

SUGGESTED REFERENCES

- *Human Interface Technology Lab -Tactile Augmentation*
<http://www.hitl.washington.edu/>
- *MIT News: MIT Touch Lab research spans basic science, virtual reality*
<http://web.mit.edu/newsoffice/nr/1999/touchlab.html>
- *Discovery School: Offers lesson plans and information*
<http://school.discovery.com/lessonplans/programs/humanbody>
- *Southwest Educational Development Laboratory:*
<http://www.sedl.org/scimath/pasopartners/senses/lesson4.html>
- **Research Matters: First Domino falls in Research on Sense of Touch**
http://www.researchmatters.harvard.edu/story.php?article_id=171
- **Feeling Your Way: Discover Your Sense of Touch**
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NATIONAL SCIENCE EDUCATION STANDARDS

Grades K-4

Science and Technology

Abilities of technological design
Understanding about science and technology

Grades 5-8

Life Science

Diversity and adaptations of organisms

*Source: *National Science Education Standards, 1996, National Academy Press*

CREDITS

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SCIENCE SCREEN REPORT

FOR KIDS

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THE SCIENCE OF TOUCH



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SYNOPSIS

We have five senses that enable us to interact with the world around us. We are most familiar with the senses of seeing and hearing. Many fear living a life of darkness or silence but no one really thinks about living without the sense of touch.

Like our other senses, we use our sense of touch every minute of every day. We use our sense of touch every time we pick something up, every time you take a step - anytime you touch something - we are putting our sense of touch to the test. In this edition of SCIENCE SCREEN REPORT FOR KIDS, we will explore our sense of touch and the latest scientific technologies available for those who have lost this sense.

CURRICULUM UNITS

- ANATOMY
- BIOLOGY
- HEALTH
- PHYSICAL SCIENCE
- PHYSIOLOGY

RUNNING TIME

17:39

BACKGROUND

Whether we are feeling a gentle breeze on our face or petting man's best friend, our sense of touch is responsible for feeling the world around us. Throughout our lives we may encounter people who have lost the use of one of their senses. At that time, we may question what life would be like without the use of one or more of our senses.

The skin is the largest and most sensitive organ. With thousands of touch receptors, it allows us to be in contact with our surroundings as it protects our body. The touch receptors send electrical impulses along nerve fibers to the brain where the information is processed and analyzed by the brain. The brain then signals the particular region of our body affected by touch.

Touch is our first form of communication. Studies have discovered that as early as eight weeks, an embryo has a developed sense of touch. Once a child is born, it is the sense of touch that brings comfort and trust to the new relationship between parent and child.

In the early 1900's during a time when people didn't believe much in hugging and touching their children, hospitals experienced a very high mortality rate. Infants were dieing and medical professionals were on a mission to stop this. Hospitals introduced a new technique called "mothering" that stimulated infants through touch. Newborns received frequent touching from the nurses and as a result less babies died and more grew up to be happy and healthy children.

Within the body are sensors, which allow us to feel pain, temperature and pressure. Sensors that detect cold are primarily located in the face and trunk and protect our vital organs from becoming too cold. Heat sensors are mostly found on the tongue, preventing us from swallowing foods that are too hot. The ability to feel textures such as smoothness, roughness and softness come from the pressure aspect of touch. Without this ability, we wouldn't be able to judge the amount of pressure needed to grab and hold onto items.

Not only are humans affected by touch, but animals are too. For example, a dog wagging its tail tells you that they enjoy being touched. Touch can even have a calming effect on a dog's heart rate. In return, dogs can have similar effects on humans. People who have high blood pressure can reduce it by simply spending time with a dog.

The question still remains as to what happens when one loses a sense. Well, the other senses become stronger. Researchers all over the world are working to develop interfaces that may someday allow people who have lost their sight to see again. Only this time, they will "see" through touch. Scientists are slowly advancing this creation by processing visual information through the skin.

Touch is such a powerful stimulation. Not only does it allow us to stay in "touch" with our surroundings, but it enables us to complete everyday tasks and enjoy what life has to offer. Scientists are continuing to conquer the complexities of the sense of touch and little by little they are piecing together information that will one day help those who are impaired in this manner.

ADVANCED ORGANIZERS

Prior to showing this video students should have some understanding of the following Benchmarks for Science Literacy, Oxford University Press, which are excerpted and, in some cases, abbreviated below. Refer to the Benchmarks for more information.

Benchmark 3: The Nature of Technology

Section A - Technology and Science:

Know by the end of Grade 5

- Technology extends the ability of people to change the world: to cut, shape, or put together materials; to move things from one place to another; and to reach farther with their hands, voices, senses, and minds. The changes may be for survival needs such as food, shelter, and defense, for communication and transportation, or to gain knowledge and express ideas.

Section C - Issues in Technology

Know by the end of Grade 5

- Because of their ability to invent tools and processes, people have an enormous effect on the lives of other living things.

Benchmark 6: The Human Organism

Section C - Basic Functions

Know by the end of Grade 2

- Senses can warn individuals about danger
- The brain enables human beings to think and send messages to other body parts to help them work properly.

Know by the end of Grade 5

- The brain gets signals from all parts of the body telling what is going on there.

**Benchmarks can be found at www.project2061.org/tools/benchol/bolintr.htm*

CRITICAL THINKING EXERCISES

1. Discuss the five senses and how they help you interact with the world. Read aloud a book about the sense of touch. For Example, Touch, The Five Senses, by Maria Rius.
2. Create a table listing the five senses and how losing one of the senses would affect your life. What different types of technology and aids are available to assist people who have lost a sense? (i.e. seeing eye dogs, canes, hearing aides, Braille)
3. What if you lost your sense of touch? Brainstorm how often and for what types of tasks throughout the day you use your sense of touch.
4. Our skin allows us to feel. Show a visual of the different layers of the epidermis and discuss the role and importance of each layer. Have student's label a diagram of the epidermis.
5. Students can blindfold one another and discuss how their loss of vision has increased their need for the sense of touch. Make sure the room is safe and clear of harmful objects. Have students guide each other to ensure safety.
6. Research Louis Braille and how his invention has improved communication for people who have lost their vision. Identify how the sense of touch is important in Braille.

VOCABULARY

- Electrode** A collector or emitter of electric charge or of electric-charge carriers, as in a semi conducting device
- Embryo** An organism at any time before full development, birth, or hatching.
- Heart rate** The number of heartbeats per unit of time, usually expressed as beats per minute.
- High blood pressure** A common disorder in which blood pressure remains abnormally high
- Interface** The point of interaction or communication between a computer and any other entity, such as a printer or human operator.
- Nerve Fiber** A threadlike process of a neuron, especially the prolonged axon that conducts nerve impulses.
- Organ** A differentiated part of an organism, such as an eye, wing, or leaf that performs a specific function.
- Premature** Born after a gestation period of less than the normal time: a premature infant
- Receptor** A specialized cell or group of nerve endings that responds to sensory stimuli.

CAREER POSSIBILITIES

■ OCCUPATIONAL THERAPIST

■ ORTHOPEDIC DOCTOR/SURGEON

■ ORTHOPEDIC THERAPIST

■ PHYSICAL THERAPIST