Human Disease and Future Health

Human Diseases and Abnormalities

- Diseases are caused by either foreign organisms entering the body or the malfunction of the genetic material within the cells.
- Either method impairs the normal functioning of systems within humans and plants.
- In society the term "dis-ease" is often used more broadly to refer to any condition that causes pain, dysfunction, distress, social problems, and/or death to the person afflicted.

Human Diseases and Abnormalities

- We have earned that cancer is caused by a carcinogen that changes the genetic make-up of the cell, thus altering the blue print of materials produced or the actual function of the cell.
- This causes the cell to grow abnormally and uncontrollably.
- Since it grows uncontrollably it usually takes resources from the surrounding healthy cells and tissues.
- This ultimately affects the organs and eventually the organ systems because once an organ starts to fail it is only a matter of time before the organ system will too.
- Remember, since all organ systems are interconnected and depend on each other, when one system gets compromised, other systems will be too.

Inner Connectedness of Systems

- In order to examine another example of how interconnected the systems are, lung cancer can be studied.
- From a previous activity, you learned that cancer affects the cells and tissues of an organ, in this case the lungs.
- Eventually a large amount of tissue within the lung will become cancerous.
- When that mass becomes large enough the lung will stop functioning properly causing the individual to exchange less oxygen and carbon dioxide

Inner Connectedness of Systems

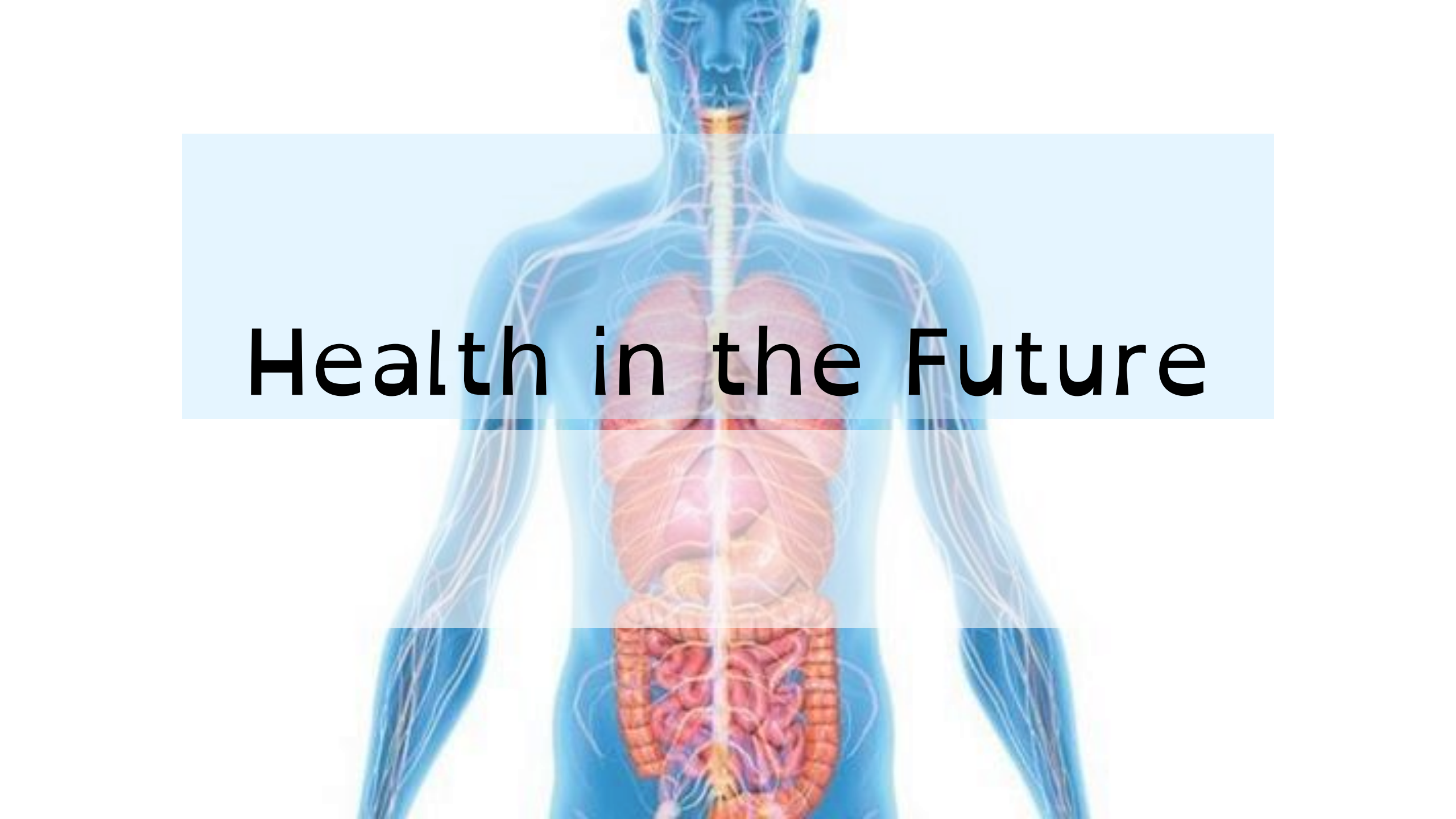
- This reduction of gas exchange in the lungs puts obvious stress on the respiratory system, but also the circulatory system as they are connected.
- The circulatory system is responsible for circulating blood, which carries oxygen, around the body.

Inner Connectedness of Systems

- If it is compromised, then less blood, and as a result oxygen, will be circulated around the body, thereby reducing the oxygen supply of all cells in the body, which therefore reduces the efficiency of all cells to function properly.
- Another interesting point is that cells from tumours can become mobile, using the circulatory system to spread and locate in other organs and systems of the body to cause further damage.

Inner Connectedness of Systems

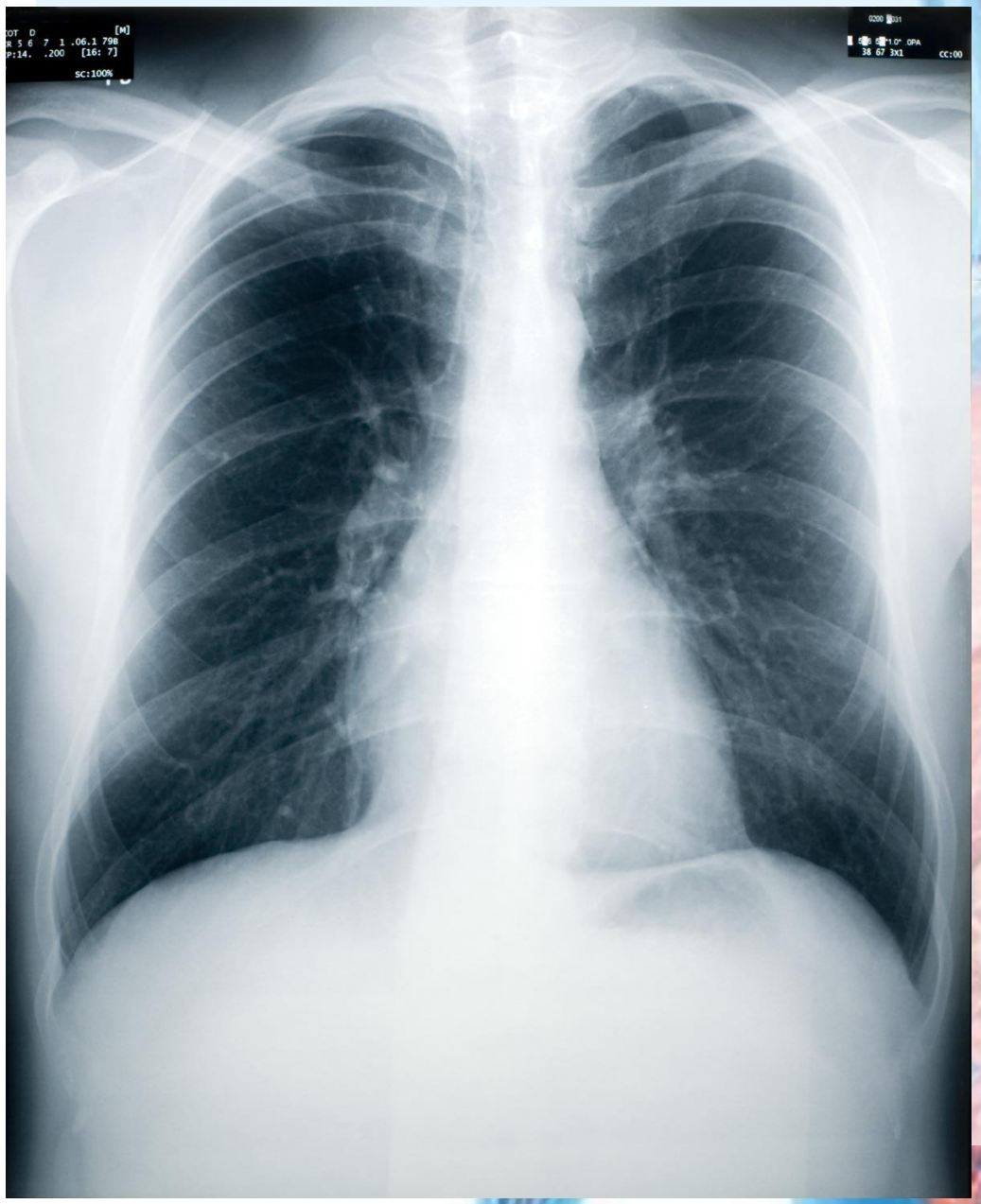
- Cancer can also be found in plants.
- Have you ever been walking in the woods and noticed a great big growth coming out of the trunk of a tree?
- That's cancer, except when it's found in plants it's called a gall.
- Plants don't have the same type of circulatory systems as humans and animals; therefore cancers in plants will remain in a fixed location and only cause problems to that small part of the plant.
- Even if a gall develops, it will not spread to other parts of the plant.

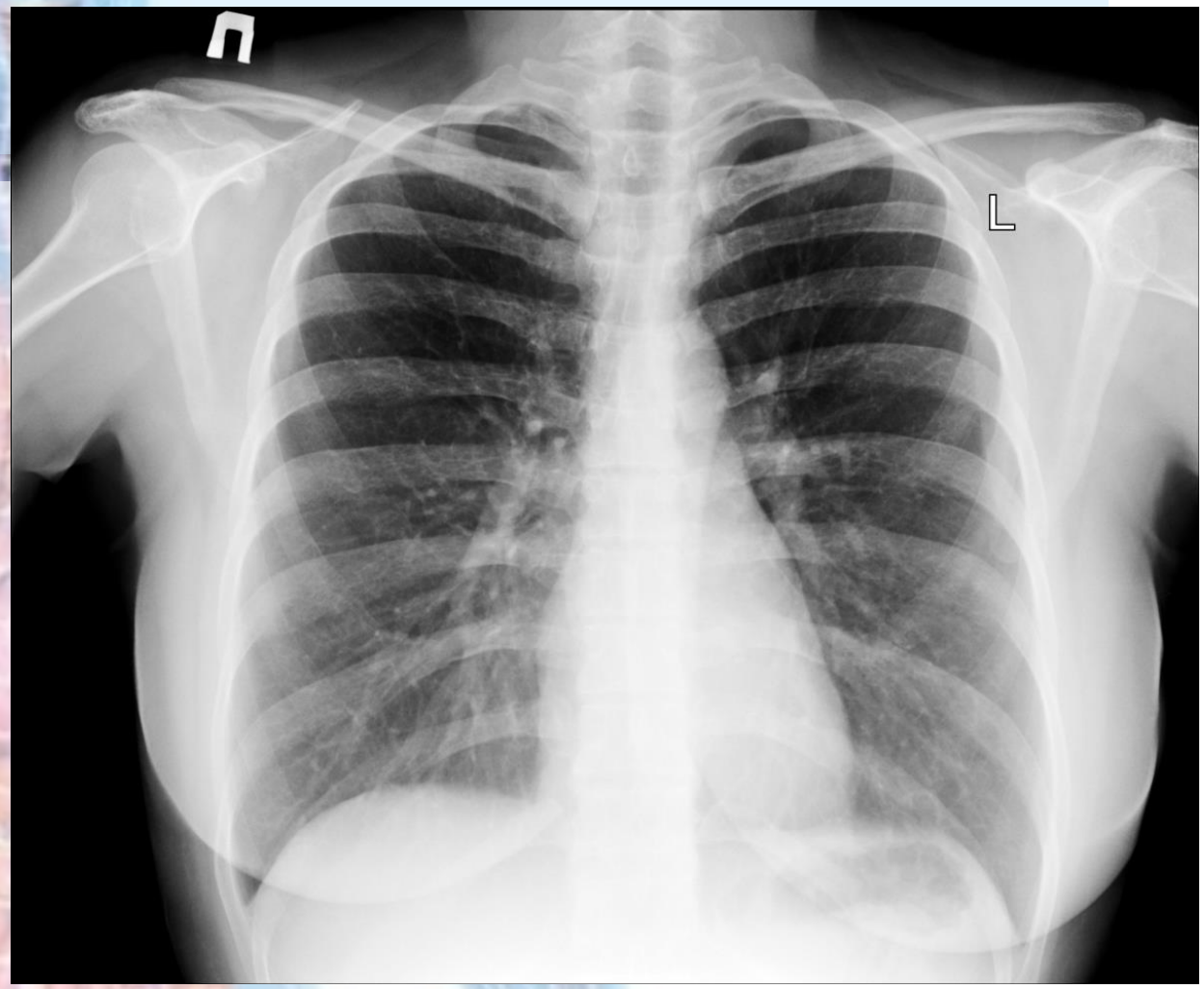


Health in the Future

X-Ray Analysis

- Examine the following X-ray images of a chest.
- What do you notice about the light and dark areas of the X-ray?
- What is similar about the images?
- What is different about them?
- Which organs or bones can you identify?

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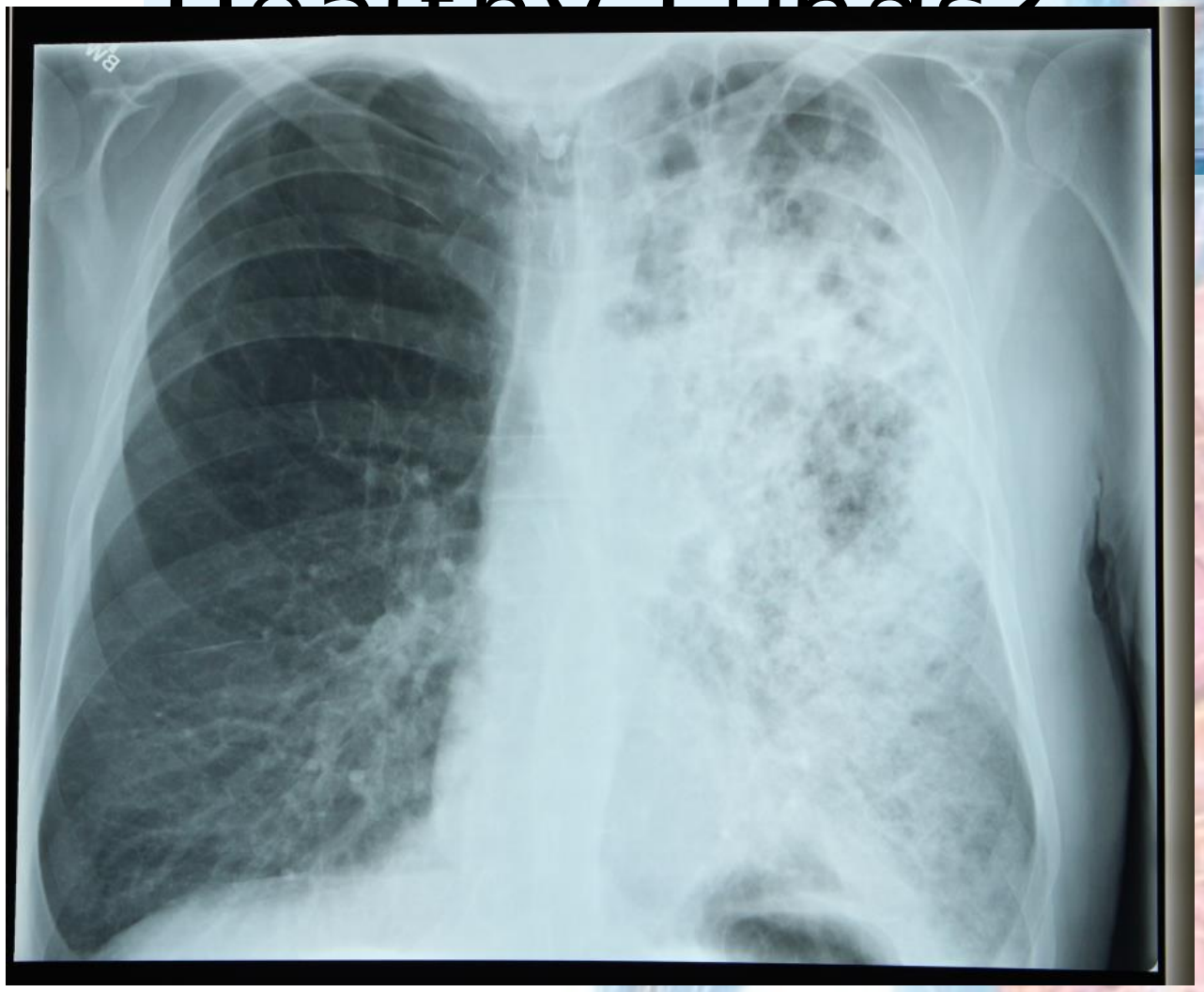
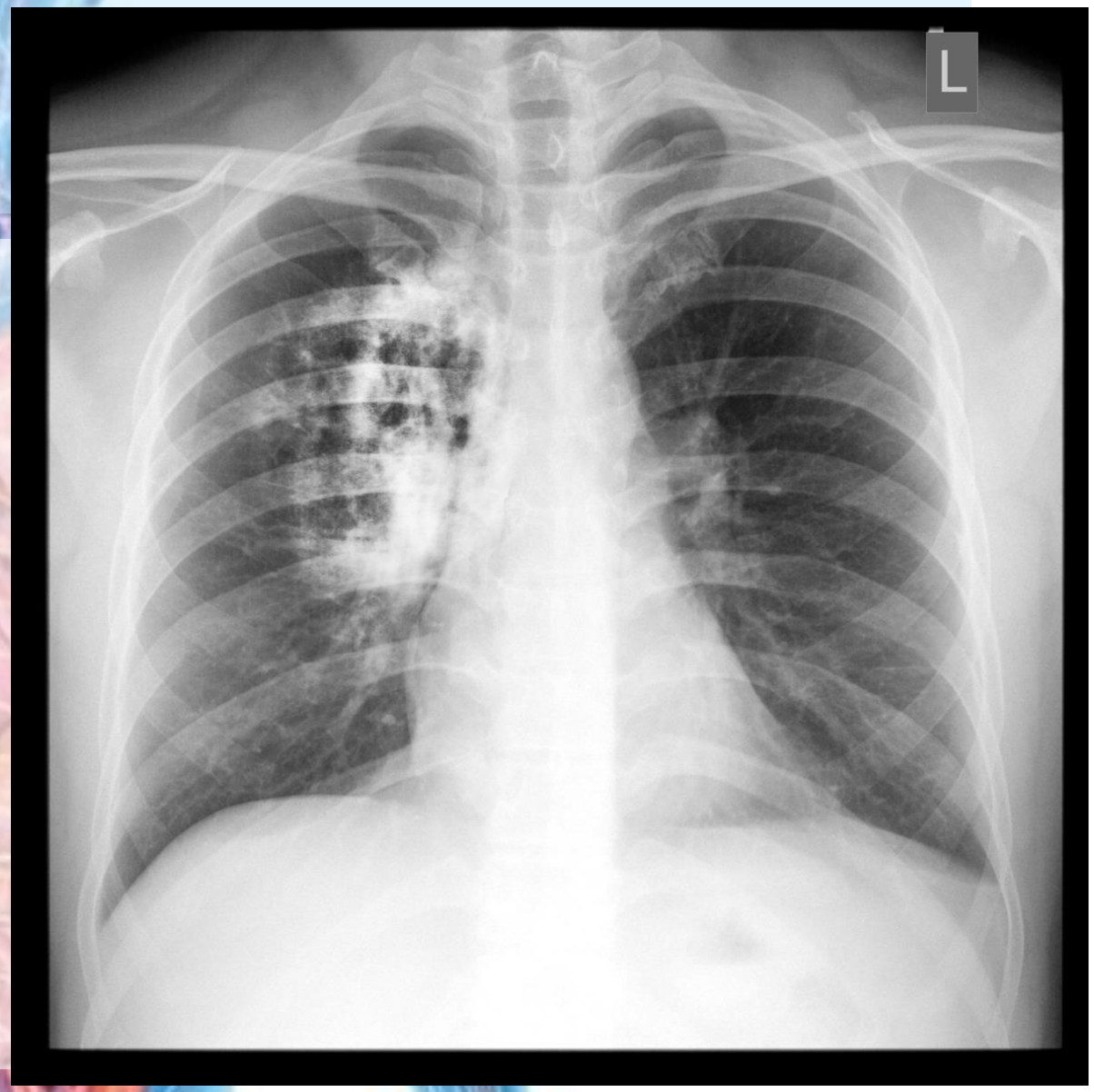
Healthy Lungs?

- Do you think the lungs shown in the X-ray images are healthy? Explain why or why not.
- The lungs shown in these X-ray images are indeed healthy.
- They appear dark and fairly symmetrical with no large growths or masses, which would appear white.
- The large white section to the right of the middle lower chest is not a dangerous growth, but the heart.
- The rounded surfaces of the liver and stomach (parts of the digestive system) can also be seen just below the lungs.

Healthy Lungs2





Healthy Lungs?

- Do you think the lungs shown in the above X-ray images are healthy? Explain why or why not.
- The lungs shown in these X-ray images are unhealthy.
- Each image depicts a different issue that can arise in the lungs, shown by irregularly shaped white sections in what should be a dark lung.
- The left image shows lungs in varying stages of pneumonia.
- The right image shows a lung with developing cancer.
- Note that in the image on the left, the heart can barely be seen because there is so much interference in the image itself.

What do you think?

- Have you ever had an X-ray before?
- What might be a reason for taking an X-ray?
- Are there any safety precautions or side effects to having an X-ray? The accompanying image might give some clues if you look at it in detail.
- Based on what you know, what do you think are some positives and negatives related to using X-rays?
- Do you know of any other types of imaging technology that hospitals use? If yes, what are they?

X-Rays

- X-rays are one form of imaging technology (developed thanks again to science!) used extensively in modern healthcare.
- It was actually the first imaging technology widely used in hospitals.
- But other effective imaging technologies have been introduced since the first X-ray.
- Explore these further in the section which follows… as a group!

Looking inside the body

- When medical professionals are trying to diagnose an issue within your body, they rely on symptoms like your temperature, reflexes, blood pressure, throat swabs and even blood analysis.
- Sometimes, though, the issue will not be easily identifiable and require further testing.
- Luckily, through scientific advancement, medical imaging breakthroughs mean there is less of a guessing game involved in diagnosis.

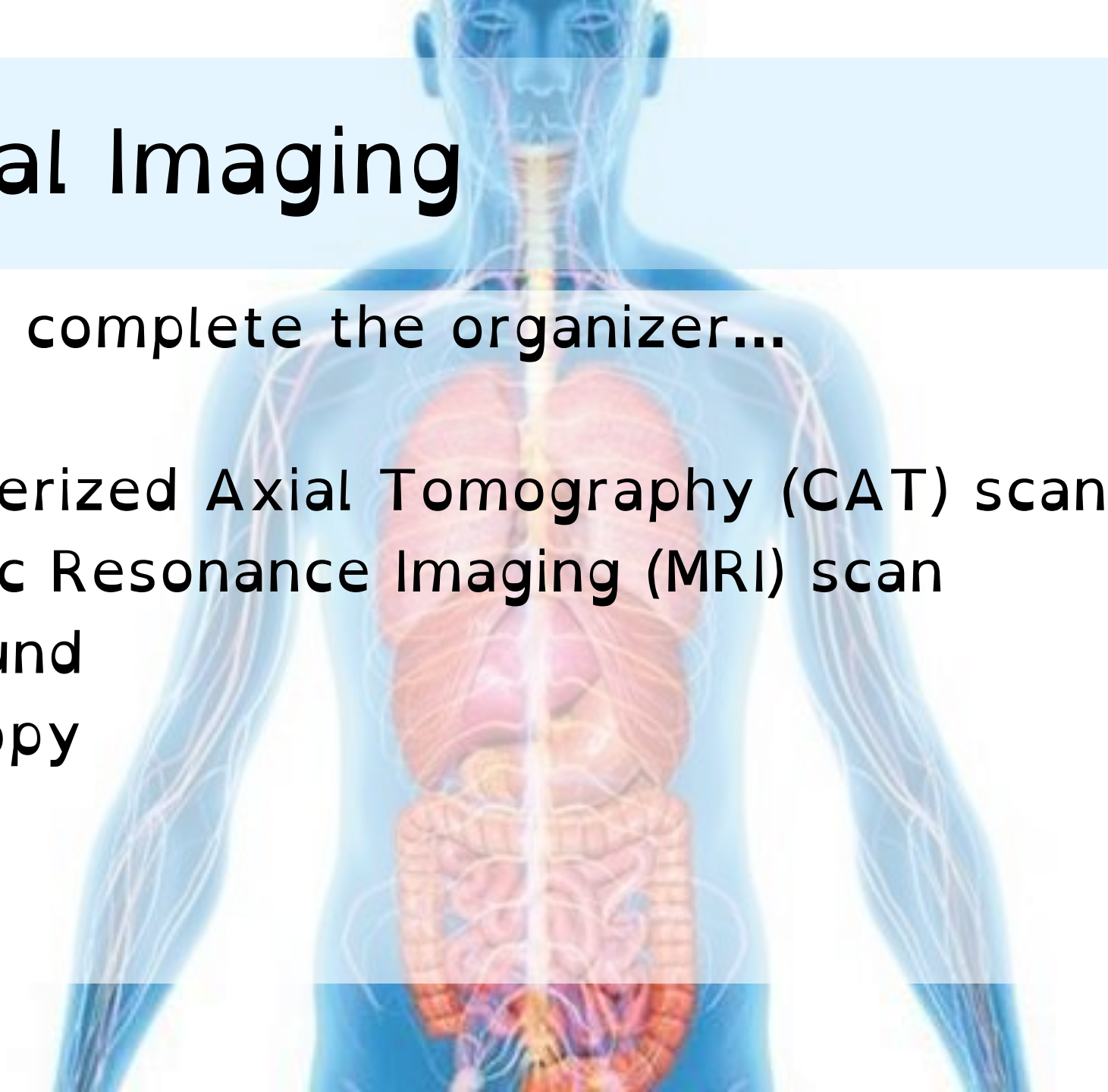
Medical Imaging Technology

- Medical imaging is used to explore, diagnose and treat the human body.
- Imaging technology allows medical professionals and patients to "see" what is going on within the body without surgery.
- There are some instances in which imaging reveals things going on inside our bodies that would not be visible even if the body were cut open!
- This results in more accurate diagnosis with little or no harm to the patient.

Medical Imaging Technology

- In Canada, we are very fortunate to have many medical imaging technologies available to us.
- In Ontario, OHIP (Ontario Health Insurance Plan) covers the cost of medical professionals using this technology to diagnose their patients.
- Below, you will find an overview of some of the technologies used in Ontario and Canada to "see" inside the body without major surgery.
- Explore further...

Medical Imaging



In groups complete the organizer...

- X-Ray
- Computerized Axial Tomography (CAT) scan
- Magnetic Resonance Imaging (MRI) scan
- Ultrasound
- Endoscopy

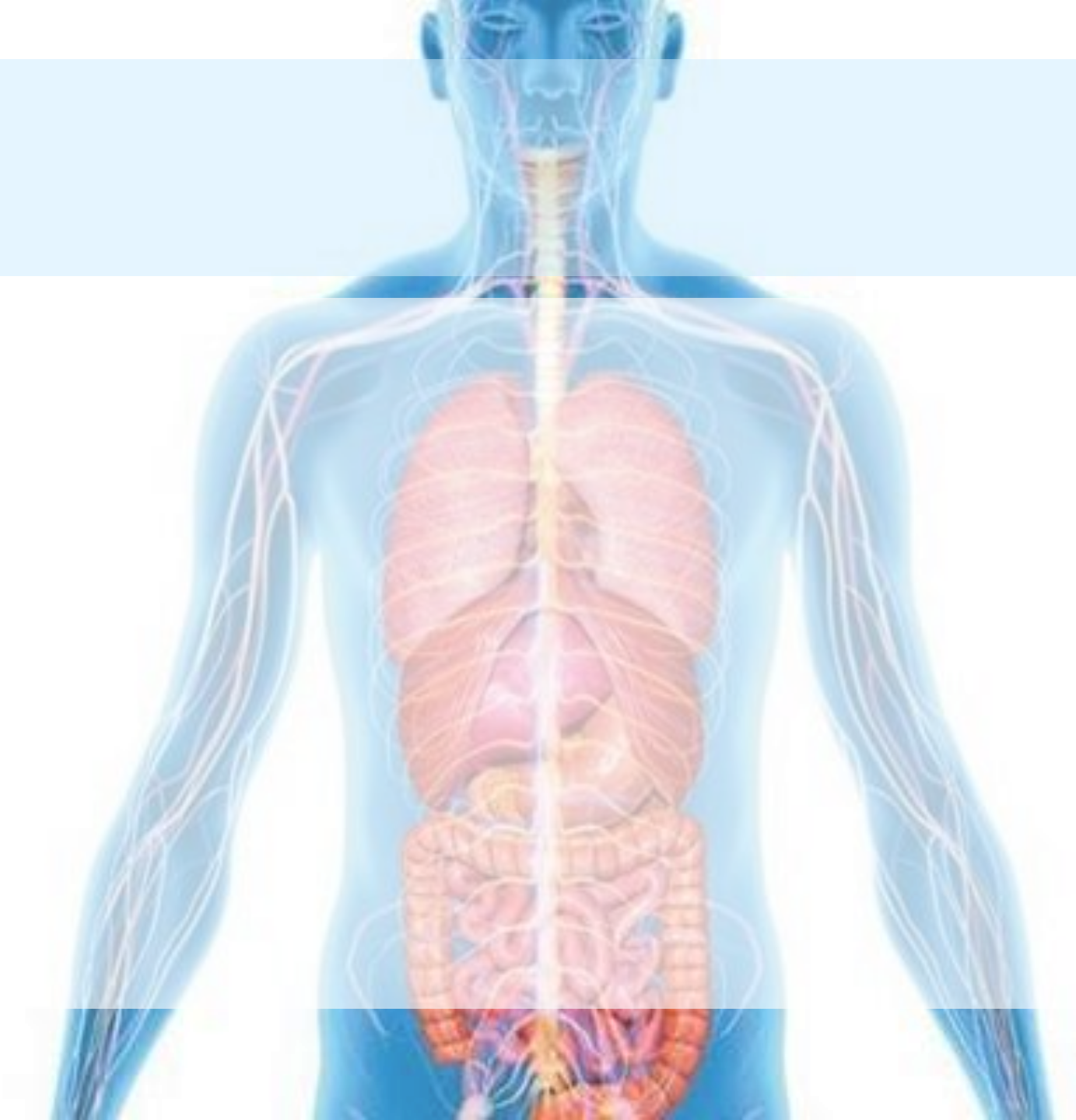
Pros and Cons of Medical Imaging

- Now that you are familiar with medical imaging technology, create a list of pros (positive aspects) and cons (negative aspects) for each one described above. You will need to complete an internet search to research this information. If you can, try also to find some short videos which explain these concepts.

Pros and Cons of Medical Imaging

- For example, the following video outlines how one form of endoscopy works while eliminating the need for sedation. This could be considered a pro when diagnosing cancer of the esophagus.

Video



Pros and Cons

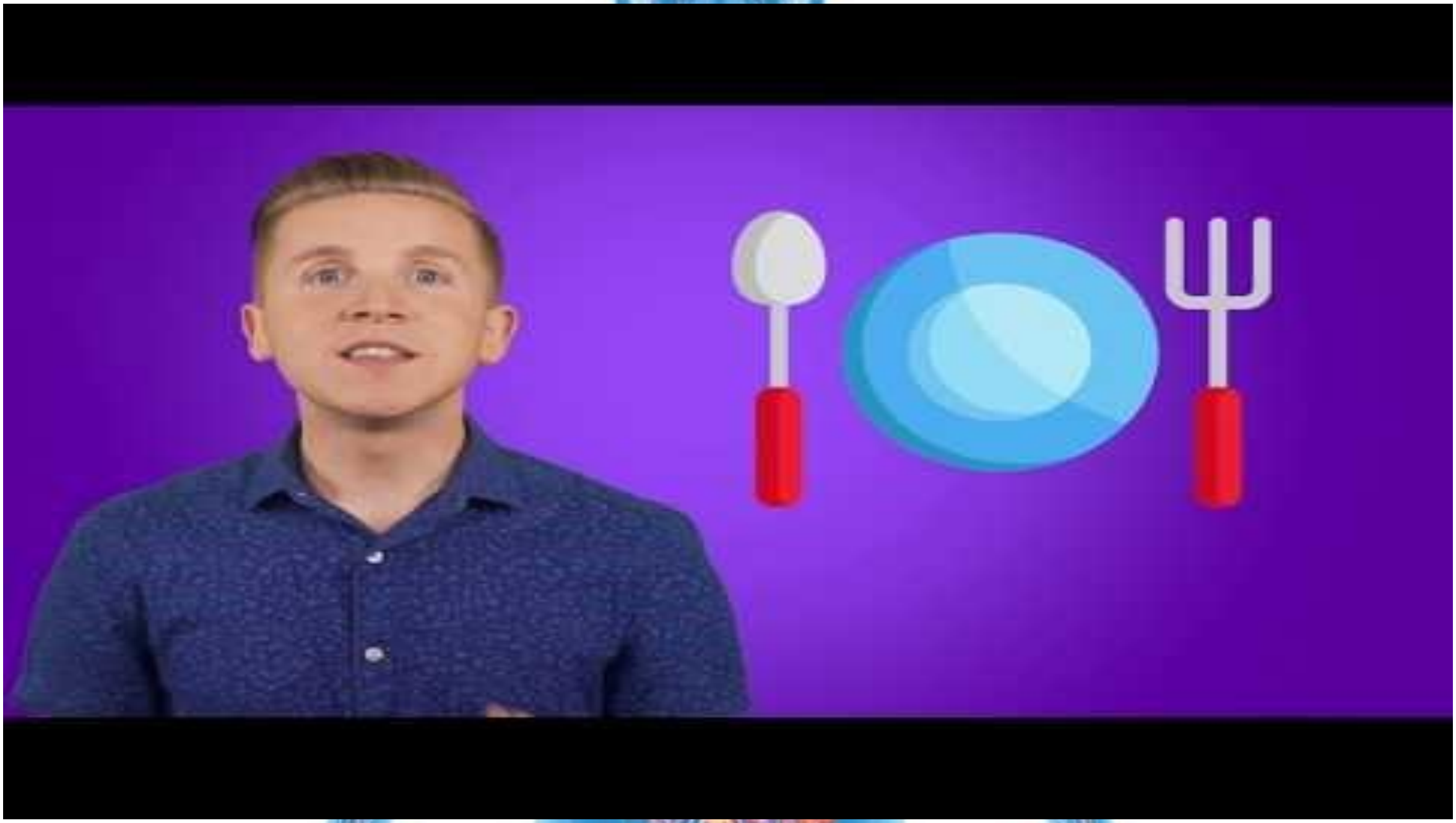
- Complete the following chart of pros and cons, being sure to include the specific sources for your information.
- Try to come up with two pros and two cons for each imaging technology.
- Be sure to check multiple credible sources so you can be sure the information is accurate. Don't just trust the first website you find!

Your Health is Your Responsibility

- Medical imaging technology is very helpful in the diagnosis of health-related issues, but did you know that your personal choices can actually help prevent certain types of health issues?
- Many decisions you make about your lifestyle directly impact your bodily health.

Your Health is Your Responsibility

- Compare your own lifestyle with what Nurse Robbie outlines in the following *Hot on Health* videos as to what you should or should not do to promote good health. Based on these, are there any changes you think you could make for a healthier lifestyle?



BANK

Which Would You Choose?

- Imagine that you have been invited to sit on a local committee for the selection of one new medical imaging technology for your community.
- You are required to help determine which technology will be purchased.
- Because of the high cost of these technologies, the hospital can afford to buy only one.
- Therefore, your selection needs to be based on sound reasoning and careful research.