

# LLS STEM Curriculum

Learning about the human body



- Grades K–5
- Core literacy and math skills
- Hands-on, STEM-based activities
- Creative thinking and problem solving
- Introduce leading LLS researchers

**New!**  
Social-Emotional  
Learning expanded  
activities



LEUKEMIA &  
LYMPHOMA  
SOCIETY®

HERO  
SQUAD

LLS STEM Curriculum  
Learning About the Human Body  
HeroSquad.org

# Here's what your LLS STEM Curriculum includes for grades K–5:

- 6 activities per grade level, including hands-on activities, a video-based activity, and a final wrap-up assessment
- 5 nonfiction passages per grade level
- 1 video featuring LLS-funded scientists talking about their careers
- NEW! Social-emotional learning skills built into activities for every grade
- ready-to-use presentation covering each grade level's content
- 2 parent send-home notes per grade level to use before and after the curriculum
- badges and certificates to celebrate student learning
- timesaving patterns and planning sheets
- teacher's guide



## Global Mission

The Leukemia & Lymphoma Society's mission is a world without blood cancers. Currently, LLS is funding over 250 grants around the world.

## This LLS STEM Curriculum addresses the standards, and more

- Covers core skills in literacy and math.
- Correlated to Common Core State Standards. (Not in a Common Core state? The standards covered are included in many other states' standards as well.)
- Features STEM-based activities and introduces students to STEM careers.
- Incorporates social-emotional learning.
- Includes hands-on activities that get students up and moving.
- Video-based activity encourages creative thinking and shows students the important role that creativity and asking questions plays in STEM fields.
- Allows students to “meet” cancer survivors and learn what inspires them—and how they inspire others.
- Allows students to learn about LLS-funded researchers.



Irene Ghobrial, MD



### Always Striving

The Leukemia & Lymphoma Society was founded in 1949. Today LLS is the world's largest nonprofit health organization that raises money to help doctors find cures for blood cancers. These funds also help patients and their families get the care and support they need.

### More about social-emotional learning

In this LLS STEM Curriculum, you'll find a social-emotional learning focus integrated into activities for every grade. The following skills are featured:

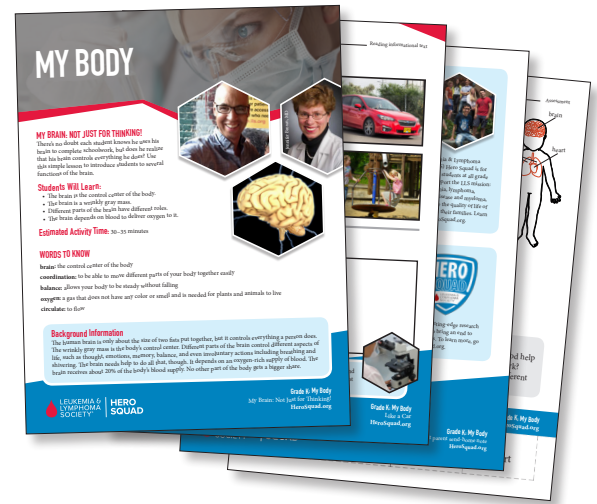
- goal setting
- teamwork
- self-confidence
- communication
- recognizing personal strengths

Social-emotional skills are important for everyone. Whether you're an LLS scientist working toward a life-saving cancer treatment or a student striving to learn new things and make friends, skills in teamwork, goal setting, communication, self-confidence, and recognizing our own strengths are important. Students who complete the activities in this LLS STEM Curriculum will focus on these skills as they learn about the human body, blood cancers, careers in science, and more.



## How to use these materials:

- Start out by reviewing the Classroom Presentation and the activities. The materials are flexible, so you can cover them all in just a week, spread them out over several weeks or months, or pick and choose which to use. Decide what's best for you. Consider completing the activities leading up to or during your Pennies for Patients campaign.
- Coordinate with your grade level team. Share the materials and plan to do the activities at the same time, if possible. Each activity includes an estimate of how much time to allow.
- Review each activity and gather materials. Most activities require few, if any, additional materials. You'll find lots of patterns, printables, and templates to save you time.
- Display the "Discover" poster in your classroom. Draw students' attention to it and start the discussion about the role creativity plays in STEM fields. Let students know that they'll experience this themselves as part of the curriculum and activities. Let students know that they'll also learn about teamwork, setting goals, and analyzing one's strengths.
- Send home the pre-unit parent note.
- Work your way through the activities and nonfiction passages. Be sure to watch the researchers' video and complete the video-based activity. Wrap up with the final assessment.
- Keep your student badges and certificates handy. Award them anytime students go above and beyond what's expected. Be sure to award the badges at the end of the unit.
- Send home the second parent note.
- Celebrate what students have learned. Refer back to the materials and remind students what they learned anytime related topics come up or are in the news. Each year the curriculum builds on previous knowledge, so let students know that they'll continue learning about STEM, the human body, and the impact of blood cancers next year.



## What Are Blood Cancers?

Blood cancers, such as leukemia, lymphoma, and myeloma or myelodysplastic syndromes, can affect the bone marrow, blood cells, lymph nodes, and other parts of the lymphatic system. An estimated 1.3 million people in the US are either living with or are in remission from leukemia, lymphoma, or myeloma.

LLS-funded research has led to the discovery and development of lifesaving therapies. Since 1954, LLS has invested more than \$1.3 billion in blood cancer research. Some of the therapies first approved for blood cancer patients are now helping patients with different types of cancers too.

## Why All the Buzz About STEM?

Jobs in science, technology, engineering, and math (STEM) are growing faster than other occupations. Current estimates predict that we'll need **1,000,000 additional STEM professionals** in the next decade—about the same time that some of your students will enter the workforce.

STEM isn't just test tubes and mathematical formulas. As students will see in this curriculum, STEM jobs require creativity to solve scientific problems. Without STEM professionals, today we wouldn't know about gravity, genes, or space. **And without STEM professionals in the future, we won't be ready to outsmart blood cancers and all cancers.** There's critical—and exciting!—work to be done.

Our future STEM thinkers and problem solvers are in your classroom right now. Share your enthusiasm for science and math. Help students see that working in STEM fields constantly brings new challenges and questions with big and interesting problems to solve. It takes scientists of all kinds to tackle those problems and work out solutions. Your students could be the ones to discover a new planet, harness a new energy source, or outsmart cancer once and for all. STEM means creating and discovering the things that will change the world. Invite your students to be a part of it!

### Fields with maximum job growth

biomedical engineering

medical science

health care



**1,000,000**

Number of additional STEM professionals needed in the next decade



Estimated size of the STEM workforce in the US



**29% more**

Average amount earned by STEM professionals

### Saving Lives

The Leukemia & Lymphoma Society funded research that led to the discovery of lifesaving treatments for cancer. In fact, some of the treatments first approved for blood cancer patients now help people with other kinds of cancers and diseases.

# Grade-by-Grade Skills and Topics

## Kindergarten: My Body

Students learn about the brain, heart, and lungs. They also learn that body systems work together.

### Brain

- The brain is a wrinkly gray mass and is the control center of the body.
- Different parts of the brain have different roles.
- The brain depends on blood to deliver oxygen to it.

### Heart

- The heart is a muscle that pumps blood.
- Blood moves around our bodies and keeps our bodies alive.
- Exercise is important for a healthy heart and blood flow.

### Lungs

- When we breathe in, air goes to our lungs.
- Our blood picks up oxygen from the air we breathe and delivers oxygen throughout the body.

### Body systems

- Different parts of our bodies depend on each other to work well.
- Part of our blood fights germs.

Students learn that asking questions is a key part of science. Students make a booklet to collect their own questions.

- Curiosity is important in science.
- Asking questions is a key part of research.
- Words such as *how* and *why* are question words.

Students read two grade-appropriate informational texts. They meet Storm, a hockey-playing blood cancer survivor, and Dr. Nichols, a physician-scientist.

Students also learn about the importance of **goal setting** by setting a personal activity goal that will keep them moving.

## Grade 1: My Blood

Students learn that our bodies need blood. They also learn about the many important functions of their blood.

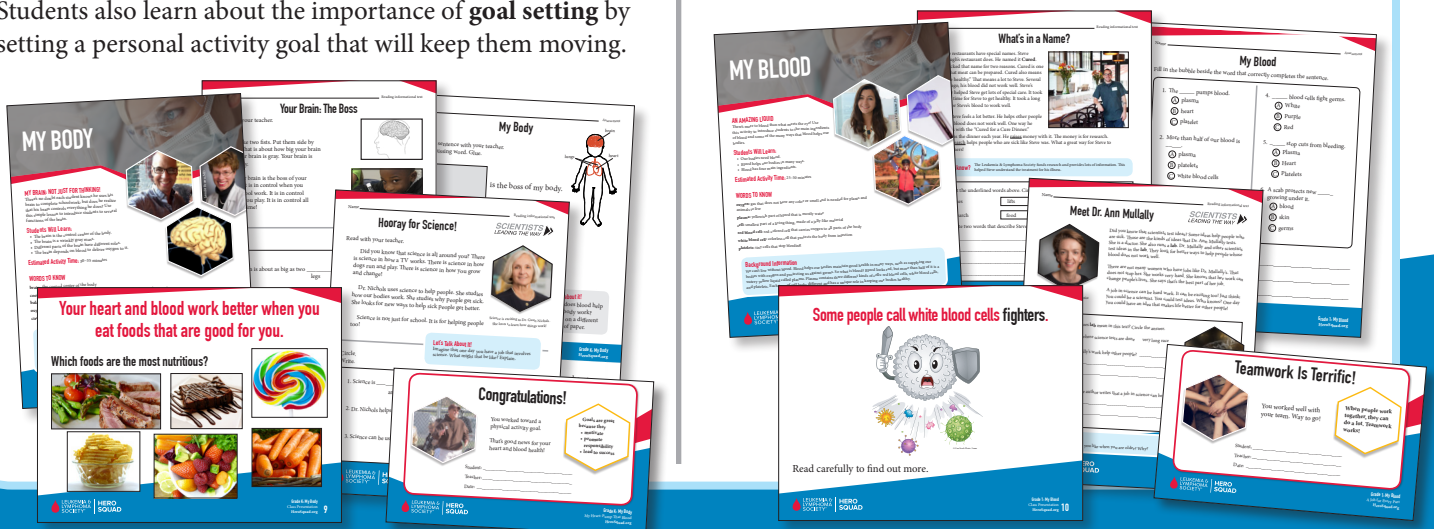
- Blood has four main parts—plasma, red blood cells, white blood cells, and platelets. Students learn what each does.
- White blood cells increase when a person is sick because white blood cells fight germs.
- Platelets help healthy blood form clots.
- Scabs form over wounds to keep germs out and to protect the new skin growing under them.
- On average, an adult has 8–10 pints of blood, a 40-pound child has 2–3 pints of blood, and a baby has one cup of blood. Students also learn that one pint is equal to two cups.

Students learn that asking questions is a key part of science. Students make a booklet to collect their own questions.

- Curiosity is important in science.
- Asking questions is a key part of research.
- Some scientists research ways to prevent, treat, or cure illnesses.

Students read two grade-appropriate informational passages and meet Steve, a restaurant owner who named his restaurant Cured for a very special reason. They also meet a physician-scientist who studies blood cancers.

Students also learn about the importance of **teamwork** and how the four main parts of blood work together as a team.



# Grade-by-Grade Skills and Topics

## Grade 2: My Bones

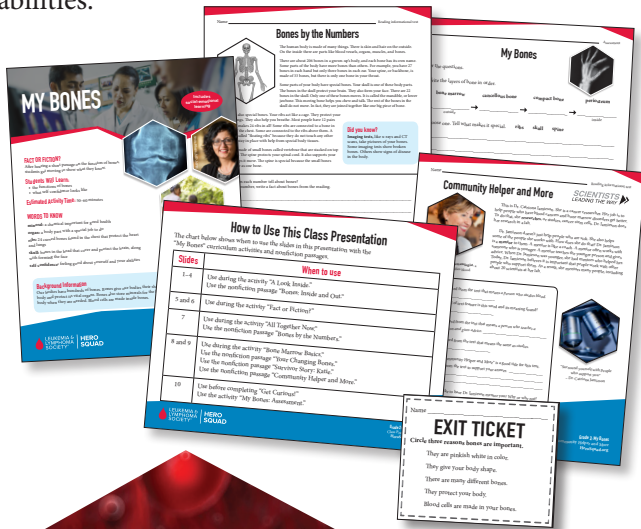
Students learn all about bones:

- What bones are made of
- The functions of bones
- That joints and bones work together for movement
- Why bones such as the skull, spine, and ribs are special
- What bone marrow is
- What problems can be associated with bone marrow

Students learn that asking questions is a key part of science. Students use a printable to ask and answer their own questions about science and bones.

Students read grade-appropriate informational texts and meet Katie, who needed a bone marrow transplant and got one from a very special donor. They also learn about a cancer researcher.

Students also learn about **self-confidence** and why it is important to feel good about yourself and your abilities.



## Grade 3: My Circulatory System

The circulatory system includes the heart, lungs, and blood vessels that move blood around the body.

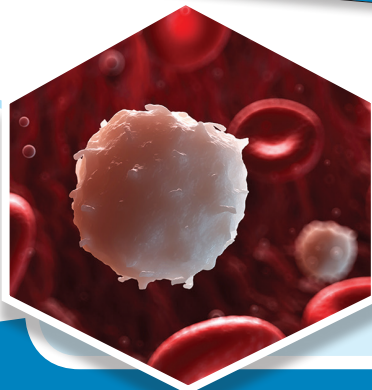
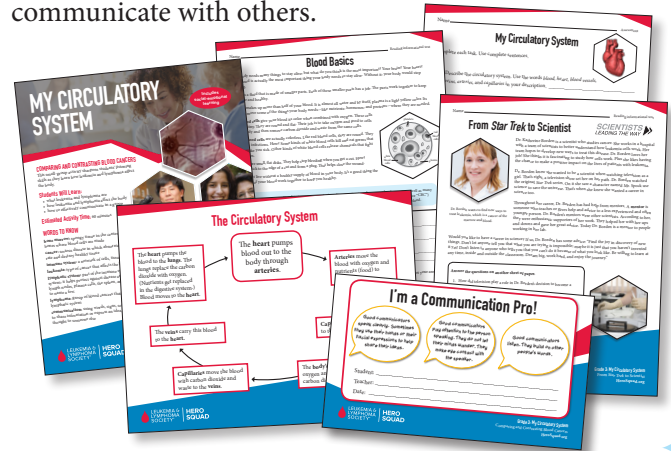
Students learn

- the parts of the circulatory system
- the functions of the circulatory system
- the parts and functions of the blood vessels
- how the pulse relates to the circulatory system
- how to find their pulses and calculate their heart rates
- what leukemia and lymphoma are
- how leukemia and lymphoma affect the body

Students learn that asking questions is a key part of science. Students use a printable to ask and answer their own questions about science and the circulatory system.

Students read grade-appropriate informational texts. They meet Jane, a cancer survivor who found a support group through LLS and who works to support others with cancer. They also meet Dr. Katherine Borden, a doctor who studies how leukemia cells work in hopes of finding new treatments for this disease.

Students also learn about the importance of good **communication** and how to more effectively communicate with others.



## Amazing Options

Thanks to funding from The Leukemia & Lymphoma Society, new and exciting treatments are being tested. One of these groundbreaking treatments involves removing a patient's immune T cells from his or her body and reprogramming the cells to find and fight cancer cells.



# Grade-by-Grade Skills and Topics

## Grade 4: My Cells

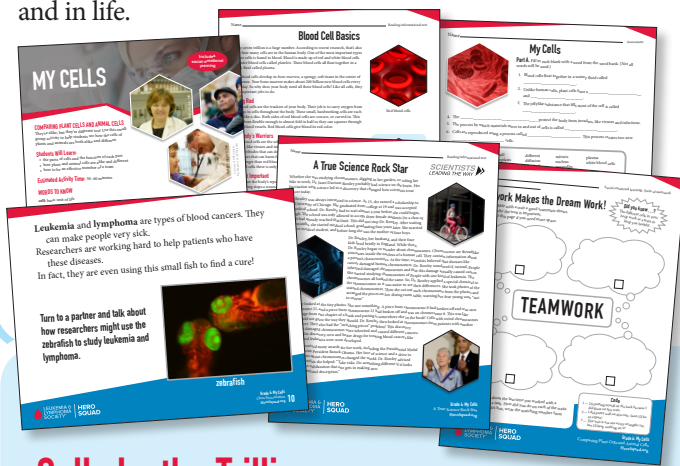
Students go molecular and learn all about cells:

- the parts of cells and the function of each part
- how plant and animal cells are alike and different
- parts of the human cell
- that human body cells are different shapes and sizes based on their function
- how materials move in and out of cells through the process of diffusion
- how diffusion relates to red blood cells and the work they do in the body
- how cells divide
- how cancer cells and normal cells differ

Students learn that asking questions is a key part of science. Students use a printable to harness the power of asking “Why?” and to learn more about cells.

Students read grade-appropriate informational text and meet Ira and Dean, two cancer survivors and athletes who accomplished amazing things. Students also read about Dr. Janet Davison Rowley, a pioneering scientist who was the first person to show the link between genetic abnormalities and certain cancers like leukemia.

Students will also learn about the importance of **teamwork** and how this skill will help them be more successful at school and in life.



## Cells by the Trillions

The human body has over 37 trillion cells. Cancer happens when some cells grow too fast and spread out of control. The Leukemia & Lymphoma Society has invested more than \$1.3 billion dollars in research to advance treatments and cures.

## Grade 5: My Immune System

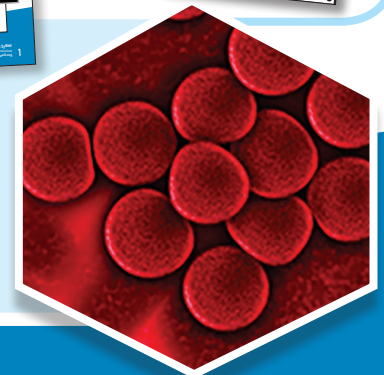
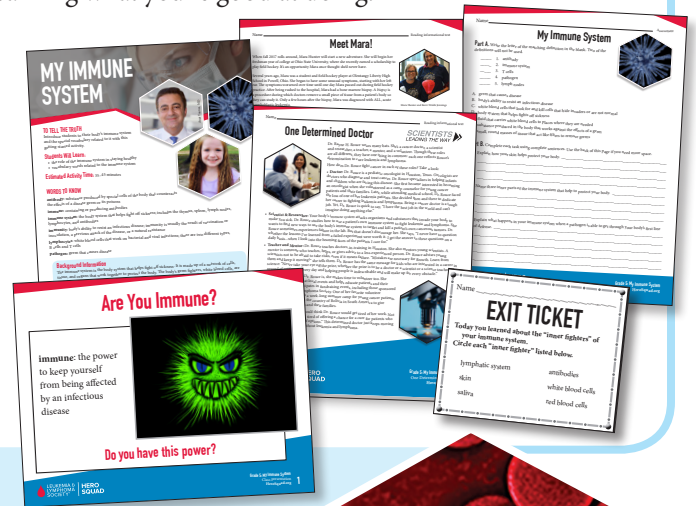
Many body parts and systems come together as students learn about the immune system:

- the role of the immune system in staying healthy
- what a pathogen is
- how the skin, mucus, saliva, and other structures protect the body from pathogens
- the different types of white blood cells
- how white blood cells attack pathogens

Students learn that asking questions is a key part of science. Students use a printable to turn “Why?” into “Wow!” and to learn more about their immune systems.

Students read grade-appropriate informational text and meet Mara, who beat cancer and earned a college scholarship to play field hockey. Mara also got a visit from an athlete who inspires her, Olympic gold medalist Kerri Walsh Jennings. They also meet Dr. Rayne Rouce, an oncologist and doctor who is fighting to find a cure for leukemia and lymphoma.

Students will also learn about the importance of **recognizing personal strengths** and the benefits of learning what you're good at doing.





# Get Started!

LLS offers resources to get involved and informed.

## HeroSquad.org

Want to get more involved with LLS? Increase the level of your school's participation in the Hero Squad program. Students learn the stories of local kids living with blood cancer and are empowered to help fund lifesaving research. The program emphasizes social-emotional learning through grade-level focused activities and collecting donations is made easy through our envelope and online fundraising platform. Your school is equipped with all materials you need and dedicated support from LLS staff. Students will have a blast while making a difference!



## lls.org

Get basic information on leukemia, lymphoma, myeloma, and other blood cancers. Learn about treatments, find clinical trials, contact information specialists, read survivor stories, and find support groups. LLS provides countless resources to support and guide families and individuals of all ages affected by blood cancers.

Have a student affected by blood cancer in your school? The Trish Greene Back to School Program for Children with Cancer offers free information and materials to parents and educators. The program was developed to encourage communication among parents, young patients, healthcare professionals, and school personnel to assure children a smooth transition from active treatment back to school.

<https://www.lls.org/article/the-trish-greene-back-to-school-program>. Part of the program's offerings is Staying Connected: Facilitating the Learning Experience During and After Cancer Treatment. This is a free, 6.5 hour, online, continuing education program to equip school personnel focused on the needs of children, adolescents, and young adults who have survived or are being treated for any type of cancer.



From all of us at LLS, thank you for teaching students the science fundamentals in this curriculum and for laying the groundwork for tomorrow's scientists, researchers, and other STEM professionals. Thanks for being part of the Hero Squad!

# GRADE- BY-GRADE

## Skills Grids



LEUKEMIA &  
LYMPHOMA  
SOCIETY®

HERO  
SQUAD

LLS STEM Curriculum  
Learning About the Human Body  
[HeroSquad.org](https://HeroSquad.org)

# KINDERGARTEN MY BODY

Social-emotional  
learning focus:  
setting goals

	<b>CCSS.ELA- LITERACY.RI.K.10</b>	<b>CCSS.ELA- LITERACY.W.K.2</b>	<b>CCSS.ELA- LITERACY.SL.K.1a</b>	<b>CCSS.ELA- LITERACY.SL.K.2</b>	<b>CCSS.ELA- LITERACY.L.K.1d</b>
	Actively engage in group reading activities with purpose and understanding.	Use a combination of drawing, dictating, and writing to compose informative texts in which they name what they are writing about and supply some information about the topic.	Follow agreed-upon rules for discussions.	Confirm understanding of information presented orally by asking and answering questions about key details.	Understand and use question words.
My Brain: Not Just for Thinking!		✓	✓	✓	
My Heart: Pump That Blood			✓	✓	
My Lungs: Take a Deep Breath		✓			
My Body: At Work	✓			✓	
I Wonder!				✓	✓
Like a Car	✓				
Your Brain: The Boss	✓				
Healthy Habits	✓				
A Winner	✓				
Hooray for Science!	✓				



**GRADE 1**

# MY BLOOD

**Social-emotional  
learning focus:  
teamwork**

	<b>CCSS.ELA- LITERACY.RI.1.1</b>	<b>CCSS.ELA- LITERACY.RI.1.10</b>	<b>CCSS.ELA- LITERACY.W.1.1</b>	<b>CCSS.ELA- LITERACY.W.1.2</b>	<b>CCSS.ELA- LITERACY.SL.1.2</b>	<b>CCSS.ELA- LITERACY.L.1.1j</b>	<b>CCSS.ELA- LITERACY.L.1.4a</b>	<b>CCSS.ELA- LITERACY.L.1.6</b>
	Ask and answer questions about key details in a text.	With prompting and support, read informational texts appropriately for grade 1.	Write and support an opinion.	Write informative texts in which they name a topic, supply some facts about the topic, and provide some sense of closure.	Ask and answer questions about information presented orally.	Produce interrogative sentences in response to prompts.	Use sentence-level context as a clue to the meaning of a word or phrase.	Use words and phrases acquired through conversations.
<b>An Amazing Liquid</b>				✓				✓
<b>A Job for Every Part</b>					✓			✓
<b>Our Body's First-Aid</b>				✓				✓
<b>Math and My Blood</b>					✓			
<b>Always Ask</b>					✓	✓		
<b>So Important!</b>	✓	✓						
<b>Mighty Fighters</b>	✓	✓						
<b>Keep Your Engine Running!</b>	✓	✓	✓					
<b>What's in a Name?</b>	✓	✓					✓	
<b>Meet Ann Mullally</b>	✓	✓					✓	

# GRADE 2

# MY BONES

Social-emotional  
learning focus:  
self-confidence

	CCSS.ELA- LITERACY.RI.2.1	CCSS.ELA- LITERACY.RI.2.2	CCSS.ELA- LITERACY.RI.2.4	CCSS.ELA- LITERACY.RI.2.5	CCSS.ELA- LITERACY.RI.2.7	CCSS.ELA- LITERACY.W.2.2	CCSS.ELA- LITERACY.W.2.7	CCSS.ELA- LITERACY.W.2.8	CCSS.ELA- LITERACY.SL.2.2
	Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.	Identify the main topic of a multiparagraph text as well as the focus of specific paragraphs within the text.	Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.	Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.	Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.	Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).	Recall information from experiences or gather information from provided sources to answer a question.	Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
A Look Inside			✓						✓
Fact or Fiction?									✓
All Together Now						✓			
Bone Marrow Basics						✓			
Get Curious!							✓	✓	
Bones: Inside and Out	✓				✓				
Bones by the Numbers	✓								
Your Changing Bones	✓	✓							
Survivor Story: Katie	✓								
Community Helpers and More	✓		✓						

**GRADE 3**

# MY CIRCULATORY SYSTEM

**Social-emotional learning focus: communication**

	<b>CCSS.ELA-LITERACY.RI.3.1</b> Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.	<b>CCSS.ELA-LITERACY.RI.3.4</b> Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.	<b>CCSS.ELA-LITERACY.RI.3.5</b> Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	<b>CCSS.ELA-LITERACY.W.3.2</b> Write informative/explanatory texts to examine a topic and convey ideas and information clearly.	<b>CCSS.ELA-LITERACY.W.3.7</b> Conduct short research projects that build knowledge about a topic.	<b>CCSS.ELA-LITERACY.W.3.8</b> Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.	<b>CCSS.ELA-LITERACY.SL.3.2</b> Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	<b>CCSS.MATH.CONTENT.3.NBT.A.2</b> Fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	<b>CCSS.MATH.CONTENT.3.NBT.A.3</b> Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., $9 \times 80$ , $5 \times 60$ ) using strategies based on place value and properties of operations.	<b>CCSS.MATH.CONTENT.3.MD.B.3</b> Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories.
Teamed Up to Move Blood				✓						
Quite a Trip				✓						
Get Pumping				✓				✓	✓	✓
Comparing and Contrasting Blood Cancers							✓			
I'm Curious...					✓					
Blood Basics	✓		✓							
Blood Movers		✓								
Special Hospital Helpers	✓	✓								
Survivor Story: Jane	✓									
From <i>Star Trek</i> to Scientist	✓									



# GRADE 4 MY CELLS

Social-emotional  
learning focus:  
teamwork

	CCSS.ELA- LITERACY.RI.4.1	CCSS.ELA- LITERACY.RI.4.2	CCSS.ELA- LITERACY.RI.4.3	CCSS.ELA- LITERACY.RI.4.4	CCSS.ELA- LITERACY.RI.4.7	CCSS.ELA- LITERACY.W.4.1	CCSS.ELA- LITERACY.W.4.2	CCSS.ELA- LITERACY.W.4.9	CCSS.ELA- LITERACY.SL.4.1	NGSS 4-LS1-1
Comparing Plant Cells and Animal Cells					✓				✓	Construct an argument that plants and animals have internal structures that function to support survival, growth, behavior, and reproduction.
Cell Models and More							✓		✓	
Cell Transport: Let's Get Moving!							✓		✓	
Normal Cells Versus Cancer Cells					✓				✓	
The Power of Why					✓			✓	✓	
Blood Cell Basics	✓	✓	✓	✓						✓
When Cells Don't Work Quite Right	✓	✓	✓	✓						✓
A Fish Joins the Fight!	✓	✓	✓	✓						
Two Tenacious Fighters	✓	✓	✓	✓						
A True Science Rock Star	✓			✓						

# MY IMMUNE SYSTEM

Social-emotional learning focus: recognizing personal strengths

	CCSS.ELA-LITERACY.RL.5.10	CCSS.ELA-LITERACY.RI.5.1	CCSS.ELA-LITERACY.RI.5.2	CCSS.ELA-LITERACY.RI.5.3	CCSS.ELA-LITERACY.RI.5.4	CCSS.ELA-LITERACY.W.5.2	CCSS.ELA-LITERACY.W.5.7	CCSS.ELA-LITERACY.W.5.8	CCSS.ELA-LITERACY.W.5.9	CCSS.ELA-LITERACY.L.5.4	CCSS.ELA-LITERACY.L.5.5.4c
	By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 4-5 text complexity band independently and proficiently.	Refer to details and examples in a text when explaining what the text says explicitly and inferences from the text.	Determine the main idea of a text and explain how it is supported by key details; summarize the text.	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in a text.	Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 5 topic or subject area.	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.	Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.	Draw evidence from literary or informational texts to support analysis, reflection, and research.	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies.	Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine precise meaning of key words and phrases.
To Tell the Truth										✓	✓
You've Got To Get Through Us First!		✓	✓	✓	✓			✓			
A Team of Infection Fighters				✓	✓			✓			
White Blood Cells to the Rescue!	✓					✓					
From Why to Wow!						✓	✓	✓	✓		
The Outer Fighters of Your Immune System		✓	✓	✓	✓						
T Cells and B Cells on Patrol!		✓		✓	✓						
Harnessing the Power of the Immune System		✓		✓	✓						
Meet Mara!		✓		✓		✓					
One Determined Doctor		✓	✓								