Getting to the Core

4th Grade Mini-Unit of Study

Sewed Up His Heart

Student Learning Journal

Lyrics to Heart Song

Music: Ho Hey, by the Lumineers

(Pump)
(Blood)
(Pump)
(Blood)

(Pump) Let's start with atrium right
(Blood) Carbon dioxide is high
(Pump) Blood moves down to ventricle
(Blood) Pumping this blood to the lungs
(Pump) Oxygen poor blood
(Blood)
(Pump)

(Blood) Onto the left atrium
(Pump) All this blood has oxygen
(Blood) Moving in right from the lungs
(Pump) Down to ventricle it pumps
(Blood) Aorta sends out blood
(Pump)
2,3

Heart muscles relax- filling up with blood it's in your heart
Atria contract fill the ventricles contract to
(Pump)
(Blood)
(Pump)
(Blood)

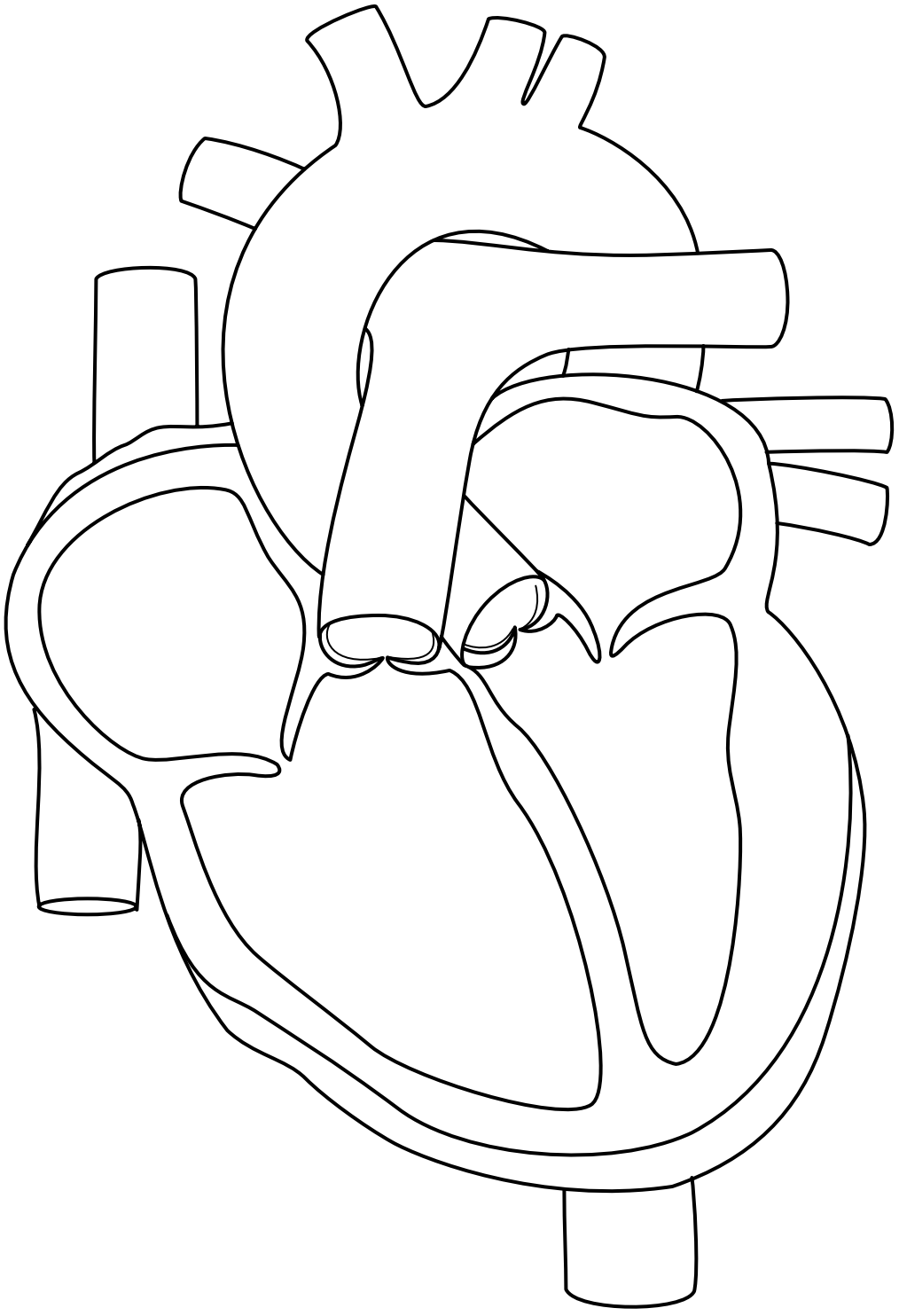
(Pump) Group of cells makes heart contract
(Blood) Pacemakers they're called in fact
(Pump) Gets info adjusting rate
(Blood) Oxygen your body needs
(Pump) The heart beating
(Blood)
(Pump) Exercise faster heartbeat
(Blood)

Heart muscles relax filling up with blood it's in your heart
Atria contract fill the ventricles contract to heart pump

Blood, we need it now
The heart's a pump
So blood goes in and out

Heart muscles relax filling up with blood it's in your heart
Atria contract fill the ventricles contract to
(Pump)
(Blood)
(Pump)
(Blood)

The Parts of the Heart



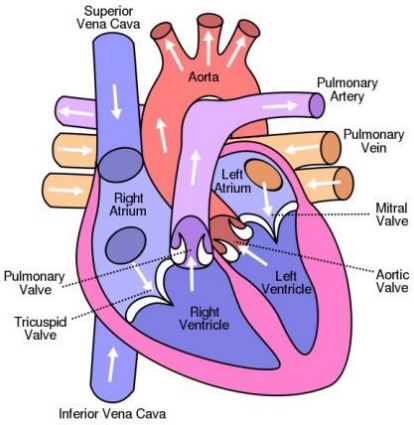
The Parts of the Heart

Thinking Map Activity

Directions: Organize the parts of the heart in a thinking map. Decide which one you would use and build it in the space below.

The Human Heart

The human heart is a fist-sized, muscular organ that is hollow. Its job is to pump blood through the body's network of blood vessels. The heart, blood, and blood vessels are part of the circulatory system, which supplies all the body's cells with the oxygen and nutrients they need, and removes waste products. The heart has chambers, valves, arteries, and veins -- and a complex electrical system keeps everything working smoothly and makes the heart beat.



An Introduction to the Human Heart

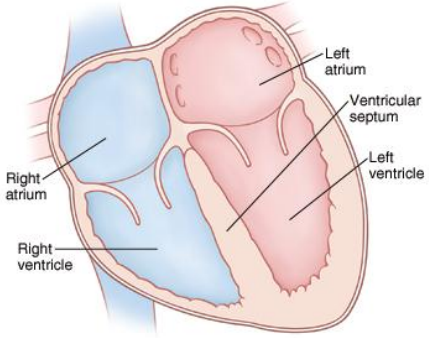
In order to understand diseases that affect the human heart, it's important to know how the heart normally works. The human heart is a hollow, muscular organ about the size of a fist. Its job is to pump blood through a network of blood vessels. These vessels form a loop, which starts at the heart, goes out through your body, and then ends back at the heart again. Together, the heart, blood, and blood vessels are part of the circulatory system, which does two of the most important jobs in the body:

- It carries oxygen and nutrients to all of your cells
- It picks up carbon dioxide and other waste products that your body produces so they can be disposed of.

The Chambers of the Heart

The inside of a normal human heart is divided into four chambers:

- The right atrium
- The left atrium
- The right ventricle
- The left ventricle.



The Heart Valves

In a healthy human heart, there are valves that keep blood flowing in one direction (see first diagram). When they open, they only let the right amount of blood through, and then they close to prevent blood from flowing backward in between beats.

The circulatory loop begins with blood entering the right atrium of the heart. When the heart beats, blood flows from the right atrium into the right ventricle through a valve.

From the right ventricle, blood flows through another valve and then to the lungs, where it picks up oxygen. From the lungs, it flows back into the left atrium of the heart and through the mitral valve into the left ventricle. From the left ventricle, blood is pumped through the aortic valve and into the aorta, where it goes out to the rest of the body, bringing oxygen and nutrients to your cells.

For the human heart to work right, each of the four chambers must contract, or squeeze, at just the right time. Your heart has an electrical system that helps coordinate this timing.

More Facts About the Heart

The Arteries

The arteries are major blood vessels connected to the human heart:

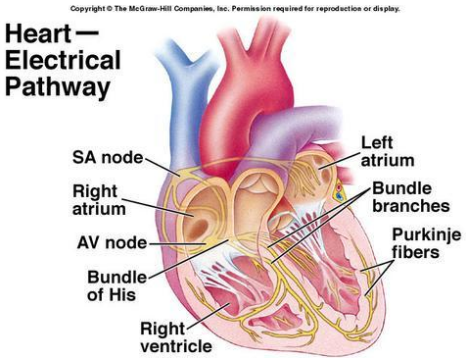
- The pulmonary artery carries blood pumped from the right side of the heart to the lungs to pick up a fresh supply of oxygen.
- The aorta is the main artery that carries oxygen-rich blood pumped from the left side of the heart out to the body.
- The coronary arteries are the other important arteries attached to the heart. They carry oxygen-rich blood to the heart muscle, which must have its own blood supply to function.

The Veins

The veins are major blood vessels connected to the human heart:

- The pulmonary veins carry oxygen-rich blood from the lungs to the left side of the heart so it can be pumped out to the body
- The venae cavae are two large veins that carry oxygen-poor blood from the body back to the heart.

The Electrical Pathways in the Human Heart



There is a group of cells in the right atrium called the SA, or sinoatrial, node. It's also known as the "pacemaker." This pacemaker produces an electrical signal that spreads out over the muscles of both atria, causing the chambers to contract and push blood into the ventricles. The electrical signal travels so fast that it causes both chambers to contract uniformly.

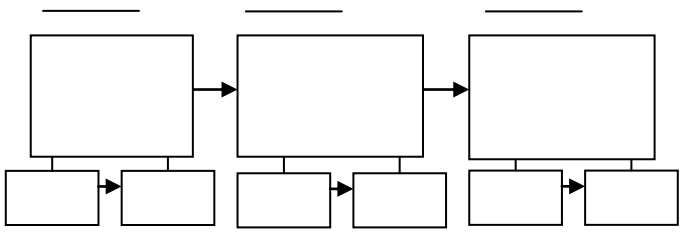
But this signal can't continue on to the ventricles because they are insulated from the atria. The only way the signal can get there is through another group of cells in the right atrium called the AV (atrioventricular) node. Here, the electrical signal slows down and then continues on to the ventricles. This causes the ventricles to contract, too, but not until the atria do first. The slowing of the signal at the AV node gives the atria time to fill the ventricles with blood before the ventricles contract to push the blood out of the heart.

After the ventricles contract, the signal fades, and the SA node sends out another electrical impulse.

This sequence is what you are hearing when you hear the usual "lub-dup" beat of your heart. Normally, the SA node sends out a signal 60 to 100 times every minute. Notice how this is a smooth process that results in heartbeats that happen at a regular rate and rhythm. This continuous and controlled cycle is called a normal sinus rhythm.

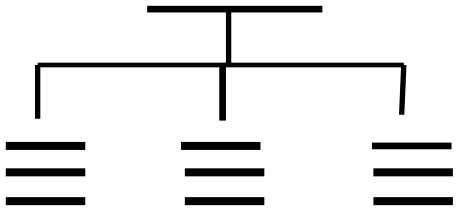
Which Thinking Map matches the structure of the text that the author used?

Flow Map: "How To", Sequence, Chronological order (time)



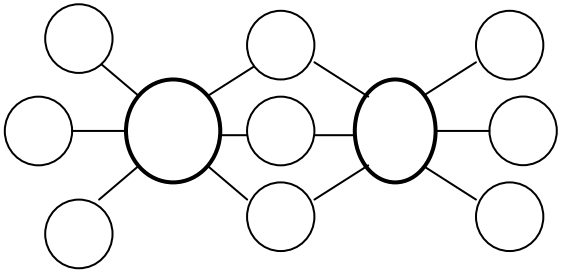
Words you might see: first, second, third, then, next, after, later, finally, at last, before, in the end, earlier

Tree Map: Main Idea and Details, Classifying and Categorizing



Words you might see: all about, types, kinds; (there is a main statement and then details that support the main idea that informs.)

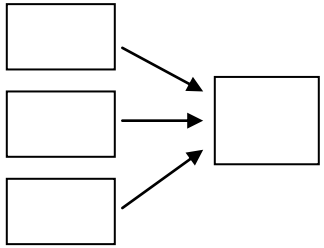
Double Bubble Map: Compare and Contrast



Words you might see: **Same**: also, as well, similarly, so, too, as well
Different: although, but, even though, however, instead of, yet

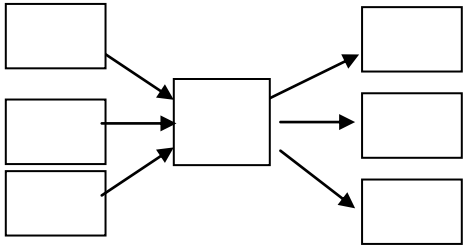
Multi-Flow Map: Cause/Effect or "To Explain Why"

Many causes lead to one effect



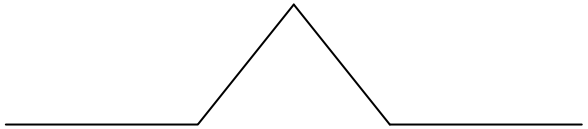
Words: because, one reason, another reason, for instance, in fact, for example, since, such as, of course, that is, actually

causes leads an event that causes effects



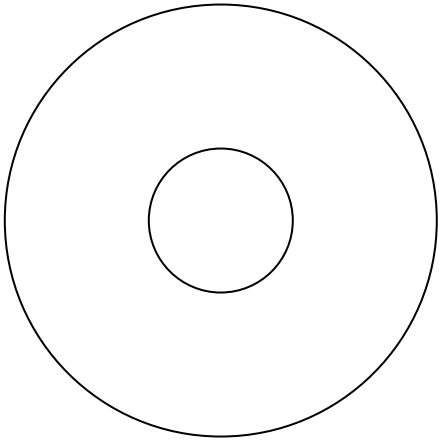
Words: so, as a result, because of this, hence, then, therefore, thus, accordingly, because of ____, we have _____.

Bridge Map: Seeing Relationships – how things remind you of something else



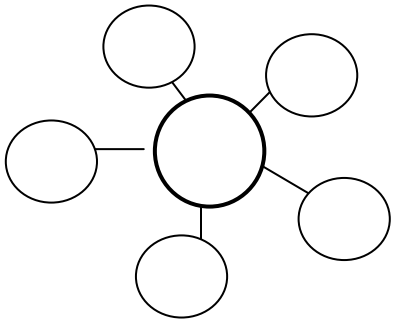
Words you might see: just like, as ___ as, same as, looks like, reminds,

Circle Map: Defining



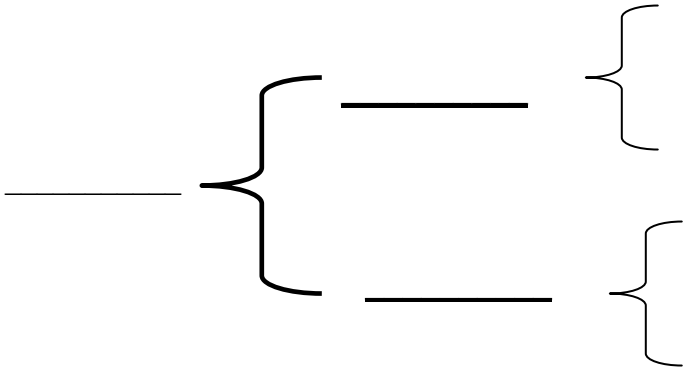
Words you might see: can be defined, is a, has, definition

Bubble Map: Describing a person or place



Words you might see: can be describes, is, has, (lots of adjectives!)

Brace Map: Whole to Parts



Words you might see: parts of, has the following, has (must be physical things that are parts of a whole)

The Human Heart

Text Structure

Directions: With your peers, discuss the structure of this text and decide which Thinking Map would be best to organize the information.

We think the structure of this text is _____.

The Thinking Map we chose to organize the information is _____,

because_____.

Build your map in the space below. If you need additional space, use the back of this page.

The Human Heart

Summary

Directions: Summarize the article, *The Human Heart,* using the Thinking Map that you created to organize the information.

Novel Ideas Only

Pioneer

We think the word ‘pioneer’ can mean:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

Double Entry Journal

Sewed Up His Heart

Main Points from the Text	**Supporting Evidence**

Focus Questions How do doctors decide when to operate? Do doctors ever get scared?

Sewed Up His Heart

from ***Sure Hands, Strong Heart: The Life of Daniel Hale Williams***
by Lillie Patterson
illustrated by Leslie Bowman

July 9, 1893, was hot and humid in Chicago. The scorching heat wave wrapped the city like a sweltering blanket and blistered the sidewalks. Rising temperatures sent thermometers zooming toward one hundred degrees.

The heat and high humidity took a heavy toll on young and old, animals and people. Horses pulling carts and streetcars dropped in their tracks. People fainted from heat prostration and sun strokes. No relief was in sight.

Doctors and hospitals were kept busy. The new Provident Hospital was no exception. Dr. Dan kept close watch on his patients. Making his rounds, he looked as immaculate as always, despite the heat. After his late-afternoon rounds were over, he retired to the closet-like room he used for his office.

Suddenly, a young student nurse burst into the room, her long starched skirt rustling as she ran.

"Dr. Dan!" she gasped. "An emergency! We need you."

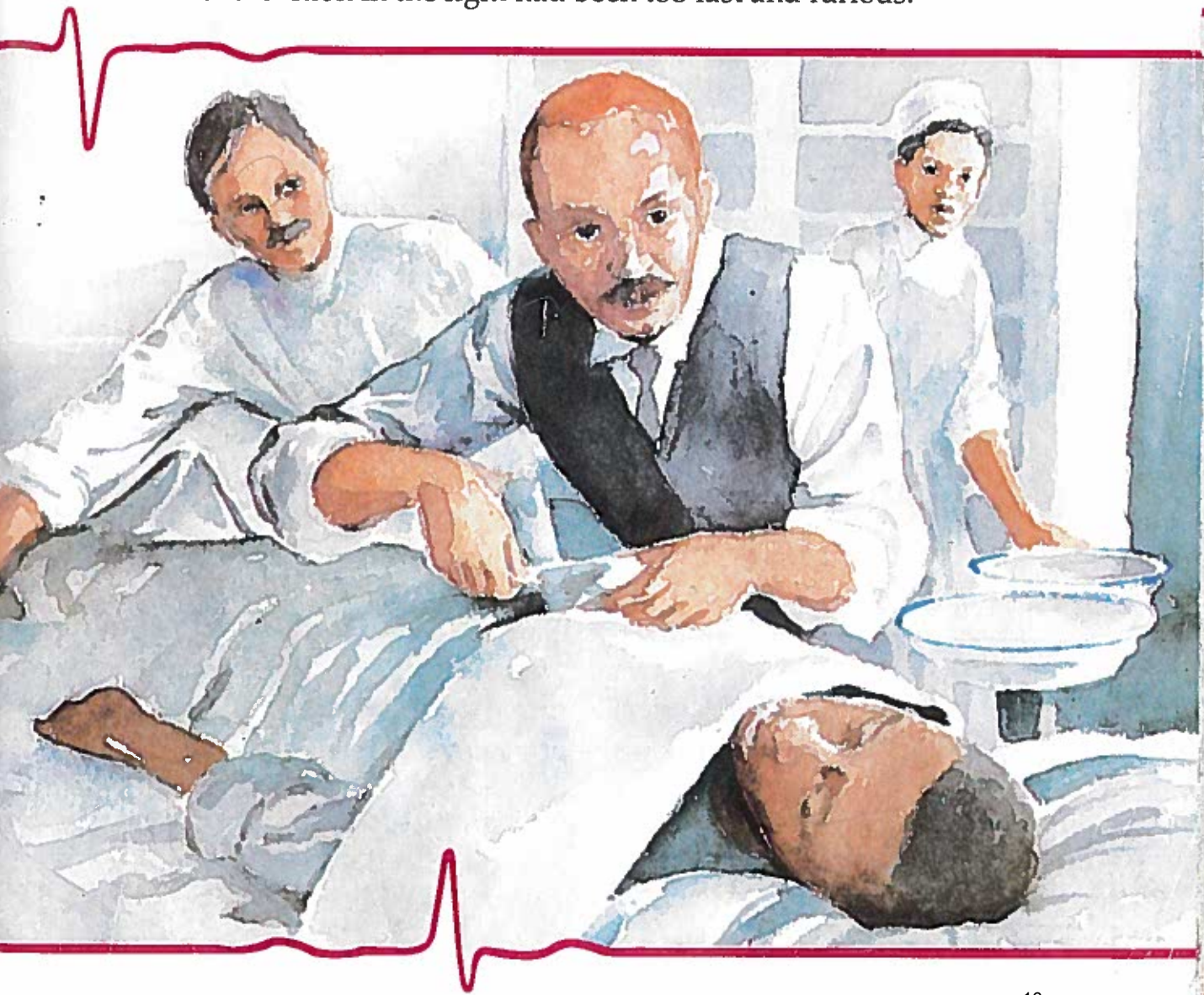
Without a word Dr. Dan dropped the report he was reading and hurried to the room set aside for emergency cases. The lone hospital intern, Dr. Elmer Barr, came running to assist.

The emergency case was a young man. He had been brought in by his friend, who gave sketchy information. The patient's name: James Cornish. His age: twenty-four years. His occupation: laborer. The illness: he had been stabbed in the chest.

The frightened friend tried to explain what happened. James Cornish had stopped in a neighboring saloon on his way home from work. The heat and a few drinks caused an argument among the customers. A fight broke out. When it ended, Cornish lay on the floor, a knife wound in his chest.

"How long was the knife blade?" Dr. Dan asked as he began his examination. This would give a clue to the depth and seriousness of the wound.

The victim had not seen the knife blade. Nor had his friend. Action in the fight had been too fast and furious.



Dr. Dan discovered that the knife had made an inch-long wound in the chest, just to the left of the breastbone. There was very little external bleeding. Nevertheless, Cornish seemed extremely weak, and his rapid pulse gave cause for concern. The X ray had not yet been invented, so there was no way to determine what was happening inside the chest.

Dr. Dan knew from experience that such cases could develop serious complications. James Cornish must be kept in the hospital, he decided. And he must be watched closely.

That night Dr. Dan slept in the hospital. He did this often when there were serious cases. As he had feared, Cornish's condition worsened during the night. He groaned as severe chest pains stabbed the region above his heart. His breathing became labored. A high pitched cough wracked his sturdy frame. The dark face on the pillow was bathed in perspiration.

Dr. Dan watched the wounded man carefully all night. The next morning, as he took the patient's pulse, he voiced his concern to the intern. "One of the chief blood vessels seems to be damaged," he said to Dr. Barr. The knife must have gone in deep enough to cut the internal mammary artery, he explained. The heart itself might be damaged.

James Cornish showed symptoms of lapsing into shock.

Both doctors knew that something had to be done, and done quickly. Otherwise Cornish would surely die within a matter of hours.

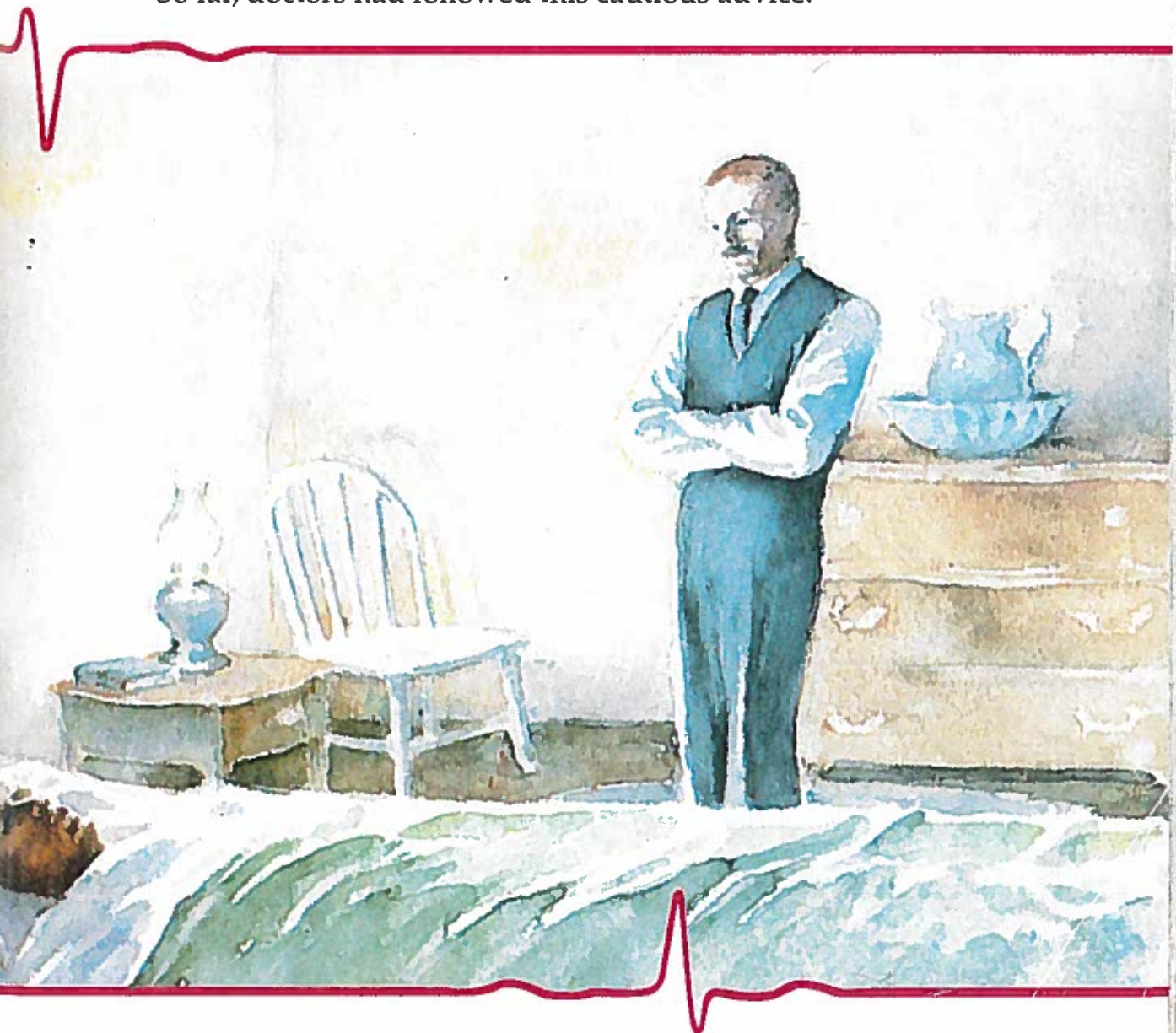
But what?

The only way to know the damage done would be to open the chest and look inside. In 1893, doctors considered this highly impracticable. For surgery, the chest was still off limits.

Standing beside the patient's bed, the barber-turned-doctor faced the situation squarely. Later he would recall how he weighed the risks of that moment. Thoughts tumbled through his mind as furiously as flurries in a wintry Chicago snowstorm.

He knew that medical experts repeatedly warned against opening the thorax, the segment of the body containing the heart and lungs. Heart wounds were usually considered fatal. As a medical student, Dr. Dan had read a quote from an eminent physician-writer. "Any surgeon who would attempt to suture a wound of the heart," the surgeon wrote, "is not worthy of the serious consideration of his colleagues."

So far, doctors had followed this cautious advice.



The risks were there for him and for Cornish. If he did not attempt an operation, Dr. Dan reasoned, the patient would die. Nobody would blame the doctor. Such cases often died.

On the other hand, if he opened the chest and Cornish died anyway, there would be certain condemnation from medical groups. His reputation as a surgeon would be questioned, perhaps lost.

The odds were against both him and Cornish. But Daniel Hale Williams had never allowed the odds to intimidate him.

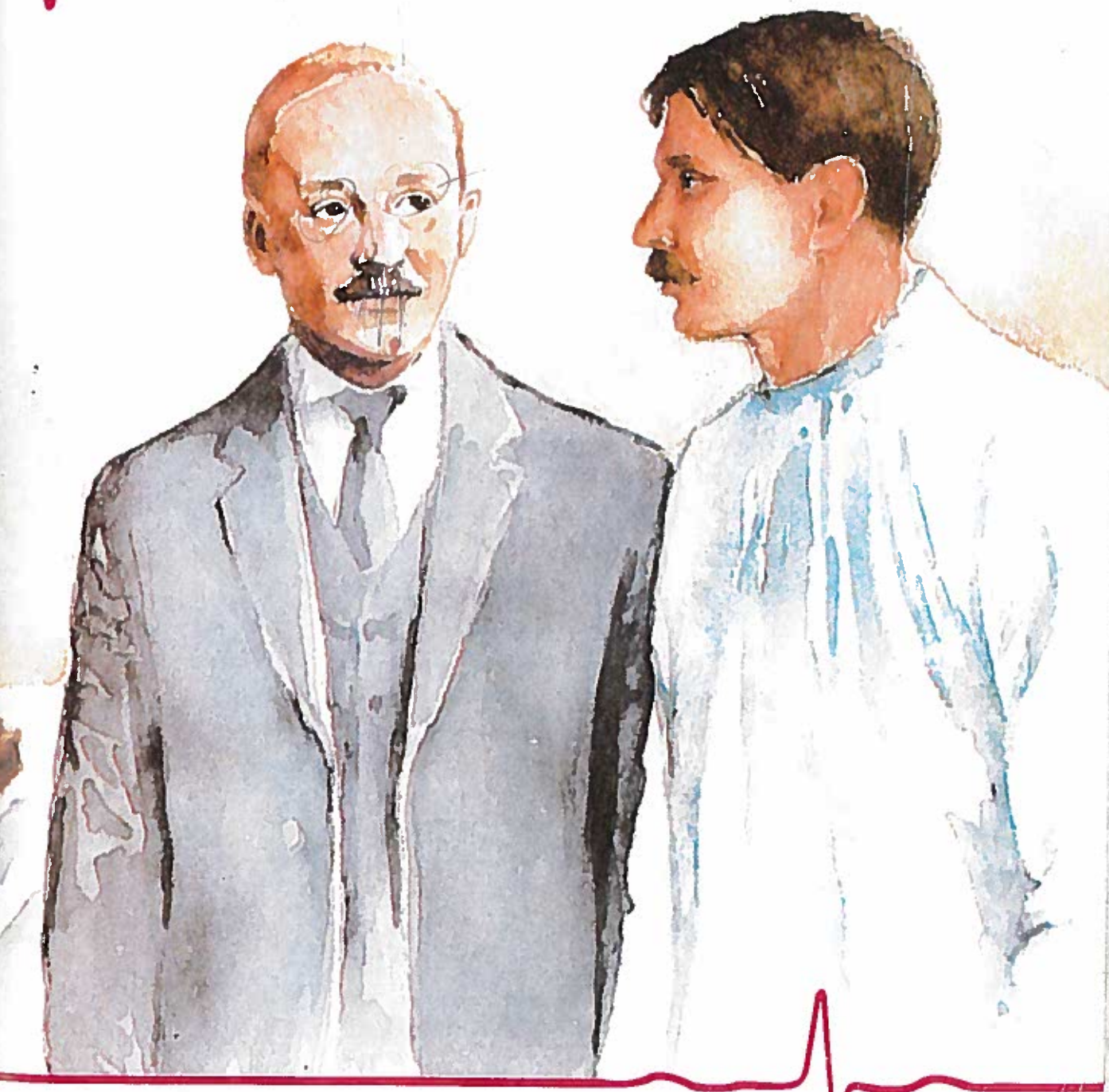
Dr. Dan lifted his chin, the way he did when he faced a challenge. The storm of doubts suddenly swept away, leaving his mind clear and calm as a rain-washed April morning.

The surgeon quietly told his decision to the intern. Two words he spoke. "I'll operate."

The word spread quickly through Provident hospital. Like a small army alerted to do battle, student nurses rushed to get the operating room ready and prepare the patient. They knew Dr. Dan's strict rules regarding asepsis, or preventing infection. The instruments, the room, furniture; everything that came in contact with the patient must be free of microbes that might cause infection.

Meanwhile, Dr. Dan sent a hurried message to a few doctors who often came to watch him operate. The intern, a medical student, and four doctors appeared. Dr. George Hall of Provident's staff was there. So was Dr. Dan's friend, Dr. William Morgan. The circle of watchers gathered in the operating room; four white, two black.

Dr. Dan scrubbed his hands and arms thoroughly. Then, with a nod toward his colleagues, he walked over and looked down at Cornish, now under the effects of anesthesia. Strong shafts of sunlight slanted through a window, giving the doctor's curly red hair a glossy luster. His thin, sensitive mouth drew taut with concentration.



Sewed Up His Heart

Text Dependent Questions Part 1

1. Re-read the first paragraph of the story. What kind of figurative language is used? What is the author's purpose in using it? How does it contribute to the setting of the story?

2. Read page 228 again. How did Dr. Dan know that James Cornish had developed complications?

3. How did medical rules create more concern for Dr. Dan?

4. What major decision did Dr. Dan have to make? What decision did he decide on? Cite evidence to support your answer.

5. On page 230 the author states "Dr. Dan lifted his chin, the way he did when he faced a challenge." What can you infer from this statement? How does the author use figurative language to describe how Dr. Dan faces challenges? Cite evidence to support your answer.

Lesson Reflection

Directions: After learning about the many parts and functions of the heart, do you think Dr. Dan should operate on James Cornish without being absolutely certain which area was damaged? Provide evidence from the text to support your answer.

The surgical nurse, proud of her training, stood at attention.

Scalpel!

A loud sigh escaped one of the doctors when the light, straight knife touched Cornish's bare skin. After that there was silence from the onlookers.

None of them knew what would happen next. How would the body react when air suddenly hit the chest cavity? Would vital chest organs shift too far out of place? Dr. Dan could not benefit from the experiences of other doctors. No paper had been written, no lectures given to guide him. Dr. Dan was pioneering in an unexplored territory. He was on his own.

The surgeon worked swiftly. He had to. The surgeon of 1893 did not have a variety of anesthetics or artificial airways to keep the patient's windpipe open. Blood transfusion techniques were unknown. Penicillin and other infection-fighting drugs had not been discovered.

Quickly, Dr. Dan made the incision, lengthening the stab wound to the right. Expertly, he cut through the skin and the layers of fat beneath it. Now he could see the breastbone and the ribs. He made another cut to separate the rib cartilage from the sternum.

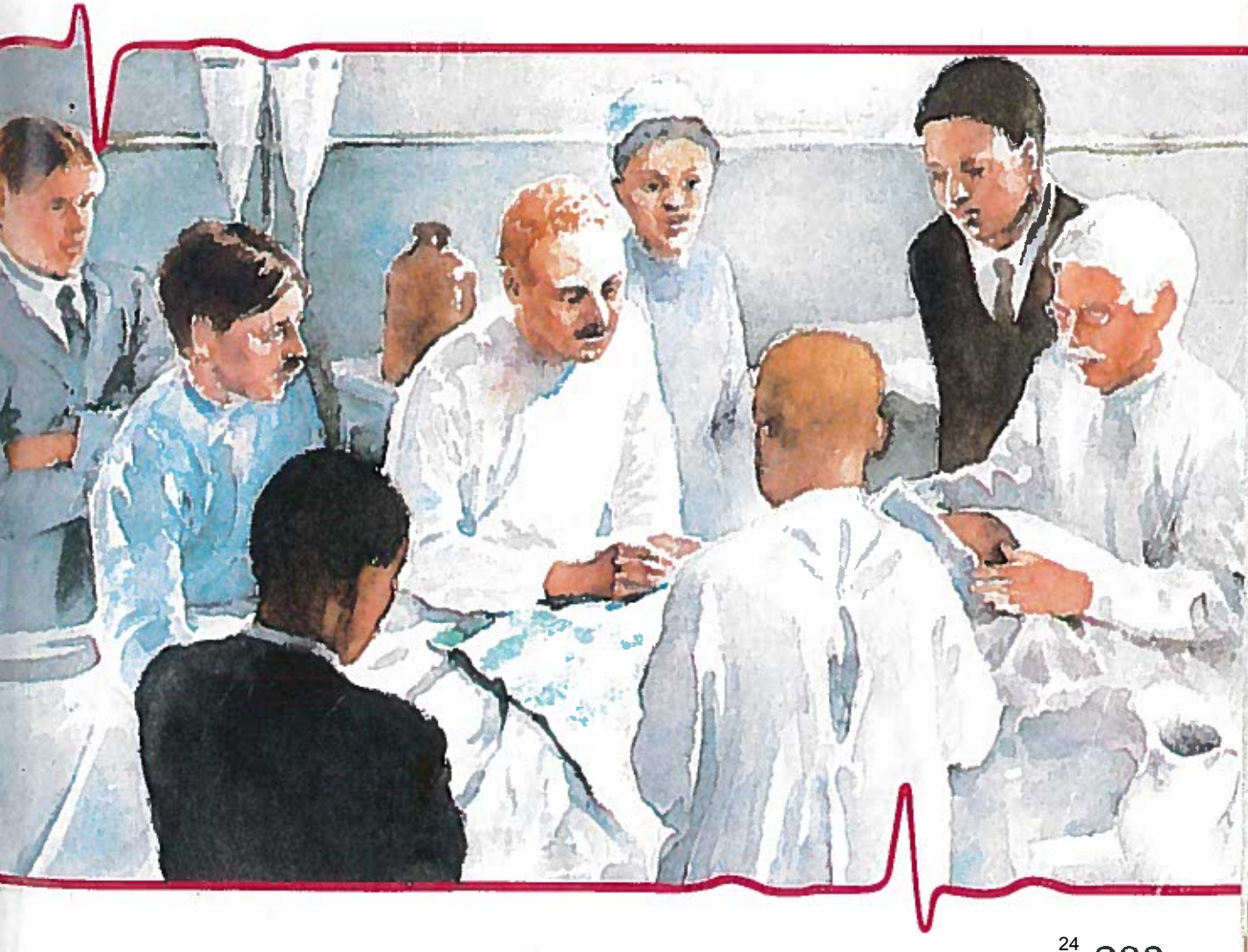
Long years of studying and teaching human anatomy gave his every movement confidence. Working with precision, he made his way through the network of cartilages, nerves, blood vessels. A few inches from the breastbone he cut through the cartilage to make a little opening, like a trapdoor.

Bending his head close to the patient's chest, he peered through the opening he had made. Now he could examine the internal blood vessels.

Now he could see the heart!

The tough bundle of muscles throbbed and jerked and pulsated, sending food and oxygen through the body. Dr. Dan examined the pericardium, the fibrous sac that protected the pear-shaped heart and allowed it to beat without rubbing against other parts of the body.

At each step, Dr. Dan reported his findings to the group of observers. The vital pericardium was cut—a tear of about an inch and a quarter in length. He probed further. Yes, there was another puncture wound, he reported, about one-half an inch to the right of the coronary artery. Had the knife moved a fraction of an inch, Cornish would have bled to death before he reached the hospital. Also—Dr. Dan paused—the left mammary artery was damaged.



As the problems were ticked off, the atmosphere in the room grew more tense. The temperature rose above one hundred degrees. Yet not one doctor reached to wipe the perspiration that poured down hands and faces. No one took note of the time. It seemed as though the moment were somehow suspended in history, awaiting results.

Dr. Dan kept on talking and working. The small wound in the heart itself should be left undisturbed, he advised. It was slight. The tear in the pericardium was a different matter. That had to be repaired.

Now the surgeon's hands moved with a rhythm born of knowledge, practice, and instinct. Strong hands; flexible enough to pluck tunes from guitars and violins. Sure hands; steady enough to string high telephone wires. Quick hands; made nimble from years of cutting hair and trimming beards and mustaches.

These hands now raced against time to save a life. Dr. Dan tied off the injured mammary artery to prevent bleeding.

Forceps!

Now he had to try to sew up the heart's protective covering. Meticulously, he irrigated the pericardial wound with a salt solution of one hundred degrees Fahrenheit. There must be no chance of infection after the chest was closed.

Using the smooth forceps, he held together the ragged edges of the wound. Against his fingers the fist-sized heart fluttered and thumped like a frightened bird fighting to fly free.

Sutures!

Despite the rapid heartbeats, the master surgeon managed to sew up the torn edges of the pericardium. For this he used a thin catgut. After that he closed the opening he had made, again using fine catgut.

Another kind of suture would be used for the skin and cartilages, he informed the circle of watchers. He changed to silkworm gut, using long continuous sutures. This allowed for quick entry if infection or hemorrhage developed later. Over the outer sutures he applied a dry dressing.

The operation was over. James Cornish was still alive.

Dr. Dan straightened his aching back. Only then did he stop to wipe the perspiration from his face.

Like figures in a fairy tale suddenly brought to life by magic, the circle of doctors began to move and talk. They rushed to congratulate the surgeon. "Never," said one, "have I seen a surgeon work so swiftly, or with so much confidence."

Each of them dashed from Provident to spread the news. Daniel Hale Williams had opened a man's chest, repaired the pericardium, closed the chest; and the patient's heart was still beating.

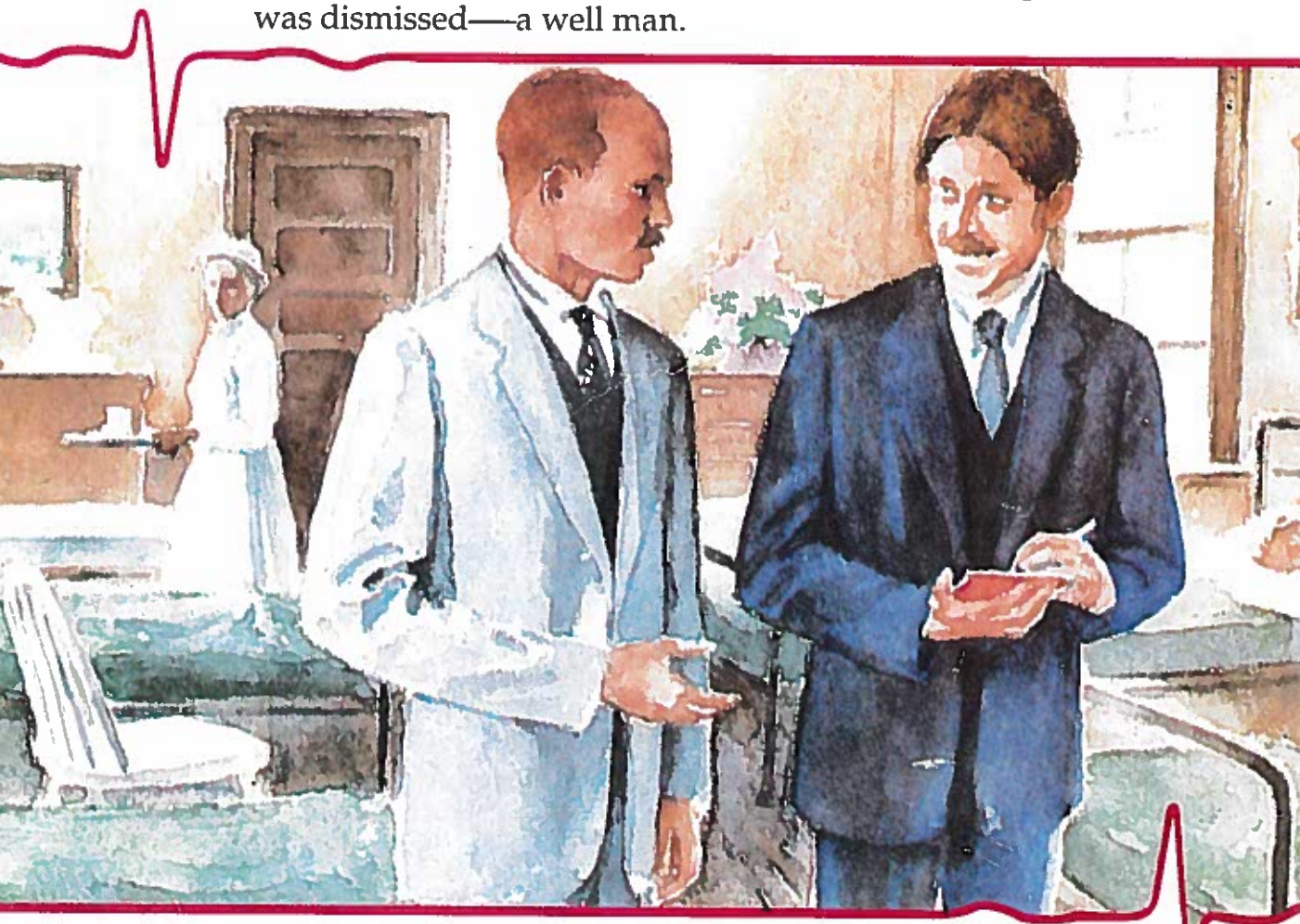
How long would Cornish live? Worried watchers waited in suspense. Had the doctor repaired the heart but killed the patient?

During the hours that followed the operation, Dr. Dan scarcely left Cornish's side. Alarming symptoms developed, and he made careful notes. The patient's body temperature rose to 103 degrees. His pulse raced at 134 beats a minute. Heart sounds became muffled and distant. Seizures of coughing shook his frame.

Dr. Dan shared his fears with Dr. Barr. Fluid had collected in the pleural cavity. This meant another operation.

He waited a few more days to give Cornish more time to gain strength. Three weeks after the first operation, Cornish was again rolled into the operating room. As before, Dr. Dan made an incision, this time between the seventh and eighth ribs. Through this opening he drew five pints of bloody serum.

Thanks to his careful adherence to antiseptic surgical techniques, there was no infection, and there were no further serious complications. Fifty-one days after James Cornish entered Provident with little chance of living, he was dismissed—a well man.



A news reporter from Chicago's *Inter Ocean* newspaper came to Provident to interview the surgeon and get the story first-hand. He found Dr. Dan more anxious to talk about his interracial hospital and the program for training nurses than to talk about the historic operation. The reporter had to coax details from him.

Nevertheless, the reporter's story came out with an eye-catching headline: "SEWED UP HIS HEART!" Another heading read: "DR. WILLIAMS PERFORMS AN ASTONISHING FEAT. . . ."

The *Medical Record* of New York later carried Dr. Dan's own scientific account of the techniques and procedures he had used during the operation. His case created worldwide attention, for it was the first recorded attempt to suture the pericardium of the human heart.

His pioneering operation gave courage to other doctors to challenge death when faced with chest wounds. Dr. Dan's techniques were copied by other surgeons, step by step.

The phrase "Sewed Up His Heart" became closely associated with the name of Daniel Hale Williams. The historic operation on James Cornish helped to advance the progress toward modern heart surgery.

Sewed Up His Heart

Text Dependent Questions Part 2

1. Read the third paragraph on page 232. Why does the author include questions? Why are these questions important? Cite specific evidence to support your answer.

2. On page 234, the author states "These hands now raced against time to save a life." What does he mean by this?

3. What complications did James Cornish have after the first surgery?

4. Read page 237. How does Dr. Dan show that he is humble? Cite specific evidence.

5. How did Dr. Dan contribute to advances in medicine? How does this reflect our Big Idea?

Reflection

Lesson 2, Day 2

Based on your partner talk, focused reading of the story, and collaborative conversation about Dr. Dan, answer this essential question: What personal qualities are necessary to become an effective healer?

X-Rays

X-rays are particles of electromagnetic radiation. They are used to show doctors what is going on inside your body. An x-ray machine sends out invisible x-ray particles, which pass through your bones. A computer or special film records this and produces pictures of what is happening inside you for your doctor to see.

How are they done?

A film, similar to those used in ordinary photos, is put behind the part of your body that is having the x-ray. The x-ray machine then shoots out a short burst of x-ray particles through your body and onto the film. You should stay as still as you can when the x-ray beam shoots, to make sure that the picture isn't blurred. The film is then developed.

The more x-rays that hit the film, the blacker it is when it is developed. Dense parts of your body block lots of the x-rays from getting through to the film, so they show up white, like your bones, for example. The parts of your body that are hollow or filled with air, like parts of your lungs, show up black. Soft tissues, like your muscles and organs, are grey. The shade of grey depends on how dense they are, so the denser the body part is, the lighter the shade of grey it will be.

What do they show?

X-rays can give your doctors information about lots of different things that are going on in your body. For example, they can show breaks and other problems in your bones, as well as some problems with your joints. X-rays can also show the size and shape of your heart, so they can detect some heart conditions.

An x-ray can be all that is needed to diagnose a problem or see how bad it is. Sometimes though, the doctors need to do more detailed x-rays, called CT scans, or do MRI before they can tell you exactly what's wrong. You will often need CT or MRI if the part of your body being looked at is soft tissue, or organs like your brain or liver.

Are they safe?

There is very little risk with having one x-ray, because the dose of radiation you are given is always the lowest one possible that the doctor needs to get a good picture.

Do they hurt?

X-rays are totally painless. You can't see or feel them!

What happens next?

The developed film is studied by a radiologist - a special type of doctor who is an x-ray expert. The radiologist will make a report and send it to the doctor who asked for the x-ray to be done, and he or she will then discuss the results with you.

The First X-Ray

Without realizing it, Roentgen had become the first person to discover how to use electromagnetic radiation to create the X-ray. The first X-ray is one he took of his wife's hand. Before this, tumors, broken bones and bullets buried within bodies could only be assessed by a doctor's examination. A patient's outcome depended on how skillful the doctor was. Within a month after Roentgen's announcement, doctors were using X-rays.

The X-ray brought about massive changes to society. Doctors, for the first time, could see images of the human heart and brain. By May of 1896, the X-ray had its first medical use, when it was used in Naples to locate bullets in the arm of a soldier wounded in battle. A German doctor would find a tumor in the tibia (part of the leg) of a child. Before long, X-rays would be used to fight cancer (with radiation therapy) as well as discover it.

The X-Ray

Text Structure

Directions: Independently, think about the structure of this text and decide which Thinking Map would be best to organize the information.

I think the structure of this text is _____.

The Thinking Map I chose to organize the information is _____,

because_____.

Build your map in the space below. If you need additional space, use the back of this page.

The X-Ray

Summary

Directions: Summarize the article, *The X-Ray*, using the Thinking Map that you created to organize the information.

Sewed Up His Heart

Collaborative Conversations

1. Using the story, *Medicine: Past and Present*, discuss how the work/discoveries of the following individuals have affected Dr. Dan? Would they have made a difference?

Hippocrates

William Harvey

Anton van Leeuwenhoek

Louis Pasteur

Joseph Lister

2. How could Alexander Fleming's discovery in 1929 have helped Dr. Dan with his surgery and his patient? (penicillin for internal germ/disease fighting).

3. How would have the invention of the x-ray impacted Dr. Dan's surgery?

Reflection/Homework

Lesson 3, Day 2

Directions: Summarize the conversation from class today, highlighting the person you think made the most important contribution.

Dr. Daniel Hale Williams

Daniel Hale Williams was a pioneering heart surgeon at a time in history when technological discoveries were changing the practice of medicine. In 1893, he became the first physician to successfully perform open heart surgery. He did this by entering the chest cavity of a stabbing victim and repairing the heart sac, or pericardium. The young man that operated on, James Cornish, went on to live another fifty years after the surgery.

Williams was also responsible for making quality health care available to urban blacks in Chicago. He opened Provident Hospital, the first interracial hospital in the United States, in 1891. Provident not only improved health care for black citizens, but also provided training and jobs for young black men and women interested in working in the medical field. Later in his career, as chief surgeon for the Freedmen's Hospital in Washington, D.C., Williams improved the hospital's organization and offered both training programs for nurses and positions for doctors.

Early Life

Daniel Hale Williams was the fifth child out of seven. He was born five years before the Civil War began and grew up in Hollidaysburg, Pennsylvania.

Williams's ancestry was mixed on both his mother's and father's side. His mother, Sarah Price Williams, claimed black, white, and Indian ancestry. His grandfather, Daniel Hale Williams I, was an African-American barbershop owner and preacher who had married a Scottish-Irish woman. Williams's father, Daniel Hale Williams II, carried on the barber business. In addition, he fought for more and better education among blacks. He was also active in the Equal Rights League, which worked to gain equal rights for blacks following the Civil War.

In 1867, soon after the family moved to Annapolis, Maryland, Williams's father died of consumption, a respiratory disease. His death caused the large family to separate. Only ten years old, young Williams was sent to Baltimore to live with a family friend and become a shoemaker apprentice. Unhappy in his situation, he ran away. Williams took the train to Rockford, Illinois, to join his mother and sisters.

When his mother returned east, he remained in Illinois and learned the barber's trade. He became friends with a barber, Harry Anderson, who took him in. Williams studied law for a short time following his high school graduation. Then, at the age of 22, he became an apprentice for Dr. Henry Palmer, a local doctor and respected surgeon who had been head of the largest military hospital in the country during the Civil War.

In the late nineteenth century, few doctors went to medical school. Most learned their profession by working as trainees with well-known physicians. Williams served the usual two-year apprenticeship with Dr. Palmer. Instead of opening his own practice, he decided in 1880 to attend Chicago Medical School, which later became the Northwestern University Medical School. After graduating in 1883, he opened an office in Chicago.

The field of medicine experienced a transformation in the 1880s. Williams and other surgeons benefitted from the discoveries of Louis Pasteur in France and Joseph Lister in England. Both men caused a revolution in the medical practice. Pasteur's experiments supported the germ theory of disease. They helped show that microorganisms, like bacteria, are the true cause of many diseases. Lister applied Pasteur's theories and revolutionized surgery by using disinfectants to kill germs when treating wounds. Williams practiced surgery from his office in Chicago, using Lister's principles of surgery by scrubbing his entire room with soap and water. He then sprayed carbolic acid, a strong germ killer, and sterilized all his medical instruments in boiling water and steam to decrease the risk of infection.

Known to his patients and friends as Dr. Dan, Williams soon gained a reputation as a successful surgeon and was appointed to the surgical staff of the South Side Dispensary in Chicago. He also became a clinical instructor and demonstrator in anatomy at the Chicago Medical College. By the late 1880s, Williams had been named the first black surgeon to the City Railway Company and was appointed to the Illinois State Board of Health.

Founded Interracial Hospital

As late as 1890 blacks could not be admitted to hospitals, except charity wards. As well, black doctors were not allowed the opportunity to work in hospitals. Williams started working to establish a hospital that would be managed and staffed by blacks as well as whites. He established the first interracial hospital, the Provident Hospital and Training School Association, in January of 1891. Provident provided a place for young black doctors to practice and trained a new generation of student nurses. The hospital opened in May of 1891, and seven of 175 applicants were accepted for the 18-month nurses' training program.

Performed First Heart Surgery

That same year, a saloon brawl in Chicago brought Williams national attention. A young black man named James Cornish had been stabbed in a neighborhood fight. He was rushed to Provident Hospital with a one-inch knife wound in his chest near

his heart. By the time Williams could administer aid, Cornish had collapsed from loss of blood and shock. Risking his reputation as a surgeon, Williams decided to operate—at that time without benefit of x-rays, blood transfusions, or antibiotics to fight infections. With six physicians witnessing the operation, he opened the patient's chest cavity and saw that the knife used in the stabbing had entered the heart about a tenth of an inch. It had also cut the sac around the heart, known as the pericardium.

Williams decided the heart muscle didn't need sewing up, but he did suture the pericardium. It was a daring operation—the first time a surgeon had successfully entered the chest cavity and surgically explored the heart. Fifty-one days later, Cornish was released from the hospital. Completely recovered, the patient lived for another 50 years, outliving his surgeon by 12 years.

Demonstrated Administrative Skill

Following his historical surgery, Williams applied for the open position of chief surgeon at Freedmen's Hospital in Washington, D.C. The hospital was set up after the Civil War to serve the medical and health needs of freed slaves and other black citizens. It had suffered a decline during the 12-year management of Dr. Charles B. Purvis. Under the administration of President Grover Cleveland, Williams received the position of chief surgeon.

Freedmen's Hospital was threatened by neglect when Williams took over. Five wooden buildings built as emergency barracks served as hospital wards. Funding was much too low, the patient death rate was high, and there were no trained nurses on staff. Williams reorganized the hospital into seven departments, set up pathological and bacterial divisions, introduced modern surgical methods, and built a biracial staff of 20 specialists. Under Williams's direction, Freedmen's offered many black doctors their first chance at a hospital position.

To change Freedmen's image as a hospital only for the very poor, Williams offered open clinics in surgery. He demonstrated and lectured, allowing the public to sit in an amphitheater and observe operations. This drastically new program succeeded in rebuilding the hospital's image. By 1896, the Freedmen's Hospital was admitting five hundred surgical cases a year and Williams had succeeded in significantly reducing the death rate to a record low. According to Dr. William A. Warfield, a student and successor to Dr. Williams who was quoted in *Black Pioneers of Science and Invention,* "Before Dr. Williams came to the hospital in 1894, there was no real surgical department. It can be said that with the arrival of Dr. Williams, surgical development began in all areas, especially abdominal. He

was laying the foundation for more and better surgical work. By the time he left the hospital, a great push had been given to all branches of surgery."

Continued to Counter Discrimination

Williams resigned from his position as chief surgeon of Freedmen's Hospital in February of 1898. Then, at the age of 42, he married Alice Johnson. The couple returned to Chicago, where Williams continued his position at Provident Hospital. In 1899, he conducted annual surgical clinics at Meharry Medical College in Nashville, which eventually led to the opening of Nashville's first interracial hospital. Williams also went to Atlanta to help organize the National Medical Association (NMA), an alternative organization for blacks, who at the time were not allowed to participate in the American Medical Association. Williams became the NMA's first vice president.

In 1912, Williams was honored with a position as associate attending surgeon at Chicago's St. Luke's Hospital, the largest, wealthiest, and most important hospital in the city. Resigning his post at Provident Hospital, he served at St. Luke's until his retirement from medicine and then lived for several years with his wife in northern Michigan. In 1926, Williams suffered a stroke that left him partially paralyzed and ended his medical career. He died on August 4, 1931, at the age of 75.

Stop & Jot – Dr. Dan Article

Everyone reads introduction and Early Life. In groups of three, jigsaw remaining parts and takes notes.

Founded Interracial Hospital:

Performed First Heart Surgery:

Demonstrated Administrative Skill:

Continued to Counter Discrimination:_____

_____

_____

_____

_____

_____

_____

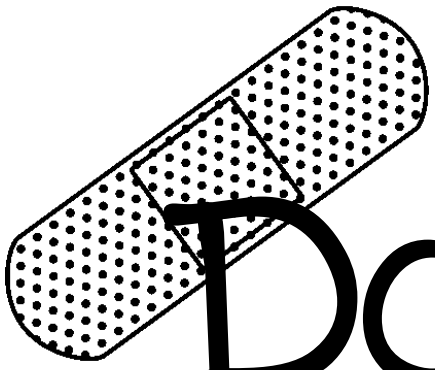
Sewed Up His Heart

Summative Assessment

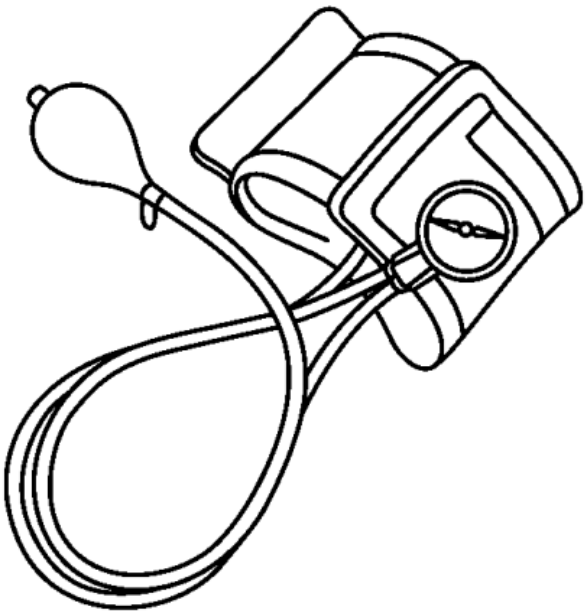
Dr. Dan accomplished a great many things in his lifetime. What do you think was his greatest accomplishment? Defend your claim by citing supportive evidence from the texts you've read throughout the unit.

End of Unit Reflection

Think about the Big Idea and Essential Questions of this unit. Answer as many as you can based on what you learned.



Doctor's Notes



Dr. _____

Choose a subject, or character, and answer these questions from their point of view
Remember to use 1st person personal pronouns (I, me, my, mine, we, us, our, ours)

Describe the scene

What were you doing?

What thoughts were going through your head?

What did you say?

Subject/Character

What were the other people doing around you?

When did this take place?

How were you feeling?

Questions to Support Journal Writing

Doctor's Journal Day 1

Directions: Pretend you are Dr. Dan. You walk into the emergency room and see James Cornish lying on the bed with a knife in his chest. What do you think? What do you do? How do you feel? Make sure to write your journal entry from the first person point of view.

Doctor's Journal Day 2

Directions: Pretend you are Dr. Dan. What is your biggest fear? What could have gone wrong during the surgery? Why was it such a risk?

Doctor's Journal Day 3

Directions: Pretend you are Dr. Dan. Knowing that your decision to operate was so risky, how do you feel now that it is over?