

Our Mission

The Michigan Society for Medical Research (MISMR) is a nonprofit educational organization that supports biomedical research and testing and the judicious use of animals in research, education and testing in the interests of human and animal welfare. Established in 1981, MISMR is made up of the state's leading research universities, teaching hospitals, pharmaceutical companies, voluntary health organizations and hundreds of scientists, educators and students who understand and support the importance of animal research and testing in advancing health care and treatment.

DID YOU KNOW?

How the Eyes See

- Light enters the eye from the cornea.
- From the cornea, light passes through the pupil. The amount of light is regulated by the iris, which is the colored part of the eye.
- The light hits the clear lens.
- It passes through the vitreous humor.
- Light reaches the retina, where the image appears to be upside down, reversed, and two-dimensional.
- The optic nerve sends this image to the back of the brain to an area called the occipital lobe. There the brain interprets the image as right-side-up and un-reversed. The image is also three-dimensional because of the separation of the eyes. This separation permits us to see objects from slightly different angles, which the brain fuses into a single three-dimensional picture.

Causes of Blindness

- **Diseases**
- **Malnutrition:** Lack of vitamin A (found in vegetables)
- **Accidents:** Chemicals and sharp objects

Reference:
Kids Discover Magazine, "Eyes". Feb. 2000

BioFocus

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Let's Focus on Science in the Classroom

By Shirley Wroblewski, BS, LVT, LATG

The science curriculum for second graders in the Saline School District (MI) contains a unit on learning about the eye called "Eye Spy". The teachers present a variety of worksheets, games, and puzzles based on the anatomy of the eye and the students are expected to memorize the specific parts of the eye (See Fig. 1) along with their functions. During this month long unit their teachers also read fun stories related to "eyes" such as: *Spectacles* by Ellen Raskin, *Through Grandpa's Eyes* by Patricia MacLachlan, and *Arthur's Eyes* by Marc Brown. In addition they learn about Helen Keller, the Braille system, and read *Living with Blindness* and *Seeing*. Over the past nine years additional topics such as: facts about the eye, disorders of the eye, and the history of the invention of eyeglasses and contacts, have been incorporated into this study and included in a "Did You Know?" handout (See side bars and end of this article). At the end of this whole unit the students take a final test on the parts of the eye. When everyone in the five classes at Pleasant Ridge Elementary School has had the chance to achieve a score of 100%, then the sheep's eye dissection days are scheduled.

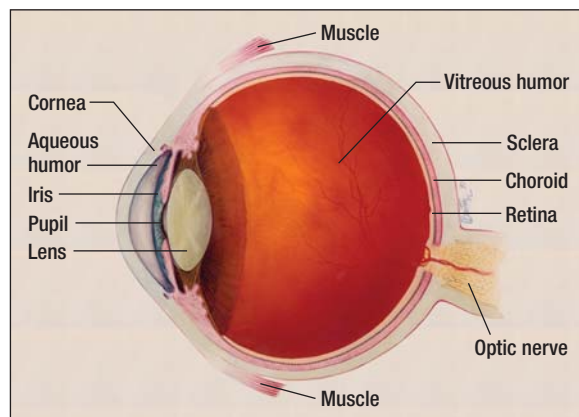


Fig. 1 Anatomy of the eye.

(Permission to use by National Eye Institute, National Institutes of Health)

Usually formalin fixed sheep eyes (Biological Research Systems, Inc., Belleville, MI) are used because of scheduling purposes and convenience, although fresh sheep's eyes are preferred. The downside of using formalin fixed eyes, besides being a biohazard agent, is that it causes the cornea to become cloudy, the vitreous body to thicken, and the eye to harden. A few days before the students handle the eyes the formalin is removed, the specimens are soaked in 70% reagent alcohol, and they are stored in .9% saline irrigation solution in the refrigerator.

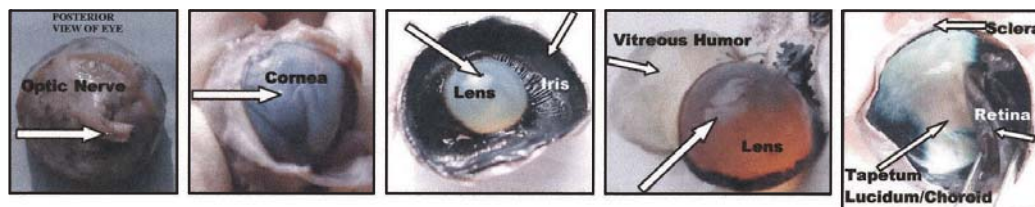


Fig. 2 Anatomy of an actual sheep's eye.

On dissection day, two students are paired with an instructor to help them dissect and discuss the specific parts of the sheep's eye (See Fig. 2). The students put on exam gloves and if requested they may wear a shielded mask and a gown. They use a regular dissecting kit which contains tissue forceps, a small blunt probe, a pair of scissors, an eyedropper, and a #15 disposable scalpel. The students also

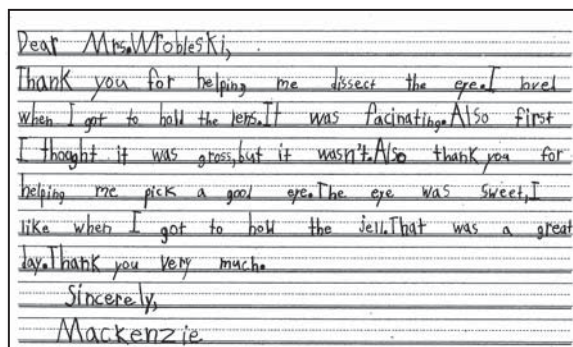


Fig. 3 Student's thank you note to instructor.

have the option to watch a peer or instructor do the dissection if they are uncomfortable with doing it themselves. During the dissection the teachers take action photographs of each child for them to keep. The photos are also sent along with "thank you" notes that the students write to their individual instructor (See Fig. 3).

Continued on back...

DID YOU KNOW?

Rods & Cones (In the Retina)

CONES

Are responsible for color vision and fine visual discrimination.

RODS

Are responsible for motion detection and night vision.

COLOR BLINDNESS

Occurs because the color-sensitive cones in the retina are either absent or do not work properly. Affects 8% of all people, usually males, and is hereditary.

BLIND SPOT

The area where the optic nerve comes off of the back of the eye and has no light receptors. That is the reason that everyone has a blind spot.

Eye Disorders

NEAR-SIGHTED

Can see close objects, distant objects are blurry. Occurs because the eyeball is too long from front to back or the cornea is curved. Since the eyeball is too deep the light rays from distant objects are focused before they hit the retina.

FAR-SIGHTED

Can see far objects, close objects are blurry. Occurs because the eyeball is too short from front to back or the cornea is too flat. That shortness causes light rays to focus behind the retina.

ASTIGMATISM

Objects both near and far are blurry. Occurs usually because the cornea has lost its spherical shape causing the light rays to have more than one point of focus when they hit the retina and creating a garbled (mixed-up) image.

Reference:
Kids Discover Magazine, "Eyes". Feb. 2000

We Want To Hear From You!

We want to include your stories, comments or questions relating to animals in your classroom in upcoming editions of *BioFocus*. Please email your stories to: mismr@umich.edu

Science in the Classroom... *Continued from front*



Fig. 4 Instructors assisting students during the sheep eye dissection.

The instructors consist of veterinarians, veterinary technicians, laboratory animal technologists, microbiologists, and medical students from the Jobst Vascular Lab at the University of Michigan (Fig. 4). The incorporation of instructors from several areas of the biomedical field, both male and female, into this unit of study has helped to stimulate talk about research and science careers among the students at the elementary school level. There are always children who want to be a veterinarian when they grow up, and this day provides a great opportunity for them to interact with people from the animal health field and have their questions answered by them.

This "Eye Spy" event helps to promote a positive experience in the field of science at a young age and encourages science exploration in these students.

The dissection of a sheep's eye at the culmination of this large unit has become one of the highlights of the year for the second graders at Pleasant Ridge Elementary School. Also, if there are any specimens left after all the classes have finished their dissections they are used to either instruct a similar class for home-schooled children, other elementary schools, or the Boy Scouts.

THE HISTORY OF EYEGASSES & CONTACT LENSES

Salvino D'armante is credited with the first wearable glasses in 1284 in Pisa, Italy (hmmm, that's where the leaning tower is... maybe their glasses were crooked!). Before that polished rock crystals were set on top of readings to magnify the writing (earliest found 1000 A.D. in Nineveh).

Benjamin Franklin invented the bifocals in 1784. On his long trips he liked to read as well as admire the scenery and he didn't like to keep changing his glasses. So, he put one half of each lens in the same frame!

Katherine Blodgett is credited with changing the glasses in America (patent in 1938). With her research on monomolecular coatings, she discovered a way to apply the coatings layer by layer to glass and metal. The thin films, which naturally reduced glare on reflective surfaces, when layered to a certain thickness, would completely cancel out the reflection from the surface underneath. This resulted in the world's first 100% transparent or "invisible" glass. This technology was incorporated into cameras, telescopes, and other inventions. She earned a Master's in physics at the age of 19 from Bryn Mawr, was the first female to earn a Ph.D. in physics at Cambridge in 1926 and the first female hired by GE Research Lab.

Leonardo da Vinci came up with the idea for contact lenses in 1508. Glassblower **F.E. Muller** of Germany produced ones made of glass in 1887, but they were so painful they could only be worn for one hour. **William Feinbloom** of New York created the first American made rigid plastic lenses in 1938 and finally the flexible soft lense came about in the 1970's.

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A Newsletter Exploring Science & Biomedical
Research Issues For School Educators