Sanrio characters

Rachel Yuen ♡

Logbook

Science Fair

2025-2026!!!

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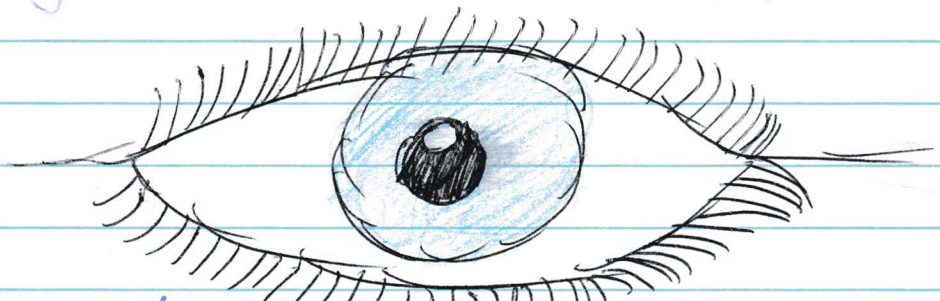

VISION/OPHTHALMOLOGY

"Vision is the art of seeing what is invisible to others."
- Johnathan Swift

MAIN GOAL: Get higher than a Bronze! Do better than last year!!!

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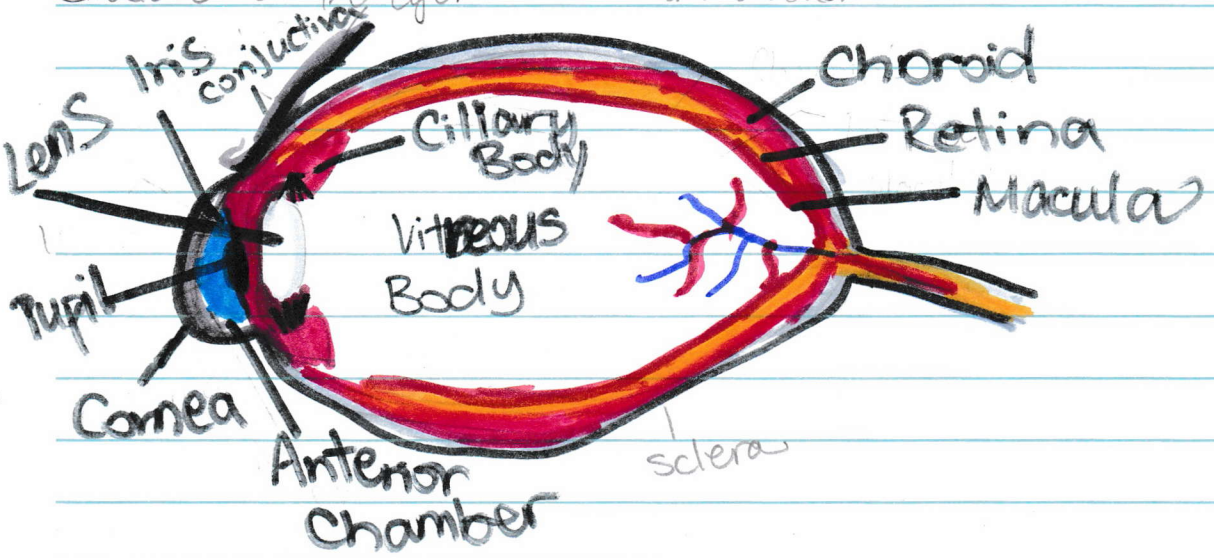
Dec 7th + 11th 2025

Background Research

Structure of the eye: (seen from above)



How Vision Works:

- Eyesight - the mode of perception they value (and fear losing) the most - survey.
- Perception - Ability to become aware due to the senses.
- Many people don't have a good understanding of the anatomy of the eye, vision, or eye health.
- Anatomy - structure

How the eye works:

Eye = similar to a digital camera)

1. Light is focused primarily by the cornea - the clear front surface of the eye, (acts like a camera lens).
2. The iris (coloured part) of the eye functions like the diaphragm of a camera, controlling the amount of light reaching the retina by automatically adjusting the size of the pupil (aperture).

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December 12 2025

Background Research

-Aperture - Opening where light passes (camera).

3. The eye's crystalline lens is located directly behind the pupil and further focuses light rays. Through accommodation (process), this lens automatically helps the eye focus on near and approaching objects, like an autofocus camera lens.

4. Light focused by the cornea and crystalline lens (and limited by the iris and pupil) then reaches the retina - the light-sensitive inner lining of the back of the eye. The retina acts like an electronic image sensor of a digital camera, converting optical images into electric signals. The optic nerve then transmits these signals to the visual cortex - the part of the brain that controls our sense of sight.

-Optical - Relating to sight, especially in relation to the physical action of light.

-Transmits - Cause something to pass on from one place/person to another.

-Visual Cortex - Part of brain that controls our sense of sight.

-Optic - Relating to the eye or vision.

-Diaphragm (di-a-phram) - Device for varying the effective aperture of the lens in a camera or other optical system.

-Varying - Differing in size, amount, degree, or nature.

-Ophthalmology (aahf-fa-mall-i-gee) - branch of medicine about the eye.

-Conjunctiva (con-jing-tai-va)

Conjunctiva Definition

- Can't easily see.

☆ Clear, thin membrane that covers part of the front surface of the eye and the inner surface of the eyelids.

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December 12 2025

Background Research

☆Conjunctiva has two segments.

-Membrane - tissue (lining)

-Segments - sections.

Bulbar conjunctiva (ball-ber):

↳ Covers the anterior part of the sclera (the "white" of the eye). The bulbar conjunctiva stops at the junction between the sclera and cornea; it does not cover the cornea.

-Junction - place where two things join.

-Anterior - nearer the front (Ant- in front of). ← Prefix

Palpebral Conjunctiva (pal-puh-bral):

↳ Covers the inner surface of both the upper and lower eyelids.

↳ Another term - Tarsal conjunctiva (tar-sull).

Both Conjunctiva's are continuous. This feature makes it impossible for contacts or anything else to get lost behind your eye. Continuous - cycle, connected lining, can loop.

Conjunctiva Function:

Primary function:

- Keep front surface of eye moist and lubricated.
- Keep inner surface of eyelids moist and lubricated so they can open and close easily without friction or causing eye irritation.
- Protect the eye from dust, debris and infection causing microorganisms.

-Debris - scattered pieces of waste. (duh-bree)

-Lubricated - make something run smoothly. (lu-bruh-cate)

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Dec 14th 2025

Background Researching

☆ The conjunctiva has many small blood vessels that provide nutrients to the eye and lids.
↳ Also contains special cells that secrete a component of the tear film to help prevent dry eye syndrome.

- Blood vessels - move blood throughout your body.
- Secrete - produce and discharge (a substance)
- Component - section/element.
- Tear film - coats the eyes surface.
- Syndrome - combo of many diseases to create a specific disease or mental condition.

Sclera Definition (sklur-ra)

☆ White of the eye that surrounds the cornea.
☆ Sclera forms more than 80% of the surface area of the eyeball, extending from the cornea all the way to the optic nerve, which exits the back of the eye.
☆ only a small portion of the anterior sclera is visible.
☆ Sclera is the dense connective tissue of the eyeball that forms the "white" of the eye. Continuous with the stromal layer of the cornea.
☆ Junction between the white sclera and the clear cornea is called the Limbus.
☆ Ranges in thickness ~0.3mm - 1mm.
☆ Composed of ~~fibrils (fi-brulls) small fibers~~ of collagen that are arranged in irregular and interlacing bundles. The random arrangement and interweaving of these connective tissue fibers are what account for the strength and flexibility of the eyeball.


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Background Research

Dec 17 2025

- Fiber - Thin strong structures that connect the body.
- Collagen - (col-la-gen) protein in the body.
- Interlacing - interweaving (weave).

☆ Sclera is relatively inactive metabolically and has only a limited blood supply.

☆ Some blood vessels pass through the sclera to the tissues.

☆ Sclera itself is considered avascular.

- Avascular - lacking blood vessels.
- Inactive - not active/engaged.
- Metabolically - Set of chemical reactions in the body's cells that change food into energy. (meta- ball-lick-ly).

☆ Some of the nourishment of the sclera comes from the blood vessels in the episclera (epa-sclera), which is a thin, loose connective tissue layer that lies on top of the sclera and under the transparent conjunctiva (covers sclera & episclera).

☆ Larger episcleral blood vessels are visible through the conjunctiva.

- Episcleral - episclera). (epi- above/on top).
- Nourishment - nourish - provide everything necessary for growth, health, and good condition (ner-rish).

☆ Other nourishment of the sclera comes from the underlying choroid (vascular layer of eyeball that is between the sclera and the retina).

- Vascular - relating to vessels (specifically blood). (vas-cu-lar)

170 (6)

Background Research

Sanrio characters

Dec 17+19, 2025

Sclera function:

☆ Along with the intraocular pressure (IOP) (intra-ock-ular) of the eye, maintains the shape of the eyeball.

☆ The tough fibrous nature of the sclera also protects the eye from serious damage - such as laceration or rupture - from external trauma.

- Fibrous - (fi-briss) - consisting or characterized by fibers.
- Laceration - (la-cer-ration) - tear or cut in skin or flesh.
- Rupture - (body part) break or burst suddenly.
- Trauma - Deeply distressing (upsetting) or disturbing experience.

☆ Provides a sturdy attachments for the extraocular muscles (extra-ock-cular) that control the movement of the eyes.

- Intraocular (intra-ock-cular) pressure - maintains shape of the eyeball.
- Extraocular (extra-ock-cular) muscles - controls the movement of the eyes.

Cornea Definition (Core-nea):

☆ The cornea allows light to enter the eye for vision.

☆ Clear front surface of the eye.

↳ Lies directly in front of the iris and pupil.

☆ Allows light to enter the eye.

☆ Front view - appears slightly wider than tall.

↳ Sclera slightly overlaps the top and bottom of the anterior cornea.

Background Research

sanrio characters

Dec 22 2025

☆ Horizontal diameter of the cornea = ~12mm
☆ Vertical diameter = ~11mm
↳ When viewed from the front.
☆ Back view, the cornea appears circular.
↳ Uniform diameter ~11.7 mm
☆ Cornea = ~$\frac{2}{3}$ size of a dime.
☆ Center thickness of average cornea = ~550 microns / slightly more than 0.5mm

- Uniform diameter - diameter measurement doesn't change (usually predictable) (~same each time).
- Microns - Unit length, a micrometer/$\frac{1}{1,000,000}$ of a meter. µm.

☆ Cornea has 5 layers. Front to back, these layers are:

1. Corneal Epithelium (core-neal' eh-pa-thee-lium) -
↳ Outer layer of the cornea, 5-7 cells thick and measures ~50µm - slightly less than 10% of the thickness of the entire cornea.
- Cells - Makes up all living organisms and tissues of the body.
↳ Epithelial cells (eh-puh-thee-lial) are constantly being produced and sloughed off in the tear layer of the surface of the eye. The turnover time for the entire corneal epithelium is ~1 week.
- Turnover of corneal epithelium - the corneal epithelium being renewed (continuous process).
- Sloughed off (stuffed) - discard/get rid of something.

2. Bowman's layer (bowman) - Very thin (8-14µm) and dense fibrous sheet of connective tissue that forms the transition between the corneal epithelium and the underlying stroma.

Background Research

Sanrio characters

Dec 22+23 2025

-Dense- closely compacted in substance. (thick, heavy).

3. Corneal Stroma (stro-ma) -

-Tissue- consists of cells & make up living things.

↳ Middle layer of the cornea.

↳ ~500 µm thick / 90% thickness of the overall cornea.

↳ Composed of strands of collagen fibrils ((connective tissues) protein structure)).

-Compose- to make up.

-Composed of - to be made up of.

↳ These Fibrils are uniform in size and are arranged parallel to the cornea surface in 200-300 flat bundles called lamellae that extend across the entire cornea.

↳ Regular arrangement and uniform spacing of these lamellae is what enables the cornea to be perfectly clear.

-Uniform- Remaining exactly the same at all times. Unchanging.

-Flat bundle- flat collection of things wrapped/tied together.

-Lamellae (la-mell-be) - plural of lamella (la-mell-la)

Flat bundles (la-mell-ay) of fibrils.

4. Descemet's Membrane (Des-sa-mays) -

↳ Very thin layer seperates the stroma from the underlying endothelial layer of the cornea (en-do-thee-lee-u).

↳ Descemet's membrane gradually (slowly) thinkens throughout life.

↳ ~5µm thick in children & ~15µm thick in older adults.

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Background Research

Dec 23 2025

5. Corneal Endothelium (en-do-thee-lium) -
↳ Innermost layer of the cornea.
↳ Back of Endothelium is bathed in the clear aqueous humor that fills the space between the cornea, the iris, and the pupil.
↳ Corneal Endothelium is a single layer of cells thick and measures ~5 μm.
↳ Most of the endothelial cells are hexagonal, but some may have 5 or 7 sides.
↳ Regular arrangement of these cells is sometimes called the endothelial mosaic.

- Endothelial Mosaic - regular arrangement of endothelial cells.
- Mosaic (mo-say-ick) - picture/pattern produced by arranging small pieces of sth together.

Cornea Function:

☆ Allows light to enter the eye for vision.
☆ Provides ≈65-75% of the focusing power of the eye.
-∪- About -≈- approximately.
☆ Remainder of the focusing power of the eye is provided by the crystalline lens (located directly behind the pupil).
☆ Most refractive errors - nearsightedness, farsightedness, and astigmatism (a-stigma-tis-um) - are due to a less-than-optimal curvature or symmetry of the cornea.
↳ Presbyopia (press-be-o-pee-uh), is due to an aging change in crystalline lens.

- Refractive - refraction - bending of waves (light/sound etc...) as they pass from 1 transparent material to another, due to their speed changing.

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Background Research

DEC 23 2025 – Jan 2 2026

- Curvature (cur-va-ture) - fact of being curved or the degree to which sth is curved.
- Optimal - best or most favorable.

Specialized functions for each part of cornea.

Corneal Epithelium - provides an optimal surface for the tear film to spread across the surface of the eye to keep it moist and healthy and to maintain clear, stable vision.

Bowman's layer - denseness helps prevent corneal scratches from penetrating into the stroma. Corneal abrasions that are limited to the outer epithelial layer generally heal without scarring; but scratches that penetrate into the Bowman's layer and the stroma typically leave permanent scars that can affect vision.

Penetrate/penetrating - go into/through sth, especially with force or effort.

Abrasion - scraping or wearing sth away.

Corneal Endothelium - single layers of cells that forms the endothelium maintains the fluid content within the cornea. Damage to the endothelium can cause swelling that can affect vision and corneal health.

Uvea (you-v-ah)/Iris/Ciliary Body/Choroid Definition:

Uvea: Natural coloured middle layer of the eyeball. Has 3 sections: Iris, Ciliary body, & choroid.

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Background Research

Jan 2 2026

Iris: Thin, circular structure (made of connective tissue + muscle that surrounds the pupil). Colour of eyes is determined by the amount of pigment in the iris.

Ciliary Body (silly-airy) - Surrounds iris & cannot be seen because it's located behind the sclera.

Choroid (core-royd) - posterior portion of uvea. Contains many tiny blood vessels. Has vital role of nourishing the retina.

Posterior (pos-ste-rior) - near the back (post- behind)
Prefix

Iris, Ciliary Body, & Choroid Functions

Iris - acts like diaphragm (camera). Controls size of the pupil. One muscle in the iris constricts the pupil in bright light, and another muscle dilates the pupil in dim lighting & in the dark.

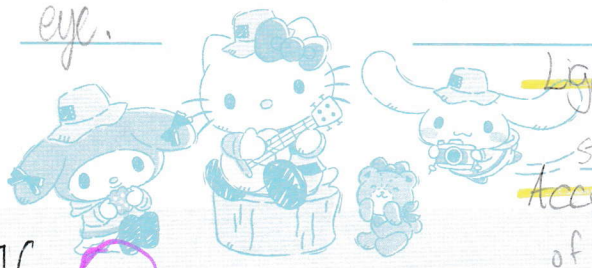
Constricts - narrow - longer than wide/small width

Dilates (die-lates) - enlarge.

Ciliary Body - holds the lens in place. Connected to the lens with a group of tiny ligaments/ciliary zonules/zonules of Zinn (zone-yule) that suspend the lens in place behind the pupil. Secretes (produce + discharge) the aqueous fluid that fills the space in the anterior segment of the eye between the cornea, iris, and lens. Contains the muscle that controls the accomodation of the eye.

Ligaments - Connective tissue that connects stuff for joints.

Accommodation - adjustment of focus of the eye.



Sanrio characters

Background Research

Jan 2 2026

Ciliary Body - posterior portion of uvea. Sandwiched between the tough outer sclera of the eyeball & the retina in the back of the eye.

Pupil Definition:

- Opening in center of iris. focused on retina to begin sight.
- Usually perfectly round, equal in size, & black (color).
  - ↳ Black bc light passing through is absorbed by retina and doesn't reflect back (normal lighting).
  - ↳ Cloudy/pale = usually the lens (directly behind pupil) has become opaque due to the formation of a cataract.
    - ↳ Cloudy lens replaced by a clear intraocular lens (IOL) during cataract surgery = regular black pupil restored.

Cataract - clouding of normally clear lens.

- Another common situation where a pupil changes color.
  - ↳ using Camera's flash function for a photo.
    - ↳ Direction you gaze at, sometimes your pupils appear red.
      - ↳ Bc of intense light being reflected by (red) retina.

Pupil Function:

☆ Iris & pupil control how much light enters the eye through the pupil.

↳ Camera terms, iris = diaphragm that controls the size of the apeture = pupil.

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Optic vision study: Comparing causes for ---

Sanrio characters

Jan 2 2026

Background Research

☆ Size of pupil is controlled by muscles within the iris.
↳ One muscle makes pupil smaller.
↳ Another makes it larger.

☆ Dynamic process controls how much light enters the eye through the pupil.

Dynamic - constant change.

☆ Low light conditions - pupil dilates so more light can reach the retina to improve night vision.

☆ Bright conditions - pupil constricts to limit how much light enters the eye.
↳ Too much light = glare + discomfort, may damage lens + retina.

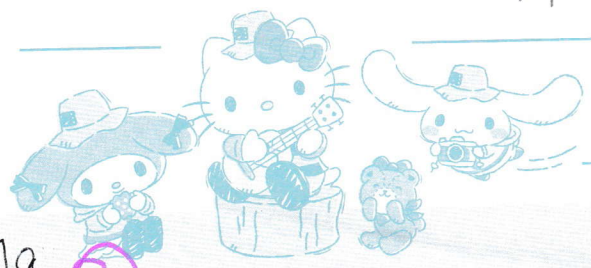
Pupil Size

↳ Varies, pupil size changes w/ age - children + young adults tend to have large pupils. while seniors usually have small pupils.

Tend - frequently/regularly

↳ Generally, normal pupil sizes (adults) ranges from 2-4mm in diameter in bright light & 4-8mm in the dark.

↳ Additionally, both pupils normally constrict when you focus on a near object.
• Accommodative pupillary response. (pew, pillary)



Background Research

Sanrio characters

Jan 24 2026.

Retina Definition: (Red-in-na)

- Conversion of light into signals takes place in the retina.
- Located @ back of the eye.
- Sensory membrane (tissue) that lines the inner surface of the back of the eyeball.
- Composed of several layers.
  - ↳ 1 contains specialized cells called photoreceptors.
  - ↳ 2 types of photoreceptors in human eye.
    1. Rods 2. Cones.
- Rod photoreceptors detect motion, provide black-&-white vision & function well in low light.
- Cones are responsible for central vision & color vision, & perform best in medium & bright light.

Sensory - Senses related.

- Rods = located throughout retina
- Cones = small central area of retina → macula.
- Center of retina = macula = small depression called the fovea.
- Fovea contains only cone photoreceptors, point in the retina responsible for maximum vision acuity and color vision.

Vision Acuity (A-cue-i-tty) - Ability to see figures and fine detail w/clarity.

Clarity - Easy to see/hear, sharpness.

Depression - hollow place.

Retina Function

- Photoreceptor cells take light focused by cornea and lens & convert it into chemical & nervous signals which are transported to visual centers in the brain by way of the optic nerve.

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Background Research

Sanrio characters

Jan 4 2026

- In the visual cortex of the brain (located in back of brain), these signals are converted into images & visual perceptions.

Visual Cortex (core-tex) - located @ back of the brain. Converts chemical & nervous signals into images & visual perceptions.

What is the Choroid?

- Middle layer of tissue in the wall of the eye.
- Found between the sclera & retina.
- Thin layer is made up of almost entirely of blood vessels.
  - ↳ Blood vessels supply oxygen and nutrients to the outer part of the retina.
- Choroid is the life source that keeps the retina healthy & functioning.

Choroid Anatomy

- Part of the uvea (so is the iris & ciliary body).
  - ↳ Iris & ciliary body work together to dilate & constrict the pupils.
- Choroid layer begins in the peripheral edges of the eyeball & lines the entire back of it, sandwiched between the sclera & the retina.
- Thickness of choroid varies depending on what part of the eye it is lining.
  - ↳ Ex: in the back of the eye, it's thickest (≈ 0.2mm) and narrows to ≈ 0.1 mm as it gets to the peripheral part of the eyeball.

80 (10)

Background Research

Sanrio characters

Jan 4 + 8 + 12 2026

Peripheral (per-rith-theral) - relating to or situated on the edge of periphery of something.

Periphery (per-rith-thery) the outer limits or edge of an area or object.

Situated - Placed in a particular position or condition.

★ Four different layers of the choroid.

1. Bruch's membrane (broock) - Thin layer of tissue located on the innermost part of the choroid. (In: retina, To: optic sclera)
2. Choriocapillaris (choreo-capa-lair-ris) layer made up of capillaries (tiny blood vessels that connect arteries to veins (cap-pi-lair-rees)).
3. Sattler's Layer (sat-lers) - Layer of medium blood vessels.
4. Haller's layer (Hall-lers) - Outermost layer of choroid, contains large blood vessels.

Arteries (Ar-ter-ries) - Blood vessel that carries blood from the heart to tissue & organs in the body.

Veins - tubes of the blood circulation in the body, carries blood towards the heart.

Choroid Function

- Eyes + clear vision depends on enough blood supply to function.
- Choroidal circulation accounts for 85% of blood flow within the eye.
  - ↳ Vital structure to the function of our eyes
- Provides nutrients for the retina, macula, & optic nerve.
- Regulating (maintain) the temp. of the retina.
- Help to control pressure within the eye.

Sanrio characters

Jan 12+13 2026

Background Research

- Absorbing light and limiting reflections within the eye that could harm vision.

↳ This part of the choroid is what cause "red eyes" when a photo is taken (using flash).

What is Macula Lutea? (mack-cue-la-loo-tee-uh)

☆ Commonly called the macula
☆ Most sensitive spot in the center of the light (sensitive retina) in the back of the eye
☆ Responsible for vision acuity, central vision, & color vision

Central vision - sharp detailed sight directly in front of you.
Color Vision - Ability to see and differentiate (differ-ent-she-ate) colors.

☆ "... is the area of the retina that allows us to see 20/20".
- Maria Richman, OD.

☆ "... the small and highly sensitive part of the retina... responsible for detailed central vision. The macula allows one to appreciate detail and perform tasks that require central vision, such as reading". - Maria Richman, O.D.

☆ Macula makes it possible to see in great detail while the rest of the retina provides peripheral (side) vision.

Why is it Called Macula Lutea

☆ Latin: macula - spot lutea - yellow.

☆ Macula lutea is a very small spot in the central retina.
☆ 5.5mm (less than 1/4 in) in diameter.

Sanrio characters

Background Research

Jan 13th 19 2026

☆When viewed/photographed by the eye doctor, the macula appears yellow (rest of retina - red).
↳ Yellow is due to the macular pigment, mainly made of lutein and zeaxanthin from your diet.

Macular Pigment (mack-cue-ler) - protects cells in the macula from the potentially harmful effects of high-energy visible (HEV) blue light from the sun.

Blue Light - light that digital electronics emit.

Lutein (loo-dee-en) - yellow pigment found in plant leaves, egg yolk, and the corpus luteum.

Corpus Luteum - temporary structure in the ovary.
(cove-pis) (loo-tee-um)

Zeaxanthin (zee-uh-zan-thin) - present in the retina and in many plants. Used as a food additive and supplement.

Additive (ad-deh-tive) - substance added to something in small quantities to improve or preserve it.

Supplement - something that completes or enhances something else when added to it.

Anatomy of the Macula Lutea

- High concentration on cone photoreceptor cells.
  ↳ Responsible for colour vision & ability to see fine details.
  - ~ 6-7 million cone cells in the retina, most located in the macula lutea.
  - Highest concentration is in the fovea (or fovea centralis).
    ↳ Central pit in macula that contains only cone cells.

Zoom Meeting Q&A

Sanrio characters

jan 17
2026

Q: How much time should be spent doing research?
A: Up to you

Q: How much mins/hrs/week should I spend time on my project?
A:

Q: What makes a good science fair project?
A:

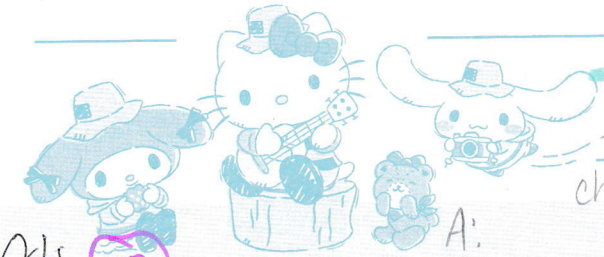
Q: What questions in this survey is unclear or doesn't make sense.
A:

Q: What can I do to enhance this survey?
A:

Q: If you were doing this survey, what doesn't make sense or needs clarity?
A:

Q: What can I do to enhance this?
A:

Q: After collecting data from peers, how could I have them participate in an experiment that provides a deeper understanding or result?
A: N/A



Q: Is their anything in my project that needs additional data or needs changing?
A:

Sanrio characters

Jan 17th/19
2026

Zoom Meeting Q&A

Q: Any techniques that you suggest to help me focus?
A: keep it fun, not a lot of time. Not insanely details. Not too much pressure.
Q: What are some tips to keep me from getting distracted?
A:

Q: Does lofi music or jazzy music in the background interupt my focus/recommended music?
A:

Q: What could be some independent, manipulated, and dependent variables?
A:
★Independent - The test

★Dependent - results.

★Manipulated - who is taking the test/which condition.

Q: Is this challenging for my age, or is it too basic?
A: Interesting q's. Very specific.

Jan 19 2026

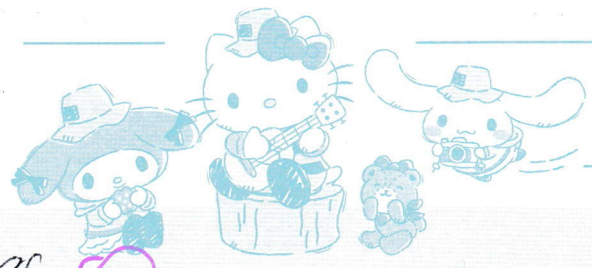
Sanrio characters Background Research

- Most rod cells are located outside the macula.
  ↳ Don't provide high-resolution or color vision, rod cells provide peripheral vision, perceive movement and shades of gray, and can function in low-light conditions.
  ↳ Estimated 120 million rod cells in the retina.
- Macula (specifically the fovea) is the only area of the retina where 20/20 vision is attainable and where color and fine detail can be distinguished.

High-Resolution - showing a large amount of detail.
Perceive - related to perception
20/20 vision - can read a row of letters on an eye chart 20 ft away.
Attainable - achievable

- As a result, the macula is responsible for enabling sharp visual detail (important for activities. e.g. driving, recognizing faces, watching TV, and engaging in all other visual tasks that require to see details).

Enable (in-able) - allow.



Survey Specifics — Sanrio characters

Jan 20 2026

HEALTHY EYE HABITS FOR KIDS.

1. Eat a balanced diet
2. Wear protective eyewear (glasses, goggles).
3. Limit screen time. (20-20-20 rule) Screen 20 mins Break 20 secs Look 20 ft. 20 secs
4. Do vision-centered activities (hand-eye coordination).
5. Spend time outside (high-quality sunglasses).
6. Get regular eye exams.
7. Getting enough sleep!

BAD EYE HABITS FOR KIDS (OPPOSITE).

1. Unbalanced diet
2. Not wearing protective eyewear
3. Unlimited/lots of screentime.
4. Not doing vision centered activities.
5. Not spending time outside/not wearing high-quality sunglasses.
6. Not getting regular eye exams.
7. Not getting enough sleep.

Myopia/Nearsightedness

+ Jan 23 2026

- can't see far things; children
- Canadian school aged 11-13 almost 30% have myopia.
- 81% of children age 8-12 with or at risk of myopia.
  - ↳ D → -0.50D to -2.00D.
- Causes: Genetics & Environment.
  - Genes
    - ↳ 1/2 chance - both parents are myopic. 50%
    - ↳ 1/3 chance - one parent is myopic. ~33%
    - ↳ 1/4 chance - no parent is myopic. 25%
  - More common than hyperopia.
  - Eyeballs too long (can't reach retina).

Survey Specifics

Sanrio characters

Jan 20 + 23 2026.

Hyperopia (Hyper-o-pea-uh)

- Harder to focus on a book, smartphone, or other close-up objects.
- Can't see close up, distant objects look clearer.
- Hypermetropia (Farsightedness) (hyper-meh-tro-pee-ah).
- Light doesn't bend correctly (retina).
  ↳ When farsighted, light focuses behind the retina instead of on it.
- Symptoms vary from person to person.
  ↳ Everything might look
- Usually caused by a normal difference in the way your eyes develop.
- Genetics can contribute.
  ↳ If someone in your family is farsighted, you're more likely to be farsighted too.
- Differences in eyes can cause farsightedness:
  ↳ Eyeball is shorter from front to back (most common).
  ↳ Cornea or focusing lens (inside) is flatter than normal.
- Rarely can be caused by an eye condition, injury or complication.
- Cornea problem - several light rays of focus. - ASTIGMATISM.
  ↳ Blurry vision. Caused by irregular shaped (mild) lens or cornea.
- Most children are born with hyperopia. Eyes can usually adjust to it on their own.
- Some don't outgrow it or are very (eyes not properly aligned. ay-blee-o-pee-a) farsighted. may need glasses, (stra-bis-mus)
  ↳ If not corrected, can lead to crossed eyes (strabismus) or lazy eye (amblyopia).

Hypothesis Ideas

Sanrio characters

Jan. 24 2026 + Feb. 8 2026

If ... Then ... Because ...

If peers in my grade do not pay much attention to their eyesight, then my peers understanding and estimates for what is a reality for our eyesight is not very accurate, because the results in the survey and tests

If kids in my grade have low knowledge on their eyesight and vision, have a lot of screentime daily, and have a certain family member with an eye condition, then they are more likely to have an eye condition and an unaccurate estimate about

If daily habits and genetics affect our eyesight, then I think kids in my grade that have more screen time, don't spend much time outside, eat lots of junk food, and don't protect their eyes to have a higher chance to have an eye condition and have a low knowledge on their eyesight and vision. Because, if their survey answers are below average and the participants recruited test results are lower than expected, what my peers expect to what is a reality is very unaccurate.

Edited online

If daily habits, the environment, genetics, and ~~food~~ consumption can affect our eyesight, then I think genetics and the environment are the biggest factors that can affect our eyesight because what you eat is ~~not~~ common that someone else eats it too, and daily habits are ~~very~~ common throughout this group. That is why I think genetics and the environment are the biggest factors that can affect our eyesight.

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Survey Specifics

Sanrio characters

jan 24, 2026 (25)

Food that affects the eye

Negative: (junk: sodas, snacks) (candy)

- Processed (changed) and sugary foods.
- Trans fats (bad fats). - baked goods, (fast) fried foods.
- High-sodium foods (processed, canned, restaurant prepared). (too much salt).
- Refined Carbs (processed food that have fiber, nutrients, and vitamins (stripped) removed). - white bread, white pasta, sugary food.

Positive:

- Vitamins
  - ↳ Dairy (A - nutrient for photoreceptors)
  - ↳ Oranges (C - highly concentrated in aqueous humour fluid).
  - ↳ Avocados (E - protect fatty acids from combining w/ oxygen).
- Other
  - ↳ kale (carotenoids - lutein & zeaxanthin)
  - ↳ Dark chocolate (Flavonoids - improve function retina ganglion cells - process visual input),
  - ↳ Eggs (selenium - prevents oxidation for several eye conditions),
  - ↳ salmon (omega 3 - structure of cell membranes + support visual function).

Myopia (-0.25 to -2.00)

- Low - up to -3.00 d. - may only need glasses for some activities
- Moderate - (-2.25) (-3.00) d. to (-5.00) (-6.00) d. - requires glasses for everyday activities
- Severe - (-5.00) (-6.00) + d. - requires glasses for everyday activities.

Hyperopia (+0.25)

- Low - up to +2.00 d.
- moderate - (+2.25) d. to (+5.00) d.
- Severe - (+5.25) d. +.

- For both, close to 0, the better (+5.00) the vision.

Sanrio characters

Feb. 8 2026

Quick Background Research

Lens

- ☆ Aka Crystalline Lens.
- ☆ Allows eye to focus on objects at varying distances.
- ☆ Behind Iris in front of vitreous body.
- ☆ Made up almost entirely of proteins.
  - ↳ Proteins 60% of the lens.
- ☆ Tissue is transparent.
  - ↳ Allows light to easily enter the eye.
- ☆ Flexible - can change shape and bend the light to focus properly on the retina.
- ☆ Bends and focuses light to create a sharp image.
  - ↳ Uses help of ciliary muscles to stretch and thin out when focusing on distant objects, or to shrink and thicken when focusing on near objects.
- ☆ When light enters the eye, the lens will bend and focus incoming light directly on the retina.
  - ↳ How the clearest possible image is produced.
- ☆ Lens projects a focused image on the retina.
  - ↳ Beginning image projected is inverted (either upside-down or reversed).
  - ↳ When image is sent to brain via optic nerve, the brain will flip image back to normal.
- ☆ Ciliary body is critical for lens to function correctly.
- ☆ Lens is kept in place by little fibers connected to the ciliary body (zonular fibers/zonules).
- ☆ Ciliary body produces aqueous humor (Keeps the lens healthy and functioning).

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Background Research

Sanrio characters

Feb. 8 + 12 2026

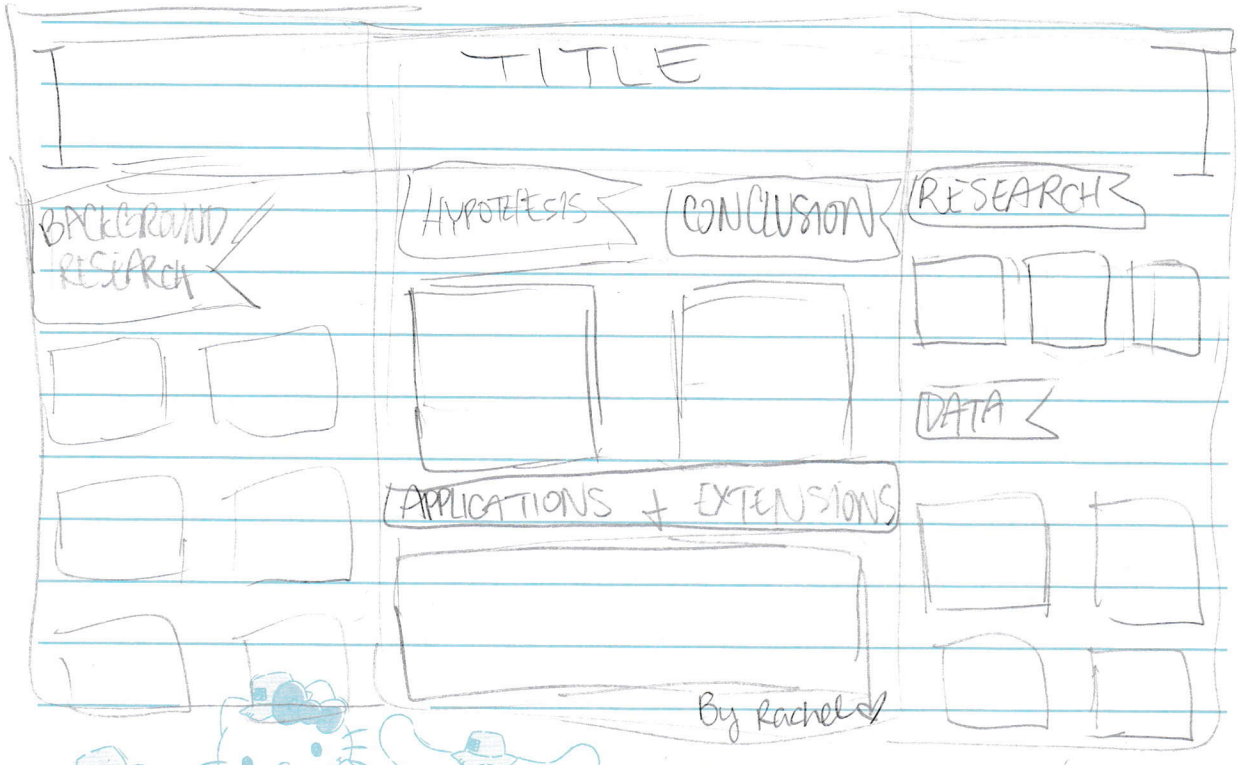
- Lens relies on aqueous humor for energy and cleansing rather than nerves or blood flow.
- Accomodation (changes) relies on elasticity of lens.

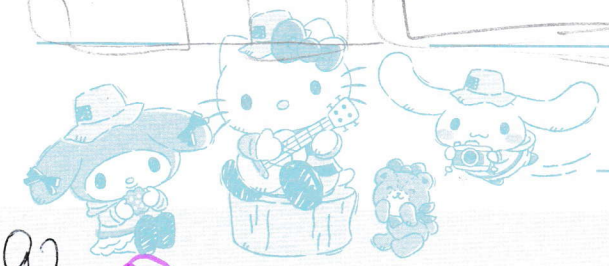
Aqueous Humor

- Clear fluid located between cornea and lens.
- Flows through eye, then drains from the eye through the trabecular meshwork.
- Trabecular meshwork (tra-beck-cue-ler mesh-work).
  - ↳ Spongy structure.
  - ↳ Regulates eye pressure by draining aqueous humor.

LAYOUT #1

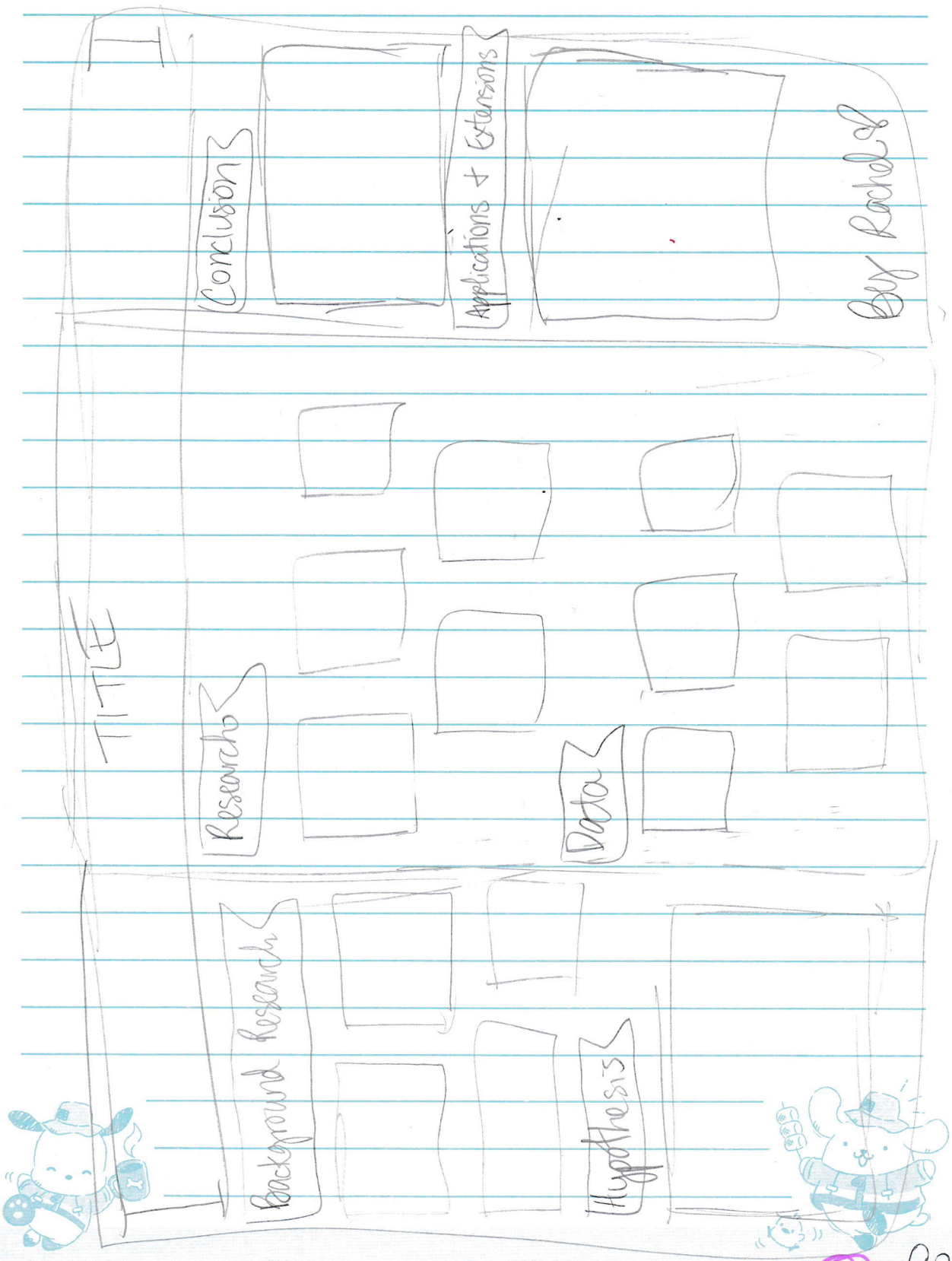
Feb 16 2026





LAYOUT #2 Sanrio characters

Feb 16 2026



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