

# Teacher Tool 48: Explore! The Human Body: Eyes and Ears Study Guide

Study Guide for Anatomy 1: Explore! The Human Body Eyes and Ears 1 and  
Anatomy 2: Explore! The Human Body Eyes and Ears 2

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## Explore! The Human Body: Eyes and Ears

**Original Air Date: January 22, 2014**

**Grade Levels: 3-6**

### **Program Description:**

For this episode of *Explore!* we focus on two specific parts of the human body, our eyes and ears, and ask the big picture question, “How can we better understand our senses of sight and hearing and the impact they make on our lives?” Through the course of this energetic and interactive cross-curricular half hour program, students get a chance to answer that question for themselves as they hear directly from a visually impaired student, teachers that work with the visually impaired, an educator who is deaf, and his sign language interpreter. As they do this, they learn fascinating facts about their eyes and ears, and explore the world with different levels of sight and hearing.

We learn how the eye and ear operate and compare human sight and hearing to that of other creatures. We investigate how 3D glasses work and why some people have a physical reaction to watching 3D movies. We see the world through the eyes of the blind and hear it through the ears of the deaf. And through it all, we include student questions and contributions to help us understand the topics better. More details on the order of segments in the program are included later in this document in the Program Format section.

### **Program Objectives:**

Students will:

1. Engage in critical and creative thinking.
2. Engage in interactive activities and discussion about the human senses of sight and hearing and how our eyes and ears operate
3. Interact with eye and ear professionals as they ask questions and learn about their career.
4. Develop an answer for themselves to the question: “How can we better understand our senses of sight and hearing and the impact they make on our lives?”

**Program Format:** (Time Codes are provided to help you find specific segments in the program.)

**I. Welcome and Introduction**—An overview of the program’s theme and topics is presented as student groups are welcomed to the program. (00:00 to 01:42)

**II. The Human Eye**—In this segment we focus on the eye and our sense of sight. Topics and cross-curricular questions included in this segment are listed below. Depending on the archive you are viewing, students will learn from teachers of the visually impaired and/or a visually impaired high school student. Video, images, factual information, vocabulary words, and student questions are included throughout the segment.

A. The Operation of the Eye (How Does That Work? /Why You Ask?) (01:43 to 05:29)

1. Anatomy of the Eye
2. How the Eye Works to Provide Vision
3. Comparing Human Sight to Sight of Other Animals

B. Living With Your Eyes (Where is That? /When Did That Happen?/How Does That Work?) (05:30 to 16:50)

1. Being Blind and Using Braille
2. Technological Innovations for the Visually Impaired
3. Watching 3D Movies

**III. The Human Ear**—In this segment we focus on the ear and our sense of hearing. Topics and cross-curricular questions included in this segment are listed below. Students will learn from an educator who is deaf and his sign language interpreter. Video, images, factual information, vocabulary words, and student questions related to each topic will be integrated throughout the segment. (16:51 to 22:13)

A. The Operation of the Ear (How Does That Work?/Why You Ask?)

1. Anatomy of the Ear
2. How the Ear Works to Provide Hearing
3. Comparing Human Hearing to Hearing of Other Animals

B. Living With Your Ears (Where is That?/When Did That Happen?/How Does That Work?) (22:14 to 28:14)

1. Being Deaf and Using Sign Language
2. Technological Innovations for the Hearing Impaired

**V. Summary and Closing**—We summarize the major concepts learned today, say thank you and goodbye. (28:15 to 29:15)

## **Featured National Standards:**

The following **Common Core Standards for English/Language Arts and Literacy in History/Social Studies, Science and Technical Subjects** are referenced in this program:

### **Grades 3-6 College and Career Readiness Anchor Standards for Reading**

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

### **Grades 3-6 College and Career Readiness Anchor Standards for Writing**

6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

### **Grades 3-6 College and Career Readiness Anchor Standards for Speaking and Listening**

1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.
4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

### **Grades 3-6 College and Career Readiness Anchor Standards for Language**

6. Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.

**Program-Related Activity Suggestions:** Based on your curriculum, time schedule, and student learning needs, consider using the activity below before viewing the archive of the program.

**1. Background Information**—The purpose of this activity is to give students background information on their sense of sight and sense of hearing to help provide a context for learning from the guests in the program. Have students explore any of the web resources below and/or resources of your own related to topics in the program.

**Web Resources Related to Sight:**

<http://www.howstuffworks.com/life/human-biology/eye.htm> --How Stuff Works web exhibit on how human vision works

[http://kidshealth.org/kid/cancer\\_center/HTBW/eyes.html](http://kidshealth.org/kid/cancer_center/HTBW/eyes.html) --Kids Health web exhibit on the human eye

<http://science.howstuffworks.com/innovation/everyday-innovations/lens.htm> --How Stuff Works web exhibit on how corrective lenses work

[http://kidshealth.org/kid/talk/qa/color\\_blind.html#](http://kidshealth.org/kid/talk/qa/color_blind.html#) --Kids Health web exhibit on what it's like to be color blind

**Web Resources Related to Hearing:**

<http://www.howstuffworks.com/life/human-biology/hearing.htm> --How Stuff Works web exhibit on human hearing

<http://kidshealth.org/kid/htbw/ears.html> --Kids Health web exhibit on the ear

[http://en.wikipedia.org/wiki/Hearing\\_range](http://en.wikipedia.org/wiki/Hearing_range) --Wikipedia website on human hearing range and comparing that to the range of other animals.

**2. Student Polls**— The purpose of this activity is to provide students the opportunity to conduct a poll of their own creation on a subject related to eyes and/or ears and have the results of that research published as part of the materials related to this program available on our Educate.Today website. Teacher instructions and a Student Worksheet for this activity are included later in this document.

**2. Tell Us Your Story**— The purpose of this activity is to provide students the opportunity to write a short remembrance, essay, or story about an experience of their own related to eyes and sight or ears and hearing, or to create a fictional story about the same subject. If you choose, you can submit student writings for possible publication on our Educate.Today website to be part of the materials available that are related to this program Teacher instructions for the activity and a student worksheet for the activity are included later in this document.

**Vocabulary:**

The following vocabulary words will be highlighted in the program.

Auditory

Incus

Malleus

Optometry

Stapes

### Supplemental Resources:

In addition to website resources included in Pre-Program Activity Option 1, additional video resources related to the program may be found on our HEC-TV website at <http://www.hectv.org/teachers/curriculum/hectv-live/explore-the-human-body-eyes-and-ears/>.

Additional web resources on topics related to our senses of hearing and vision are included below:

1. How do corrective lenses work?

<http://science.howstuffworks.com/innovation/everyday-innovations/lens.htm>

[http://en.wikipedia.org/wiki/Corrective\\_lens](http://en.wikipedia.org/wiki/Corrective_lens)

[http://www.youngmenshealthsite.org/corrective\\_lenses.html](http://www.youngmenshealthsite.org/corrective_lenses.html)

[http://kidshealth.org/kid/feel\\_better/things/glasses.html](http://kidshealth.org/kid/feel_better/things/glasses.html)

<http://www.wisegeek.com/what-are-corrective-lenses.htm>

2. How are glasses made?

<http://www.npr.org/templates/story/story.php?storyId=130754089>

<http://www.eyewareyecare.com/ArticleHowLensesEyeGlassesAreMade.html>

<http://www.youtube.com/watch?v=uYImcdCAvbY>

[http://inventors.about.com/od/gstartinventions/a/glass\\_3.htm](http://inventors.about.com/od/gstartinventions/a/glass_3.htm)

<http://www.webmd.com/eye-health/eyeglasses-eyes>

3. How do 3D glasses work?

<http://www.howstuffworks.com/question360.htm>

<http://www.scientificamerican.com/video.cfm?id=instant-egghead---how-do-3-d-glasse2012-09-27>

<http://mentalfloss.com/article/12876/how-do-3d-glasses-work>

4. Invention of sign language and its impact on the deaf

<http://www.start-american-sign-language.com/who-invented-sign-language.html>

<http://www.rocketcityspacepioneers.com/space/who-invented-sign-language>

<http://www.nidcd.nih.gov/health/hearing/pages/asl.aspx>

<http://www.funbrain.com/signs/>

5. Invention of Braille and its impact on the blind

<http://www.ideafinder.com/history/inventions/braille.htm>

[http://en.wikipedia.org/wiki/Louis\\_Braille](http://en.wikipedia.org/wiki/Louis_Braille)

<http://www.howstuffworks.com/braille.htm>

<http://brailleproject.weebly.com/effects-on-communication.html>

## Sight and Hearing Poll Activity Teacher Instructions

**Instructions:** The purpose of this activity is to provide students the opportunity to conduct a poll of their own creation on a subject related to human sight and/or hearing and have the results of that research published on our Educate.Today website with materials related to this archived program. The Student Worksheet provides some steps to use with your students as they consider the topics they want to ask about, the questions they want to ask, how they want to ask those questions, and processes for conducting their research and presenting the results of their research. You could choose to have students each conduct an individual poll, work in small groups to conduct polls, or create one poll for the class and individually ask people the poll questions to get results for the entire class. You could choose to conduct this cross-curricular activity with just your students or you could choose to share the results of your research with our entire viewing audience.

If you'd like us to consider publishing your students' poll results on our website, please send us a student presentation concerning your poll in one of the following formats:

1. A 90-second to 2-minute video explaining your poll and its results. This can be sent to us on a DVD or uploaded directly to our ftp server. To let us know which of these methods you'd prefer, please e-mail us at [live@hectv.org](mailto:live@hectv.org) and we'll respond with the appropriate information.
2. Create a PowerPoint (or similar software) presentation that explains your poll and its results. To learn size restrictions and other criteria for the document, please e-mail us at [live@hectv.org](mailto:live@hectv.org), and we'll respond with the appropriate information.

To be considered for publication, all submissions must be the work of you and your students only and have clear narration and images. You and your students must have created all elements of the presentation yourselves; no elements of the presentation should come from other sources. Language and images must be appropriate for viewing by an audience in grades 3 through 6. Overall quality for the presentation must make it worthy for publication.

When you submit your presentation, be sure to include the following information:

1. Name of School
2. Teacher Name
3. Name(s) and Grade Level of Student(s) who created and conducted the poll
4. Name(s) and Grade Level of Student(s) who are giving the presentation (whether speaking live during the program or appear on the video submitted)

Please note that, if selected, the presentation will be published on our HEC-TV website. All involved should be aware that when the video/PowerPoint is submitted for consideration, they are giving permission for that publication to occur.

If you have any questions about this activity, please do not hesitate to e-mail us at [live@hectv.org](mailto:live@hectv.org) or call us at HEC-TV at 573 884 6986.

## Conducting a Poll Student Worksheet

Name \_\_\_\_\_

**Instructions:** For this activity, you will conduct a poll with different people asking for their response to questions you have created on a specific topic. You will work with your teacher and classmates to create a five question poll on a topic related to a person's hearing and/or vision. Together you will determine the questions, conduct the research, tally the results, and report the results of your research. To conduct your poll, you will need to:

1. Determine the topic you want to know about and the people you need to ask to find that information out. For example, do you want to know about your schoolmates' eyesight? Or would you rather find out how about their hearing? Or do you want to know something else entirely? Do you want to ask your classmates or schoolmates to get their answers or do you want to ask teachers and parents instead or in addition? You'll also need to think about how many people you want to ask to get the best results possible in the amount of time you have to conduct your poll. Once you have determined what you want to know, whom you want to ask, and how many people you want to ask, write that information down in the section below then go on to step 2.

The Topic of My Poll Is:

The People I Will Ask Are:

The Number of People I Will Ask Is:

2. Determine the five questions you want to ask—What is it you would like to find out about people's hearing or vision? Would you like to know how many students in your school are color blind or if they know what color blindness is? Would you like to know how many wear glasses or contact lenses and when they first got them? Would you like to know their favorite smells? Would you like to know their least favorite smells? You will brainstorm lots of ideas as you determine the five questions you most want to know about. Once you have determined the five questions you want to ask about, write a rough draft of each in the section below, then go on to step 3.

My Five Rough Draft Questions Are:

3. What is the best way to ask the question? As you know, there are many ways to ask a question. For a poll, you want to ask the question in an objective way, and you also want to think about how you want to receive the answers to the question. For example, you could ask the question in an open-ended way: “What is your favorite food smell?” With this type of question, people would give you a short answer of their own. You can also ask questions in a close-ended way where you give people choices about their answer. For example, you could ask: Do you wear glasses or contact lenses? This question would give people the close-ended choice to answer yes or no. A different example would give them choices to pick from: Which of the following food smells do you like best? A) a cake baking. B) the slice of an orange. C) hamburgers grilling, D) garlic. Now take your rough draft questions above and see if you want to change the wording of any of them. Once you have determined the final wording for each of your questions, write them in the section below, then go on to step 4. Be sure to number each question.

My Final Five Questions Are:

4. Determine the order of your questions. Do you need to know certain information first from the person before asking them another question? If so, think about that as you determine the order of your questions. For example, before asking them if they know what “color blindness” is, do you need to ask them if they have ever heard the term “color blind?” Look at your final questions and decide what you think is the best order to ask them in. If that order is different than what you have written in the section above, write the new order in the section below then go on to step 5. You do not need to rewrite the entire question; just use the numbers you have in the section above and put them in your final order in the section below.

### Final Order of My Questions:

5. Conduct your research. You can choose to ask your poll questions of people face to face or you could give them a sheet to fill out or you could send them the survey via e-mail. You, your teacher, and your classmates will determine the way you want to conduct your research and then go out and do it. Create a clean copy of your questions on a separate sheet of paper if you need to. Once you've conducted your research, it's on to step 6.
6. Tally your results. Once you have completed your poll, tally up the results of each question. You should tally up your results both in terms of real numbers and percentages. For example, let's say 50 people answered the first question on your poll, "Do you wear glasses or contact lenses?" The results in terms of real numbers were 36 people said "yes" and 14 people said "no." The results in percentages would be to take those real numbers and divide them by the amount of people asked. That would give you the following results: 36 "yes" answers divided by 50 people equals 72% and 14 "no answers" divided by 50 people equals 28%. You could also break the results down even more if you like. For example, how many of the "yes" answers came from boys and how many from girls? What about the age of the person? You, your classmates, and your teacher can determine how you want to tally the results. Once you get those final results, record them on separate sheet of paper or on a computer and move on to step 7.
7. Report the results of your research. Now that your results are tallied, you need to let others know the results. There are many ways you can present your results. You could give an oral report. You could write a report. You could create a presentation using PowerPoint or a similar software. Along with your teacher and classmate determine how you want to report your results. Once you've determined the type of report you are giving, go ahead and complete it by including the data you received from your poll. As you provide the results to each of your five questions, be sure to think also about how you want to present that specific information in your report. Do you want to give it as real numbers printed out, do you want to use visual methods such as bar graphs or pie charts, or do you want to do a combination of both? Work with your teacher and classmates to make those decisions, and then you're ready to create and present your final results report.

## Tell Us Your Story Activity Teacher Instructions

**Instructions:** The purpose of this activity is to provide students the opportunity to write a short remembrance, story or essay about a situation they experienced related to their hearing or vision or a fictional story on the same subject and, if you choose, to have that writing submitted for possible publication on our Educate.Today website to be part of the materials related to this archived program.

The Student Worksheet provides some steps to use with your students as they consider what they want to write about. Students could do this activity as an in-class project, a homework assignment, or as an individual enrichment opportunity. After completing their writings, they could share them with each other for peer evaluation and enjoyment and/or publish them in a school or classroom setting.

If you'd like us to consider publishing your students' story on our website, please send it to us in one of the following formats:

3. A 90-second to 2-minute video with your student reading his or her story. This can be sent to us on a DVD or uploaded directly to our ftp server. To let us know which of these methods you'd prefer, please e-mail us at [live@hectv.org](mailto:live@hectv.org) and we'll respond with the appropriate information.
4. A PDF document that contains the student's story. To learn size restrictions and other criteria for the document, please e-mail us at [live@hectv.org](mailto:live@hectv.org), and we'll respond with the appropriate information.

To be considered for publication, all submissions must be entirely the work of the student. Language and images must be appropriate for viewing by an audience in grades 3 through 6. Overall quality for the presentation must make it worthy for publication. A jpeg image of the student author may be included in the PDF version of the story if you choose to submit via that option or be e-mailed separately with the submission when you send it.

When you submit your student's writing for consideration, please be sure to include the following information for each submission:

5. Name of School
6. Teacher Name
7. Name and Grade Level of Student who wrote the story
8. Title of Story
9. Name of Pet that Inspired the Story

Please note that, if selected, the presentation will be published on our HEC-TV website. All involved should be aware that when the video/PDF is submitted for consideration, they are giving permission for that publication to occur.

If you have any questions about this activity, please do not hesitate to e-mail us at [live@hectv.org](mailto:live@hectv.org) or call us at HEC-TV at 573 884 6986.

## Tell Us Your Story Student Worksheet

Name \_\_\_\_\_

**Instructions:** For this activity, you will write a remembrance, story, or essay about an event related to your sense of hearing or vision or a fictional story related to the same subject. To begin your work, go to step 1.

1. Take some time to remember events in your life related to your sense of hearing or your vision. Perhaps it's the time you learned you were going to get glasses. Perhaps it's a time when you heard a really loud sound and lost your hearing for a bit. Perhaps it's a time when you misheard something and funny consequences resulted. Perhaps it's about a time when you were blindfolded and remember what it was like to not know where you were. Create a list of ideas below to choose from, then go on to step 2.

My Story Could Be About:

2. Pick the topic you most want to write about. Take the ideas you brainstormed in step one and start writing down some details about each topic that you could put in your story. Compare those ideas to each other and select the topic you think would create the best story for you. Write your final topic idea below then move on to step 3.

My Final Topic Is:

3. Begin to write a rough draft of your story. Put your ideas down on paper. Start arranging them into your story or essay. Read over what you've written and rearrange and rewrite as needed. After you've spent some time on the writing yourself, have someone else read what you wrote and ask for the suggestions about organization, wording, and details then move on to step 4.
4. Continue writing and revising as needed until you get to what you think is your best work—the work you want to submit as our final paper. As you do this revising don't hesitate to get feedback from your classmates, teacher, parents, friends. As you get ready to turn in your final version, be sure to include step 5 below.
5. Read your final paper from beginning to end and select the 60-second segment from your story that you would most want to read aloud to your classmates and, potentially, the audience joining the live program you are participating in. Be sure to mark that 60-second segment in your final paper before turning it in to your teacher.