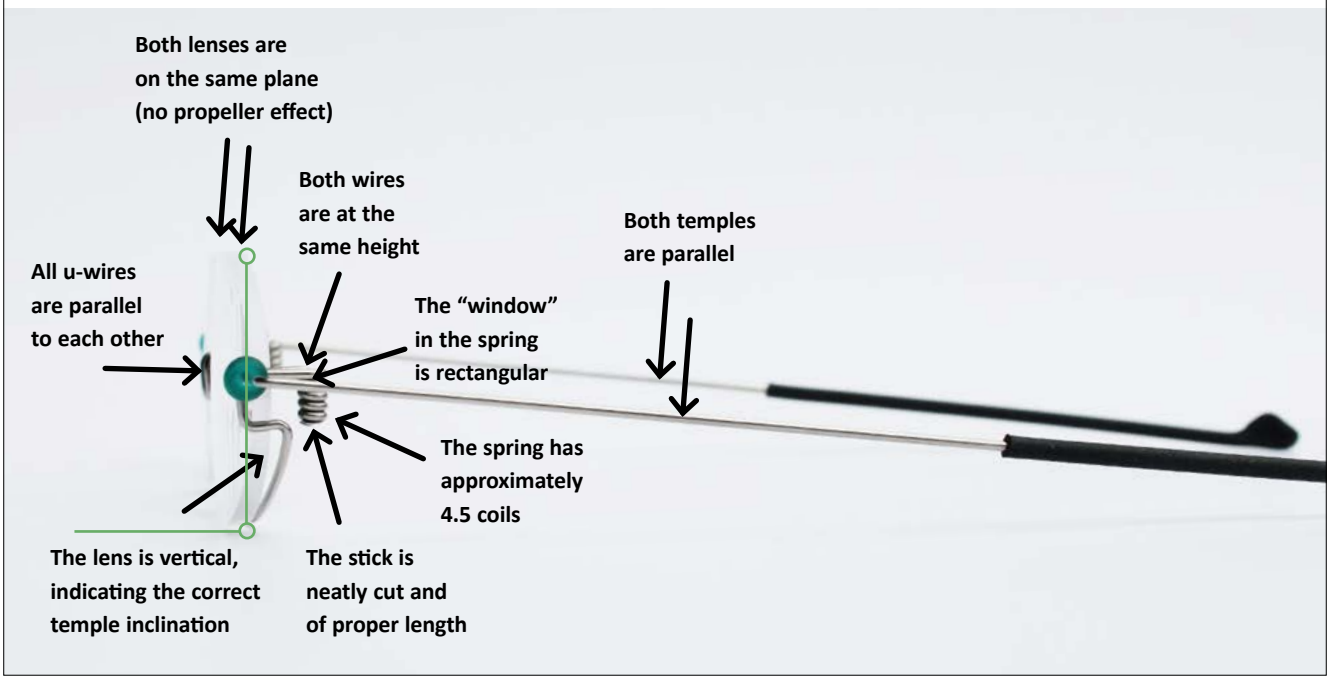
4.2 Quality Criteria of GoodVision Glasses

When using or repairing GoodVision Glasses, ensure that the following quality standards are met. If any of these criteria are not fulfilled, the glasses must be repaired or replaced:

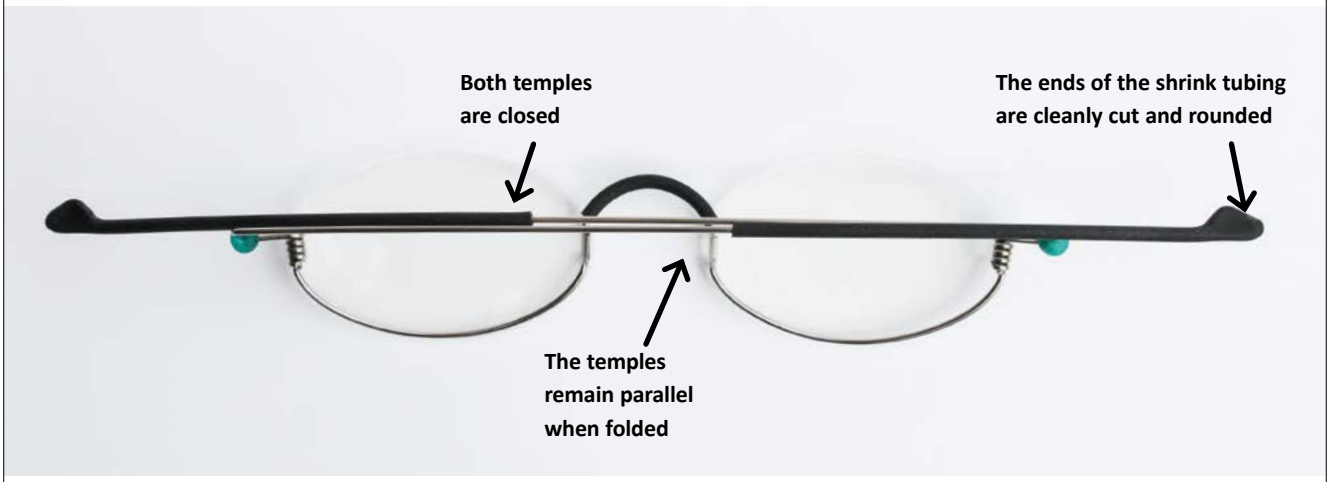
Frontal view



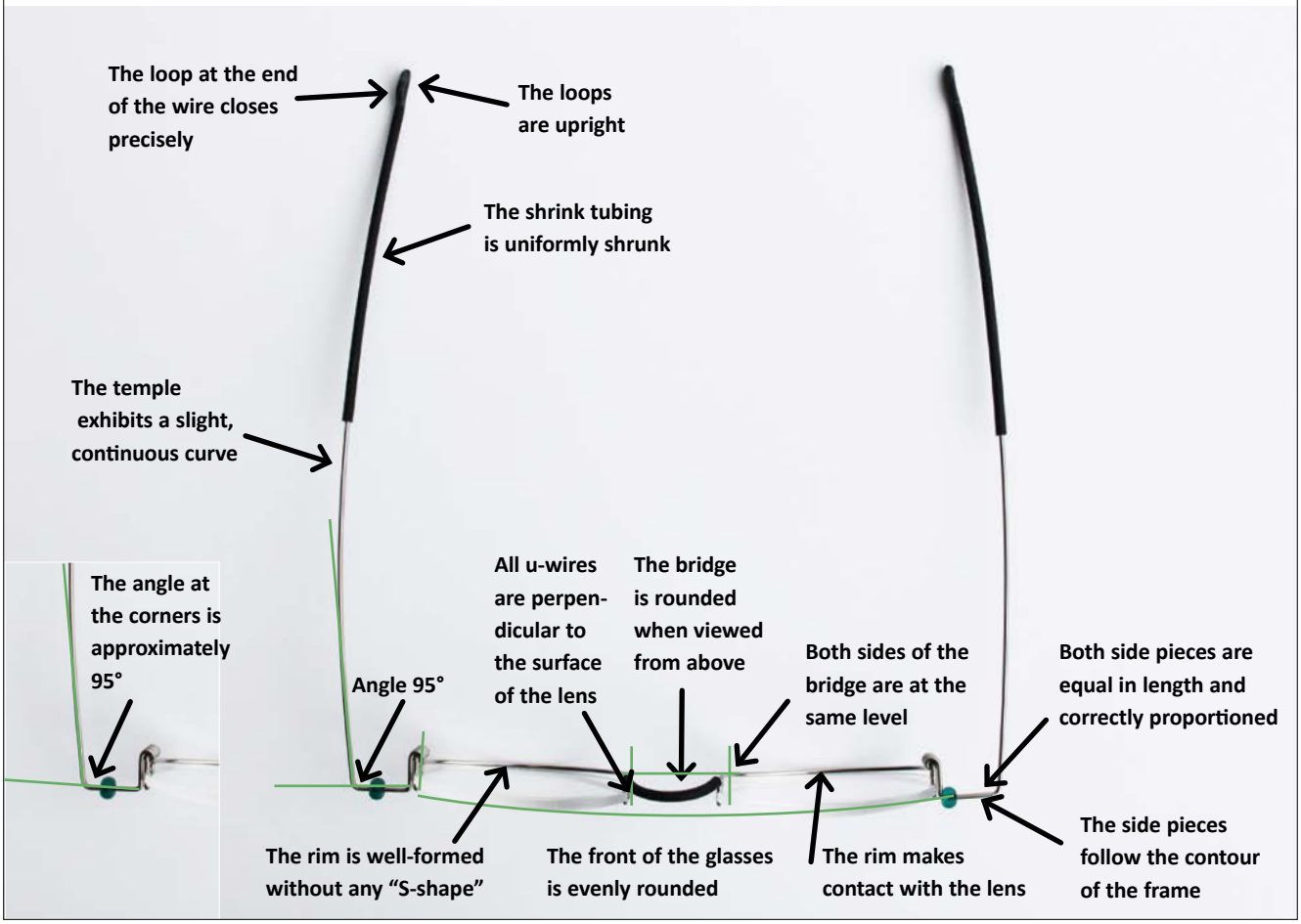
Side View



Closed View



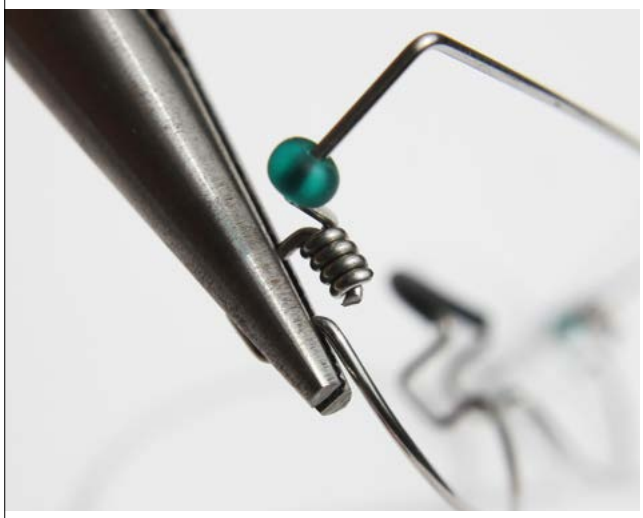
Top View



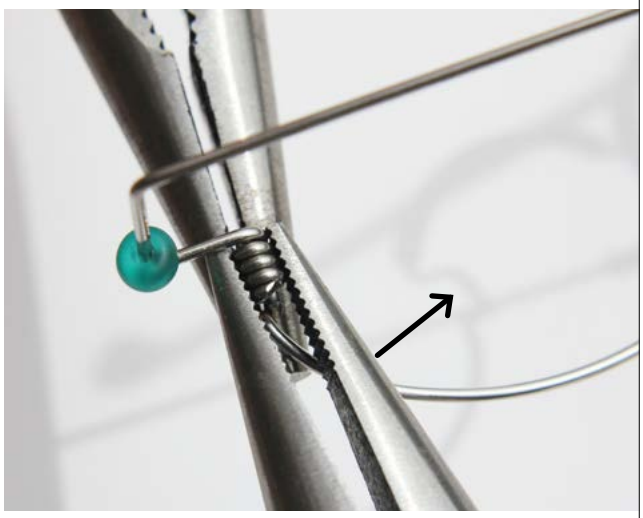
4.3 Repairing GoodVision Glasses

Repairing Oblique Temples

If temples are misaligned:



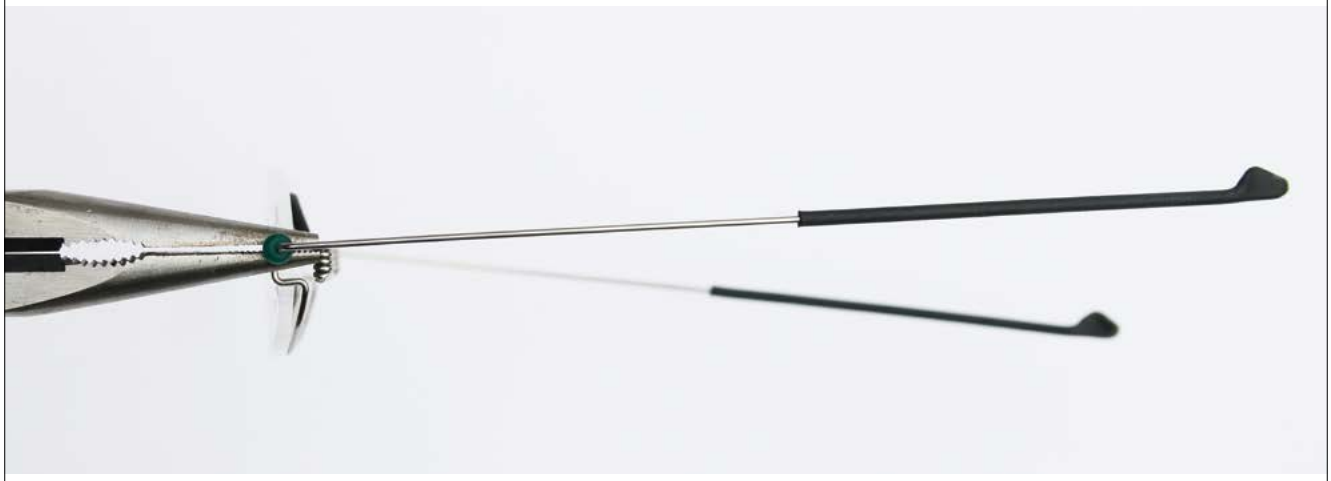
- Hold the u-wire firmly with one pair of pliers



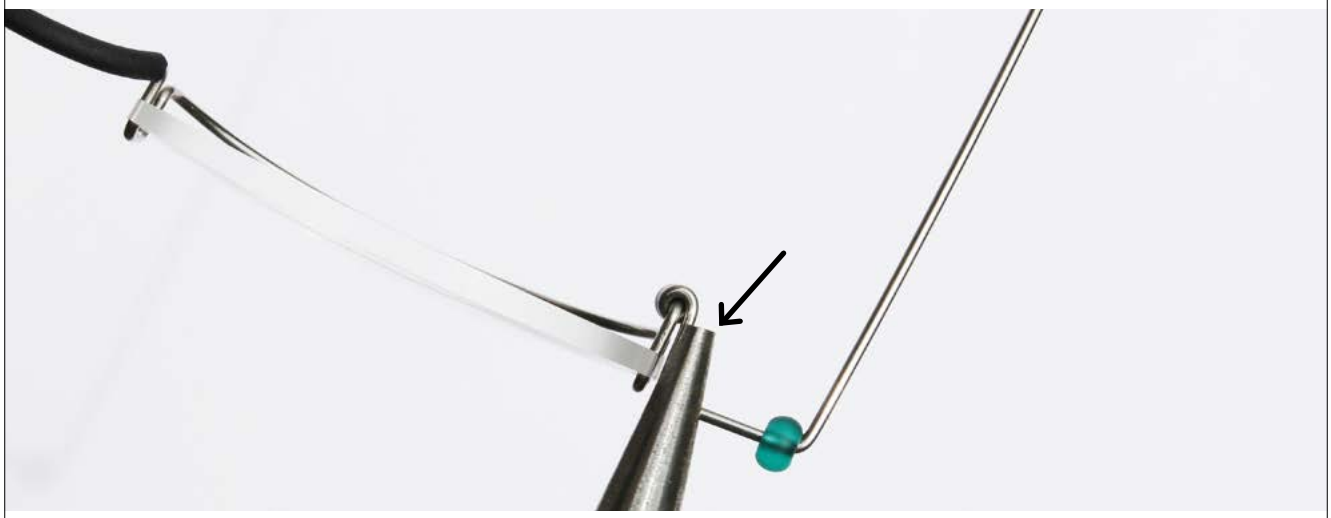
- Adjust the spiral by bending it inward or outward using a second pair of pliers

→ The result is well-aligned temples

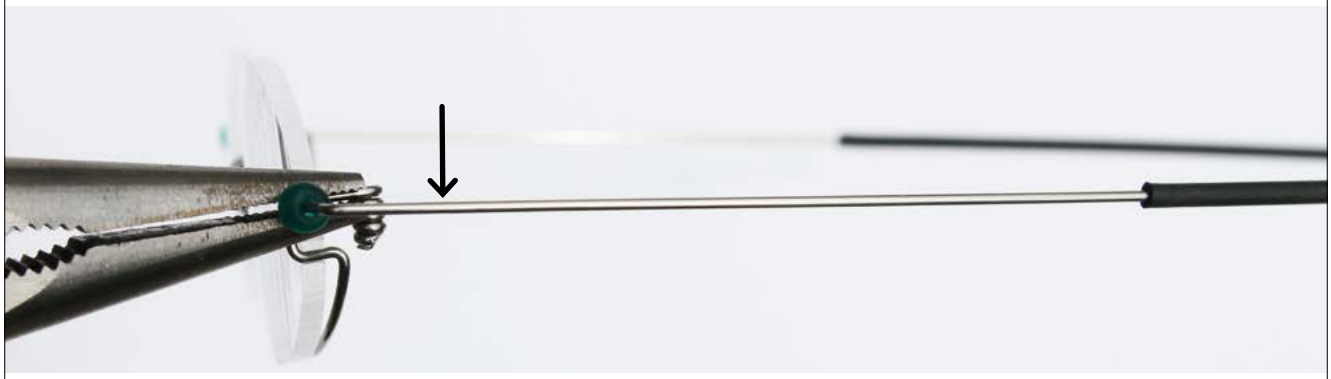
Adjusting Temple Angle



If the temples are not parallel:



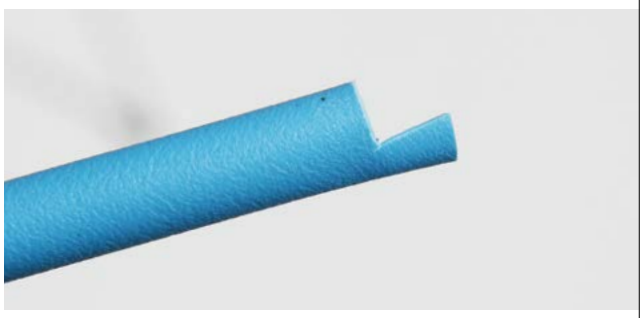
Grip the small section of wire beside the spring with pliers



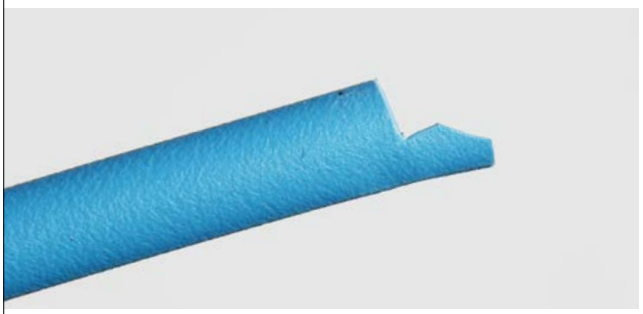
Replacing Shrink Tubing on the Temples

The spring steel wire is highly durable, but the shrink tubing can degrade over time. Follow these steps to replace it:

1 Cut the damaged tubing



2 Trim neatly

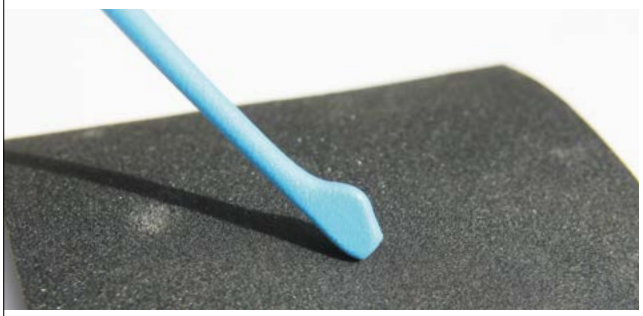


3 Re-cut the tubing if necessary

4 Tuck the cut end inside the new tubing

5 Slide the tubing onto the temple

6 Apply heat to shrink it

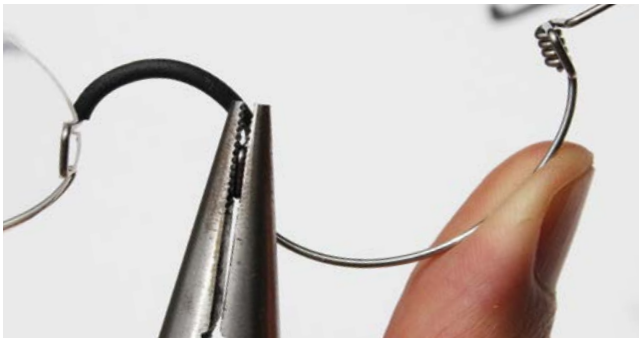


7 Finish with fine sandpaper (grade 400–600)

8 The result is a clean, renewed temple finish

Fixing a Gap Between Wire and Lens

Gaps between the wire and lens can cause the lens to fall out



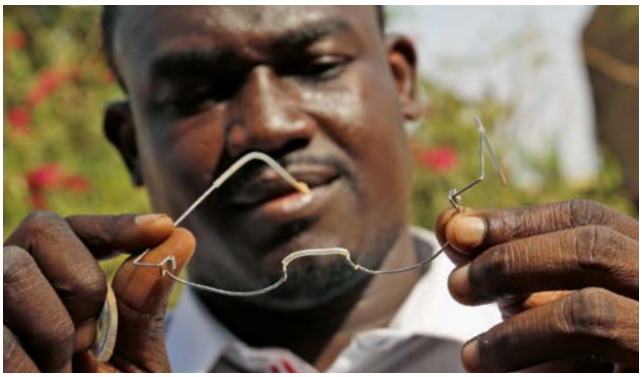
Hold the u-wire with pliers and press on it with your fingers

Ensure the gap is fully closed

Demolishing Frames for Practice

Want to improve your repair skills? Practice by intentionally damaging a frame and then restoring it:

Run over the glasses with a car (under supervision)



Analyze the damage

Practice and master the repair process

Eye Camp-Checklist

Version 2026-06-11

Location, Date: _____

Refractionist: _____

Adjusting Person: _____

Quality Controller: _____

VAsc R: ___ VAsc L: ___ Prescr. Distance R: ___ L: ___

VAsc R: ___ VAsc L: ___ Prescr. Near R: ___ L: ___

1. For the Quality Controller:
Follow one patient and check that EVERY task has been completed properly. Mark a ✓ if completed properly, ✘ if the task has not been completed properly.

2. For the GoodVision Technician (GVT):
Memorize this checklist. The Optical Manual is the foundation of the refraction process.

Arrival of Patients	
If a large number of patients are waiting, give each one a small slip of paper with a number	2
Make sure waiting area is as comfortable as possible(provide shade, benches, etc.)	3
Make sure your GVTs are wearing GoodVision glasses	3

Preparing the Patients	
Take groups of 10–30 people at a time and prepare them for the vision screening test	2
Stand in the front of the room and explain the process clearly	3
Ask if anyone has difficulty with their eyesight	3
Ask about difficulty reading, using mobile phones, threading needles, identifying bus numbers, etc	3
Ask if they know friends/family/neighbors who also need glasses and encourage them to bring those people with them	2

Show the Patients the GVGs	3
Explain the features, but without too many details: high quality, affordable, as robust as bicycle spokes, locally produced, German design	3
Mention the reasonable price	2
If someone has no money today, explain where and how they can purchase glasses later	3

Demonstrate the Vision Chart	4
Show the different directions of the “E”s	3
Ask the patients to raise their right hands	2
Ask the patients to show their right palms	3
Instruct the patients to cover the right eye with their right palm	4
Have the patients indicate in which direction the E is pointing	3
Repeat the process with the other eye	2

For school classes: First explain to the entire class, then take smaller groups of 10 for testing.	3

Vision Chart Setup	
Is the distance exactly 4 meters?	3
Sit on the chair yourself to confirm readability of the final line	3
Ensure no shadows or reflections on the chart	3
Make sure symbols are not blocked by the pointer	3
Confirm the room has sufficient light	3

Eye Health Screening	
Is the patient’s pupil grey?	4
Does the patient have painful eyes, red eyes, excess tearing, discharge, or anything unusual?	4
→ If so, refer the patient to the hospital and note it in the client book.	4

Lens Bar/Lens Trial Set	
Are the lenses clean?	3
Can the patient see through the center of the lens?	3
Rest your hand lightly on the patient’s head to prevent shaking, but let them know you are going to touch them and ask for permission first.	2

Prescreening (School Children)	
Ask if the child can read line 6/9.5 with each eye (covering the other eye with the palm)	4
Check with plus lenses (+2.0 D right, +2.0 D left) whether the child can read line 6/12 or not.	4
Record the VA and whether or not the child is able to read line 6/12 with the +2.0 D lenses	4

Eye Test	
Both Eyes: Ask the patient: "Which is the smallest readable line where you recognize at least 4 out of 5 symbols?"	3
If no line is visible, turn the vision chart to the page with larger symbols	3

Start With the Right Eye First (Then the Left)	2
Cover the left eye with the palm (not with fingers!).	3
Determine the smallest readable line where the patient can read 4 out of 5 symbols. This gives you the **Starting Power.** → If the VAsc (uncorrected vision) is worse than 6/15, start with **+0.50 D.**	4
Enter VAsc into the GoodVision App.	3

Special Case: Schoolchildren Who Can Read Line 6/12 with +2.0 D	4
→ This indicates probable **hyperopia.** Remember that children have very strong accommodation. Spend enough time testing with plus lenses.	4

Special Case: The Patient Cannot See Even the Largest Symbols	3
Move the vision chart closer—about 40 cm away—and check again → For example, if they now see line 30, that's equivalent to line 300 at 4 m → If they see line 15, it equals line 150 Starting Power in this case: +2.0 D Increase lens power step by step (first plus, then minus) Stop if none of your lenses improve vision. If nothing works, refer the patient to a hospital	4

Step-by-Step Refraction—Starting With Plus	4
1. Start with **plus** Starting Power	
2. Wait at least 3 seconds	
3. Ask: "Is this worse?"	
4. Check if visual acuity gets worse	
5. If not worse: determine the line at which they can now read 4 out of 5 symbols	
6. Take next higher **plus** lens → repeat	
7. Stop when the patient says "It is worse" and VA declines	
8. Go back 0.5 D and test again	
9. Take the **highest plus lens** that gives the **best VA**	
Enter VAcc and the prescription into the GoodVision App	

If Plus Lenses Make Vision Worse → Switch To Minus	
1. Ask: "Is this better?"	
2. Check if VA improves	
3. Find the smallest line they can see 4 out of 5 symbols	
4. If they see a smaller line than before, take next higher minus and continue	
5. Stop when no further improvement	
6. Go back 0.5 D and test again	
7. Take the **lowest minus lens** with the **best VA**	
Enter VAcc and prescription in the GoodVision App	
Then repeat the same process for the **left eye**	

Important:	
If a person cannot reach line 12 (i.e., VAcc < 50%) or vision doesn't improve with any lenses: → Try the **pinhole test.** If VA improves with pinhole, continue testing. → If not, refer the patient to a hospital. *(Even if the patient is referred to a hospital, the patient may still buy glasses if they wish)*	

Reading Glasses (For Patients 40+ Years)	
For reading glasses, add the following to the distance prescription: Age 40 → +1.0, Age 45 → +1.5, Age 50 → +2.0, Age 55 and older → +2.5	3
Let the patient hold the reading test card themselves. They will find the most comfortable distance for themselves	3
If they can't read anything: → Use a needle and thread or rice with stones and ask what they need the glasses for	3
Confirm if a reading/working distance of 40 cm is comfortable (check with straight arms) If held too far → **increase plus** If held too close → **reduce plus**	3

Sales Process	
Let the patient look into a mirror	3
The GVT and the customer should sit at the **corner** of the table to enable better interaction with each other and easier adjustments of the glasses	2

Let the patient choose their **preferred color of eyeglasses**	2
Let the patient choose their **preferred color of the glasses case**	3
Show the patient how to clean the glasses: → Use clean water and a little soap → Dry with **new toilet paper**	3

The Table	
Is the table clean (no waste on it?)	2
Is there a plastic box for the waste? (Box with hole in cover)	2
Is there a nice blanket on the table? (dark blue blanket available in stock)	3
Is there a mirror standing (not lying) on the table	2
Are there two pairs of pliers on the table?	2
Are there glasses cases nicely presented on the table? (4–5 pieces)	2
Are there different types of eye glasses available? (round, rectangle, sun)	3
Are there different colors of eye glasses available?	2

Reality Eye-Test	
Far vision: let the patient look outside with his new glasses (to people, nature, trees etc.)	3
Near vision: ask him what he needs the glasses for: let him read/give him needle and thread/box of beans with stones etc.	3

Adapting the Glasses	
Front: Are the glasses horizontal?	3
Is the pupil distance (PD) being tested? Do the glasses have the right size?	4

Side: Do the temples fit behind the ears?	3
Do the temples of the glasses NOT press against the head of the patient? (→ round temples)	4

From Top: Do the eyelashes NOT touch the lens?	3
Are the lenses clean?	2

Patient-Book	
Fill the book **completely** (every line or gap)	3
Phone No.: If patient has no phone no. → Ask him for the number of his Brother/Child/Neighbor etc.	2
Address: if he has no address, write the name of his village	2

Final eye-check—Most important !!!	
After adapting the glasses do the final eye-check!!!	4
Which line can he read with his RIGHT eye with HIS NEW glasses?	4
Which line can he read with his LEFT eye with HIS glasses?	4
NOW write VAcc on GoodVision App and in the client book. (Is it equal compared during the eye test?)	3

Stamp in the health book	
Put the stamp into the health book	3
If the patient does not have such a book, then give him his prescription on a card	2

Marketing	
Ask the patient, who of his family/friends/ neighbors cannot see properly.	3
Give him a card for every **family member/friend** who needs glasses, write their names on it (Mother, Brother, Friend 1, Friend 2 etc.)	3
Ask him if he works in a company, get the phone number of his boss and make an outreach	2
Is he a priest → Ask him if you can make an outreach in his church.	
Is he a chief → Ask him for a village outreach etc.	2
Ask the patient if he wants to buy **sunglasses** or reading glasses too or a second pair of glasses	3

End of Outreach	
Is everything cleared and no waste left behind?	3
Did the GVT act according to the current valid standard precautions?	4

Declaration of Quality Controller

With my signature I declare that I have filled out this form to the best of my knowledge. I spoke to the GVT about his eye test errors.

Shop-Checklist

Version 2026-06-11

Place, Date: _____

Refractionist: _____

Adjusting Person: _____

Quality Controller: _____

VAsc R: ___ VAsc L: ___ Prescr. far L: ___ R: ___

VAsc R: ___ VAsc L: ___ Prescr. near L: ___ R: ___

1. For the Quality Controller:
Follow one patient, check ✓ EVERY point
if done properly, make a cross ✘ if not done.

2. For the GVT/Shopkeeper:
Learn this list by heart! Basis of the
refraction process is the Optical Manual.

Arrival of the patiens	
Immediate welcoming of a new customer.	3
Make sure people are waiting feel comfortable (shade, benches to sit etc.)	3
Is the GVT wearing our glasses himself?	3

The Shop	
Doormate at the entrance?	2
No private stuff on the cabinets and table? (shade, benches to sit etc.)	2
Panels properly aligned and filled?	2
Clean mirrors in the panels? (shade, benches to sit etc.)	2
General cleanliness of the shop?	2

Preparation of patients	
Stay in front of them and explain the project	3
Ask them who has problems to see properly (awareness)	3
Ask them who has problems in handling their mobile 4 phone, with reading, working on the field, seeing the numbers of the minibus, putting the thread into the needle etc.	3

Explain the vision chart	4
Show the direction of different E's	3
Show me your hands (everybody shows his hand)	2
Show me your palms (everybody shows his palm)	3
Close your left eye with your palm (not with fingers!)	4
Show me the direction of the E's.	3
Now the same test with the other eye	2

Vision chart	
Is the distance 4 Meter?	3
Sit down on the chair YOURSELF and check if you can read the last line!	
No shadow on the signs? (from GVT or from stick)	3
No reflection from light?	3
No sun behind the vision chart? (sit down and check yourself if you can see the symbols)	3
Signs are not covered by the pointer of GVT?	3
Is there enough light in the room to see properly?	3

Check eye disease and eye complaint	
Is the pupil grey?	4
Does the patient have painful, watery eyes, red eyes or is anything not looking normal?	4
→ In these cases send him to the hospital (tell him and write in the client book)	4

Lens Bar/Lens Trial Set	
Are the lenses clean?	3
Can patient see through the middle of the lens? (Look from front)	3
Lay your hand or fingers on the head of the patient to reduce shaking	2

Eye Test	
Both eyes: Ask the patient which the smallest line is he can see at least 4 out of 5 symbols	3
If he can see no line, turn the vision chart around for the large symbols	3

Right eye first (then left eye)	2
Left eye is covered with palm (not with fingers)	3
Which line he can see at least 4 out of 5 symbols? → you get the Starting-Power → **Starting-Power for VAsc < 6/15 = 0.50 D!**	4
Write VAsc in GoodVision App	3

Special Case: School-going children who are able to see line 6/12 with + 2.0 D (probably **Hyperopia)**	4
Children's accommodation is very strong! Spend enough time testing with PLUS!	4

Special Case: He can't see the largest symbols	3
Bring the vision chart 40 cm near to his eyes and test → if he can now see line 30, it's like line 300 (or e.g. line 15 → always ten times as much) **Starting-Power: Take 2.0 D** Increase the power (first Plus, then MINUS) step by step. Stop only if no one of your lenses can help If you cannot help → Send him to hospital	4

Start with PLUS Starting-Power	4
Wait at least 3 seconds (count 21, 22, 23)	4
Ask: "Is this worse?"	3
Check if the VA decline when the answer is worse	4
If it is not worse, find the line he can see 4 out of 5	4
Take next higher PLUS (continue ….)	4

Stop when he says "It is worse" and **VA declined**	3
Take 0.5 D less and test again	3
Take the **highest** PLUS-lens with the **best** VA	4
Write VAcc in GoodVision App	3
Write prescription in GoodVision App	3

If PLUS-lenses are worse and **VA declines** → go to MINUS Starting-Power	3
Ask: "Is this better" and check if **VA increases**	3
Find the smallest line he can see 4 out of 5	4
If he can see a smaller line then bevor and VA increases take next higher MINUS (continue …)	3

Stop when the line does not improve any more	4
Take 0.5 D less and test again	3
Take the **lowest** MINUS-lens with the **best** VA	4
Write VAcc in GoodVision App	3
Write prescription in GoodVision App (Then continue with left eye …)	4
If somebody cannot reach **line 12** (VAcc less 50%) or the VA is not improving with any of your lenses → perform pinhole frame test—continue Eye Test if VA is improving, otherwise send him to the hospital. (If he wants he can buy your glasses nevertheless)	4

Reading glasses (Customers older than 40 years)	
For **reading glasses** take the prescription **you found for distance** and add reading value: 40 → +1.0 | 45 → +1.5 50 → +2.0 | 55 and older → +2.5	3
Let the patient hold the reading test himself → so he can find his best distance	3
If he cannot read, take thread and needle, or rice with stones etc. Ask him why he needs the glasses.	3
Test if reading/working distance of 40 cm is OK (reading with rectangle arms)	3
If he holds reading test **too far** → Take more PLUS If he holds reading test **too near** → Take less PLUS	4

Sales Process	
Show them the glasses	3
Tell them about the glasses (high quality, affordable, as robust like the spokes of the wheel of a bike, produced locally, German design)	3
Make th customer aware that with these glasses he can do what was not possible before.	3
Let the patient look into the mirror!	3
The GVT and the client sitting at the corner of the table (optician not behind table) for better contact and easy adaption of glasses.	2
Let the patient choose his favorite color of glasses case	2
Let the patient choose his favorite color of eye glasses	3
Instruct to the patient how to clean the glasses (water, soap, toilet paper)	3
Tell them the price	2
Tell them what to do if they have no money today (where they can buy later, when you come back)	3

The Table	
Is the table clean (no waste on it?)	2
Is there a plastic box for the waste? (Box with hole in cover)	2
Is there a nice blanket on the table? (dark blue blanket available in stock)	3
Is there a mirror standing (not lying) on the table	2
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Is he a priest → Ask him if you can make an outreach in his church.	
Is he a chief → Ask him for a village outreach etc.	2
Ask the patient if he wants to buy **sunglasses** or reading glasses too or a second pair of glasses	3

End of Sales	
Is everything cleared and no waste left behind?	3
Did the GVT act according to the current valid standard precautions?	4

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With my signature I declare that I have filled out this form to the best of my knowledge. I spoke to the GVT about his eye test errors.

Notes


Good Vision