**ACTIVITY: Eye dissection**

**Activity idea**

In this activity, students use dissection to examine the parts of an eyeball.

By the end of this activity, students should be able to:

* observe parts of an eye
* name some key components of an eye
* link the parts of an eyeball to their functions.

# For teachers

## Introduction/background

Dissections offer memorable science experiences that can provide inspiration for students to learn more about living things and even consider pursuing a career in biology. There are many ways a dissection can be done, and this will depend on you and your students’ knowledge and confidence. You may wish to start off simply with a teacher demonstration, watch a [video](https://www.exploratorium.edu/learning_studio/cow_eye/step01.html) or even ask an expert to come in. Always take time for students to observe closely and develop questions about what they discover.

***Pedagogical help***

Cows’ eyes are a good size for observing many of the parts found in a human eye. Note that these must be sourced from an approved provider (refer to the Ministry of Education’s [Safety and science](https://stanz.nzase.org.nz/app/uploads/2015/05/Safety-and-Science.pdf) page 32.) You can freeze eyeballs and defrost them for use, but it does result in the lenses becoming opaque.

Acknowledge the importance of being respectful when using animal parts to learn. You may have students who choose not to participate in the dissection for personal or religious reasons. Let them know that this is their choice and offer [alternative ways of learning about the eye](https://www.sciencelearn.org.nz/resources/3007-labelling-the-eye). Some students may wish to include a karakia before they begin.

Highlight any safety concerns. This could include but is not limited to the following:

* Using biological material. Keep the material on boards. Avoid contamination – secure long hair and clothing. Ensure students wash their hands after handling the material. Dispose of the material by freezing it. Equipment and surfaces should be cleaned and disinfected.
* Using sharp equipment. Ensure students cut away from themselves.
* Feeling unwell. Some students may feel nauseous or faint. Make sure that they know what to do if this happens to them – it may not always be the students who expect it.
* Provide access to a space for students to sit where they cannot see the dissections.
* Provide varying levels of participation such as asking a less-confident student to record the process.

Place diagrams and other materials in clear files for easy cleaning.

Set up work spaces with newspaper and boards. Try to ensure a good amount of space so students can gather around and have room to lay out the interesting things they find.

There are different ways you can cut an eye. One way that will show the parts well is to cut around the middle of the eye so that you can open the two sides up – a little like opening up a book. Exploratorium has [step-by-step instructions](https://www.exploratorium.edu/learning_studio/cow_eye/doit.html) and a [video](https://www.exploratorium.edu/learning_studio/cow_eye/step01.html), which may be helpful.

During clean-up, pass around a container for groups to put their dissected eyes into rather than carrying the material around the room. Fold up and dispose of any paper/gloves into a lined bin. Wash/disinfect equipment and surfaces. Ensure students wash their hands well.

## What you need

* Eyes to dissect – one eye between 2–3 students
* Sharp dissecting scissors – 1 per group (scalpels and tweezers are optional)
* [Diagram of the eye](https://www.sciencelearn.org.nz/images/2312-cross-section-through-the-human-eye)
* Laminated labels and felt pens (optional)
* Boards to work on
* Newspaper for covering desks
* Containers for disposal – for example, ice cream containers
* Alternative activities – such as [Labelling the eye](https://www.sciencelearn.org.nz/resources/3007-labelling-the-eye)
* Access to hand-washing facilities
* First aid kit
* Old shirts or aprons (optional)
* Gloves (optional)
* Devices to take photographs (optional)
* Disinfectant to clean surfaces

## Teaching suggestions

1. Find out what students already know about the eye. Ask them to partner up and look at each other’s eyes. What do they notice? What parts can they name? Are all eyes the same? Are reptile eyes the same as mammals? Are cows’ eyes the same as humans’ eyes?
2. Observe and discuss a [diagram of an eye](https://www.sciencelearn.org.nz/images/2312-cross-section-through-the-human-eye). Introduce any [key words](https://www.sciencelearn.org.nz/resources/1887-sight) you want students to use during the dissection.
3. Watch the videos [How the eye works](https://www.sciencelearn.org.nz/videos/11-how-the-eye-works) and [The eye’s lens system](https://www.sciencelearn.org.nz/videos/13-the-eye-s-lens-system).
4. Provide the cow eyes for student observation.
5. Ask students to identify the parts they know as well as parts they do not know. Use the diagram to help.
6. This is a good point to get students to make an observational drawing of their own.
7. Point out any muscles that may be attached to the eye. Ask students to move their eyes from side to side and up and down, noting that this action is supported by these muscles.
8. Cow eyeballs often have a lot of fat around them. Discuss its role in cushioning the eye.
9. Ask students to locate the optic nerve – they may need to remove some fat to see this clearly. Discuss how it connects with the brain.
10. Provide the scissors. Discuss how to use them safely and what to do if there is an accident.
11. Begin the dissection. The sclera (outside white part of the eye) can be surprisingly tough so approach the initial incision with care. Cutting down onto a board can help. You may need to help students with this part. You will need to apply a bit of force to pierce the eyeball initially in order to get the scissors in to be able to cut around the eye – sometimes this may result in a squirt of vitreous fluid.
12. Once the initial incision is made, cut around the eye. Ask students to observe:
* the vitreous humour – this can be quite jelly-like or liquid if the eye has been frozen
* cornea
* iris
* lens
* pupil
* blindspot
* optic nerve.
1. Ask students to name the parts and describe the role of each part.
2. Ask students to lay out the parts on the newspaper and label them using a felt pen. Alternatively, provide laminated labels.
3. Hold the lens over a piece of text. What do students observe?

1. Once students have had some time to explore, ask them to share what surprised or interested them about the eye or what questions they have.
2. Clean up the area and ensure students wash their hands thoroughly.

## Extension idea

Follow up the dissection with a reflective activity. Poetry or art can be effective at supporting this.