

Building Smart Contact Lenses

Overview

You have been asked to design a model of a smart contact lens that can communicate visual problems directly from the patient's eye to the ophthalmologist.

Step 1: Build an Eye

- You will build a 3D model of an eye using art supplies and building materials that your teacher provides you.
- Look at [Handout: Eye Diagram](#) so you know what parts of the eye must be included in your model.

Step 2: Brainstorming and Sketching a Smart Lens

- Now, you will brainstorm an idea for a smart contact lens that can go over the eye you have created. The contact lens will be "smart," meaning it will have technology incorporated into it. Specifically, the technology will be a microchip. A microchip is like a tiny computer that stores information on a small chip. Look at [Handout: What are Contact Lenses?](#) to get some ideas for what smart lenses can do. Choose one or make up your own use! Fill out the questions below and sketch a picture to show how the smart lens will work.
- Where will the microchip be located on the lens?
- What type of information will the microchip send to the ophthalmologist?
- Who would benefit from this type of lens?
- Sketch what your contact lens will look like on a separate sheet of paper.

Step 3: Building a Smart Lens

- You will build a 3D a smart lens to go over the eye you created.
- Use art supplies and building materials provided by your teacher.
- Your smart lens should cover the iris completely. At the same time, make sure the microchip doesn't cover the iris.

Eye Diagram

Pupil

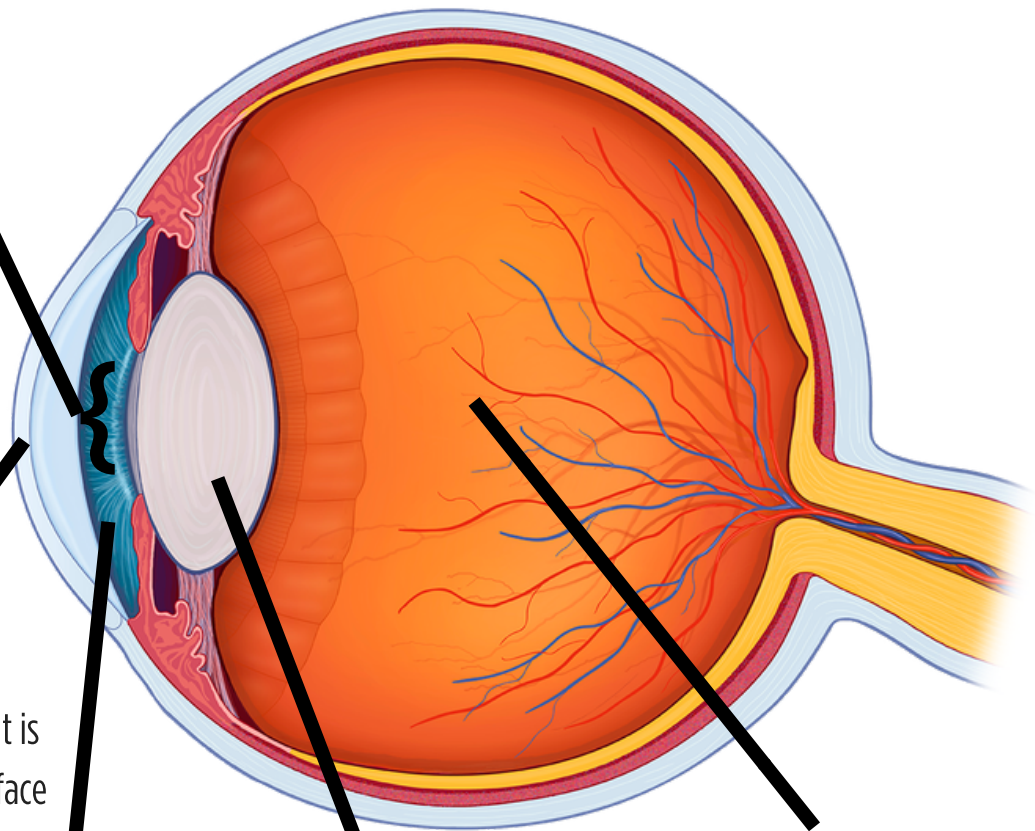
The opening in the center of the iris. Light passes through the iris instead of reflecting it which is why it is black in color.

Cornea

The eye's outermost layer. It is the clear, dome-shaped surface that covers the front of the eye. It plays an important role in focusing your vision.

Iris

A thin, circular structure in the eye, responsible for controlling the diameter and size of the pupil and the amount of light reaching the retina. Eye color is defined by that of the iris.



Lens

A transparent structure behind the iris that helps to focus light and images.

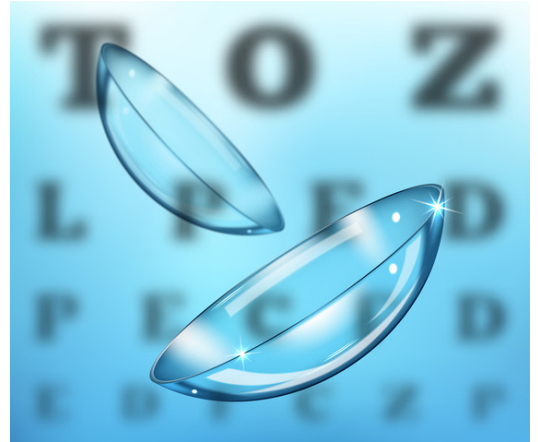
Vitreous Humor

A clear, colorless fluid that fills the space between the lens and the retina of your eye.

What are Contact Lenses?

What is a contact lens and why do people use them?

A contact lens is a thin plastic lens placed directly on the surface of the eye to correct visual defects. There are two types of contacts, soft lenses, and hard lenses. Soft lenses are made from gel-like, water-containing plastics called hydrogels. These lenses are very thin and pliable and conform to the front surface of the eye. Hard contact lenses are made of rigid material -- it's not bendable. This benefit of this type of lens is that they do not dry out, making them a bit more reliable than soft lenses. Many people wear contact lenses instead of traditional glasses if they lead an active lifestyle, if they don't like the way they look in glasses, for a more convenient way to correct vision problems, or for general comfort reasons.



Can contact lenses help people with serious eye problems?

One serious eye problem in some people are cataracts. A cataract is a clouding of the normally clear lens of your eye. For people who have cataracts, seeing through cloudy lenses is a bit like looking through a frosty or fogged-up window. Clouded vision caused by cataracts can make it more difficult to read, drive a car (especially at night), or see the expression on a friend's face. Contacts can help people that suffer from cataracts see better.

Smart Contact Lenses

Scientists are currently trying to incorporate technology into contact lenses. They are hoping to help people with medical issues, colorblindness, and even enhance "normal" eyes! Smart contact lenses will have tiny microchips (super-small computers that can perform tasks) attached to them. The microchips collect information from the outside world that the human wearer couldn't collect on their own. That information is then sent somewhere to be used. The information can be sent to a computer, smartphone, or even into the person's brain! The microchips will be so small, the contact wearer will not even be able to feel them inside the contact. The microchip can be programmed to do almost anything, like correct colorblindness or give someone super-vision! That person would be able to see much further and more clearly than someone without smart contact lenses. Other lenses are being developed to monitor the blood sugar of a diabetic person. If their blood sugar fell too low, the microchip would send an alert to the wearer's phone. This way, the person could fix the problem before it got too serious.