MedTable AR Curriculum Educator Guide: MIDDLE SCHOOL

Revolutionizing Anatomy Education with Augmented Reality

This concise curriculum integration guide helps educators embed MedTableAR into classroom curriculum. Fill in the placeholders for each lesson and adapt suggestions to appropriate grade level and school context. Using this guide, educators will be fully equipped to integrate MedTable AR technology into their classroom, boosting student engagement and learning outcomes.

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Curriculum Integration Plan

Throughout each lesson, emphasize that students will:

- **Collaborate effectively** in pairs to complete AR/VR exploration tasks and communicate their findings clearly.
- **Demonstrate understanding** by completing quizzes and/or the Student Handout together as a learning pod.
- **Discuss** observations, share insights, and help each other navigate human body systems.

Lesson Objective:

By the end of this lesson, students will be able to:

- Identify and describe major human body systems and their key structures.
- Locate body structures accurately within the AR/VR device.
- Collaborate effectively in pairs to complete tasks and communicate findings clearly.
- Demonstrate understanding by completing the Scavenger Hunt with their team and Student Note Guide with their assigned partner.

Essential Questions:

- What are the major human body systems and what roles do they play?
- How do different body systems work together to maintain health and function?
- How can effective communication and teamwork help us learn and solve problems?

Standard to be addressed:

- Human Body Systems (HS-LS1-2) Performance Expectation: Develop and use a model to illustrate the function of a system in the human body.
- Human Body Systems (MS-LS1-2) Performance Expectation: Develop and use a model to describe the function of a system in the human body.

Assessment:

- Completion and accuracy of the Student Note Guide.
- Completion and accuracy of the Scavenger Hunt
- Participation in group discussion and reflection.
- Observation of teamwork and communication skills during activities.

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Materials (*optional)

- 3 Tablets with MedTable AR app
- 1 MedTable AR Team Guide
- *3 Student Note Guides (one per student pair)
- *Clipboards
- *Pens or pencils

Lesson Activities

1. Introduction (5 minutes)

- Briefly review the major human body systems (circulatory, respiratory, digestive, nervous, muscular, skeletal).
- Explain the use of MedTable AR tablets to explore these systems interactively.
- Go over the Student Note Guide and Scavenger Hunt.
- Emphasize teamwork and communication expectations.

2. Group Exploration (25 minutes)

- Each pair uses their tablet to navigate the Human Body Map.
- Pairs discuss findings and help each other understand the systems.
- Record structures and functions in the Student Note Guide.
- Teams complete the associated quiz by locating all structures.

3. Group Sharing and Reflection (10 minutes)

- Each member of the team will share at least one interesting fact and one challenge they faced.
- Discuss how communication helped their teamwork.
- Review any questions of the MedTable AR experience.

4. Wrap-Up (5 minutes)

- Recap key points about body systems and teamwork.
- Collect Student Note Guides for review. (*optional)
- Encourage students to think about how body systems interact in daily life.

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Grade Level:	**Middle**	**School Name:**	
Subject:	**Cardiovascular System.**	**Educator(s):**	
Duration:	**35 minutes**	**Lesson Date:**	

Lesson Objective: (What do you want students to learn?)

- Identify and describe the structures of the cardiovascular system.
- Understand the role and function of the cardiovascular system in the human body.
- Demonstrate how to navigate MedTable AR effectively.

Standard to be addressed: (can be changed to reflect the standards of the course)

- **Structure and Function (MS-LS1-3)** Performance Expectation: Develop and use a model to describe how the structures of organisms (including humans) function to support life processes.
- **Human Body Systems (MS-LS1-2)** Performance Expectation: Develop and use a model to describe the function of a system in the human body.

Essential Questions:

- What are the main structures of the cardiovascular system?
- How does the cardiovascular system interact with other body systems?
- What are the functions of the heart, blood vessels, and blood?

Key Terms:

Aorta: The largest artery in your body. It carries oxygen-rich blood from the heart to all parts of the body.
Arteries: Blood vessels that carry oxygen-rich blood away from the heart to the rest of the body.
Basilic and Cephalic Veins: Veins found in your arm that are often used when doctors need to take blood or give you medicine through an IV.
Capillaries: Tiny blood vessels that connect arteries and veins. They help with the exchange of oxygen, carbon dioxide, nutrients, and waste between blood and body tissues.
Carotid Arteries: These arteries supply blood to your head and neck. They branch into smaller arteries that go to different parts of your head.
Coronary Arteries: These arteries supply blood to the heart muscle itself, helping it stay strong and healthy.
Femoral Vein: This vein carries oxygen-poor blood from your thigh and leg back to the heart.
Heart: A muscular organ that pumps blood throughout your body. It has four chambers: two atria (upper chambers) and two ventricles (lower chambers).
Inferior Vena Cava: This large vein carries oxygen-poor blood from the lower part of your body back to the heart.
Platelets: Small pieces in your blood that help it clot, which prevents you from bleeding too much when you get a cut.
Plasma: The liquid part of your blood that carries cells, nutrients, hormones, and waste products.
Pulmonary Arteries: These arteries carry oxygen-poor blood from the heart to the lungs, where it picks up oxygen.

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Red Blood Cells: These cells carry oxygen from the lungs to the rest of your body and take carbon dioxide back to the lungs to be exhaled.
Superior Vena Cava: This large vein carries oxygen-poor blood from the upper part of your body back to the heart.
Veins: Blood vessels that carry oxygen-poor blood back to the heart.
White Blood Cells: These cells are part of your immune system and help fight off infections in your body.

Opening:

Today, you will take part in an exciting exploration of the cardiovascular system using MedTable AR! This important network helps deliver oxygen and nutrients to our body's tissues while also getting rid of waste products. We will discover the key parts of this system, learn how they work together, and understand why they are essential for our overall health. Plus, we'll discuss why knowing about the cardiovascular system is important for staying healthy and feeling our best.

Discussion Prompts:

1. How did using MedTable AR change your understanding of the cardiovascular system?
2. What was the most interesting fact you learned about the cardiovascular system?
3. How does the cardiovascular system work with other body systems?

Q&A:

1. **Q**: What is the primary function of the heart?
   A: The primary function of the heart is to pump blood throughout the body, supplying oxygen and nutrients while removing waste products.
2. **Q**: How many chambers does the heart have, and what are they called?
   A: The heart has four chambers: two atria (upper chambers) and two ventricles (lower chambers).
3. **Q**: What is the difference between arteries and veins?
   A: Arteries carry oxygen-rich blood away from the heart, while veins carry deoxygenated blood back to the heart.
4. **Q**: What role do capillaries play in the cardiovascular system?
   A: Capillaries facilitate the exchange of oxygen, carbon dioxide, nutrients, and waste between blood and body tissues.
5. **Q**: What are red blood cells, and what is their function?
   A: Red blood cells are responsible for transporting oxygen from the lungs to the body's tissues and carrying carbon dioxide back to the lungs.
6. **Q**: Why are platelets important for the cardiovascular system?
   A: Platelets are crucial for blood clotting, helping to prevent excessive bleeding when injuries occur.
7. **Q**: How does the cardiovascular system respond to exercise?
   A: During exercise, the heart rate increases, and blood vessels dilate to deliver more oxygen and nutrients to active muscles.
8. **Q**: What is plasma, and what does it contain?
   A: Plasma is the liquid component of blood, containing water, electrolytes, proteins, hormones, and waste products.

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9. **Q**: How do white blood cells contribute to cardiovascular health?
   A: White blood cells help defend the body against infections and diseases, thus maintaining overall health and function of the cardiovascular system.
10. **Q**: What lifestyle choices can negatively impact cardiovascular health?
    A: Poor diet, lack of exercise, smoking, and excessive alcohol consumption can negatively impact cardiovascular health.

Career Exploration:

- **Cardiologist:** A physician specializing in diagnosing and treating heart and blood vessel conditions.
- **Cardiovascular Technician:** A healthcare professional who assists in diagnosing and treating cardiovascular diseases using diagnostic equipment.
- **Nurse Practitioner:** A nurse with advanced training who can provide care for patients with cardiovascular issues.
- **Exercise Physiologist:** A professional who develops fitness programs to improve cardiovascular health and overall fitness.

Closure:

We learned about the different parts of the cardiovascular system and how they work together. The cardiovascular system is important for our health because it helps our bodies get the nutrients and oxygen we need while also getting rid of waste. By understanding how this system functions, we can see why it's essential to take care of our heart and blood vessels. Making healthy choices, like eating well and exercising, along with seeing a doctor for regular check-ups, can help keep our cardiovascular system strong

NOTES:

- Have students complete the associated quiz.
- Have students explore the Body Organ: Heart

MedTable AR Body System Exploration: MIDDLE SCHOOL

Grade Level:	**Middle**	**School Name:**	
Subject:	**Digestive System**	**Educator(s):**	
Duration:	**35min**	**Lesson Date:**	

Lesson Objective: (What do you want students to learn?)

- Identify and describe the structures of the digestive system.
- Understand the role and function of the digestive system in the human body.
- Demonstrate how to navigate the MedTable AR anatomy table effectively.

Standard to be addressed: (can be changed to reflect the standards of the course)

- **Structure and Function (MS-LS1-3)** Performance Expectation: Develop and use a model to describe how the structures of organisms (including humans) function to support life processes.
- **Human Body Systems (MS-LS1-2)** Performance Expectation: Develop and use a model to describe the function of a system in the human body.

Essential Questions:

- What are the main functions of the digestive system?
- How does the digestive system work to break down food?
- How can lifestyle choices impact digestive health?

Key Terms:

Absorption: The process by which nutrients from food are taken into the bloodstream.

Alimentary Canal: The continuous tube that runs from the mouth to the anus, through which food passes during digestion.

Bolus: A soft mass of chewed food that is formed in the mouth and swallowed.

Chyme: The semi-liquid mixture of partially digested food and digestive juices found in the stomach and small intestine.

Digestive Enzymes: Proteins that speed up the breakdown of food into smaller molecules.

Digestion: The process of breaking down food into smaller, absorbable components.

Enzyme: A biological catalyst that speeds up chemical reactions, including digestion.

Esophagus: A muscular tube that connects the throat to the stomach; it transports food.

Gallbladder: A small organ that stores and concentrates bile produced by the liver.

Intestines: The long, tube-like organs where digestion and nutrient absorption occur (includes small and large intestines).

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Liver: A vital organ that produces bile for digestion and processes nutrients.

Pancreas: An organ that produces digestive enzymes and hormones like insulin.

Peristalsis: The wave-like muscle contractions that move food through the digestive tract.

Rectum: The final section of the large intestine, where waste is stored before elimination.

Salivary Glands: Glands in the mouth that produce saliva, aiding in digestion and swallowing.

Sphincter: A circular muscle that controls the passage of substances through openings in the digestive system (e.g., lower esophageal sphincter).

Stomach: A hollow organ that holds food while it is being mixed with stomach enzymes and acids.

Villi: Tiny, finger-like projections in the intestines that increase surface area for absorption.

Opening:

Today, you will take part in an exciting exploration of the digestive system through the use of MedTable AR! We'll talk about the main jobs of the human digestive system in our overall health and how it is able to break down food, absorb nutrients, and eliminate waste. We'll also discuss why it's important to understand the digestive system for staying healthy and well.

Discussion Prompts:

- How did using the MedTable AR change your understanding of the digestive system?
- What was the most interesting fact you learned about the digestive system?
- How does the digestive system work with other body systems?
- Discuss how different careers in health and medicine might utilize knowledge of the digestive system.

Q&A:

1. **Q:** What is the main job of the digestive system?
   A: The main job of the digestive system is to break down food, absorb nutrients, and get rid of waste.
2. **Q:** What does the stomach do?
   A: The stomach mixes food with special juices to help start breaking down proteins.
3. **Q:** What do the intestines do in digestion?
   A: The small intestine absorbs most of the nutrients from food, while the large intestine takes in water and helps form waste.
4. **Q:** How does bile help with digestion?
   A: Bile helps break down fats, making them easier for the body to digest and absorb.
5. **Q:** What are enzymes, and why are they important?
   A: Enzymes are special proteins that help break down food into smaller parts that our bodies can use.
6. **Q:** What role does the pancreas play in digestion?
   A: The pancreas makes digestive juices and helps control blood sugar levels with insulin.
7. **Q:** Why is it important for the body to absorb nutrients?
   A: Absorbing nutrients is crucial because it gives the body the energy it needs to grow, stay healthy, and repair itself.

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8. **Q:** What are villi, and why are they important in the intestines?
   A: Villi are tiny, finger-like structures in the small intestine that help absorb more nutrients by increasing the surface area.
9. **Q:** What is the job of the esophagus?
   A: The esophagus is a tube that carries food from the mouth down to the stomach.
10. **Q:** How does the liver help with digestion?
    A: The liver makes bile, which is stored in the gallbladder and then released into the small intestine to help digest fats.

Career Exploration:

- **Nutritionist:** Professionals who advise individuals on dietary practices to promote health and wellness.
- **Gastroenterologist:** Medical doctors specializing in the diagnosis and treatment of digestive system disorders.
- **Dietitian:** Registered health professionals who specialize in food and nutrition.

Closure:

We've explored the parts and functions of the digestive system. By studying how our bodies process food, we can make informed decisions about health and diet.

NOTES:

- Have students complete the associated quiz.

MedTable AR Body System Exploration: MIDDLE SCHOOL

Grade Level:	**Middle**	**School Name:**	
Subject:	**Integumentary System**	**Educator(s):**	
Duration:	**35 minutes**	**Lesson Date:**	

Lesson Objective: (What do you want students to learn?)

- Identify and describe the structures of the integumentary system.
- Understand the role and function of the integumentary system in the human body.
- Demonstrate how to navigate the MedTable AR anatomy table effectively.

Standard to be addressed:

- **Structure and Function (MS-LS1-3)** Performance Expectation: Develop and use a model to describe how the structures of organisms (including humans) function to support life processes.
- **Human Body Systems (MS-LS1-2)** Performance Expectation: Develop and use a model to describe the function of a system in the human body.

Essential Questions:

- What are the main functions of the integumentary system?
- What roles do hair and nails play in protecting our bodies?
- How does the integumentary system keep us safe from the outside environment?
- Why is it important to take care of our skin?

Key Terms:

Dermis - The inner layer of skin that contains blood vessels, nerves, and connective tissue.
Epidermis - The outermost layer of skin that provides a protective barrier.
Follicle - A small cavity in which a hair develops.
Hair - A filamentous structure that grows from follicles in the skin, providing protection and insulation.
Melanin - A pigment responsible for the color of skin and hair, which helps protect against UV radiation.
Nails - Hard protective coverings on the tips of fingers and toes.
Sebum - An oily substance produced by sebaceous glands that moisturizes the skin and hair.
Skin - The largest organ of the body, serving as a barrier and protector for underlying tissues.
Sweat Gland - Glands that produce sweat to help regulate body temperature.
Tissue - A group of cells that work together to perform a specific function; in the integumentary system, this includes epithelial and connective tissues.
Hypodermis (Subcutaneous Layer) - The layer of fat and connective tissue beneath the dermis that insulates the body and absorbs shock.
Keratin - A protein that forms the structure of hair, nails, and the outer layer of skin.
Pore - A tiny opening in the skin through which sweat and sebum are released.

MedTable AR Body System Exploration: MIDDLE SCHOOL

Opening:

Today, you will take part in an exciting exploration of the integumentary system, which includes our skin, hair, and nails, using MedTable AR! We'll talk about the main jobs of this system, the roles that hair and nails have, and how it helps protect our bodies from outside dangers. We'll also discuss why it's important to understand the integumentary system for staying healthy and well.

Discussion Prompts:

1. How did using MedTable AR change your understanding of the integumentary system?
2. What was the most interesting fact you learned about the skin?
3. How does the integumentary system work with other body systems?

Q&A:

1. **Q:** What are the two main layers of skin?
   A: The epidermis and the dermis.
2. **Q:** What is the primary function of the epidermis?
   A: The epidermis provides a protective barrier for the body.
3. **Q:** What is melanin, and what does it do?
   A: Melanin is a pigment that gives skin its color and protects against UV radiation.
4. **Q:** What do sweat glands do?
   A: Sweat glands help cool the body through perspiration.
5. **Q:** How do hair follicles work?
   A: Hair follicles produce hair, which helps with insulation and protection.
6. **Q:** What is sebum, and why is it important?
   A: Sebum is an oily substance that moisturizes and protects the skin and hair.
7. **Q:** How does the integumentary system help with touch and sensation?
   A: The skin has sensory receptors that detect touch, temperature, and pain.
8. **Q:** What is the role of nails in the integumentary system?
   A: Nails protect the tips of fingers and toes and help with gripping.
9. **Q:** How does the integumentary system help maintain body temperature?
   A: It regulates temperature through sweating and blood flow.
10. **Q:** Why is skin care important?
    A: Good skin care helps prevent infections and maintains overall skin health.

MedTable AR Body System Exploration: MIDDLE SCHOOL

Career Exploration:	**Closure:**
● **Dermatologist:** Discuss how dermatologists diagnose and treat skin conditions. ● **Cosmetic Chemist:** Explore how cosmetic chemists develop products for skin care. ● **Esthetician:** Explain the role of estheticians in providing skin treatments and advice. ● **Health Educator:** Consider how health educators teach about skin health and hygiene.	*We've explored the parts and functions of the integumentary system, including the importance of hair and nails, and how this system protects us from outside dangers. Understanding the integumentary system is important for knowing how to take care of our skin and to stay healthy overall.*

NOTES:

- Have students complete the associated quiz.
- Have students explore the Body Organ: Integumentary

MedTable AR Body System Exploration: MIDDLE SCHOOL

Grade Level:	**Middle**	**School Name:**	
Subject:	**Lymphatic System**	**Educator(s):**	
Duration:	**35 minutes**	**Lesson Date:**	

Lesson Objective: (What do you want students to learn?)

- Identify and describe the structures of the lymphatic system.
- Understand the role and function of the lymphatic system in the human body.
- Demonstrate how to navigate MedTable AR effectively.

Standard to be addressed: (can be changed to reflect the standards of the course)

- **Structure and Function (MS-LS1-3)** Performance Expectation: Develop and use a model to describe how the structures of organisms (including humans) function to support life processes.
- **Human Body Systems (MS-LS1-2)** Performance Expectation: Develop and use a model to describe the function of a system in the human body.

Essential Questions:

- What are the main structures of the lymphatic system?
- What are the functions of the lymphatic system?
- How does the lymphatic system interact with other body systems?

Key Terms:

Cisterna Chyli: A small pouch at the bottom of the thoracic duct that collects lymph from the lower parts of the body.
Lymph: A clear fluid that moves through the lymphatic system. It has white blood cells and helps remove waste from the body.
Lymphatic Ducts: Large tubes that carry lymph from smaller lymphatic vessels into the bloodstream. Two main ones are the right lymphatic duct and the thoracic duct.
Lymph Nodes: Tiny, bean-shaped organs that filter lymph and contain cells that help the body fight infections.
Lymphatic Vessels: Thin tubes that carry lymph all around the body.
Right Lymphatic Duct: The tube that takes lymph from the right upper part of the body and moves it into a vein near the heart.
Spleen: An organ that cleans blood, recycles iron, and helps make immune cells called lymphocytes.
Thymus: A gland where special immune cells, called T lymphocytes, grow and become ready to fight infections.
Tonsils: Lumps of tissue in the throat that help protect the body from germs that enter through the mouth and nose.

MedTable AR Body System Exploration: MIDDLE SCHOOL

Opening:

Today, you will take part in an exciting exploration of the lymphatic system using MedTable AR! This system helps keep our body's fluids balanced, protects us from infections, absorbs fats from our food, moves lymph around, and makes immune cells to help us stay healthy. We will look at the important parts of this system, what they do, and why they are essential for our overall health.

Discussion Prompts:

1. How did using MedTable AR change your understanding of the lymphatic system?
2. What was the most interesting fact you learned about the lymphatic system?
3. How does the lymphatic system work with other body systems?

Q&A:

1. **Q**: What is lymph?
   A: Lymph is a clear fluid that moves through the lymphatic system and contains white blood cells and waste.
2. **Q**: What are lymph nodes?
   A: Lymph nodes are small, bean-shaped organs that filter lymph and hold immune cells to help fight infections.
3. **Q**: What do lymphatic vessels do?
   A: Lymphatic vessels are thin tubes that carry lymph all around the body.
4. **Q**: What is the role of the spleen?
   A: The spleen cleans blood, recycles iron, and helps make lymphocytes, which are important for the immune system.
5. **Q**: Where is the thymus and what does it do?
   A: The thymus is located in the chest, and it is where T lymphocytes grow up and get ready to fight infections.
6. **Q**: What are tonsils?
   A: Tonsils are pieces of lymphoid tissue in the throat that help protect against germs that enter through the mouth and nose.
7. **Q**: What does the right lymphatic duct do?
   A: The right lymphatic duct takes lymph from the right upper part of the body and moves it into the bloodstream.
8. **Q**: What is the cisterna chyli?
   A: The cisterna chyli is a pouch at the bottom of the thoracic duct that collects lymph from the lower body.
9. **Q**: What is mucosa-associated lymphoid tissue (MALT)?
   A: MALT is a type of lymphoid tissue found in places like the gut and respiratory tract that helps protect against germs.
10. **Q**: How does the lymphatic system work with other body systems?
    A: The lymphatic system works closely with the circulatory system to keep fluid balanced and with the immune system to protect against diseases.

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Career Exploration:	**Closure:**
● **Medical Doctor (MD):** A doctor who specializes in understanding and treating diseases related to the lymphatic system, like infections or cancers. ● **Biomedical Researcher:** A scientist who studies the lymphatic system to learn more about it and create new treatments for diseases. ● **Clinical Laboratory Technologist:** A lab worker who tests samples to help doctors find out if someone has diseases related to the lymphatic system. ● **Health Educator:** A person who teaches communities about the lymphatic system and how to keep the immune system healthy.	*We learned about the different parts of the lymphatic system and how they work together. The lymphatic system is important for our health because it helps keep our body's fluids balanced, protects us from infections, absorbs fats from what we eat, transports lymph, and makes immune cells to fight off sickness. Knowing how it works helps us understand why the lymphatic system is so essential for staying healthy.*

NOTES:

- Have students complete the associated quiz.

MedTable AR Body System Exploration: MIDDLE SCHOOL

Grade Level:	**Middle School**	**School Name:**	
Subject:	**Muscular System**	**Educator(s):**	
Duration:	**35 minutes**	**Lesson Date:**	

Lesson Objective: (What do you want students to learn?)

- Identify and describe the structures of the muscular system.
- Understand the role and function of the muscular system in the human body.
- Demonstrate how to navigate and utilize the MedTable AR anatomy table effectively.

Standard to be addressed:(can be changed to reflect the standards of the course)

- **Structure and Function (MS-LS1-3)** Performance Expectation: Develop and use a model to describe how the structures of organisms (including humans) function to support life processes. This includes identifying and describing the structures of the muscular system.
- **Human Body Systems (MS-LS1-2)** Performance Expectation: Develop and use a model to describe the function of a system in the human body, focusing on the role and function of the muscular system in movement and interaction with other body systems.

Essential Questions:

- What are the main jobs of the muscular system?
- How do muscles work together to help us move?
- How does the muscular system work with other body systems?
- Why is it important for us to learn about the muscular system?

Key Terms:

Antagonist Muscle - A muscle that opposes the action of another muscle.
Cardiac Muscle - The type of muscle found only in the heart, responsible for pumping blood.
Contract - The process by which a muscle shortens and generates force.
Flexor - A muscle that decreases the angle between two bones at a joint.
Involuntary Muscle - Muscle that operates without conscious control, such as cardiac and smooth muscles.
Muscle Fiber - The individual cells that make up a muscle; can be classified as slow-twitch or fast-twitch fibers.
Muscle Group - A collection of muscles that work together to perform a specific movement.
Skeletal Muscle - The type of muscle attached to bones that enables voluntary movement.

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Smooth Muscle - Involuntary muscle found in the walls of internal organs, responsible for movements such as digestion and blood vessel constriction.
Tendon - A strong connective tissue that attaches muscles to bones.
Voluntary Muscle - Muscle that can be consciously controlled, such as skeletal muscle.
Muscle Contraction - The process by which muscle fibers generate tension and shorten.

Opening:

Today, you will take part in an exciting exploration of the muscular system using MedTable AR. This hands-on experience will let you see and interact with different parts of the human body. Your goals for this lesson are to identify and describe the important structures of the muscular system, understand how they help us move, keep us standing tall, and even generate heat.

Discussion Prompts:

- How does the use of MedTable AR change the way you learned about the muscular system?
- Why do you think understanding the muscular system is important for athletes or active individuals?
- What did you find most interesting about the muscles in our body?

Q&A:

1. **Q:** What are the three types of muscle tissue in the human body?
   A: Skeletal, smooth, and cardiac muscle.
2. **Q:** What is the main function of skeletal muscles?
   A: Skeletal muscles allow us to move our bodies voluntarily.
3. **Q:** What connects muscles to bones?
   A: Tendons connect muscles to bones.
4. **Q:** What is the difference between voluntary and involuntary muscles?
   A: Voluntary muscles can be controlled consciously, while involuntary muscles work automatically.
5. **Q:** What is an antagonist muscle?
   A: An antagonist muscle opposes the action of another muscle, allowing for smooth movement.
6. **Q:** How do muscle fibers contract?
   A: Muscle fibers contract through a process called the sliding filament theory.
7. **Q:** What is the function of cardiac muscle?
   A: Cardiac muscle makes up the heart and helps pump blood throughout the body.
8. **Q:** What role do smooth muscles play?
   A: Smooth muscles help control involuntary movements in organs like the stomach and blood vessels.
9. **Q:** What is a flexor muscle?
   A: A flexor muscle decreases the angle between two bones at a joint.

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10. **Q:** How does exercise benefit the muscular system?
    A: Exercise strengthens muscles, improves endurance, and enhances overall health.

Career Exploration:

- **Physical Therapist:** Discuss how physical therapists help people recover from injuries and improve muscle function.
- **Exercise Scientist:** Explore how exercise scientists study the effects of physical activity on muscle health.
- **Sports Coach:** Explain how coaches use knowledge of the muscular system to train athletes effectively.

Closure:

Today, you have taken a closer look at the structures and functions of the muscular system, including how muscles help us move and keep our posture straight. You've also had the chance to use the MedTable AR anatomy table to see these concepts in action. Learning about the muscular system is really important for areas like health, fitness, and medicine.

NOTES:

- Have students complete the associated quiz.
- Have students explore the Body Organ: Heart

MedTable AR Body System Exploration: MIDDLE SCHOOL

Grade Level:	**Middle**	**School Name:**	
Subject:	**Nervous System**	**Educator(s):**	
Duration:	**35 minutes**	**Lesson Date:**	

Lesson Objective: (What do you want students to learn?)

- Identify and describe the structures of the nervous system.
- Understand the role and function of the nervous system in the human body.
- Demonstrate how to navigate the MedTable AR anatomy table effectively.

Standard to be addressed: (can be changed to reflect the standards of the course)

- **Structure and Function (MS-LS1-3)** Performance Expectation: Develop and use a model to describe how the structures of organisms (including humans) function to support life processes.
- **Human Body Systems (MS-LS1-2)** Performance Expectation: Develop and use a model to describe the function of a system in the human body.

Essential Questions:

- What are the main structures of the nervous system?
- How does the nervous system interact with other body systems?
- What are the functions of the brain and spinal cord?

Key Terms:

Autonomic Nervous System: Regulates involuntary bodily functions.
Axon: The part of a neuron that transmits signals away from the cell body.
Brain: The control center of the body, responsible for processing information.
Brainstem: The part of the brain that controls basic life functions.
Cerebellum: Coordinates movement and balance.
Cerebrum: The largest part of the brain, involved in higher brain functions.
Dendrites: The branches of a neuron that receive signals from other neurons.
Glial Cells: Supportive cells that nourish and protect neurons.
Myelin Sheath: Insulates the axon and speeds up signal transmission.
Peripheral Nervous System (PNS): Connects the CNS to the rest of the body.
Reflex: An automatic response to a stimulus.
Somatic Nervous System: Controls voluntary movements of skeletal muscles.

MedTable AR Body System Exploration: MIDDLE SCHOOL

Spinal Cord: Transmits signals between the brain and the body.
Synapse: The junction between neurons where communication occurs.

Opening:

Today, you will take part in an exciting exploration of the nervous system using MedTable AR! This important network controls and coordinates actions and reactions in the body. We will discover the key parts of this system, learn how they work together, and understand why they are essential for our overall health. Plus, we'll discuss why knowing about the nervous system is important for staying healthy and feeling our best.

Discussion Prompts:

1. How did using MedTable AR change your understanding of the nervous system?
2. What was the most interesting fact you learned about the nervous system?
3. How does the nervous system work with other body systems?

Q&A:

1. **Q:** What is the main job of the brain?
   A: The brain processes information, controls our thoughts and feelings, and helps coordinate how our body works.
2. **Q**: What is the spinal cord, and where can you find it?
   A: The spinal cord is a long, tube-like structure that runs down your back. It is protected by the bones of your spine and connects your brain to the rest of your body.
3. **Q:** What does the spinal cord do in the nervous system?
   A: The spinal cord sends signals between the brain and the body and helps with quick reactions, like reflexes.
4. **Q**: What is a neuron, and what are its main parts?
   A: A neuron is a type of nerve cell that sends signals. Its main parts include the cell body, dendrites, axon, and myelin sheath.
5. **Q**: What does the myelin sheath do?
   A: The myelin sheath acts like insulation on a wire, helping to speed up the electrical signals that travel along the neuron.
6. **Q**: What are the two main parts of the nervous system?
   A: The two main parts are the Central Nervous System (CNS), which includes the brain and spinal cord, and the Peripheral Nervous System (PNS), which connects the CNS to the rest of the body.
7. **Q**: What is a synapse?
   A: A synapse is the space between two neurons where they communicate by sending signals to each other.
8. **Q**: What is the function of the brainstem?
   A: The brainstem controls basic life functions such as breathing, heart rate, and blood pressure.
9. **Q**: What are the meninges?
   A: The meninges are protective layers that cover the brain and spinal cord, helping to support and cushion them.
10. **Q**: What is cerebrospinal fluid (CSF), and what does it do?
    A: Cerebrospinal fluid cushions the brain and spinal cord, provides nutrients, and helps remove waste from around them.

MedTable AR Body System Exploration: MIDDLE SCHOOL

Career Exploration:	**Closure:**
● **Neurologist/Neurosurgeon:** Doctors who focus on problems with the brain and nervous system. They help diagnose issues and perform surgeries if needed. ● **Neuropsychologist:** Specialists who study how the brain affects behavior and thinking. They help people with brain-related challenges and usually have advanced training in psychology. ● **Therapists (Physical & Occupational):** Healthcare workers who assist patients in regaining movement and skills for daily activities after injuries or illnesses related to the nervous system.	*We learned about the different parts of the nervous system and how they work together to help our bodies take in information and react to what's happening around us. Knowing how the nervous system works helps us understand why it's important to stay healthy by making good choices and visiting the doctor regularly.*

NOTES:

- Have students complete the associated quiz.
- Have students explore the Body Organ: Brain

MedTable AR Body System Exploration: MIDDLE SCHOOL

Grade Level:	**Middle School**	**School Name:**	
Subject:	**Respiratory System**	**Educator(s):**	
Duration:	**35 minutes**	**Lesson Date:**	

Lesson Objective: (What do you want students to learn?)

- Identify the structures of the respiratory system.
- Understand the function of the respiratory system.
- Demonstrate how to navigate MedTable AR effectively.

Standard to be addressed:

- **Structure and Function (MS-LS1-3)** Performance Expectation: Develop and use a model to describe how the structures of organisms (including humans) function to support life processes.
- **Human Body Systems (MS-LS1-2)** Performance Expectation: Develop and use a model to describe the function of a system in the human body.

Essential Questions:

- What are the main structures of the respiratory system?
- Why is breathing important for our bodies?
- How does the respiratory system interact with other body systems?

Key Terms:

Alveoli: Tiny air sacs in the lungs where oxygen and carbon dioxide are exchanged.

Bronchi: Two main air passages that branch from the trachea into each lung.

Bronchioles: Smaller tubes that branch from the bronchi and lead to the alveoli.

Diaphragm: A dome-shaped muscle that separates the chest cavity from the abdomen; helps us breathe by moving up and down.

Gas Exchange: The process of oxygen entering the blood and carbon dioxide being removed.

Larynx: The voice box; contains vocal cords and is involved in sound production.

Nasal Cavity: The area behind the nose where air is filtered, warmed, and moistened.

Pharynx: The throat; a passage for air and food.

Trachea: The windpipe; a tube that connects the larynx to the bronchi.

Respiration: The process of taking in oxygen and releasing carbon dioxide.

MedTable AR Body System Exploration: MIDDLE SCHOOL

Opening:

Today, you will take part in an exciting exploration of the respiratory system using MedTable AR! We will discover how oxygen in the air is taken into the body, while also letting the body get rid of carbon dioxide in the air breathed out. Plus, we'll discuss why knowing about the respiratory system is important for staying healthy and feeling our best.

Discussion Prompts:

- How did using MedTable AR change your understanding of the respiratory system?
- What was the most interesting fact you learned about the respiratory system?
- How does the respiratory system work with other body systems?

Q&A:

1. **Q**: Why is it important for the nasal cavity to filter air?
   A: The nasal cavity filters out dust and germs, which helps protect the lungs and keeps the air clean.
2. **Q**: How does the diaphragm help us breathe?
   A: When the diaphragm contracts, it creates more space in the chest cavity, allowing air to be drawn into the lungs.
3. **Q**: What is the main function of the trachea?
   A: The trachea is the windpipe that carries air from the throat to the lungs.
4. **Q**: What happens in the alveoli?
   A: In the alveoli, oxygen from the air enters the blood, and carbon dioxide from the blood is released into the air.
5. **Q**: Why do we need to breathe out carbon dioxide?
   A: Carbon dioxide is a waste product of cellular respiration, and it needs to be removed from the body to maintain proper pH balance.
6. **Q**: Explain the difference between external and internal respiration.
   A: External respiration occurs in the lungs (gas exchange between alveoli and blood), while internal respiration occurs in tissues (gas exchange between blood and cells).
7. **Q**: How does exercise affect our breathing?
   A: During exercise, our breathing rate increases to supply more oxygen to our body and remove carbon dioxide more quickly.
8. **Q**: Why is it important for respiratory health to avoid pollutants and irritants?
   A: Pollutants and irritants can damage respiratory tissues, impair cilia function, and lead to chronic diseases, negatively affecting gas exchange efficiency.
9. **Q**: How does smoking affect the respiratory system?
   A: Smoking can damage the lungs, reduce airflow, and cause diseases like bronchitis and emphysema.
10. **Q.** What medical speciality focuses on lung health and treat illnesses like asthma and pneumonia.
    A. Pulmonology. Pulmonologists specialize in lung health and treat illnesses like asthma and pneumonia.

MedTable AR Body System Exploration: MIDDLE SCHOOL

Career Exploration:	**Closure:**
● **Respiratory Therapists:** They help patients who have trouble breathing by using special treatments and machines to improve lung function. ● **Pulmonologists:** Doctors who specialize in lung health and treat illnesses like asthma and pneumonia. ● **Cardiovascular Technicians:** Professionals who monitor the heart and blood vessels to make sure oxygen-rich blood flows properly throughout the body. ● **Paramedics and Nurses:** They provide emergency care to help patients breathe and keep their hearts working during medical emergencies.	*We learned about the different parts of the respiratory system. Understanding its structures and functions helps us consider the impact of lifestyle choices (like smoking or exercise) on respiratory function and the importance of taking action to improve our respiratory health.*

NOTES:

- Have students complete the associated quiz.
- Have students explore the Body Organ: Lungs

Describe the pathway of air as it enters our body:

Air enters through the nasal cavity → moves to the pharynx → passes through the larynx → goes down the trachea → splits into the bronchi → travels through bronchioles → reaches the alveoli.

MedTable AR Body System Exploration: MIDDLE SCHOOL

Grade Level:	**Middle School**	**School Name:**	
Subject:	**Skeletal System**	**Educator(s):**	
Duration:	**35min**	**Lesson Date:**	

Lesson Objective: (What do you want students to learn?)

- Identify and describe the structures of the skeletal system.
- Understand the function of the skeletal system in the human body.
- Demonstrate how to navigate the MedTable AR anatomy table effectively.

Standard to be addressed: (can be changed to reflect the standards of the course)

- **Structure and Function (MS-LS1-3)** Performance Expectation: Develop and use a model to describe how the structures of organisms (including humans) function to support life processes. This includes understanding various parts of the skeletal system.
- **Human Body Systems (MS-LS1-2)** Performance Expectation: Develop and use a model to describe the function of a system in the human body, focusing on how the skeletal system supports and interacts with other systems.

Essential Questions:

- What are the main jobs of the skeletal system in our body?
- Why are joints important for movement?
- How do our bones support our everyday activities?

Key Terms:

Carpals: The eight small bones that make up the wrist.

Clavicle: Also known as the collarbone.

Femur: The longest bone in the body, located in the thigh.

Fibula: The smaller bone in the lower leg, located on the outer side of the tibia.

Humerus: The long bone of the upper arm, extending from the shoulder to the elbow.

Metacarpals: The five bones that form the palm of the hand.

Metatarsals: The five long bones in the foot.

Patella: Also known as the kneecap, it is a small, flat bone that protects the knee joint.

MedTable AR Body System Exploration: MIDDLE SCHOOL

Pelvis: The bony structure located at the base of the spine, composed of the ilium, ischium, and pubis.

Phalanges: The bones of the fingers and toes.

Radius: One of the two long bones in the forearm, located on the thumb side when in the standard anatomical position.

Rib Cage: Composed of 12 pairs of ribs that protect the thoracic cavity. It includes the sternum (breastbone).

Scapula: Also known as the shoulder blade, it connects the humerus (upper arm bone) with the clavicle.

Skull: The bony structure that forms the head, protecting the brain and supporting the facial structures.

Tarsals: The seven bones that make up the ankle (including the talus and calcaneus).

Tibia: The larger of the two bones in the lower leg, located on the inner side, commonly referred to as the shinbone.

Ulna: The second long bone in the forearm, located on the opposite side of the radius; it is generally larger at the elbow and smaller at the wrist.

Vertebral Column: Also known as the spine, it is composed of 33 vertebrae divided into regions: cervical (7), thoracic (12), lumbar (5), sacral (5 fused), and coccygeal (4 fused).

Opening:

Today, you will take part in an exciting exploration of the skeletal system using MedTable AR! This hands-on experience will let you see and interact with different parts of the human skeleton, like bones, joints, and cartilage. As you go through this activity, pay attention to how these structures work and why the skeletal system is important for keeping our bodies healthy and active. Let's dive in and discover more about our amazing skeletons!

Discussion Prompts:

- How does the use of MedTable AR change the way you learned about the skeletal system?
- Why do you think understanding the skeletal system is important for athletes or active individuals?
- How does the skeletal system work with other body systems?
- What did you find most interesting about the bones in our body?

Q&A:

1. **Q:** What is the main purpose of the skeletal system?
   A: To provide structure, support, and protection for the body.
2. **Q:** What are the two main parts of the skeletal system?
   A: The axial skeleton and the appendicular skeleton.
3. **Q:** Which bone is known as the collarbone?
   A: The bone known as the collarbone is the clavicle.
4. **Q:** What do we call the place where two bones meet?
   A: A joint.
5. **Q:** How many bones do most adults have?
   A: Most adults have 206 bones.

MedTable AR Body System Exploration: MIDDLE SCHOOL

6. **Q:** What is the largest bone in the human body?
   A: The femur (thigh bone).
7. **Q:** What are the two bones in the forearm?
   A: The two bones in the forearm are the radius, which is on the thumb side, and the ulna, which is on the opposite side.
8. **Q:** What is the largest bone in the lower leg?
   A: The largest bone in the lower leg is the tibia, which is also called the shinbone.
9. **Q:** What is the main purpose of the patella?
   A: The main purpose of the patella, or kneecap, is to protect the knee joint and help the thigh muscles work better when we move.
10. **Q:** Why do bones need to be strong?
    A: Strong bones provide support for the body and protect vital organs.

Career Exploration:

- **Orthopedic Surgeon:** Discuss how orthopedic surgeons treat injuries and conditions related to bones.
- **Physical Therapist:** Explore how physical therapists help people recover from injuries involving the skeletal system.
- **Radiologic Technologist:** Explain how these professionals use imaging to see bones and diagnose issues.

Closure:

Today, you've learned a lot about skeletal structures and how they help support and protect our bodies. Take a moment to think about the main ideas we talked about and how this information can be useful in areas like health, fitness, and medicine. Understanding our skeleton is important for taking care of ourselves and staying active.

NOTES:

- Have students complete the associated quiz.

MedTable AR Body System Exploration: MIDDLE SCHOOL

School Name:		**Course Name:**	
Educator:		**Year:**	

With utilization of this structured Professional Development Plan, educators will be equipped to effectively integrate MedTable AR into their classroom curriculum, enhancing student engagement and learning outcomes throughout the academic year.
This document is meant to serve as a blueprint and can be customized to fit the needs of the educator, students, and classroom.

PDP	Goal	Activities/Actions:	Resources Needed:	Expected Outcomes/Evidence of Completion:
Initial Year Goal	**Goal:** ☐ Incorporate the MedTable AR device into the classroom and align instruction with course of study, for students to explore human body systems. **Standard:** ☐ (insert standard)	☐ Attend an introductory workshop on MedTable AR. ☐ Explore the user interface of MedTable AR. ☐ Develop lesson plans that incorporate MedTable AR.	**Classroom Resources:** ☐ Access to MedTable AR software and devices. ☐ Training materials for educators. **District Resources:** ☐ PD opportunities ☐ Support to align curriculum standards ☐ Sharing of best practices **MedTableAR Support** ☐ Online PD offerings ☐ MedTable AR Educators Notes ☐ MedTable AR LMS offering (Google classroom)	☐ Demonstrate proficiency in using MedTable AR. ☐ Creation of at least two lesson plans incorporating MedTable AR. ☐ Educators report increased confidence in using the technology. ☐ Completed lesson plans and feedback from classes. ☐ Student engagement metrics (participation, interest).

Initial Year Goal Artifacts (suggest linking documents from drive)

- ★ **Workshop Attendance Records:** Documentation showing attendance of training sessions.
- ★ **Lesson Plan Samples:** Copies of lesson plans developed during workshops, demonstrating integration of MedTable AR
- ★ **Class Feedback Form:** Feedback form completed by students and teachers, providing insights into their experiences.

MedTable AR Body System Exploration: MIDDLE SCHOOL

PDP	Goal	Activities/Actions:	Resources Needed:	Expected Outcomes/Evidence of Completion:
Mid-Year Goal	**Goal:** ☐ Enhance student understanding of human body systems through interactive learning experiences **Standard:** ☐ (insert standard)	☐ Implement lessons across multiple grades using the device. ☐ Distribute student surveys. ☐ Gather student feedback and performance data. ☐ Adjust teaching strategies based on collected data. ☐ Analyze performance data. ☐ Conduct collaborative sessions.	**Classroom Resources:** ☐ Ongoing access to MedTable AR software and devices. (updates) ☐ Assessment tools (quizzes, surveys). **District Resources:** ☐ Thorough Professional development opportunities for educators. ☐ Support to align curriculum standards ☐ Sharing of best practices **MedTableAR Support** ☐ Online PD offerings ☐ MedTable AR Educators Notes ☐ MedTable AR LMS offering (Google classroom)	☐ Improvement in student assessments related to body systems. ☐ Collection of feedback from students regarding their learning experiences. ☐ Documentation of adjusted lesson plans based on feedback. ☐ Analysis report of student performance data.

Mid-Year Goal Artifacts (suggest linking documents from drive)

- ★ **Student Assessment Results:** Data from quizzes that measure students' understanding of human body systems before and after using MedTable AR.
- ★ **Student Feedback Surveys:** Surveys filled out by students reflecting on their engagement and interest in the subject matter when using the device.
- ★ **Annotated Lesson Plans:** Revised lesson plans that include notes on changes made based on feedback and data collected.

MedTable AR Body System Exploration: MIDDLE SCHOOL

PDP	Goal	Activities/Actions:	Resources Needed:	Expected Outcomes/Evidence of Completion:
End-Year Goal	**Goal:** ☐ Evaluate the overall impact of the MedTable AR device on student learning and engagement. **Standard:** ☐ (insert standard)	☐ Conduct collaborative sessions with fellow educators. ☐ Present findings to stakeholders.	**<u>Classroom Resources:</u>** ☐ Ongoing access to MedTable AR software and devices. (updates) ☐ Assessment tools (quizzes, surveys). **<u>District Resources:</u>** ☐ Thorough Professional development opportunities for educators. ☐ Sharing of best practices **<u>MedTableAR Support</u>** ☐ Online PD offerings ☐ MedTable AR Educators Notes ☐ MedTable AR LMS offering	☐ Detailed report on the effectiveness of the mixed-reality device in teaching body systems. ☐ Recommendations for future use and improvements. ☐ Increased interest in science among students. ☐

End-Year Goal Artifacts (suggest linking documents from drive)

- ★ **Comprehensive Impact Report:** A detailed report summarizing the findings from assessments, including statistics and qualitative data regarding student learning and engagement.
- ★ **Stakeholder Presentation Slides:** Slides created for presenting the MedTable AR integration to administration, parents, or at an educational symposium.
- ★ **Video Testimonials:** Short video clips of students and teachers sharing their experiences with MedTable AR