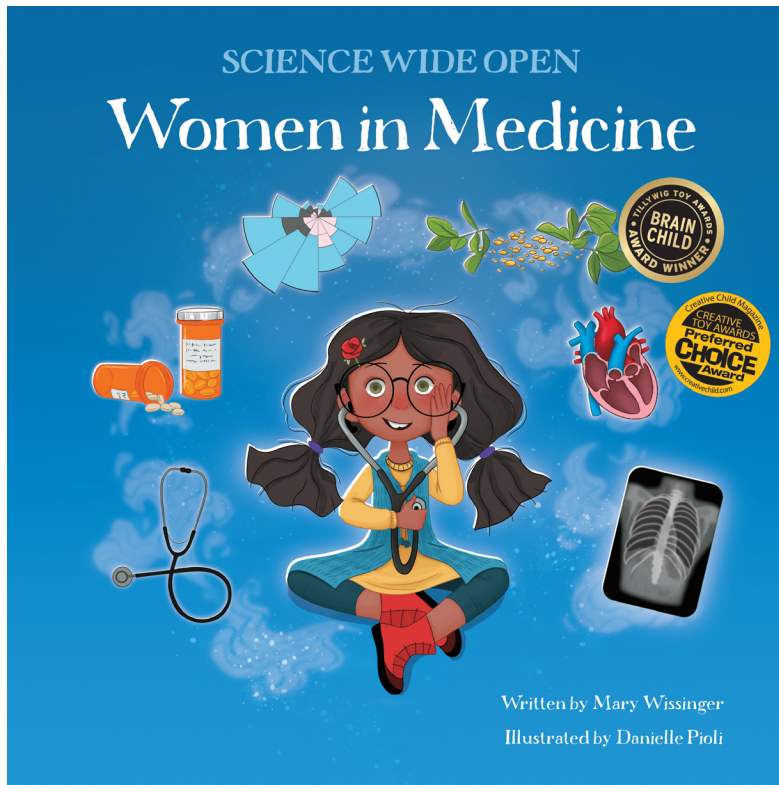


Women in Medicine Teacher's Guide

Written and designed by Chloe Cattaneo, Liliann Albelbaisi, and Hannah Thelen



To be used with *Women in Medicine*
and *Las mujeres en la medicina*
Written by Mary Wissinger
Illustrated by Danielle Pioli

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About the Author: Mary Wissinger



Mary was born in Wisconsin where she spent most of her childhood singing, reading, and daydreaming. She dove into storytelling through acting, singing, and writing (and writing and writing).

While spending time as a classroom teacher sharing the magic of music, she saw firsthand the incredible life-changing power of stories. The stories children read become the stories they play, and then the stories they tell.

Mary can now be found at her standing desk in St. Louis, MO, writing stories that inspire curiosity about the world and connection with others. (But don't worry, she still sings with the Saint Louis Symphony Chorus.)

Mary is also the author of all six books in the Science Wide Open series and the My First Science Textbook series. She can be reached at Mary.Wissinger@ScienceNaturally.com.

About the Illustrator: Danielle Pioli

As children usually do, Danielle Pioli always loved drawing. The idea of creating a whole universe—from her mind to paper—made her fall in love with art and storytelling. She also always felt like a healer at some level. As a child in Sao Paulo, Brazil, she was so drawn to magic—what she calls Quantum Physics now—that she was certain she could heal and help people. Because of this, she grew up to become an Artist and Hypnotherapist/Energy Healer.

Danielle is the illustrator of all six books in the Science Wide Open series.



Women in Medicine

Teacher's Guide Contributors

Science Naturally would like to thank the following people for their hard work, invaluable insight, and dedicated time in creating *Women in Medicine* and its accompanying Teacher's Guide:



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Resources

Women have been deeply involved in medicine for as long as people have been alive. Skilled women have created new surgeries, therapies, and medicines to help their patients feel better, found treatments and cures for diseases, discovered how new diseases are created and spread, and helped increase the safety of childbirth.

Science Wide Open: Women in Medicine introduces students to the many important contributions women have made to healthcare throughout world history. The field of medicine is vast and complicated, and it is always expanding. Grasping the enormity of this field is not easy, but students can reach a deeper understanding of the role of healthcare and doctors through the hands-on activities and critical thinking questions provided in this guide. The listed resources offer students a chance to continue exploring and asking questions, and expand their knowledge of medicine.

YouTube Videos on Medicine

What is Medicine?

Doctor Checkup for Kids - Types of Doctors - Social Studies | Kids Academy

How Your Immune System Works

Science for kids | Body Parts - Unluckiest Kid Compilation! | Experiments for kids | Operation Ouch

The history of women in medicine

Books On Medicine

Who Says Women Can't Be Doctors?: The Story of Elizabeth Blackwell by Tanya Lee Stone

Girls for Medicine! By Orezime Uyeh

The Fantastic Body: What Makes You Tick and How You Get Sick by Dr. Howard Bennett

The Surgery Book: For Kids by Dr. Shivani Bhatia

The Cure for a Crime by Roopa Farooki

The My Strong Mind Series by Niels Van Hove

I'm No Different Than You by Jaime Mahaffey and Kristy High

Websites to Interact with

KidsHealth <https://kidshealth.org/en/kids/center/htbw-main-page.html>

Britannica Kids <https://kids.britannica.com/kids/article/medicine/353448>

Health for Kids! <https://www.healthforkids.co.uk/>

About the Women

***Women in Medicine* presents seven remarkable historical figures who each played an integral role in the development of modern healthcare. Their accomplishments continue to impact the medical field as we know it today. Read the short bios below to learn even more about the women featured in the book, and their life-saving medical contributions.**

Helen Taussig: (United States, 1898–1986) Dr. Helen Taussig was an American cardiologist who co-founded the Blalock-Thomas-Taussig shunt, which extended the lives of babies who suffered from Tetralogy of Fallot. This condition is a combination of four heart defects that causes low oxygen levels in the blood. A modified version of the shunt surgery is still used today. Dr. Taussig grew up partially deaf, which progressed to complete deafness as she grew older. As a result, she would use her hands to feel for a heartbeat. She was the first woman and pediatrician to be elected as the head of the American Heart Association.

Peseshet: (Egypt, Fourth Dynasty, ca. 2500 BCE) Often credited as the earliest known female physician in the world, Peseshet had the title of “lady overseer of the female physicians.” She was the director to many women physicians, and likely trained more to become midwives in the medical school of Sais.

Xoquauhtli: (Mexico, Aztec Empire, ca. 1496) There is little known about Xoquauhtli. She may not have been a real person. However, midwives in general are known to have been very important members of the Aztec community. Giving birth was a sacred event with many rituals, likened to the experience of being in war or on the battlefield. Aztec midwives helped develop early forms of obstetrics, using herbs as medicines and techniques to ease pain and quicken labor. Xoquauhtli’s job would have been to ensure the safety of the baby and the mother throughout pregnancy and birth.

Angella Ferguson: (United States, 1925–present) When Dr. Angella Ferguson started to notice the high percentage of African American infants who suffered from sickle cell disease, there was not much known about it. Through dedicated research and experimentation, she created a blood test to accurately diagnose sickle cell anemia in children under 12. It remains the standard test in most of the United States, administered to infants as soon as they are born. Dr. Ferguson also helped develop treatment strategies for children suffering from the disease.

Tu Youyou: (China, 1930–present) In 1969, Tu Youyou was appointed the head of Project 523, a secret military project that was focused on fighting malaria. Countless doctors and scientists tried hundred of thousands of combinations to fight the disease, but Tu Youyou decided to look into traditional Chinese herbs. She and her team were able to find a substance in sweet wormwood, called artemisinin, that saved millions of lives all over the world and is still used in modern malaria treatments.

Gerty Cori: (Austria, 1896–1957) Biochemist Dr. Gerty Cori discovered a form of glycogen (sugar) stored in the muscles, as well as an enzyme that broke down this glycogen. She was the first woman to receive a Nobel Prize in Physiology or Medicine, awarded for her research on the conversion of muscle glycogen to lactic acid to a form of energy. This process is known as the Cori Cycle. Her work, conducted alongside her husband, helped many scientists understand how our bodies metabolize sugar and carbs, which is significant for the treatment of diabetes.

Florence Nightingale: (England, 1820–1910) Florence worked as a nurse during the Crimean War, where she realized the connection between hygiene and the patients’ health. She worked to keep the stations clean, created more ventilation, and improved the standards of living for her patients, which then increased their survival rate. She established the first secular nursing school, developed graphical representations of patient data that are still used today, and is considered the founder of the Western nursing profession.

Pre-Reading: Listening to Your Heartbeat

Grades: Second–Fifth Grade

Materials: paper, markers, timer (optional)

Subject: Wellness checks, anatomy

Skills: Focused listening, making inferences, critical thinking, comparing and contrasting

Common Core:

CCSS.ELA-Literacy.SL.1.1.A

National Health Education Standards:

1.2.2 Identify benefits of practicing health-promoting behaviors.

1.2.6 List ways to engage in healthy practices and behaviors (e.g., exercise).

Background

Women in Medicine / Las mujeres en la medicina begins by introducing readers to Dr. Helen Taussig, an influential pediatrician who worked with children whose hearts wouldn't pump enough blood to their lungs. Dr. Taussig listened to her patient's heartbeats to see if their hearts were healthy. Now, doctors always listen to our heartbeats during wellness checkups to make sure our hearts are pumping enough blood throughout our bodies. Before you start the activity with your students, ask them how many of them have had a doctor listen to their heartbeat.

Activity

1. Tell your students to spread out around the classroom and find a place where they are not too close to anyone else (at a table, fill every other chair). Give each student a sheet of paper and a marker, and have them each write their name on the paper.
2. Tell the students to place their right hand over their heart. Demonstrate if necessary. Make sure the students are very quiet, so each student has a chance to tell if they can feel and hear their own heartbeat. If they cannot, the students may move their hand around on their chest to find the heart.
3. Once every student has found their heartbeat, ask them to take the marker with their left hand.
4. When they are ready to begin, start a timer or count silently for 20 seconds. During this time, each student will make a tally mark on their paper every time they feel their heart beat.
5. After twenty seconds, tell the students to remove their hand from their heart and stand up. Time the students for ten more seconds and ask them to do as many jumping jacks as possible (or another preferred physical activity) during that time.
6. Immediately after this physical activity, ask the students to return to sitting, place their hands on their hearts, and record their heartbeats in the same fashion for twenty more seconds.
7. Call the students back together to discuss. They should bring their sheet of paper with them for the discussion.

Pre-Reading: Listening to Your Heartbeat continued

Discussion

Ask the students to look at the marks on their paper. What does the pattern look like? Have them share with a partner and ask them to compare and contrast their heartbeat pattern with their partner's. What looks different? What looks the same?

Did their heartbeat slow down, speed up, or stay the same after doing jumping jacks (or another physical activity)? Ask what they think causes a heartbeat to speed up or slow down. Talk through the basic function of the heart (it's a muscle that pumps blood, which delivers oxygen throughout the body).

Doctors like Dr. Helen Taussig rely on hearing their patient's heartbeat to find out if their patient is healthy. Ask why it might be important to listen for a heartbeat. What can a heartbeat tell doctors about their patients?

Ask the students if they can think of a good way to help keep their hearts healthy, based on what they learned from the activity.

Pre-Reading: Tools of the Trade

Grades: Second–Fifth Grade

Materials: “Tools of the Trade” worksheet, paper/notebooks and pencils

Subject: Medical tools

Skills: Identifying, observation, active listening

National Health Education Standards:

3.2.4 Describe the role of trusted adults in clinical and community settings in order to obtain valid health information and services.

3.2.5 Discuss reasons for going to a health appointment.

Background

Science is about making observations, asking questions, and coming up with methods to answer those questions. In order to find the answers they seek, scientists need specific tools. Doctors use tools to identify their patients’ problems and figure out how they can help them. Your students are probably familiar with some of the tools doctors use from checkups with your doctor. In this two-part activity, students will learn about the functions of tools used by doctors and practice putting them in context after reading *Women in Medicine*.

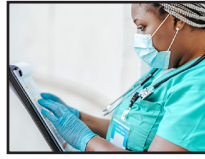
Activity

1. Introduce your students to the tools of the trade using the handout on the next page.
2. Ask each student to briefly write down (or brainstorm, for younger students) what the function of each tool could be.
3. Tell each student to turn to a neighbor and share their ideas for what each tool is used for. If they disagree, have them discuss why they have different ideas about a tool’s purpose.
4. Call the class back together and continue on to part 2.

Tools of the Trade



Stethoscope



Mask and Gloves



Syringe



Tongue Depressor



Blood Pressure Cuff



Otoscope



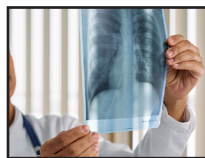
Reflex Hammer



Ophthalmoscope



Ultrasound



X-Ray

After Reading: Tools of the Trade

Part Two

Grades: Third–Fifth Grade

Materials: *Women in Medicine / Las mujeres en la medicina*, completed “Tools of the Trade” worksheet

Subject: Medical tools

Skills: identifying, sorting, active listening,

observation

National Health Education Standards:

3.2.4 Describe the role of trusted adults in clinical and community settings in order to obtain valid health information and services.
3.2.5 Discuss reasons for going to a health appointment.

Background

This is a continuation of the pre-reading tools of the trade activity.

Activity

1. Read *Women in Medicine / Las mujeres en la medicina* aloud to the class (or ask them to read independently).
2. Review the tools of the trade from Part 1 of the activity. Clarify what the purpose of each tool actually is.
3. Divide the class into small groups and ask them to discuss which tools each of the doctors and healers in *Women in Medicine* would use (or might hypothetically use if they lived in modern times) in their work. Are there any doctors or healers who wouldn't have used any of these tools, even if they had access to them?
4. Bring the class back together and ask each group to share and discuss.

Discussion

Were there any tools that had a different purpose than you thought? Did any of the actual purposes of these tools surprise you?

Why would some doctors or healers not use the tools described in this activity? What tools do you think they would use instead?

Why is it so important for doctors to have tools to assist them in their work? How do medical tools help patients as well as the doctors who use them?

Which tool (or tools) seem the most important and helpful to you? Which one(s) seem the least important and helpful? If you had to invent a new tool for doctors to use, what would it be?

After Reading: Types of Doctors

Grades: Third–Fifth Grade

Materials: *Women in Medicine / Las mujeres en la medicina*, “Types of Doctors” handout, Doctor Cards and Patient Cards (cut)

Subject: Medical specializations

Skills: information recall, partner work, learning new vocabulary

National Health Education Standards:

3.2.5 Discuss reasons for going to a health appointment.

3.5.4 Document interactive health literacy by talking with a health professional about health information to be a proactive, well-informed patient.

4.2.1 Identify how effective interpersonal communication can benefit personal health and well-being.

Background

There are many types of careers in medicine, and new medical fields and specialties are emerging all the time. Doctors are just one type of healthcare professional, but they can choose to study or specialize in many different areas. After reading *Women in Medicine*, your students should have a better understanding of how many amazing things doctors can do. This activity will allow students to explore the possibilities within the medical field, recognize options for caring for their own health, and imagine which medical specialty they might be interested in pursuing!

Activity

1. After reading *Women in Medicine / Las mujeres en la medicina* out loud to your students, ask them about the featured women. How are they alike? How are they different? What are they doing to help people?
2. Tell your students that there are many different kinds of healthcare professionals who do different things to help people. Distribute the handout “Types of Doctors” and go over the vocabulary words with your students. Allow plenty of time to introduce these difficult words, answering any questions along the way, and providing pictures and examples for each kind of doctor whenever possible.
3. Divide the class in half, into two large groups. One group will be the doctors in the first round and the patients in the second round. The other half will be patients in the first round and doctors in the second round.
4. Give each student in the doctor group a Doctor Card. Give each student in the patient group a Patient Card.
5. Tell the “doctors” to spread out around the room and find a seat at a table. There should be an empty chair next to them or across from them.
6. Explain that each “patient” will move around the classroom, visiting different “doctors.” The patients should visit the doctor they need in order to help them with the problem described on their card. The doctors should help their patients according to their specialty, which is

After Reading: Types of Doctors continued

decided by the vocabulary word on the Doctor Card.

7. If the students are confused about what a doctor/patient interaction should look like, model a conversation for them. The patient should introduce themselves, the doctor should ask them what's wrong, the patient should describe their problem, and the doctor should try to help by answering questions, recommending next steps (like a test, exam, or surgery), or prescribing something like a medication.
8. Allow the students in the patient group to walk around, find their doctors, and have a conversation about their problem. Once every student has had a chance to talk with a doctor, the two doctor and patient groups can switch.
9. You may redistribute the doctor and patient cards and play as many rounds of this activity as you like, pausing to help students remember the vocabulary words on the doctor cards whenever necessary.

Discussion

What did you learn from this activity? What was it like to pretend to be a doctor? What was it like to pretend to be a patient? Which doctor/patient conversation was the most positive for you, and why? If you could be any kind of doctor, which kind would you be, and why?

Types of Doctors

Allergists: treat all kinds of allergies, like food allergies or insect sting allergies.

Anesthesiologists: give patients a careful combination of medicines to make them unconscious during surgery.

Cardiologists: are experts on the heart. They can operate on the heart or help patients with heart diseases.

Dentists: are experts on the teeth. They can check their patient's teeth, or even perform surgery on teeth.

Dermatologists: are experts on the skin, hair, and nails. They help patients with skin diseases, acne, scars, or skin allergies.

Emergency Specialists: make quick life-and-death decisions for sick or injured patients in the emergency room.

Family Physicians: take care of the whole family, children, adults, and the elderly. They give shots and checkups, and monitor ongoing illnesses.

Gastroenterologists: are experts on the organs that help digest your food, like the stomach, liver, pancreas, and gallbladder. You might see them for stomach pain, diarrhea, or trouble eating.

Hematologists: are experts on the blood. They treat patients with blood diseases, like sickle cell disease.

Medical Geneticists: diagnose and treat genetic disorders, which are passed down from parents to their children.

Neurologists: are experts on the brain and nervous system. They operate on the brain and treat brain disorders.

Obstetricians (OBGYNs): are experts on women's health. They also help check on pregnant people, make sure they're healthy, and help with childbirth.

Oncologists: are experts on cancer. They help treat patients with cancer, and often work with surgeons.

Ophthalmologists: are experts on eyes. They can prescribe glasses, check patient's eyes, treat eye diseases, and perform surgery on eyes.

Pathologists: work in labs instead of with patients, trying to find out what causes different diseases.

Pediatricians: work with and treat children from the time they are born until they are young adults.

Podiatrists: are experts on ankles and feet. They help with injuries and illnesses only in the ankles and feet.

Psychiatrists: help treat patients with mental illnesses, who may feel they can't control their sadness or fear. They use medication and therapy to help patients.

Radiologists: use X-Rays and other technology, like ultrasounds, to look inside your body and diagnose diseases.

Rheumatologists: specialize in bones, muscles, and joints. They help people with back pain, weak bones, or arthritis.

Doctor Cards



Allergist

Treatments: skin testing (placing the potentially harmful allergen against the skin to see if there's a reaction), blood tests, exposing the patient to a small amount of food they might be allergic to in order to check for a reaction

Anesthesiologist

Treatments: interacting with patients to explain the anesthesia process, deciding the correct amount of anesthesia to give to patients based on their weight and condition

Cardiologist

Treatments: using X-Rays to identify the problem with the heart, inserting a balloon to open the arteries of the heart if blood flow is blocked, treating chest pain and high blood pressure with medication

Dentist

Treatments: filling in cavities, removing wisdom teeth, removing teeth that are rotted, cleaning and whitening teeth, repairing chipped teeth, performing root canals (if the tissue under or inside the tooth is infected)

Dermatologist

Treatments: prescribing face wash, lotion, and medicine for skin conditions like acne, removing loose skin, draining and removing growths on the skin, examining skin issues and sending samples of the damaged skin for testing

Emergency Specialist

Treatments: stabilizing patients by bandaging and cleaning wounds, setting broken bones, placing a chest tube if the patient cannot breathe, restarting the heart if it stops beating

Family Physician

Treatments: monitoring chronic (long-term) diseases such as diabetes, kidney disease, asthma, etc. They help their patients manage pain that comes from chronic diseases, give checkups, and diagnose new diseases

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Doctor Cards continued



Gastroenterologist

Treatments: pressing on the stomach and listening for anything unusual, prescribing medicine and/or diet changes for stomach issues, removing any ulcers (sores inside the stomach) and helping to make the stomach less irritated

Hematologist

Treatments: taking blood samples to check for disease, treating blood disorders and blood cancer, transferring donated blood to a patient who lost too much blood, transplanting bone marrow for a patient who isn't producing healthy blood cells

Medical Geneticist

Treatments: researching hereditary diseases to find cures, running tests to diagnose hereditary diseases, helping patients manage pain

Neurologist

Treatments: prescribing headache medicine, testing coordination, memory, and muscle strength, testing electrical signals in your nervous system, measuring electrical activity in the brain

Obstetrician (OBGYN)

Treatments: delivering babies, checking to make sure the baby and mother are healthy before birth, performing ultrasounds to see how the baby is developing, removing growths and performing surgery on the reproductive system

Oncologist

Treatments: performing surgery to remove cancer, providing chemotherapy (killing cancer with medicine), radiation therapy (using a beam that kills cancer cells but leaves healthy cells alone)

Ophthalmologist

Treatments: performing eye exams to check your vision, prescribing glasses, performing surgery on eyes if needed, treating eye diseases like dry eye syndrome with medication

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Doctor Cards continued



Pathologist

Treatments: performing tests in a lab to help other doctors diagnose diseases, examining body tissues and cells up close using a microscope, confirming a diagnosis for other doctors

Pediatrician

Treatments: checkups for children, giving small children and babies vaccines (shots), examining children to make sure they're growing properly

Podiatrist

Treatments: removing warts and other growths on the feet and legs, setting broken foot/leg bones, making casts to hold feet and legs steady and manage pain, treating foot/leg skin diseases

Psychiatrist

Treatments: talking to patients about their mood and behavior, prescribing medicines to help improve mood, recommending therapists for patients to talk to

Radiologist

Treatments: using x-rays and other complex machines to take pictures of the inside of the body, diagnosing problems like broken bones, tracking a patient's recovery progress, prescribing a medication or treatment, or administering radiation therapy

Rheumatologist

Treatments: diagnosing diseases/problems with the joints and bones, prescribing medicines, recommending physical therapists and exercises

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Patient Cards



In the beginning of spring, I can't go outside because I cough until I throw up, and my eyes get itchy and puffy.

I'm prepped and ready for surgery, but I'm scared that I will wake up during the surgery. I want to talk to the doctor who will make sure I stay unconscious.

My heart is beating really fast all the time, and it's really uncomfortable. It's also been causing a lot of pain in my chest.

There's a pounding pain in my tooth whenever I yawn, try to talk, or try to eat. My mom thinks the tooth might have rotted.

I have bright red spots on my skin, and more and more of them are appearing every day.

I have been in a serious car accident and was brought to the emergency room in an ambulance. My arm is especially injured, it's covered in cuts and might be broken.

I am going to a routine wellness checkup with my mom, who is also getting her checkup from our doctor.

I have not been able to eat all week. I'm usually not hungry, and when I do try to eat my stomach hurts a lot.

I fell off my bike and skinned my knee two months ago, and my knee keeps bleeding and won't make a scab.

My mom has a disease that makes her unable to walk. I've been wobbly on my feet lately, and my mom worries I might have her disease.

Trying to think too hard gives me a headache so bad that I have to go right to bed and lie down.

My mom is pregnant, and I'm going with her to her doctor to check on how the new baby is doing.

My grandpa has cancer, and I'm worried about him. I want to talk to a doctor that knows a lot about cancer to find out if he'll be okay.

Lately I've had a really hard time seeing anything that's too far away, and my parents think I need glasses.

My dad works in a research lab with other doctors, and he's taking me to see his friend, who specializes in finding the causes of diseases.

My little sister and I have gone to the same doctor for our checkups since we were born. Today we have another checkup together.

My ankle has been swollen for a month, and it hurts too badly to walk on it at all.

I have been so sad for the last few months that I can't get out of bed, and nothing makes me feel better. I want to see a doctor who can help me feel happier and have more energy.

I broke my finger, and the doctor wants to look closer at the bone by taking me to another doctor who does X-rays.

My bones feel weak lately, it's hard for me to exercise and I'm always worried I'll break a bone.

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After Reading: Healthcare, Beyond the Doctors

Grades: Second–Fifth Grade

Materials: *Women in Medicine / Las mujeres en la medicina*

Subject: healers throughout history and in the modern world

Skills: applying real-world experiences to discussion, guided text analysis

Common Core: CCSS.ELA-Literacy.SL.3.1

National Health Education Standards:

3.5.3 Discuss which trusted adults and resource people in the community can help a person obtain credible health information and trustworthy services.
5.2.3 Explain how family, peers, and trusted adults can affect a health decision.

Background

Doctors help us when we're sick or injured, prescribe medicine and other treatments, perform surgeries, and make sure we stay healthy for as long as possible. However, doctors are not the only important healers! Throughout history, people like Xoquauhtli have dedicated their lives to learning about healthcare and helping people around them. Nurses like Florence Nightingale and biochemists like Gerty Cori have also made important contributions to medicine and helped countless patients, even though they aren't doctors. This activity will help students think about healing outside of a doctor's office by using examples from history and their real lives.

Activity

1. Review or re-read the section of *Women in Medicine / Las mujeres en la medicina* that discusses Xoquauhtli (pages 14-17).
2. Ask students to think about Xoquauhtli's work as a midwife. Ask if they've ever heard of midwives before, and what they know about the job. Give the students time to share. If none of them know anything about this subject, take some time to tell them about the role of midwives, doulas, and other women healers throughout history.
 - a. One example to use here is imperial Japan, where male doctors didn't help with childbirth at all. Midwives, older relatives (such as mothers and aunts), and female doctors would be completely in charge. They learned how to help pregnant women by watching other midwives and relatives, then passed on their knowledge to others.
3. Ask the students to think to themselves (or write, for older students) about a time they were sick, injured, or feeling bad, and someone helped them to feel better who isn't a doctor. Give the students plenty of time to think. It may help to offer your own example first, or use prompts. Did they ever have a parent or sibling help them while they were sick? Did someone ever see them fall or get hurt and come over to help? Have they visited the school nurse? Have they gone with a parent to pick up medicine from a pharmacist?
4. Ask if anyone wants to share their experiences. Leave plenty of time for the students to share and ask each other questions, if appropriate.

After Reading: Healthcare, Beyond the Doctors continued

Discussion

What are the different ways people can act as healers? Who has acted as a healer for you in your own life? Did you relate to any of the experiences your classmates shared, and why? How can you safely act as a healer for others, just like Xoquauhtli, without becoming an official doctor? When is it unsafe to act as a healer for others?*

*It is important to remind your students that they should always go to the doctor if they are seriously hurt or sick, and that it is not a game to try and “heal” others with serious illnesses or injuries. Women like Xoquauhtli had many teachers and role models to learn from, and lots of experience helping pregnant people. You should never try to help others by doing something you do not have experience doing.

After Reading: Major Organs and Organ Systems

Grades: Third–Fifth Grade

Materials: *Women in Medicine / Las mujeres en la medicina*, "Labeling Major Organs" worksheet, "Organ Systems Fill-in-the-Blank" worksheet

Subject: organs and organ systems

Skills: understanding and applying new vocabulary, matching, making inferences

NGSS: 4-LS1-1 From Molecules to Organisms: Structures and Processes
3-LS1-1 From Molecules to Organisms: Structures and Processes
4-LS1-2 From Molecules to Organisms: Structures and Processes

Background

Our amazing bodies consist of many organs, which all work together in systems to keep us healthy. When any one of our major organs are not working properly, other organs—and even our whole body—can be affected. This worksheet-based activity will help students understand what the major organs are, what they do, and some of the basic systems they are a part of.

Activity Part 1

1. Gather the students and review or reread the section of *Women in Medicine / Las mujeres en la medicina* that explains why your heart beats (pages 5-8, with special attention to the diagram on page 6).
2. Stop to ask the class some questions about the material you reviewed: What is the purpose of the heartbeat? Why is the heart so important? Why were Dr. Helen Taussig's patients' hearts not working properly, and what did she do to help? Why do other organs in the body, like the lungs, need the heart? How do the lungs and heart work together?

Brain: the most complicated organ in the body. We still don't understand it fully, but we know it controls how all other organs function, and makes us think and feel emotions.

Heart: pumps blood throughout the body to deliver oxygen and other important nutrients to other organs.

Kidneys: remove waste from the blood and body and turn it into urine.

Large intestine: converts digested food that has been broken down by the small intestine into feces, which will then be excreted.

Liver: helps us digest and turn food into energy, and gets rid of toxins in our bodies or our blood.

Lungs: filter the air we breathe, removing carbon dioxide or anything that's bad for us. The lungs work with the heart to add oxygen to our blood.

Nerves: carry electrical messages between your brain and the rest of the body.

Small intestine: absorbs water and fully breaks down digested food that has traveled through the stomach.

Stomach: breaks down and digests our food, helping to turn healthy food into energy and unhealthy food into waste.

After Reading: Major Organs and Organ Systems continued

3. Introduce the students to the other major organs, using the vocabulary below.
4. After reviewing the vocabulary, have the students divide into small groups and work on the "Major Organs" worksheet together, which asks the students to label organs using a word bank. Give the students as much time as they need to complete the worksheet together. Circulate through the classroom to offer help, suggestions, or corrections when needed.
5. Bring all the students together and ask them to discuss the activity. Did they find it easy or difficult to identify the major organs? Did it help them understand how the organs work to see them all together in the body? Why or why not? Can they understand how all the organs must work together to make the body function based on what the organs look like together?

Activity Part 2

1. Introduce the students to the vocabulary below.

Arteries: tubes that carry oxygen-containing blood from the heart to tissues and organs in the body.

Circulatory system: the organ system that circulates blood through the body.

Digestive system: the organs that take in food and liquids and break them down into substances that the body can use for energy.

Esophagus: the passageway for food that travels between the mouth and the stomach.

Excretory system: the organ system that finds and releases waste from the body.

Nervous system: your body's "command center." Starting from the brain, it uses electrical signals to control movements, thoughts, and more.

Organ system: a group of organs that work together to perform a specific function in the body.

Trachea: the passageway for air that travels between the throat and the lungs.

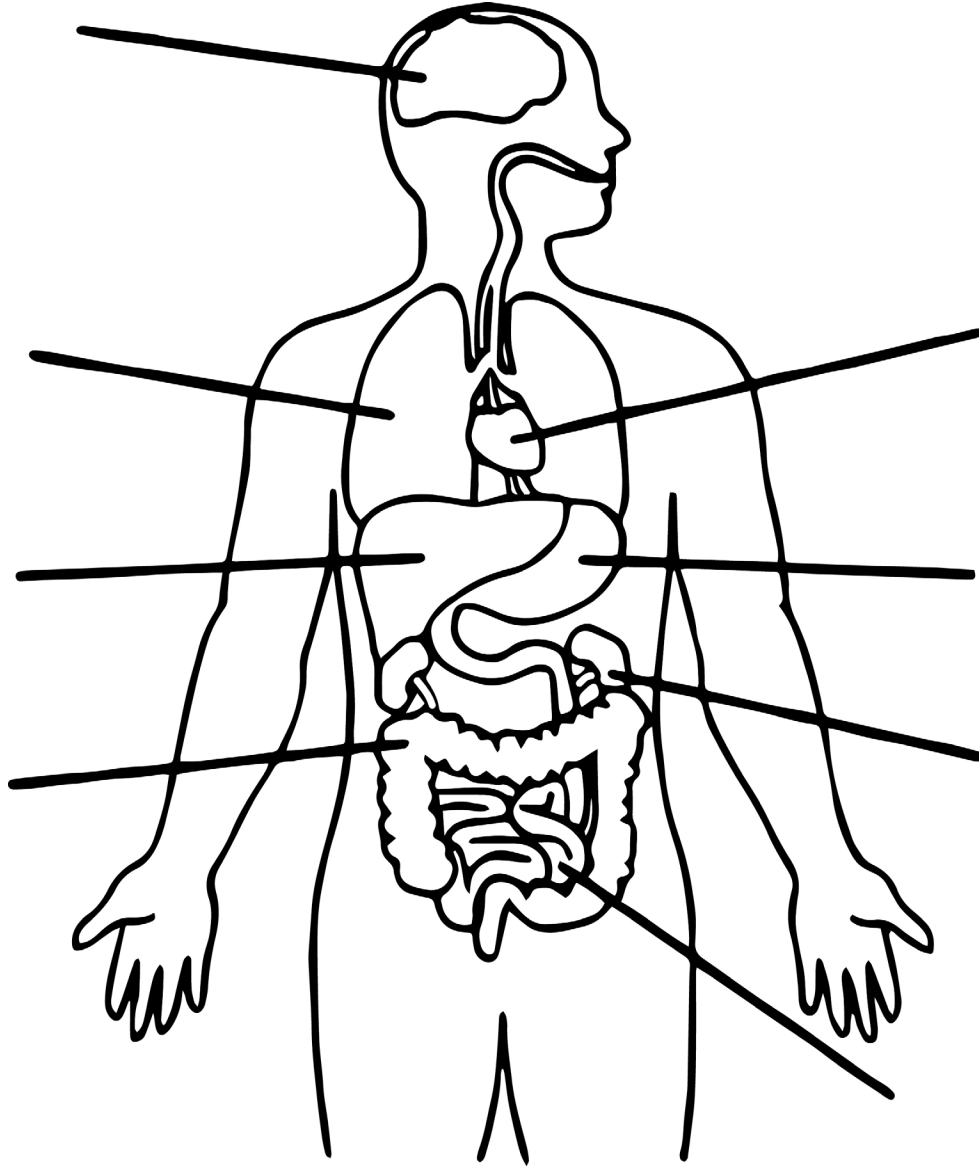
Veins: tubes that collect blood from throughout the body and carry it back to the heart to receive more oxygen and nutrients.

2. Split the students into the same groups from Part 1 and give the students one copy of the "Organ Systems Fill-in-the-Blank" worksheet per group. Give the students as much time as they need to complete the worksheet together. Circulate through the classroom to offer help, suggestions, or corrections when needed.
3. Bring all the students together and ask them to discuss the activity. Was this worksheet easier or more difficult than the last? Did it help them to understand how organs work together? Do they think internal organs rely on external organs? How so? Why is it important for sense organs to communicate with other organs?

Discussion

Ask the students specific questions about how the heart and lungs work together, or the small and large intestines, or the liver and stomach. Do organs have to be part of the same systems to work together? Why or why not? Can organs be a part of more than one system? How does the communication between organs in the body affect how doctors treat their patients?

Labeling Major Organs



Heart

Liver

Lungs

Brain

Stomach

Small Intestine

Large Intestine

Kidneys

Organ Systems Fill-in-the-Blank

respiratory	systems	carbon dioxide	trachea	oxygen
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Body organs work together to form organ _____.

The lungs and _____ are part of the _____ system, which brings _____ gas into your body and releases _____ gas into the air.

oxygen	veins	circulatory	arteries
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Your heart, which pumps blood, is part of the _____ system. Blood takes _____ to all parts of the body by travelling through _____.

Then _____ brings the blood back to your heart.

mouth	food	esophagus	intestines	digestive
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The _____ system is responsible for breaking down _____ so that your body can use it. When you eat food, you use your _____. From there, food travels through the _____ to your stomach, where it is digested. The _____ then absorb nutrients from the digested food and break down waste.

excretory	nervous	nerves	waste	muscle movement
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Your kidneys are part of the _____ system, which removes _____ from your body. Your brain and _____ form the _____ system, which controls your heartbeat, breathing, _____, and senses.

After Reading: Cures, Treatments, and Preventions

Grades: Second–Fifth Grade

Materials: *Women in Medicine / Las mujeres en la medicina*, 6 sheets of paper, 2 plastic sheet protectors, 1 fan, 2 large heavy books, 6 large bowls/tupperware, water, 2 washcloths or towels, scotch tape

Subject: what is the difference between cures, treatments, and preventive measures?

Skills: making inferences, working in groups, presenting findings, using the scientific method

Common Core: CCSS.ELA-Literacy.SL.3.1

National Health Education Standards:

1.2.5 Identify practices and behaviors that prevent or reduce health risks.

5.5.4 Identify options when making a health-related decision.

5.5.5 Predict the potential consequences of each option.

Background

Doctors have many options for how to treat their patients, and different patients will have different needs depending on their illness or injury. Some diseases and injuries can be cured by doctors, others can only be treated. Sometimes doctors give their patients preventive treatments for certain diseases (or even injuries). This hands-on group activity will show students the difference between preventive treatments, treatments, and cures. Older students will also be able to use the scientific method in this experiment, just like real doctors and

Vocabulary

Cure: a treatment for an illness or injury that makes the patient completely healthy again

Treatment: a process of helping an ill or injured patient feel an improvement in their health, although they will not be completely healthy again

Preventive Treatment: a process of helping a healthy patient protect themselves from getting sick or injured in the future

Activity Part 1

1. Review the vocabulary with the whole class, referring to *Women in Medicine / Las mujeres en la medicina* pages 22–24.
2. Split the class into 6 groups (or 3 groups for a small class). There should not be more than 4–5 students in each group, or each student will not have a chance to fully participate. The first 2 groups will be testing **cures**, the 3rd and 4th groups will be testing **treatments**, and the 5th and 6th groups will be testing **preventive treatments**. Do NOT tell each group what they will be testing.
3. Distribute a plain piece of 8.5 x 11" paper, scotch tape, and a large bowl or tupperware to each group. Distribute a sheet protector to the preventive treatment groups. Distribute washcloths/small towels to the cure groups. Set up a fan on a table in a central space in the classroom. Ideally, the fan should be set up in a warm and sunny place.

After Reading: Cures, Treatments, and Preventions continued

4. Fill each group's bowl/tupperware halfway with room-temperature water. Older students may complete this step independently.
5. Distribute instruction worksheets to each group.
6. Wait for each group to complete the preparation part of the experiment and write down their observations. Circulate to answer questions or provide help as needed. Then, once every group is ready, tell the students they may begin their experiment.
7. Circulate to make sure the students are completing the experiment correctly and not spilling water. Provide help if necessary. Collect the damp cloths from groups 1 and 2 when they are finished with them.
8. Once each group has completed their experiment and answered the questions together (step 6 or 7), switch the fan you've set up on to its lowest setting. Tell the students that they may take their papers up to the table and place them in front of the fan. Help them secure the papers with tape if necessary.
9. Wait about an hour and a half for the papers to dry. In the meantime, collect each group's worksheet and help the students clean up their stations from the experiment. You may give the students a break, perform the first part of this activity before lunch or recess, or move on to another lesson for the remainder of the waiting time. While the papers are drying, continue to check on them. If the papers that were left in sheet protectors are completely dry, you may remove them from in front of the fan.
10. When the sheets of paper from groups 3 and 4 (the treatment groups) have dried somewhat and are just damp, place a heavy book on top of each sheet of paper to smooth out the wrinkles. If you like, you may bring these groups back together to perform this step or watch you perform it.

Activity Part 2

1. Once the sheets of paper have dried, bring all of the students together. Remove the heavy books from the papers from groups 3 and 4. Have all the students look at each paper carefully.
2. Stop at each paper on the table and ask the students what they observe about them. Do the papers look like they did before the experiment? Do they think they could write on them? Can you still see the group members' names on the back clearly? What do the students think was done to each piece of paper?
3. After making initial observations, allow each group to explain how they performed their experiment in turn. Allow other students to ask questions along the way and make sure multiple students in each group are speaking about what they did in the experiment, what their predictions were, and what their observations were after the experiment.
4. Tell the students that two groups were testing for a cure, two groups were testing for a treatment, and two groups were testing for a preventive treatment. Ask the students to guess which group is which.

After Reading: Cures, Treatments, and Preventions continued

Discussion

When you were performing this experiment, you stopped to make predictions and observations with your group along the way. When doctors are coming up with new treatments and performing experiments, they always start with making predictions, and they always make careful observations along the way. Why do you think this is so important for doctors to do? Why was it important for your group to stop and make predictions and observations in this experiment?

In these experiments, the sheet of paper represents the patient, the water represents sickness, and drying the paper in front of the fan (and weighing it down with books) represents different kinds of treatments (cures, preventive treatments, and treatments). Does this make sense to you? Why or why not? Can you explain it to another student?

Why do you think the groups who used a sheet protector in their experiments (groups 5 and 6) were testing preventive treatments? Why is using a sheet protector before putting the paper in water preventative?

Why do you think the groups who used a washcloth in their experiments (groups 1 and 2) were testing cures? Did these cures work? Why or why not? If they didn't work, what would you change about the experiment to make sure they did work next time?

Why do you think the groups who put the paper directly into the water (groups 3 and 4) were testing treatments? Did the paper look better, but not completely better, after being left in front of the fan and weighed down with a heavy book?

Just like different patients, these different pieces of paper needed different treatments in order to get "better" (to look like they did before they got wet). Why do you think different treatments work for some patients, and not others?

Experiment Instructions

Cures, Treatments, and Preventions

Group 1 and 2

1. Write all of your group member's names on the back of the blank sheet of paper.
2. When your teacher says to begin, one group member will pick up the washcloth, dip it in the water, and then wring it out (twist the cloth in your hands to get out as much water as possible). Make sure you wring out the cloth over the bowl, so it doesn't spill.

STOP

3. Discuss with your group, and elect one group member to write your answers below. What do you think will happen if you place the damp cloth on top of the sheet of paper? What would happen if you hadn't squeezed the cloth first, or if you put the sheet of paper directly into the water?

STOP

4. Wait until your teacher to tell you to begin the experiment. One group member will carefully spread out the cloth and place it on top of the sheet of paper so it covers the whole paper. Once the cloth is on top of the paper, the whole group will count to ten out loud. After ten seconds, one group member will lift the cloth off of the sheet of paper and bring it to your teacher.
5. Discuss with your group, and elect one group member to write your answers below. What looks different about the sheet of paper? What do you observe? Were your predictions about what would happen correct?

STOP

6. Wait until your teacher tells you to begin this step. Once your teacher says to begin, elect one group member to take the paper up to the fan that has been set up for this experiment. Another group member will use four small pieces of tape to tape the sheet of paper to the table in front of the fan.
7. You have completed the group work part of this experiment!

Experiment Instructions

Cures, Treatments, and Preventions

Group 3 and 4

1. Write all of your group member's names on the back of your blank sheet of paper.

STOP

2. Discuss with your group, and elect one group member to write your answers below. What do you think will happen if you put this sheet of paper in water? What will happen to the names written on the back?

STOP

3. Wait until your teacher tells you to begin the experiment. One person will dip the sheet of paper all the way into the water, then the whole group will count to ten out loud. After ten seconds, one person will very carefully remove the sheet of paper from the water. Set it down flat on top of a dry towel until it stops dripping.
4. Discuss with your group, and elect one group member to write your answers below. What looks different about the sheet of paper? What do you observe? Were your predictions about what would happen correct?

STOP

5. Wait until your teacher tells you to begin this step. Once your teacher says to begin, elect one group member to carefully take your sheet of paper up to the fan that has been set up for this experiment. Lay the paper as flat as possible on the table.
6. You have completed the group work part of this experiment!

Experiment Instructions

Cures, Treatments, and Preventions

Group 5 and 6

1. Write all of your group member's names on the back of your blank sheet of paper.
2. When your teacher says to begin, elect one group member to take your sheet of paper and slide it into the plastic sheet protector.

STOP

3. Discuss with your group, and elect one group member to write your answers below. What do you think will happen if you put this sheet of paper in water with the plastic sheet protector on it? What would happen if you took the sheet protector off?

STOP

4. Wait until your teacher tells you to begin the experiment. One person will place the sheet of paper (still in its sheet protector) in the water, then the whole group will count to ten out loud. After ten seconds, one person will remove the sheet of paper from the water.
5. Discuss with your group, and elect one group member to write your answers below. What looks different about the sheet of paper? What do you observe? Were your predictions about what would happen correct?

STOP

6. Wait until your teacher tells you to begin this step. Once your teacher says to begin, elect one group member to take your sheet of paper out of the sheet protector. Another group member will take the paper up to the fan that has been set up for this experiment. Another group member will use four small pieces of tape to tape the sheet of paper to the table in front of the fan.
7. You have completed the group work part of this experiment!

After Reading: Making a Difference in Medicine

Grades: Second–Fifth Grade

Materials: *Women in Medicine / Las mujeres en la medicina*, chalkboard or whiteboard, chalk or whiteboard markers

Subject: Women’s advancements in medicine, paying attention and making an impact

Skills: Guided text analysis, creating real-world examples

Common Core: CCSS.ELA-Literacy.RI.3.1

NGSS: 5-ESS3-1 Earth and Human Activity

National Health Education Standards:
8.5.1 Demonstrate how to persuade others to make healthy choices

Background

Women in Medicine / Las mujeres en la medicina introduces us to so many amazing women and their important contributions to the field of medicine. Like all scientists, these women made discoveries because they were curious about the world around them, and because they were observant. They were able to pay close attention to problems they saw in the world and come up with solutions using medicine. In order to make a difference, it is necessary to pay careful attention to what’s happening around you, and try to think of ways you can create change. Today, students will discuss what they’ve observed and are curious about in their real lives. They will identify problems and brainstorm solutions with each other, just like real scientists and doctors must do!

Activity

1. Reread or remind the students of the work of Dr. Helen Taussig, Peseshet, Xoquauhtli, Dr. Angella Ferguson, Tu Youyou, Dr. Gerty Cori, and Florence Nightingale.
2. Ask the students to turn to a partner and share: what do they admire about these healthcare workers and doctors? What did all of these women do to help people, in their different ways? How did their work make a difference in the world?
3. Remind the students that all of these influential healthcare workers and doctors made their discoveries because they were curious and observant about the world around them. They saw problems that needed to be solved and found ways to solve them through creative thinking and experimentation.
4. Ask students to think (or write, for older students) about a problem they’ve observed in the world around them, and brainstorm thoughts about how this problem could be solved. What creative solutions can they think of to help people and make a difference? Encourage the students to believe they are fully capable of observing problems, no matter how large or small, and thinking up creative solutions for them.
5. After around five minutes of thinking/writing, ask students to share the problems they thought of and some of their solutions. Write the problems and solutions the students identified on the board. Allow students to continue to raise their hands with more solutions and thoughts as they come.

After Reading: Making a Difference in Medicine

Discussion

Anyone is capable of identifying problems in the world and thinking of ways to solve them and help people. Today, all of you have taken the first steps towards becoming influential doctors and scientists just like those in *Women in Medicine / Las mujeres en la medicina*.

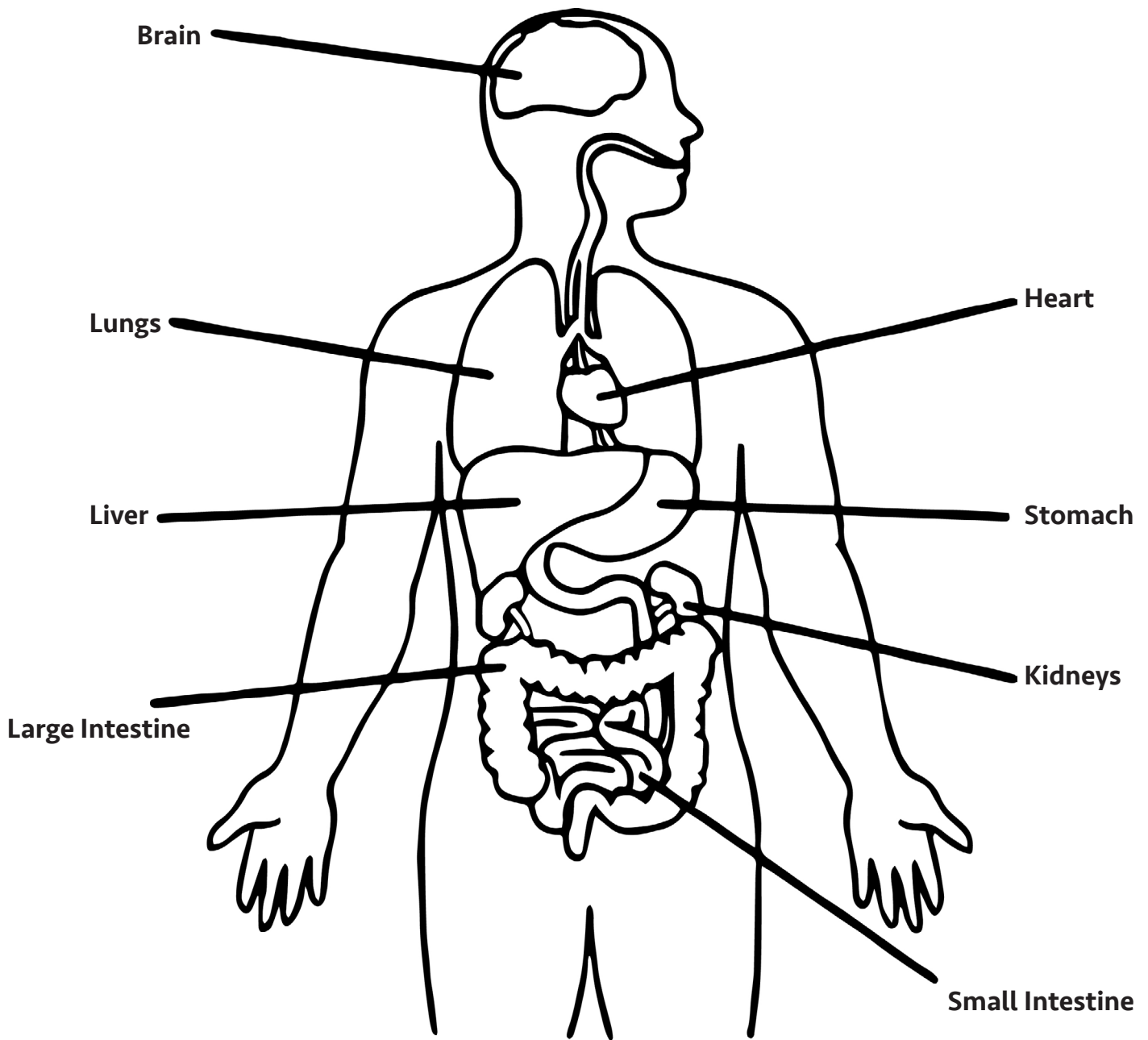
How can you, as students and as young people, start to make a difference in the world right now? What small steps can you take to help others, encourage healthy choices, and solve problems?

How can problems be solved using medicine and science? Why is it important to continue making discoveries, doing research, and doing experiments in medicine and science?

If you were a doctor, what problems would you focus on solving using medicine? How would you help people around the world?

How can we, as humans, make a positive difference in the world rather than a negative one through the use of science and medicine? How can we use science and medicine to protect the environment, or help others who have been negatively affected by human activity in nature?

Labeling Major Organs Answer Key



Heart	Liver	Lungs	Brain
Stomach	Small Intestine	Large Intestine	Kidneys

Organ Systems Fill-in-the-Blank Answer Key

respiratory	systems	carbon dioxide	trachea	oxygen
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Body organs work together to form organ **systems**.

The lungs and **trachea** are part of the **respiratory** system, which brings **oxygen** gas into your body and releases **carbon dioxide** gas into the air.

oxygen	veins	circulatory	arteries
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Your heart, which pumps blood, is part of the **circulatory** system. Blood takes **oxygen** to all parts of the body by travelling through **arteries**. Then **veins** bring the blood back to your heart.

mouth	food	esophagus	intestines	digestive
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The **digestive** system is responsible for breaking down **food** so that your body can use it. When you eat food, you use your **mouth**. From there, food travels through the **esophagus** to your stomach, where it is digested. The **intestines** then absorb nutrients from the digested food and break down waste.

excretory	nervous	nerves	waste	muscle movement
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Your kidneys are part of the **excretory** system, which removes **waste** from your body. Your brain and **nerves** form the **nervous** system, which controls your heartbeat, breathing, **muscle movement**, and senses.

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