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Practice Perspective

Helping Students with Visual Impairments Know Themselves Better Through the Life-Sized Eyeball Activity

Cindy Bachofer

"I want to be the vitreous this time!" shouts an excited student as she claims the role of holding up a clear plastic ball decorated with sparkly stickers (aka floaters). Students trade places in line as they begin a second round of playing Life-Sized Eyeball. Knowing about the eye and one's eye condition is foundational to self-identity as a student with a visual impairment (that is, those who are blind or have low vision) and this initial activity in a series of lessons on the eye can help students along the way in that self-identity process. In this perspective, the rationale for dedicating instruction time to this topic, and unexpected benefits that have come from conducting these lessons with students, are described.

The Life-Sized Eyeball activity will first be explained, followed by examples of preteaching activities (that is, introducing vocabulary and other content information to students in preparation for an academic activity) to help students understand the structure of the eye and how the parts must work together for vision to occur (see Box 1). Everyday items are used that students hold as props to represent parts of the eye, starting with the cornea at the front and ending with the brain at the back. The parts of the eye represented, the item used, and the definitions to be read are listed in Table 1. Players hold an assigned prop and a label card as they take their place in line. The word for the part of the eye, such as "cornea," is printed in bold large letters on cardstock, and the simple definition is given on the back of the card (in print and braille, as needed). The prop can also be attached to a string and worn around the student's neck if this adaptation is easier for holding while reading the card. A voice recording of the definition or an adult reading it can be available if a student is nervous about reading aloud or needs support in the activity. Once everyone is in place, the cornea player holds up a clear plastic salad bowl and loudly reads, "I'm the cornea of the eye and like a windshield I protect the eye and stop things from getting in it." The players take their turns down the line according to the eye's structure. Taking a video of students rehearsing or of the final production can be

Lesson plan for Life-Sized Eyeball Activity

Objectives

1. Given the word list of parts of the eye, students will be able to spell and pronounce each.
2. Given a list of definitions including a metaphor for each, students will be able to define the parts.
3. Given a role related to one's eye condition, students will be able to name the part and explain the implication.

Materials

1. Word list (see Table 1)
2. Matching cards set 1, words split into syllables
3. Matching cards set 2, words and the metaphor
4. Simple diagram of the eye with labels
5. A 3D model of the eye

Introduction

To assess prior knowledge, use questions that let students say what they already know about the eye. Examples are: "What are some of the parts inside the eye called?" and "How would you explain how the eye sees?" Responses will help guide the activity's level of detail. Explain that the lesson will include vocabulary terms, definitions, and eye structure.

Teaching procedures

1. Practice the vocabulary terms and definitions aloud.
2. Students read and pass around label cards.
3. Explore props representing parts of the eye.
4. Two or three students line up and demonstrate the reading with a prop.
5. All students stand in a line and rehearse providing support as needed.
6. Students give a final staging. (See the article for more procedures.)

Evaluation (oral or written or both)

Students will: list and define the words, name the parts of the eye in order, and name the part related to one's eye condition.

Summary

Compare students' prior knowledge with new information gained about the eye. Let students explain what was the most interesting new fact they want to share with someone at home. Based on student questions and interest, describe a next lesson from the set of activities.

Box 1

an incentive to join in, and that would give another review of the information when replayed. As few as six parts may be represented or as many as 20 if two eyes are being built. Students may want to repeat the first staging or trade props for a second round. A quick, introductory lesson to familiarize students with the new eye anatomy words helps to build their confidence for the staging.

Preteaching activities

This preteaching segment can take different forms of word practice to reinforce literacy goals. Once students have been able to read the words and practice saying them out

Table 1
Parts of the eye, props, and definitions for the Life-Sized Eyeball activity.

Part of the eye	Prop	Definition
Cornea*	Large, clear plastic salad bowl	I'm the cornea of the eye, and like a windshield I protect the eye and stop things from getting in it.
Iris*	Squishy cloth donut-shaped pool toy	I'm the iris or color ring of the eye, and I decide how much light gets in by changing my size.
Aqueous	Round, clear plastic pouch or toiletry bag	I'm the aqueous or the vitamin water substance, and I carry nutrients for the front part of the eye.
Lens*	Clear plastic dome insert to a hanging plant basket or lid for bakery items	I'm the lens of the eye that bends the light rays (light supervisor) before they get to the back of the eye.
Vitreous*	Clear balloon or ball (sparkle stickers for floaters)	I'm the vitreous or the thick jelly ball that holds the shape of the eye.
Eye muscle (1 or 2 people)	Rubber exercise band (red, orange, or pink)	I'm one of the muscles or elastic band in the eye that moves it up and down or left and right.
Retina*	Bath mat (red or orange) with heavy pile	I'm the retina or the back wall of the eye, where cells take the image and send it to the brain.
Optic nerve*	Thick pipe cleaner or flexible cable (red or orange)	I'm the optic nerve, and like a connecting cable I carry the message from the retina to the brain.
Brain	Light-up textured 6″ or larger ball	I'm the brain or mega-computer of the body, and I help the eyes to figure out what they are seeing.

Note: *basic parts of the eye for shorter activity. Underlined words are the metaphor for each part.

loud, they can use a word list (in print or braille) to write them on paper or on a computer as spelling practice. They can also do a matching game by matching the eye part to its metaphor in the definition, such as cornea is windshield and optic nerve is connecting cable. Another word game is syllable match-up. Prepare the cards by splitting the words into two syllables (for instance, cor-nea, vit-reous) and mix them as a pack of cards for each to sort. Students can then use their word list as support and match the two parts to make a whole word. On the second and third match-up rounds, as familiarity with the terms has increased, students may like to be timed to gauge their speed with mastering new vocabulary. Allowing time for questions and discussion is important, as their interest can lead to related lessons on eye anatomy and implications of their eye condition. Use of a 3D eye model and simple colored diagrams of the eye (labeled and unlabeled) are additional helpful materials. These activities can be adapted as needed for group size, range of ages, visual ability, functioning level of participants, and setting.

Building the Eyeball

Building the eyeball is very adaptable as a hands-on activity for a variety of learning goals. Students numbering as few as three, with each being responsible for two key parts (six are marked with an asterisk in Table 1), can build the eyeball. By building two eyes, a larger group of 20 can participate. The on-your-feet nature of this activity and the performing aspect allows silliness to erupt as learning takes place.

Teenagers at the upper high school level have engaged and requested a second round as often as have younger elementary school students. Holding up the brain and being "the brains of the outfit" was a vied-for position. Students who are blind can tactilely explore the objects and work individually to place them in order, recognizing the part-to-whole association that is demonstrated as students assemble in a line. The number of eye parts can be limited to the most basic eye structure (for example, front, middle, back), and definitions can be shortened as needed depending on learning goals and a student's level of functioning. This activity is also adaptable in a variety of settings. It has been used with student groups in summer programs, in classrooms at both specialized schools and public schools, and in one-on-one lessons. Beyond the student age level, this activity has been a success at adult trainings (for example, parents, general education staff members, new professionals in the vision field), in which a shared understanding of eye anatomy and implications of the eye condition are critical for training goals.

Life-Sized Eyeball components

Along with being adaptable, the components of the Life-Sized Eyeball are "educator-friendly," and can expand as more about vision is learned through medical research. The recommended materials used for the Life-Sized Eyeball activity are intended to be compact, affordable, and durable. All the items fit in a tote bag, so it is easily transportable. These items are everyday products sold at dollar stores, craft stores, or online sites. As much as possible, it is important for the items' color and size to be similar to the part of the eye they are representing. For example, the lens and the vitreous should be transparent, allowing the passage of light, and the vitreous should be the largest item, since it fills most of the globe of the eye. The eye muscles, the retina, and the optic nerve should be represented in reddish-orange shades; it is helpful to select these colors so that students gain a true sense of eye anatomy. The eye is the structure through which the visual signal passes, but the far more complex pathway of vision occurs in the brain. Each day, researchers learn more information about vision and the brain, and it is exciting to imagine future "life-size" lessons representing these two essential organs of sight. Factual information about the eye has been emphasized so far, but this activity also opens the door to students voicing more personal thoughts about managing life with visual impairment.

Knowledge about the eye's anatomy

Having knowledge about typical eye anatomy can help students find words for explaining their impairment in their own way and for saying what it is like to feel different from one's sighted peers. Talking about one's visual impairment is an essential skill in personal and school or work settings (Guerette, Lewis, & Mattingly, 2011; Sacks, 2006). It comes up on the playground, in the grocery store, or in the break room at work. Whether people are simply curious or rather insensitive, students will hear comments and questions about their eyes, and having a reply ready can put the person with a visual impairment in charge. Communicating accurate and appropriate information about one's eye is a part of both social skills and self-determination, areas of the expanded core curriculum. Joining in a series of lessons and giving practice time in role play and conversations about the eye help students with visual impairments respond with more confidence when they are confronted with questions (such as, "What's wrong with your eye?") about their vision. The statement, "My eye is different from yours," is a possible start to turning an

awkward situation into a positive social interaction. This kind of discussion among students happened naturally as they warmed up to the topic and shared their own experiences of talking about their eyes.

This activity was a starting point for unexpected benefits in academic and psychosocial areas as the interest of students was sparked. A request to bring back the Life-Sized Eyeball can initiate online research for extending the script, and a restaging can be planned once each group member has added information to his or her assigned part of the eye. For example, "I'm the cornea . . . and I'm responsible for two-thirds of the focusing that takes place in the eye." Knowing how to spell, pronounce, and define the parts of the eye and the associated research and conversations with peers involved in the Life-Sized Eyeball activity can encourage students with visual impairments to ask questions at their next appointment with an eye care specialist, and they could be more prepared to respond to unexpected questions or comments about their own vision loss. See *Learning about My Eye* (Bachofer, 2015) in References for additional activities.

Learning about the eye supports general curriculum goals. Writing a personal essay about one's eye condition and its functional implications presents a rich opportunity for self-awareness and for sharing a unique perspective with others. Science class is another place to learn about the eye, with an emphasis on eye anatomy and functioning in biology and lessons on refraction and optics in physics. Projects in other curricular areas such as journalism, public speaking, art, or independent study can highlight information learned and implications about having a visual impairment. Numerous avenues exist for students studying this topic across the school curriculum at both the elementary and secondary level.

For some students who are visually impaired, learning about the eye raises resistance rather than interest. Those students are not ready to talk about it with others, and they are not open to a structured lesson on the topic. Allowing a student to independently explore the 3D model of the eye during one-on-one instruction can be an entry point for students who have their guard up about having a visual impairment. This handheld eye has removable parts and invites visual as well as tactile exploration. Questions often arise if the model is presented as a generic human eye and not as one with a visual impairment. The parts of a small-scale model can then be compared to the parts of the Life-Sized Eyeball spread out on a table. In these short sessions, a student is getting used to hearing about the eye, saying the words, and handling the items. This approach can help the topic feel less threatening and more factual, and it may lead to joining in conversation with peers who have a visual impairment.

The Life-Sized Eyeball activity brings an element of play to learning about the eye. It presents information on individual parts, the structure of the eye, and the interrelatedness of the parts working together for vision to occur. The activity is adaptable for a range of participants and settings, and it can serve as a stand-alone lesson or as part of a set of lessons. The information that students gain has application to both academic and personal goals. More importantly, they are testing the words that let them explain this part of their identity. Knowledge is power and, in this case, feeling empowered can happen while building the Life-Sized Eyeball.

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