

EYEGLOSS LENSES AND FRAMES

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Lens Properties

- Refractive index
- Specific gravity
- Abbe number (V-number): are a useful measure of dispersion for visible light
- Impact resistance

Eyeglass lens materials

- The material from which a lens is made has little impact on the corrective power of the lens, but it can have a major impact on lifestyle.
- **Glass lenses**
- **Plastic lenses**

Glass lenses

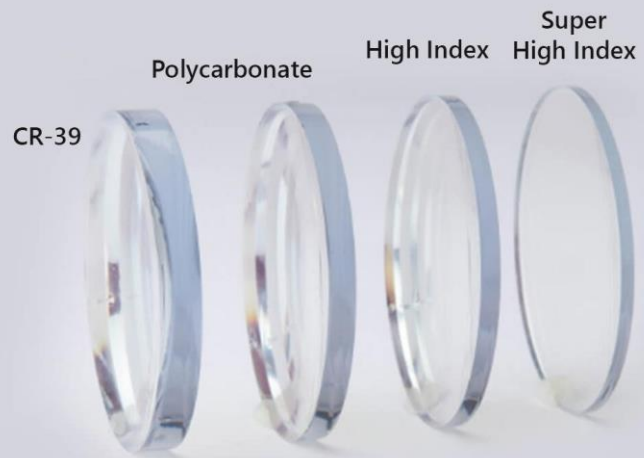
- Crown (standard) glass1.52
- Flint:
 - Light.....1.61
 - Medium.....1.7
 - Heavy1.9

Plastic Lenses

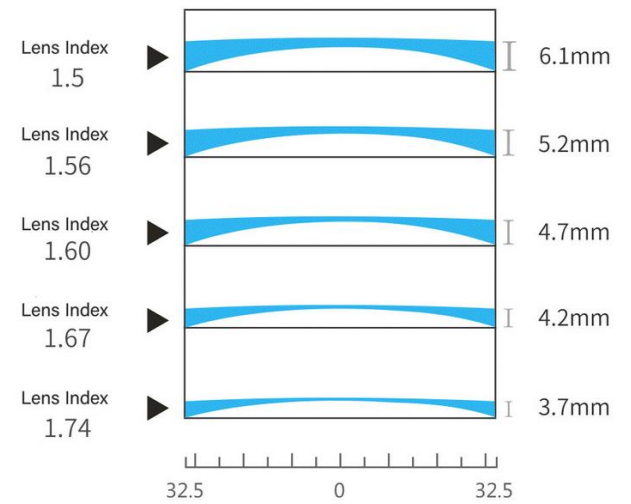
- **CR-39 (Columbia Resin)**
- **Polycarbonate lenses**
- **Trivex Lenses**
- **Hi-Index Lenses**

Material	Refractive Index	Abbe number	Specific Gravity	Advantages and disadvantages
Crown glass	1.523	59	2.54	Excellent optics Heavy Low cost
CR-39 plastic	1.498	58	1.32	Low cost Excellent optics
Polycarbonate	1.586	30	1.20	Blocks 100 percent UV. Superior impact resistance
Trivex	1.54	45	1.11	Blocks 100 percent UV. Lightest lens

Lens Material	Refractive Index	Abbe Value	Key Features and Benefits
High-index plastics	1.70 to 1.74	36 (1.70)	The thinnest lenses available. Block 100 percent UV. Lightweight.
		33 (1.74)	
High-index plastics	1.60 to 1.67	36 (1.60)	Thin and lightweight. Block 100 percent UV. Less costly than 1.70-1.74 high-index lenses.
		32 (1.67)	
Tribrid	1.60	41	Thin and lightweight. Significantly more impact-resistant than CR-39 plastic and high-index plastic lenses (except polycarbonate and Trivex). Higher Abbe value than polycarbonate. Downside: Not yet available in a wide variety of lens designs.



SPH: -4.00D



Impact resistance lenses

- Polycarbonate (Lexaen)
- Polyurethane (Trivex)



Sunglasses

-
- Sunglasses should provide 100 percent UV protection from all UV light.
 - Darker sunglasses don't always mean they offer more UV protection
 - Tints don't reflect how well the lenses block UV (ultraviolet) light.
 - UV-absorbing contact lenses are NOT substitutes for UV-absorbing goggles or sunglasses.
 - Sunglasses should have the largest lenses possible to protect your eyes from sun damage.
 - Transmission should be less than 40%
 - Normal sunglasses will not protect your eyes from certain light sources including solar eclipse and arc welding.

Classification

- Tinted solid glass lenses
- Glass lens with tinted coating
- Tinted plastic lenses
- Photochromic lenses
- Mirror lenses

Different sunglass tints



Gray Green Amber/Brown Rose/Red Yellow/Orange Blue



Green

- Good for general use
- Dims glare, brightens shadows
- Provides good contrast in low light



Blue

- Trendy look
- Reduces glare, best in snowy conditions
- Good for skiing & snowboarding



Brown / Amber

- Best for sunny days
- Enhances contrast & depth perception
- Good for outdoor sports & driving



Grey / Black

- Good everyday tint
- Reduces eye fatigue
- Minimizes glare, especially off of water



Yellow

- Good for low-light conditions like fog & haze
- Best for electronic devices
- Filters blue light, reduces eye strain

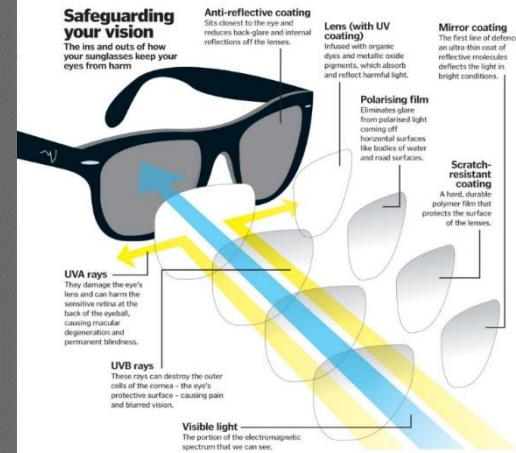
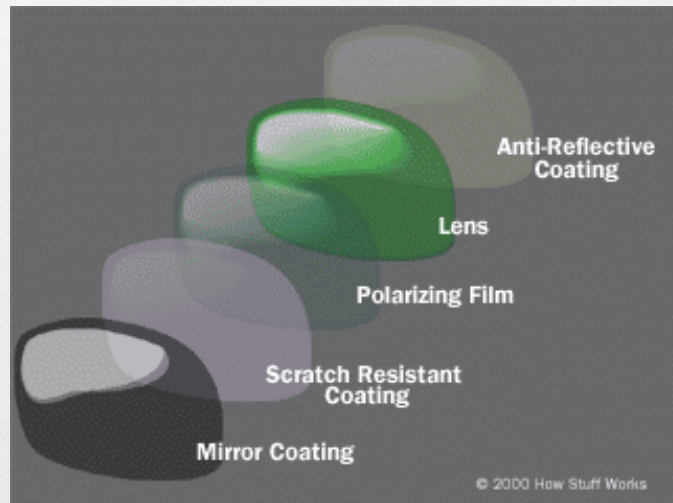


Pink / Red

- Good in snowy conditions & winter sports
- Improves visual depth, reduces eye strain
- Unique, fashion-forward look

Lens Coatings

- Anti-reflective coating
- UV-blocking
- Polarizing coating
- Scratch-Resistant Coating
- Blue blocking
- Anti-fog coating
- Photochromic coating



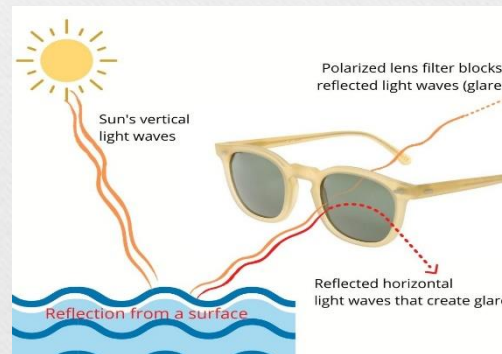
Anti-Reflective Coating

- To reduce the amount of internal and external reflections on a lens
- Improves the quality of vision
- Improves night vision
- Makes the lenses appear somewhat invisible and very thin
- Everyone could benefit from an anti-reflective coating
- It is especially beneficial for people with **high prescriptions**, people who have a **decrease in the vision at night**, and professions in which **cosmetic appearance** is important.



Polarizing Film

- Polarized lenses are usually used to make sunglasses
- Vertically polarized lenses decrease bright glare and reflections by blocking horizontal polarized reflected



Polarizing Film

- There are a few instances where polarized lenses are not recommended.
- When looking at LCD
- When glare or more light might be an advantage:
 - to see ice on roads when driving
 - to see icy patches when skiing
 - when driving at night.



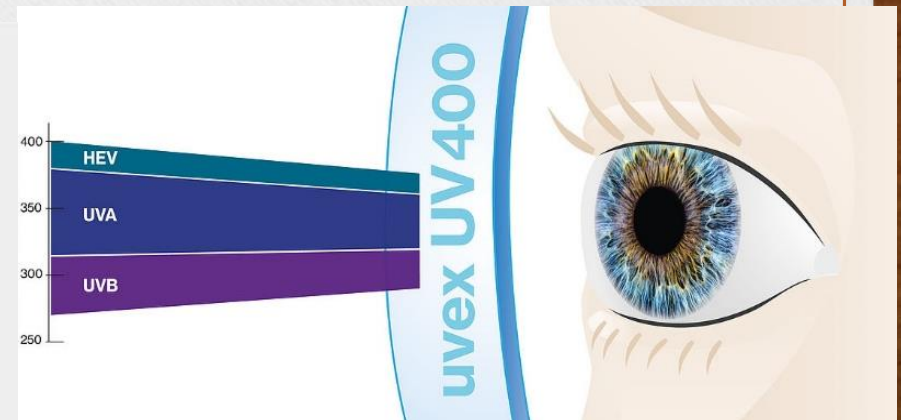
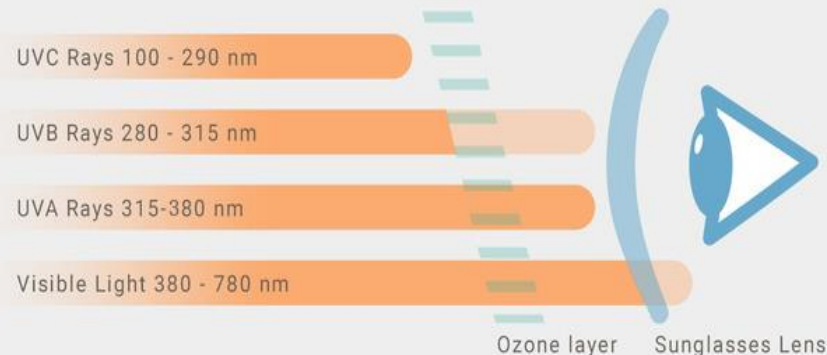
Scratch-Resistant Coating

- Scratch-resistant coatings are applied to the front and back of lenses in the manufacturing process.
- Does make lenses harder to scratch.



UV-blocking

- Polycarbonate and nearly all high-index plastic lenses provide 100% UV protection.
- CR-39 plastic lenses need a special coating applied to block all UV rays.



Photochromatic Lenses

- Photochromatic lenses are great for people who do not wish to carry a separate pair of sunglasses.
- Classified as: photogray, photobrown, photosun
- It is important to note that photochromatic lenses will not change behind the windshield of a car
- In some environments, it may take several minutes for the lens tint to change from dark to light.

Anti-Fog Lens Products

Available as spray solution, Creams and gels, and wet wipe

- Essilor's Optifog
- No Fog Spray
- Zero Fog
- ICOAT No Fog
- Fogbuster
- Defog It

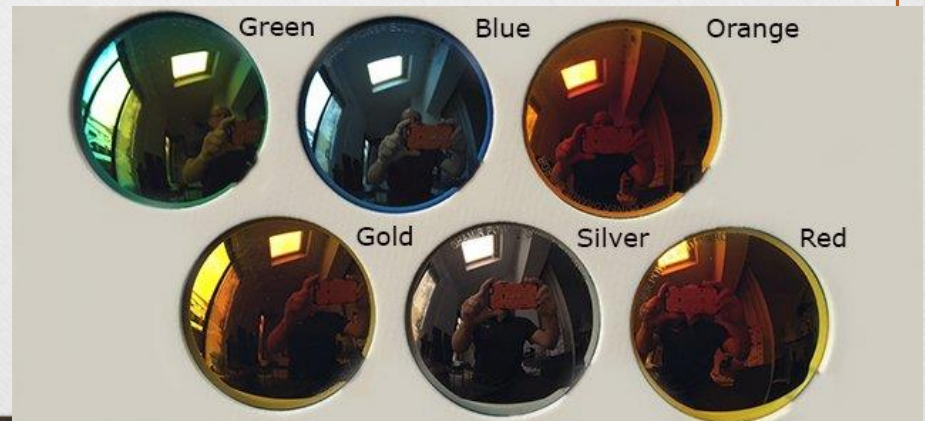
Blue Light Blocking

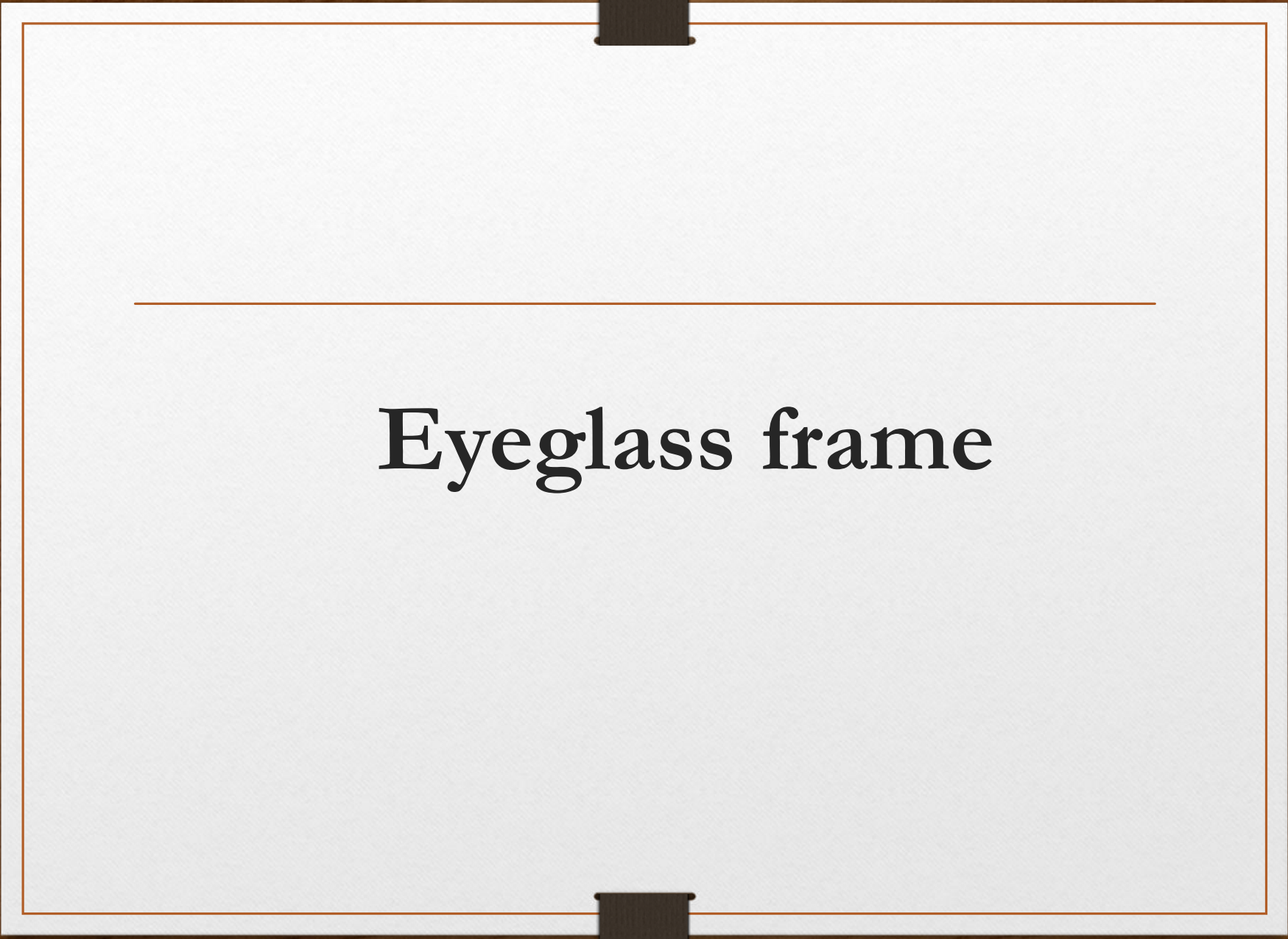


- However, there is no scientific evidence that blue lights from a computer screen cause any lasting harm.
- The strain that we feel from a long computer session is actually caused by blinking less often, resulting in dry eyes.
- There is some evidence that blue light affects the body's circadian rhythm, our natural wake and sleep cycle. The best way to avoid sleep disruption is to avoid using screens two to three hours before bed. Using "dark" or "night" mode on devices in the evening can help, too.

Mirrored coating

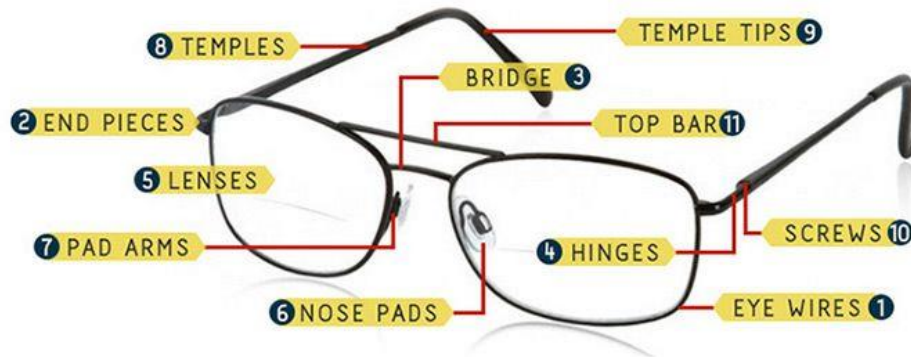
- Are thin layers of metallic coatings on an ordinary sunglass lens. Although they do cut down on the amount of visible light entering your eyes, never assume they will fully protect you against UV radiation.





Eyeglass frame

Parts of eyeglass frame



Frame Materials

- **Metallic frame**
- **Plastic frame**
- **Combination Eyeglass Frame**
- **Unusual Frame Materials**



Metallic frame

- Titanium: Tical (nickel-free), Flexon (Nickel Titanium)
- Stainless Steel Frames
- Nickel: Monel (containing 68 percent nickel, 30 percent copper, and two percent iron, the most commonly used frame material today)
- Pure Aluminum Frames: can get rigid, especially in lower temperatures
- Magnesium Frames (Lighter than both titanium and aluminum, hypoallergenic)
- Beryllium Frames (more than 30 percent lighter than aluminum)

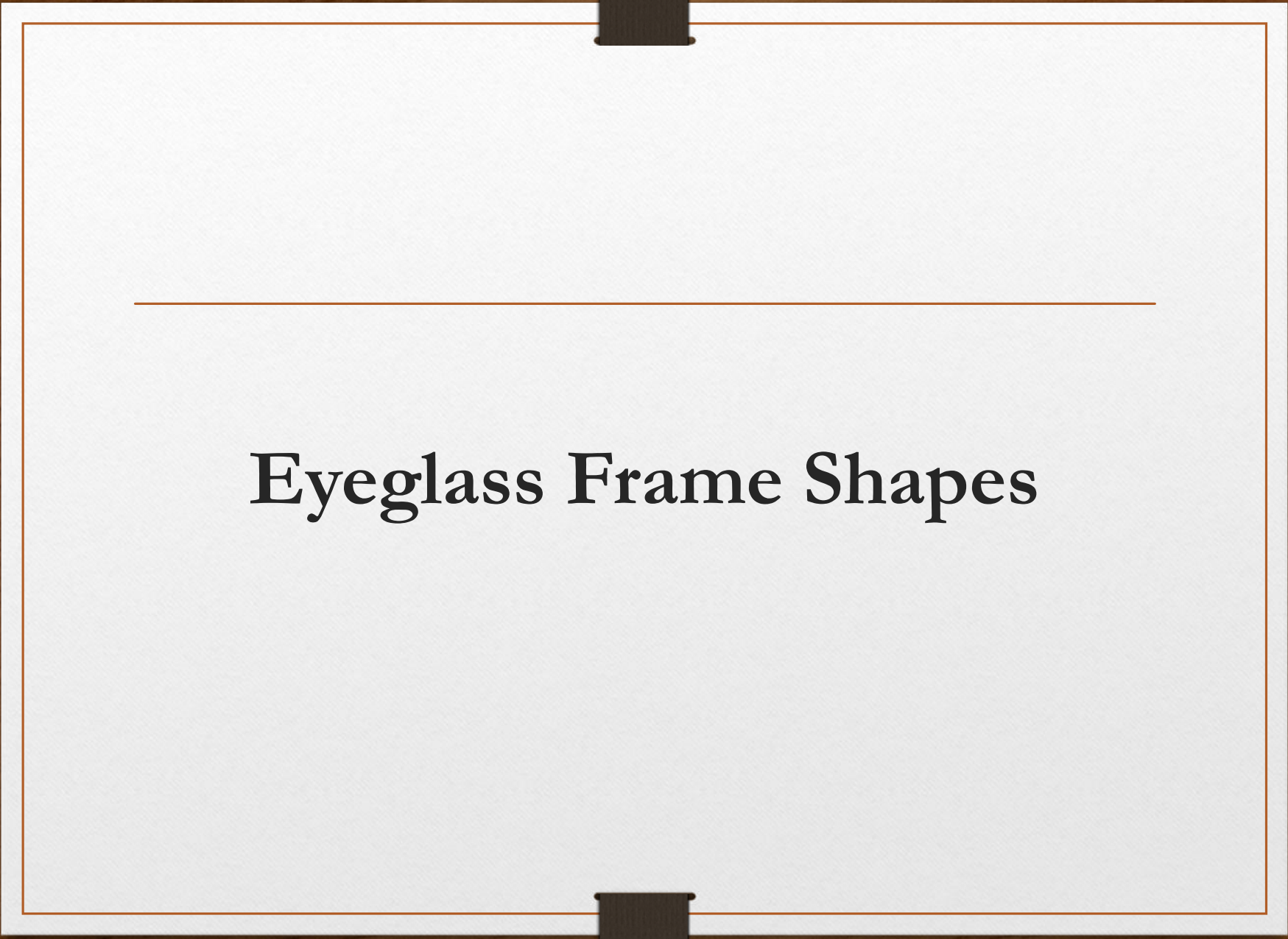
Plastic Glasses Frames

The two commonly used plastic frame materials are called:

- Zyl (or cellulose acetate) is the most commonly used plastic frame material
- Propionate (**cellulose acetate propionate**, a nylon-based plastic that is hypoallergenic).

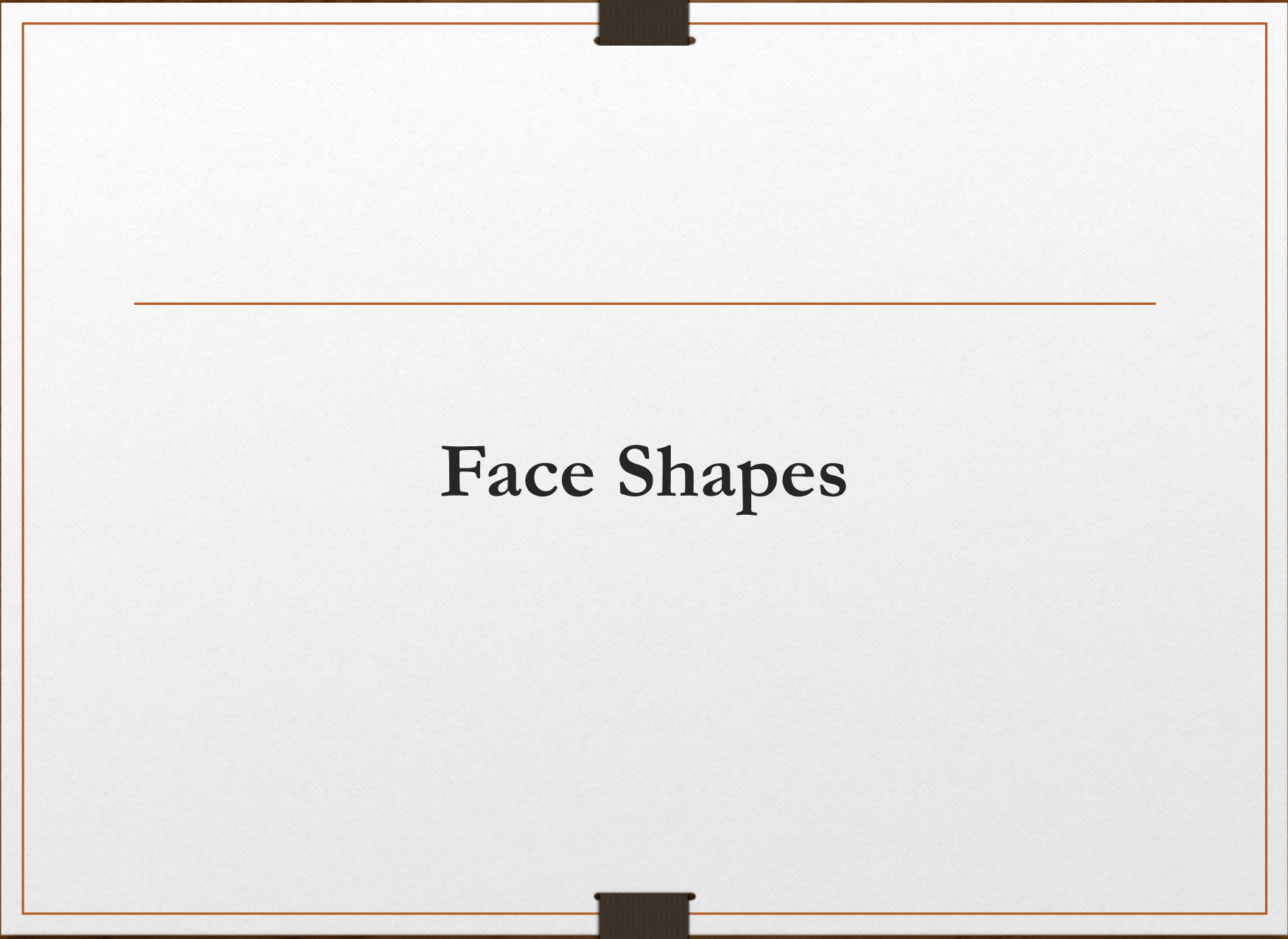
Unusual Frame Materials

- Solid **silver** or sterling silver: Sometimes silver is used as a trace element in metal alloy frames and often provides a jewelry-like accent on plastic frames.
- **Gold:** can be used for accenting plastic or metal frames as well.
- **Wood, bone** and **buffalo horn** frames usually are handmade
- **Leather:** is not as durable or practical as other materials
- **Semi-precious or precious stones** and crystals



Eyeglass Frame Shapes

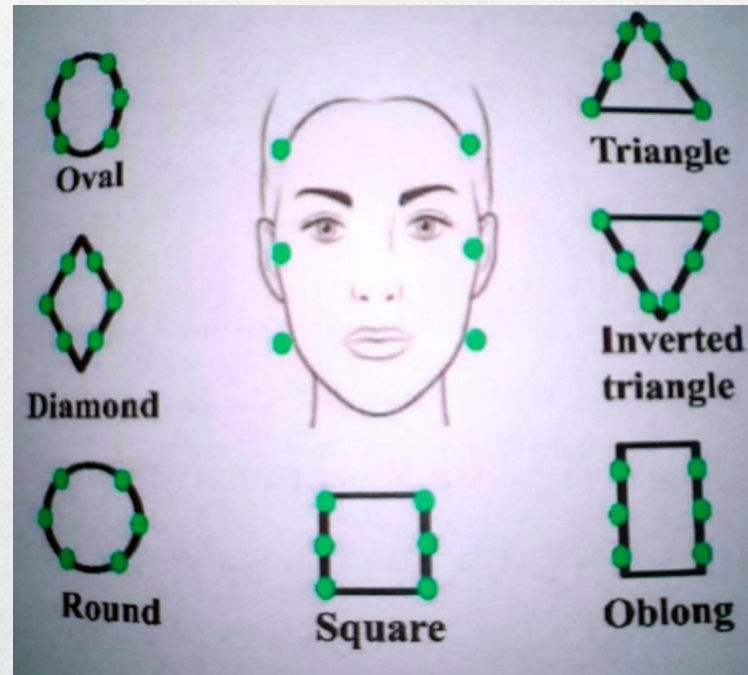




Face Shapes

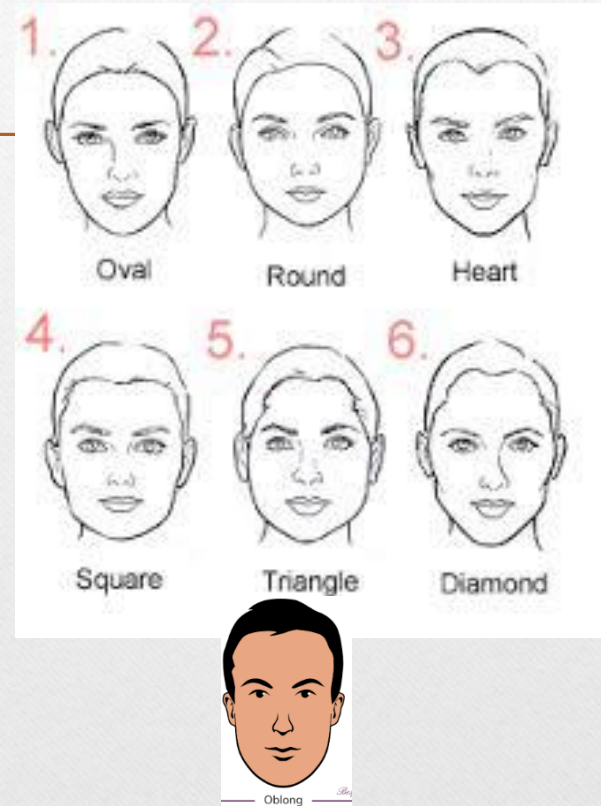
How to Determine Face Shape?

- Place dots along the outside of face in the photograph or mirror image (six total):
- One on the outer edge of either side of the forehead (left and right side).
- One on the outer edge of either cheekbone, close to your eyes.
- One on the outer edge of either side of your jaw line, in the vicinity between your mouth and chin.
- Now, look at the shape created by these dots, this should give you an idea of the basic shape of your face.



There are 5 main categories of face shapes:

- Oval
- Round
- Heart
- Square
- Triangular
- Diamond
- Oblong



Face Shape Guide for Glasses

OBLONG FACE



As an oblong face already has keen features, you want to balance them out with deeper lenses and rounded frames.



AVIATORS



OVAL



WAYFARER

ROUND FACE



A round face looks more defined with sunglasses that have sharp, square frames, for instance, wayfarers, or aviators.



AVIATORS



WRAP



RECTANGLE

HEART FACE



For a heart-face, choose sunglasses with square frames. Refrain from overly elaborate frames and teardrop lenses.



AVIATORS



WRAP



RECTANGLE

SQUARE FACE



Not to overimprove a square face, avoid angular and sharp frames. Go for rounded and curved sunglasses instead.



AVIATORS



WAYFARER



BROWLINE

TRIANGLE FACE



To balance out a triangular face, opt for teardrop or deep lenses as well as frames that are angular, square and heavy on top.



BROWLINE



OVAL



RECTANGLE

DIAMOND FACE



If you have a diamond-shaped face, then you are free to choose any shades without going to extremes though.



AVIATORS



OVAL



ROUND

OVAL FACE



Any sunglasses shape will flatter an oval face. Yet, make sure that their width equals or exceeds your face width a little.



WAYFARER



AVIATORS

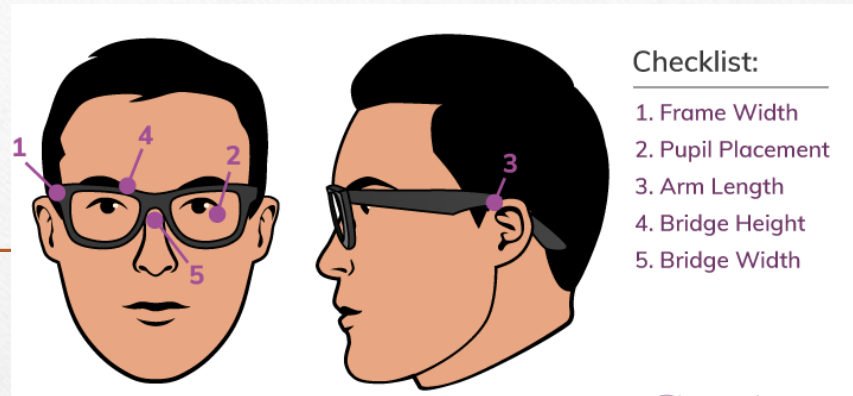


RECTANGLE

Key measurements for determining your fit

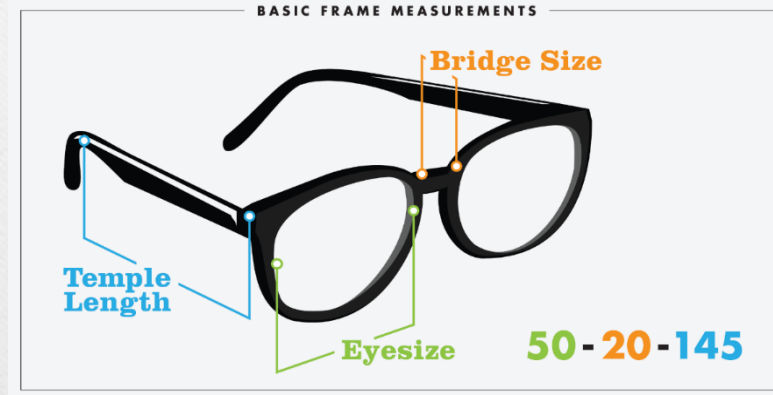
Most eyeglass frames have three numbers stamped inside them.

- Lens width: horizontal length of each lens
- Bridge width: distance between the lenses
- Temple length: length of each temple, or arm, starting at the hinge



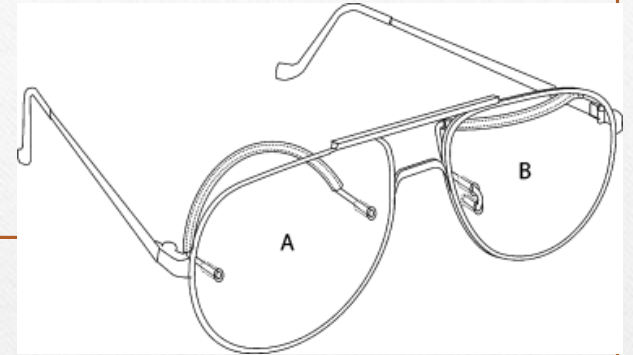
Checklist:

1. Frame Width
2. Pupil Placement
3. Arm Length
4. Bridge Height
5. Bridge Width



Special Eyeglasses

- Crutch glasses
- Moisture chamber glasses
- Safety glasses





Thank You