

What's Included?

Unit Planning

- State & NGSS Standards document
- Unit Pacing Guide for 50 min classes
- Vocabulary terms for prefix/suffix work
- Differentiation ideas for honors students and virtual students ***Digital links for virtual learning found here**
- Honors assignment list

Notes

- PowerPoints
 - Intro to Anatomy PPT (32 slides)
 - Cellular Processes PPT (19 slides)
- Cornell Notes Pages
 - Fill-in-the-blank (7 pgs)
 - Editable versions of all Cornell notes
- Doodle Notes Pages
 - Intro to Anatomy (5 pgs)
 - Cellular Processes (3 pgs)
 - Guide to Using Doodle Notes
 - Doodle Note Keys & Examples

Student Pages

- This folder contains duplicate copies of every student page. They are in order according to the pacing guide for QUICK PHOTOCOPYING if you are using the pacing guide as is.

Activities

- Anatomy Pre-test Activity (2 pgs)
- Find My Wound Anatomical Labeling Game (4 pgs)
- Autopsy Lab (4 pgs)
- Bio Review Station Lab (5 pgs)
- Homeostasis in Cardiovascular Systems Lab (5 pgs)
- Homeostasis Sorting Activity (2 pgs)
- Answer keys or grading rubrics for all activities

Extensions

- Digging Deeper: Survival Needs*
- Digging Deeper: Cell Differentiation
- Review: Cellular Tonicity*
- Data Analysis: Cell Cycle*
- Homeostasis: Feedback Loops
- Answer Keys for all Extensions

*Honors Options

Review and Assessment

- Editable Task Card Review (24 cards) with answer sheet
- 3 diagrams of directional terminology and body cavities (3 pgs)
- Intro to Anatomy Quiz through Google Forms
- Intro to Anatomy Test (paper)- both Honors and Regular versions with answer sheets and keys

Unit Planning:

NGSS and State Standards Document

If your state isn't listed, contact me by email (support@suburbanscience.com) and I'll help you figure out which ones are covered!

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- Editable Task Card Review (24 cards) with answer sheet
- 3 diagrams of directional terminology and body cavities (3 pgs)
- [Intro to Anatomy Quiz through Google Forms](#) (Make a copy of this file to your Drive. Do NOT assign to students using this link.)
- Intro to Anatomy Test (paper)- both Honors and Regular versions with answer sheets and keys

Supplementary Resources

- [Crash Course Video: Intro to Anatomy](#)
- [Anatomical Directions Game](#)
- [Anatomical Term Word Search](#)
- [YouTube Video: Cell Cycle & Mitosis](#)

- [Video: The Semipermeable Membrane](#)
- [Biomimicry: Cell Membrane Game](#)
- [Case Study on Hyponatremia](#) (good extension for cellular processes and osmosis)

Materials Needed

- General classroom use: computers, colored pencils, markers, and crayons, index cards for prefixes and suffixes
- Anatomy Pre-test Activity: Chalk markers
- Find My Wound Game: File folders, paper clips
- Autopsy Lab: Specimens (bananas, pickles, or gummy bears), dissection tools, paper plates or trays
- Bio Review Lab: Beakers or clear jars, sandwich bags, cornstarch, iodine, water, paper clips, chalk markers, craft supplies
- Homeostasis in Cardiovascular and Respiratory System Lab: Stopwatch or clock calculators

Intro to A&P Unit Guide

Intro to A&P Unit Guide

Standards:

Topic: State: Standards:

| Topic | State | Standards |
|-------|--------|---|
| OH | AP.0.3 | Homeostasis is a theme that is explored through and negative feedback mechanisms that continue under conditions of temperature regulation, pH, hormones, there can be a disruption in the feedback imbalance can result in a variety of conditions. |
| CO | None | |
| GA | None | |
| IN | AP.1.3 | Explore the homeostatic range to sustaining hum predict the consequences of what happens when |
| UT | None | |

Standards:

Topic: State: Standards:

| Topic | State | Standards |
|-------|-------------------------|--|
| OH | AP.0.4 | Standard anatomical position is to be used as a reference point. Each area of the human body is identified by region. The features and structures of the body, relative to each other, are described by directional terms. The body and its organs can be divided by planes. The organs are located in cavities. |
| CO | Standard 1, Objective 2 | Identify directional terminology. |
| GA | | |
| IN | | |
| UT | | |

Standards:

Topic: State: Standards:

| Topic | State | Standards |
|-------|----------------------------|--|
| OH | AP.0.3 | Building on knowledge about cell structures and processes from middle school and Biology, this topic focuses on the increasing complexity of cells as they are organized into tissues. Several tissue types make up an organ. Several organs working together make up an organ system. All the organ systems interact and form the human body. |
| CO | Standard 1, Objectives 1-3 | Identify the six levels of structural organization of the human body. |
| GA | SAP.1 | Obtain, evaluate, and communicate information to analyze anatomical structures of the human body. |
| IN | AP.2.1 | Analyze how each hierarchical level of life contributes to complexity of anatomy and physiological functions. Investigate the relationships among various tissue types as well as the molecular and cellular composition of these tissues. |
| UT | Strand 1, Standards 1-2 | Contrast the sciences of anatomy with physiology. Describe the six levels of structural organization of the human body and give an example of each level. |

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| UT | Strand 1, Standards 1-2 | Contrast the sciences of anatomy with physiology. Describe the six levels of structural organization of the human body and give an example of each level. |

Choosing Standards:

Although many states use NGSS, there are some states that do not. I worked hard to find other state standards, but if yours are not addressed, please send me an email at support@suburbanscience.com and I can help you determine which of your state standards are covered in this unit. Thank you!

NGSS for the Unit:

- HS-LS1-1: Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.
- HS-LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
- HS-LS1-3: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
- HS-LS1-4: Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

Intro to A&P Unit Guide

© Suburban Science

Unit Overview Page

plus

Supplementary Resource Ideas and Materials Lists

Editable Pacing Guides

| Intro to Anatomy Pacing Guide | | | | | |
|-------------------------------|-----|--|--|---|--|
| | Day | Intro | Instruct | Assess | Homework |
| Cellular Processes | 6 | <ul style="list-style-type: none"> Review answers from Autopsy Lab | <ul style="list-style-type: none"> Online Quiz through Google Forms Cellular Processes PPT (Section 1) Cornell Notes (Tissues & Cells) | <ul style="list-style-type: none"> Summative assessment through quiz Informal discussion and questions Cornell notes summary | All: Digging Deeper: Cell Differentiation |
| | 7 | <ul style="list-style-type: none"> Review homework answers | <ul style="list-style-type: none"> Cellular Processes PPT (Sections 2 & 3) Cornell Notes (Protein Synthesis and Cellular Division & Transport) | <ul style="list-style-type: none"> Informal discussion and questions Cornell notes summary | Honors: Review: Cellular Tonicity <i>Teacher: Prep for Bio Review Lab</i> |
| | 8 | <ul style="list-style-type: none"> Honors: Review homework answers Regular: Study flashcards | <ul style="list-style-type: none"> Bio Review Lab Materials: beakers or clear jars, sandwich bags, cornstarch, iodine, water, paper clips, chalk markers, craft supplies | <ul style="list-style-type: none"> Formative assessment of knowledge of cellular processes through lab accuracy | Honors: Data Analysis: Cell Cycle |
| Homeostasis | 9 | <ul style="list-style-type: none"> Honors: Review homework answers Regular: Study flashcards | <ul style="list-style-type: none"> Homeostasis: Feedback Loops Start Homeostasis in Cardiovascular and Respiratory System Lab Materials: stopwatch or clock, calculators | <ul style="list-style-type: none"> Check on student progress and understanding during lab activity | |
| | 10 | <ul style="list-style-type: none"> Review flashcards, possibly using Prefix/Suffix Bingo (see Prefix/Suffix document in Unit Planning Folder) | <ul style="list-style-type: none"> Finish Homeostasis in Cardiovascular and Respiratory System Lab (Honors: Make graphs in Excel) Do Homeostasis Sorting Activity Materials: Chalk markers | <ul style="list-style-type: none"> Check on student progress | All: |
| Review | 11 | <ul style="list-style-type: none"> Study for test | <ul style="list-style-type: none"> Task Card Review | | |
| Assess | 12 | <ul style="list-style-type: none"> Last minute student questions? Study for test | <ul style="list-style-type: none"> Take Unit Test | | |

Using this Pacing Guide as is? You can print all the student pages in order from the "Student Pages" folder. (Quizzes and tests not included in Student Pages.)


The daily topic coincide with the previous standards document.

Lesson planning is now quick and easy!

| Intro to Anatomy Pacing Guide | | | | | |
|-------------------------------|-----|---|--|--|---|
| | Day | Intro | Instruct | Assess | Homework |
| Hierarchy of Organization | 1 | Students complete "Getting to Know You" Doodle Notes | <ul style="list-style-type: none"> Review Syllabus Discuss Lab Contract Do Anatomy "Pre-test" Activity Materials: Chalk markers, one set of cards per class *Please check the syllabus and lab contract before providing to students. It will need to be modified to include your specific class requirements. An EDITABLE version of these documents is provided in the "First Day Items" folder. | <ul style="list-style-type: none"> Collect Intro Doodle Notes Informal discussion and questions after Anatomy Pre-test Activity | All: Review syllabus with parents Have lab contract signed by students and parents |
| | 2 | Note: In other units, we learn these in context. In the Intro unit, there are a lot of general terms to learn, so we just do a few a day. Students add to prefix/suffix flashcards: <ul style="list-style-type: none"> a-, -ation, -cyte | <ul style="list-style-type: none"> Intro to Anatomy PPT (Sections 1 and 2) Cornell Notes (Intro to Anatomy & Body Systems and Necessary Life Functions & Survival) | <ul style="list-style-type: none"> Informal discussion and questions during presentation Cornell notes summaries | Honors: Digging Deeper: Survival Needs |
| Anatomical Terminology | 3 | Students add to prefix/suffix flashcards: <ul style="list-style-type: none"> -dynia, -algia, -alge(s), hydro-, -itis | <ul style="list-style-type: none"> Intro to Anatomy PPT (Section 3) Cornell Notes (The Language of Anatomy) Find My Wound Game Materials: file folders, paper clips | <ul style="list-style-type: none"> Informal discussion and questions during presentation Cornell notes summaries Informal check of terminology while playing game | |
| | 4 | Students add to prefix/suffix flashcards: <ul style="list-style-type: none"> macro-, micro-, -ology | <ul style="list-style-type: none"> Intro to Anatomy PPT (Section 4) Cornell Notes (Dividing up the Body) Complete Diagrams (Body Cavities: Lateral View, Body Cavities: Frontal View, Body Directional Terms) | <ul style="list-style-type: none"> Informal discussion and questions Cornell notes summaries Informal (or formal) check of accuracy on diagrams | <i>Teacher: Prep for Autopsy Lab</i> |
| | 5 | Students add to prefix/suffix flashcards: <ul style="list-style-type: none"> -osis, phys-, -scopy, therm- | <ul style="list-style-type: none"> Autopsy Lab Materials: Specimens (bananas, pickles, or gummy bears), dissection tools, trays or plates | <ul style="list-style-type: none"> Informal check of lab accuracy | All: Study for Quiz |

Coincide with State Standards document in Unit Planning Folder

***Bold items** must be photocopied.

 This icon is found on the top right corner of Honors pages for easy identification.

Differentiation Ideas for:

- Student Interest
- Student Ability
- Teaching Pace
- Teaching Environment (Virtual, in-class, or hybrid)

Differentiation

Differentiation is a key component to any unit. Here are some tips for differentiating based on student interest, ability and teaching environment.

Student Interest/Choice

- Both Cornell notes and Doodle Notes™ are included in this unit. Although most of my students preferred the Doodle Notes™, they may not resonate with everyone. Some students may prefer the structure of the Cornell notes.

Differentiation

Teaching Environment

- Virtual or Hybrid students
 - Digital Options:
 - Links for PowerPoints
 - Digital Students pages using Google Slides™ for students to type on
 - Digital Doodle Notes™
- For the Homeostasis in Cardiovascular and Respiratory Systems Lab, students can use family members and neighbors for test subjects.
- Digital drag-and-drop diagrams can be provided for students to self-check and turn it electronically. I have these [available for every body system](#). Digital diagram quizzes are included, as well.
- Pacing

All found on the following page.

es OR Doodle Notes

Body Systems

Honors Assignment List

Although there are no official education standards for what makes an "honors" class, honors assignments generally provide one of three options:

- Greater depth of knowledge
- Additional critical thinking
- More independent work

In this unit, you can find some additional assignments used to increase knowledge for honors students. These can certainly be used for all students also be helpful for extra credit, homework, or sub days if you need it. Because answers to these assignments are often less straightforward, grading for completion and then discussing the answers to make sure they are correct.

| Assignment | Type of work | Skills addressed |
|--------------------------------|-------------------------------------|---|
| Digging Deeper: Survival Needs | Reading and research assignment | Critical thinking, research, independent learning |
| Review: Cellular Tonicity | In-depth review, reading assignment | Critical thinking |
| Data Analysis: Cell Cycle | Math extension | Interpreting graphs, |

All honors assignments are designated by a in the top right corner for identification.

For additional skill-work in pathology or for students thinking of going to medical school, I also use my Anatomy case studies. There is one for each body system that require critical thinking, research, and allow students to integrate to body system to another.

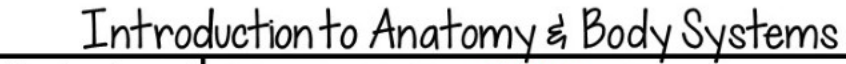
[Click here to see the Case Studies](#)

Differentiation

Student Ability

- Advanced students
 - Honors options are included in the student pages. These can be given to a whole advanced class or individual students, as needed.
 - Honors extensions are provided for the Homeostasis in Cardiovascular and Respiratory Systems Lab for students to use MS Excel or Google Sheets to analyze data and create graphs.
 - Editable Cornell notes (found in the Notes folder)
 - Delete the fill-in-the-blank notes on the right side leaving only questions for a more independent note-taking experience.
 - Delete the summary and allow students to come up with their own.
 - When using diagram quizzes, use the option without the word bank and/or grade on spelling of the structures.
 - Tests:
 - Don't allow students to use prefix/suffix flashcards on the test.
 - Use the "Honors" tests that don't have word banks for the diagrams and include additional short answer questions.
- Struggling students
 - Eliminating homework altogether may work well for students that have trouble thinking independently or have home situations that don't allow for work outside of class. Make sure to account for the extra class time needed to complete all assignments in class.
 - Although I always help students during labs and answer questions as they complete lab worksheets, these students may need to have each lab answer discussed and checked the following day rather than grading the labs for accuracy.
 - Editable Cornell notes (found in the Unit Planning folder)
 - Use the fill-in-the-blank style of notes for these students so they can focus on material and less on summarizing.
 - Using the fill-in-the-blank summary, see if students can come up with the words that go in the blanks before providing the summary to them.
 - Diagram Quizzes: use the option with the word bank or use the option without the word bank but don't grade spelling.
 - Tests:
 - Allow students to use prefix/suffix flashcards on the test rather than memorizing them.
 - Use the "Regular" tests that eliminate some of the short answer questions and include word banks for the diagrams.
- For any ability
 - Both the PowerPoints and the Cornell notes have editable options so whole topics or vocabulary words can be added or deleted.

Virtual, hybrid, or
absent students
can stay right on
track!



Physiology is the study of how that organism's body functions.

| | |
|-------|---------------------------------|
| Cell: | Basic unit of all living things |
|-------|---------------------------------|

Organ:

Organ system:

Organism:

System

Function

Summary:

The anatomy of the human body describes the structures found within it. These structures are organized into different levels of complexity. The 11 systems made of cells, tissues and organs work together in an individual organism.

Can be used in Google Classroom, Microsoft OneDrive or many other platforms!

Greek and Latin Roots for Medical Terminology Practice

Anatomical Prefixes/Roots/Suffixes:

| | Term | Definition |
|--------------------------------|--------------------------|--------------------|
| Intro to A&P and General terms | a- | not, without |
| | -ation | condition, process |
| | -cyte | cell |
| | -dynia, -algia, alge(si) | pain |
| | hydro- | water |
| | -itis | inflammation of |
| | -ism | condition |
| | macro- | large |
| | meta- | beyond |
| | micro- | small, tiny |
| | -ology | the study of |
| | -osis | abnormal condition |
| | phys- | to grow |
| | -scopy | viewing of |
| | therm- | heat, temperature |

Using Prefixes/Suffixes in your Classroom:

Why study prefixes and suffixes at all?

The basis of scientific terminology comes from Latin & Greek. By teaching science students Latin & Greek prefixes, suffixes and root words, they can learn to dissect new scientific terms when they come across them in news articles or textbooks. This is a great way to train our students to be scientifically literate adults. Even if they don't remember all the facts they've memorized in this class, they can interpret scientific information from the media and from their own doctors.

How can you use them in class?

- **How I do it:**
 - **Beginning of the year:** I ask students to bring in a stack of 300 3"x5" index cards. I always have a few extra on hand for students that forget or can't afford them, although they're fairly inexpensive.
 - **Beginning of (almost) every class:** I write any prefixes and suffixes that are relevant to that day's topic on the board along with the definition. Students record the prefix/suffix on one side of an index card and the definition on the other. If there aren't any terms for that day, students can review the terms they already have written down.
 - **On test day:** I add approximately two scientific words to the end of every unit test. These are words that relate to the unit but are not ones we have discussed in class. Students must use the prefixes/suffixes we've studied to interpret the meaning of the new term. For on-level or advanced classes, I recommend not letting students use their index cards on the test, but for low-level students, it may be beneficial to allow it.

-cyte

Uses in your Classroom:

Helpful tips for using cards:

- Always have a master list of the terms you've given out or keep your own set of notecards. It may be helpful to have students write the date in the top corner of the card. This allows absent students to copy the terms they missed when they return.
- Starting class with these terms is a great way to give yourself a few more minutes to get organized. Students can always review their index cards or quiz each other if you need a few more minutes.
- Students will need some way to keep the cards organized- put them on a ring, rubber band them together, or keep them in a bag.
- Students add to these index card stacks throughout the year without removing terms. The course builds on itself, so it's always beneficial to review terms from previous units as well as the current unit. You may find that some terms are duplicated from one unit to another. No need to have students write the same term twice.
- For advanced students, you may want to have them look up the definition in a textbook rather than providing it to them.

Be sure to mention these prefixes and suffixes again as they come up in class. Using the terms in context is the best way for students to recognize and remember them.

Prep sub plans:

Students can type the terms into Quizlet or a similar site and quiz themselves.

Students can make up scientific terms (real or not) and have other students interpret the meaning of the term.

Use a blank bingo board (provided on the next page) and have students fill in the definitions for the current or past unit in any blank. The sub can call out a prefix or suffix and students mark off the definition until someone wins bingo.

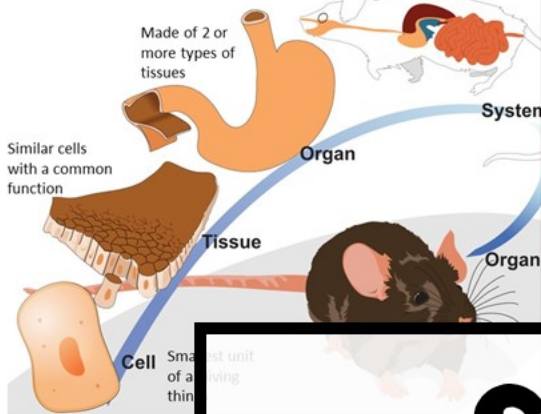
*This is another important reason to have a master list or set of cards for all the terms students have already learned.

A great way to encourage scientific literacy and prepare students for higher level science courses.

2 Highly Visual PowerPoint Presentations

51 editable, fully-animated slides

What are the levels of organization in the human body?



What is anatomical position?

- Anatomical terminology helps anatomists discuss parts of the body **easily and efficiently**.
- It starts with a standard **anatomical position**.
- Body is straight with feet slightly **apart** and thumbs



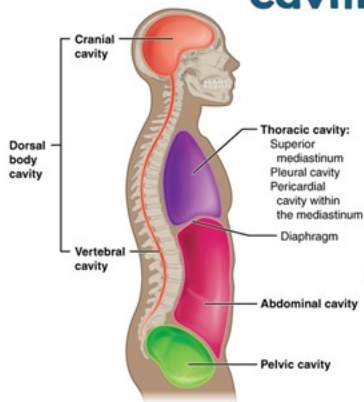
What life functions aid in survival?

- Nutrition (through digestion & absorption)
- Respiration (heart and lungs)
- Regulation of body temperature (blood, and muscles)
- Transportation (allows molecules to move through the body)
- Maintenance of atmospheric pressure
- Exchange of appropriate gas between lungs and rest of body



Sample Slides

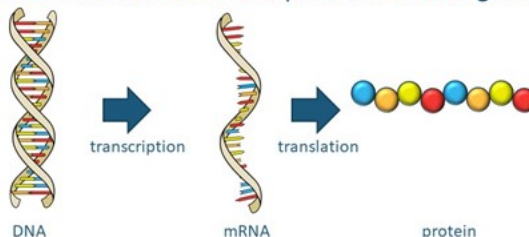
What are the major body cavities?



- The dorsal body cavity encloses the **brain and spinal cord**.
- These are protected by membranes called the **meninges**.

What are the characteristics of DNA?

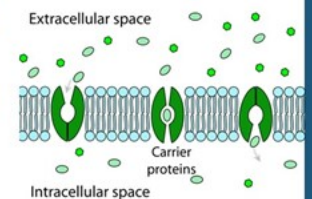
- DNA is used to code for all of the **proteins** required by the body.
- Two major processes are used to create proteins: **transcription & translation**.
- A section of DNA that codes for a protein is called a **gene**.



What is active transport?

Active transport moves molecules from **low** concentration to **high** concentration. Because this is the opposite of the natural process, it **DOES** require **energy**.

There are 2 main types of active transport that cells use: **Endocytosis** ("into cell") and **Exocytosis** ("out of cell")



Two note-taking styles are included:

Cornell Notes

Dividing Up the Body

What are the three body planes?

What are the major body cavities?

What membranes are found in the body cavities?

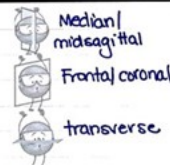
How is the abdominal cavity arranged?

Summary:

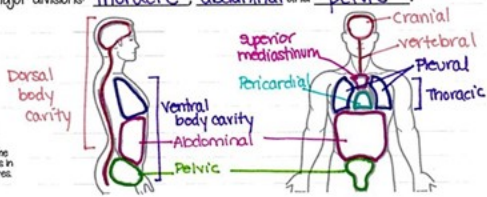
Anatomical structures can be cut or sectioned into flat surfaces called planes. Give an example of a time a body plane would be used by a doctor: sectional images (like an MRI)

The dorsal body cavity encloses the brain and spinal cord. These are protected by membranes called the meninges.

The ventral body cavities protect the visceral organs. They are divided into 3 major divisions: thoracic, abdominal and pelvic.



Identify the planes in these pictures



Identify the body cavities in these pictures

The ventral body cavities are lined with a double-layered membrane called the serosa. The inner layer is called the visceral serosa and the outer layer is called the parietal serosa. Between these two layers is fluid called serous fluid.

REGIONS: QUADRANTS:

| | | | | |
|------------------|--------------|------------------|------------------|------------------|
| R hypo-chondriac | Epi-gastric | L hypo-chondriac | R Upper Quadrant | L Upper Quadrant |
| R lumbar | umbilical | L lumbar | R lower Quadrant | L lower Quadrant |
| R iliac | Hypo-gastric | L iliac | | |

The abdominal cavity is fairly irregular externally but contains many important internal organs. For this reason, it is categorized into quadrants or regions to describe specific locations.

The body can be described in three major planes. The organs are contained within the dorsal and ventral body cavities. These are protected by double-layered membranes.

Doodle Notes

Dividing Up the Body

What are the three body planes?

What are the major body cavities?

What membranes are found in the body cavities?

How is the abdominal cavity arranged?

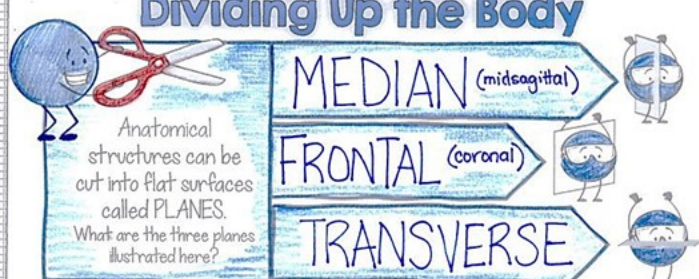
Summary:

Anatomical structures can be cut into flat surfaces called PLANES. What are the three planes illustrated here?

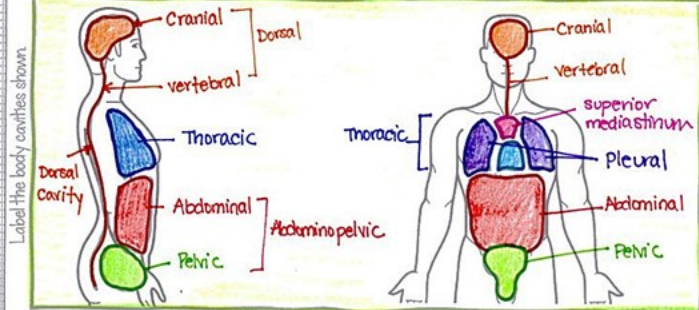
MEDIAN (midsagittal)

FRONTAL (coronal)

TRANSVERSE



Identify the planes in these pictures




Identify the body cavities shown

The ventral body cavities are lined with a double-layered membrane called the serosa.

- Inner layer = visceral serosa
- Outer layer = parietal serosa
- Between layers = serous fluid

Doodle a quick picture of the three layers.

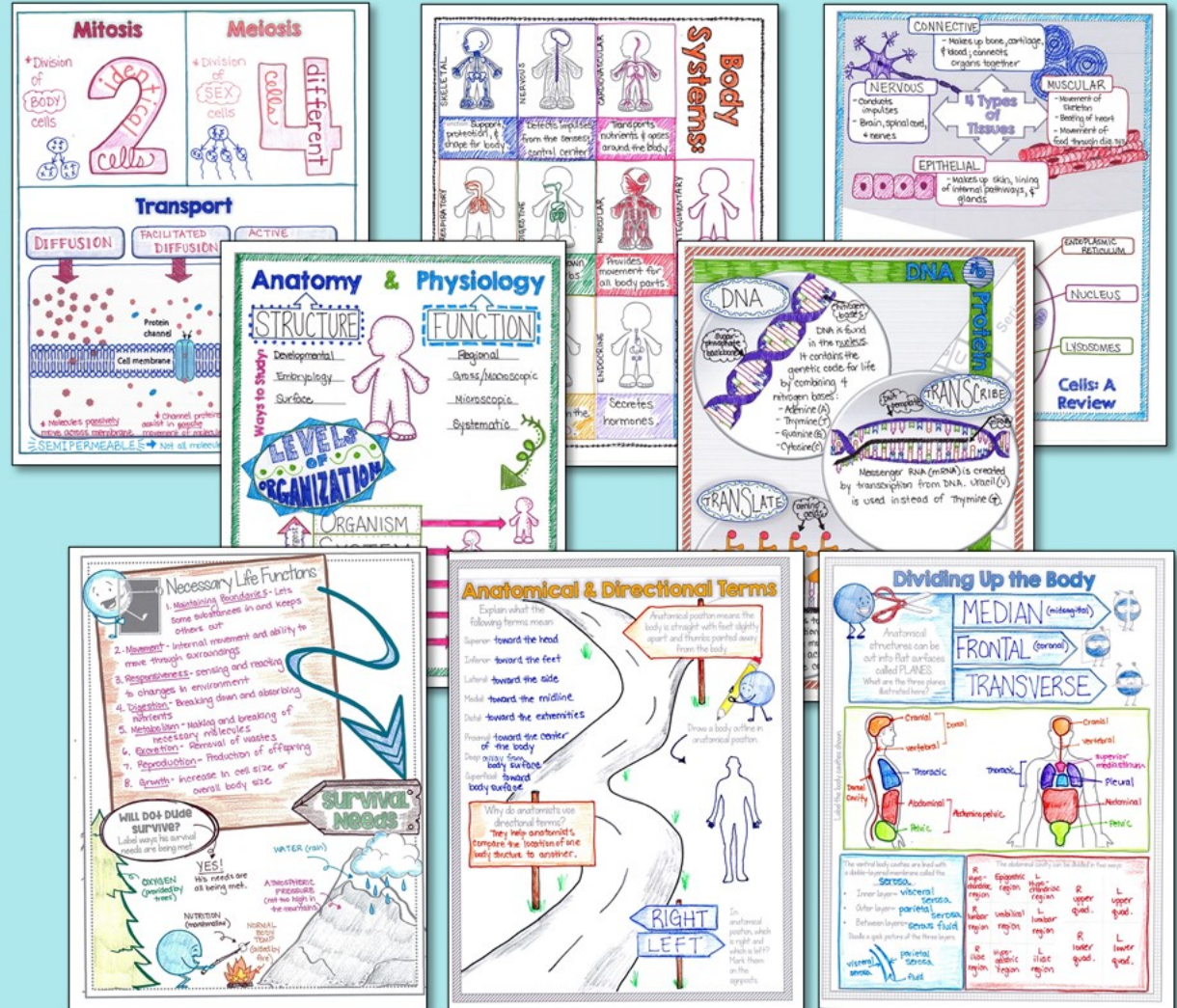
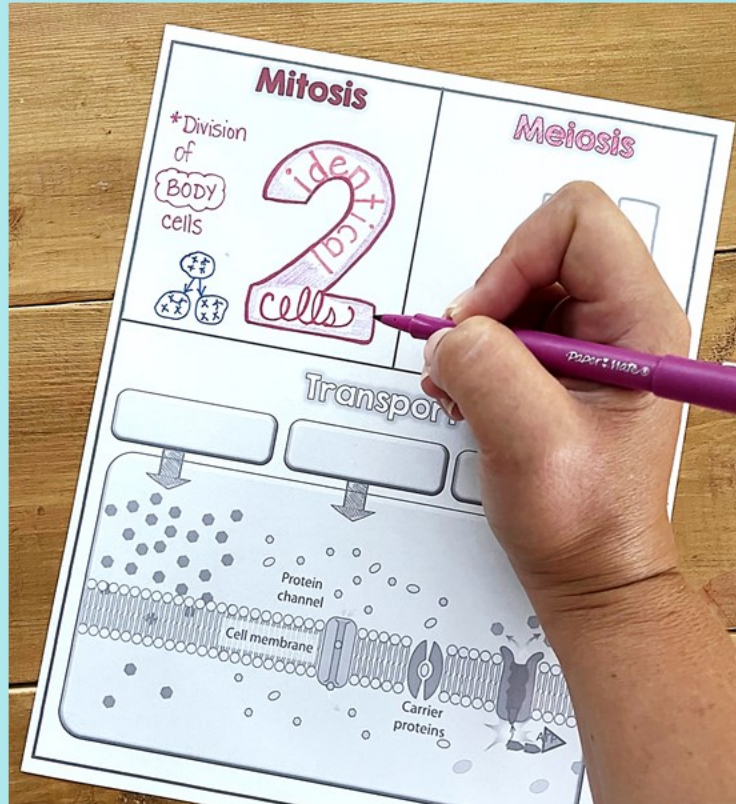


The abdominal cavity can be divided in two ways:

| | | | | |
|-------------------------|---------------------|-------------------------|---------------|---------------|
| R hypo-chondriac region | Epi-gastric region | L hypo-chondriac region | R upper quad. | L upper quad. |
| R lumbar region | umbilical region | L lumbar region | R lower quad. | L lower quad. |
| R iliac region | Hypo-gastric region | L iliac region | | |

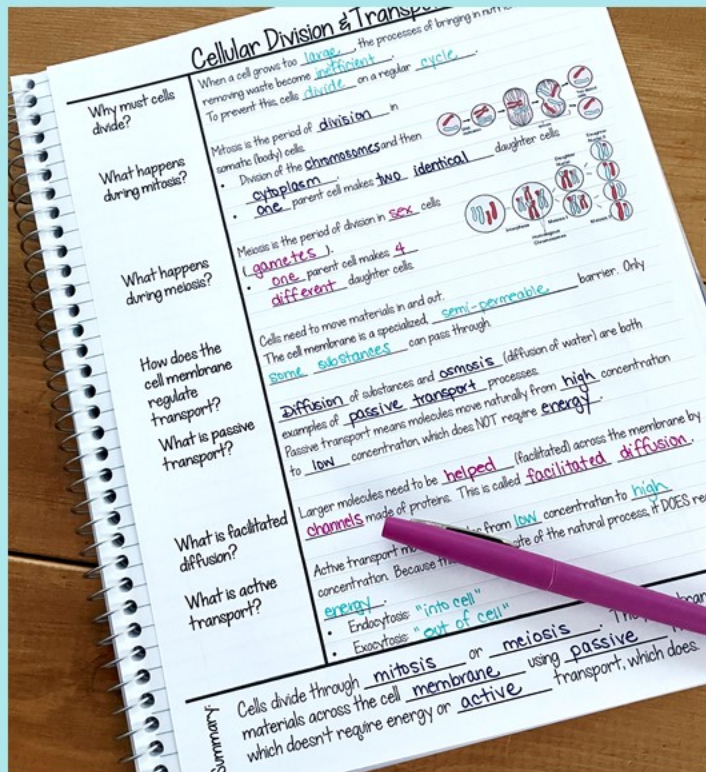
Both coincide perfectly with the presentation for **error-proof notes!**

8 pages of Doodle Notes



Doodle Notes™ increase student focus and memory-
and they're great fun!
A guide for using them in your classroom is included.

7 pages of Cornell Notes



Big
concept
questions

Content
summary for
each page

Cellular Division & Transport

Why must cells divide?
When a cell grows too large, the processes of bringing in nutrients and removing waste become inefficient.
To prevent this, cells divide on a regular cycle.

What happens during mitosis?
Mitosis is the period of division in somatic (body) cells.
• Division of the chromosomes and then cytoplasm.
• one parent cell makes two identical daughter cells

What happens during meiosis?
Meiosis is the period of division in sex cells (gametes).
• one parent cell makes 4 different daughter cells

How does the cell membrane regulate transport?
Cells need to move materials in and out.
The cell membrane is a specialized semi-permeable barrier. Only some substances can pass through.
Diffusion of substances and osmosis (diffusion of water) are both examples of passive transport processes.
Passive transport means molecules move naturally from high concentration to low concentration which does NOT require energy.

What is passive transport?
Larger molecules need to be helped (facilitated) across the membrane by channels made of proteins. This is called facilitated diffusion.

What is facilitated diffusion?
Active transport moves molecules from low concentration to high concentration. Because this is the opposite of the natural process, it DOES require energy.
• Endocytosis: "into cell"
• Exocytosis: "out of cell"

What is active transport?
Cells divide through mitosis or meiosis. They can transport materials across the cell membrane using passive transport which doesn't require energy or active transport, which does.

Each page is **editable**.
Add and delete text, questions, and summaries
to meet the needs of your students.

Includes 6 Activities

- Anatomy “Pre-test” Activity
- Autopsy Lab
- Biology Review Station Lab
- Find My Wound Game
- Homeostasis Lab
- Homeostasis Sorting Activity

Anatomy “Pre-test” Activity

Objective: Students will illustrate prior knowledge of the human body by drawing a body system and labeling several organs/structures within it.

Teacher Instructions:

1. Divide the class into groups (maximum of 9 groups). Assign each group one of the following body systems. Give each group the card from the following page that coincides with their assigned body system.
 - Skeletal
 - Muscular
 - Digestive
 - Cardiovascular
 - Respiratory
 - Urinary
 - Nervous
 - Endocrine

*Lymphatic and Integumentary systems have been left out because students will likely struggle to draw and label the structures. Reproductive system has been left out. Although the reproductive systems will be covered in detail in this course, it's probably not a great way to start your first week. ☹️ If you would like to include them, you'll need to come up with a few structures for the students to draw.

2. Each group will draw on butcher paper. I encourage students to use chalk markers. If you would like to include them, you'll need to come up with a few structures for the students to draw. Students should work only with their group members and use NO other materials/information to create this drawing. Do NOT correct students as they draw.

*NOTE: Chalk markers are my preferred way to draw the body systems because students love them and they are easy to erase. If you do not use chalk markers, have students draw on butcher paper and use a dry-erase marker.

3. After all groups are finished, have each group rotate around the room to observe drawings from other groups. They can adjust/correct drawings if needed using their group's chalk marker color.
4. When all groups are satisfied with the drawings, discuss the accuracy of each. This should give you a good sense of misconceptions and previous knowledge of human anatomy before students begin the course.

Materials:

- Chalk markers in several colors (or other drawing materials)
- Lab tables to draw on



Anterior sketch & description

Posterior sketch & description

Part 3: Incisions

1. Turn your specimen anterior side is up.

Autopsy Lab Teacher Instructions

Please Note: You know your students best. Use your own discretion if your student population is sensitive to violence or crime scenes. It is certainly possible to do the autopsy without the forensic aspects of the activity.

Objectives:

- To introduce students to the tools and methods used during a specimen dissection.
- To use anatomical terminology correctly.

Set-up:

- Students should work in groups of 2-3.
- A number of different “specimens” can be used for this lab. See options below.
- Make sure students have at least 45 minutes to complete this lab. They should be encouraged to make out as if they were dissecting a real specimen and make detailed drawings of their observations.

Materials:

- Specimens (1 per group)
- Dissection tools (1 set per group): gloves, scalpel, dissecting pins, dissecting tray or paper plate (1 per group)

Specimen Options:

- **Bananas:**
 - Pros: Easy to “wound” and have internal details students can draw. Good practice cutting through skin.
 - Cons: Can be expensive for large numbers of students.
 - **Whole pickles:**
 - Pros: Cheaper to buy in large quantities and have internal details students can draw.
 - Cons: Wounds are less clearly seen than on bananas.
 - **Gummy Bears:**
 - Pros: Cheap and easy to obtain in large quantities.
 - Cons: Small specimens and difficult to “wound”. No internal features.
- Limbs and eyes can be added to bananas or pickles to make them more anatomically correct. For eyes, simply attach googly eyes to thumbtacks and insert into specimen. These can be reused in future years.

Wound Options:

- Specimens can be bruised, cut, or otherwise damaged to create surface abnormalities.
- Bananas can be “tattooed” with stickers or stamps.
- Cocktail spears or toothpicks can be inserted to show “stab wounds”.
- Items can be inserted into the internal cavities of bananas and pickles to show “internal bleeding”. Pieces of cotton soaked in food dye work best for this. Drowning victims can have blue-dyed cotton inserted into thoracic cavity.
- Unpopped popcorn kernels can be pushed into the specimen to represent bullets.

Here's a crime scene I created for my A&P class. It has some stabbing victims, gunshot wound victims, and drowning victims. Prep can be as easy or as elaborate as you'd like.



Autopsy Lab

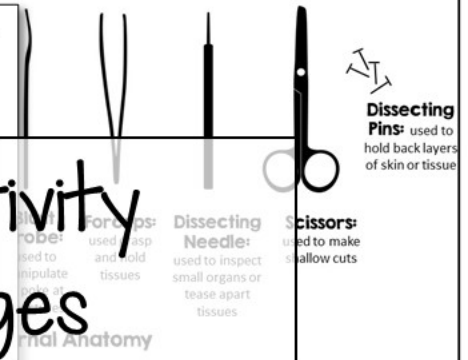
Medical Examiner(s): _____

Date of Autopsy: _____ Patient Name: _____

Cause of Death: _____

Part I: Dissection Tools

1. Locate and identify each of the following tools listed below. In future dissections, you will be expected to know these tools and how to use them correctly.



Anterior features of the body, noting any wounds, scars, tattoos, etc. On the following page, make a **detailed** sketch of both the anterior and posterior specimen. Label the following parts of the specimen: **superior, inferior, right, left** normalities, objects, etc. and their locations. (using appropriate terms)

located in the **cranial end proximal** to the face.

Great for teaching
dissection
techniques!

Station 4

| | |
|---|--------------------------|
| 1 | TACAAAAACAAGTACACATCTAGC |
| 2 | TACATAACAATTGCACGTAGACT |
| 3 | TACTAAACCACTACATAGGCGACT |
| 4 | TACAGACGTCCGTGCACCATCATC |

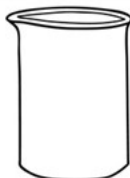
Bio Review Lab Student Worksheet

Station 1:

At this station, you will see two containers with baggies in them. Container #1 shows the original set-up. Cornstarch (a very large molecule) was mixed with water and put into the sandwich bag. On the outside of the bag water was mixed with iodine. When iodine comes in contact with starch, it turns from yellow to black. Container #2 shows the results after leaving the bag in the iodine for 1 day.

Use this information and the notes from today's class to answer the following questions:

1. Draw the set-up for each container below. Draw the bag as well as what is inside and outside the bag.



Container #1

2. Define the term "selective permeability".

3. Explain how this demonstration shows select

4. Give an example of something you could find

5. Do you think this shows that iodine is

Station 2:

Learn about the lipid bilayer from the following

Build a lipid bilayer on the lab table using the following items: cholesterol, phospholipids, ch

Get this checked by your teacher:

1. Surface proteins on the lipid bilayer can a information given on the website, list two membrane markers.

Bio Review Lab Teacher Instructions

Directions for setting up Station 1:

1. Fill each jar $\frac{3}{4}$ full with tap water and then add 1-2 tablespoons of iodine to both jars. **Keep in mind when using iodine that it will stain your skin and clothing and it is toxic if swallowed.**

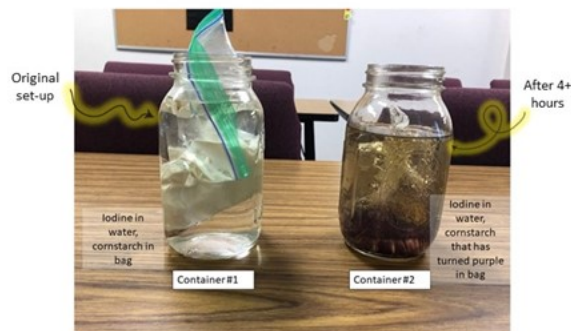
2. Next, put $\frac{1}{3}$ cup of cornstarch in each plastic baggie. Then, mix the cornstarch and water together in the baggie. Seal the baggie. You can wait until the iodine is added to the baggie to mix the cornstarch and water together.

3. Put one baggie into the jar with iodine in it and gently push it down to make sure it is submerged. The other baggie will be left OUT of the iodine solution.

4. After 4-6 hours, the baggie in the iodine solution will turn black. The baggie that was left out of the iodine solution will remain clear. This will allow students to compare.

5. Just before class, put the other baggie with cornstarch into the other jar. This will serve as the demonstration of what the bag looked like before the iodine molecules moved. This will allow students to compare.

***Don't forget to do this for every "Station 1" you're planning to have.**



Find My Wound Game

Teacher Notes:

Students will need a partner to complete this activity.

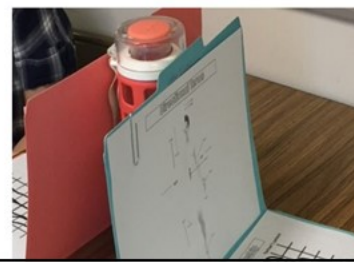
For repeated use of this activity in multiple classes, it may be helpful to laminate the pages and use dry-erase markers.

Materials for each pair:

Two file folders

Two paper clips

Pencil



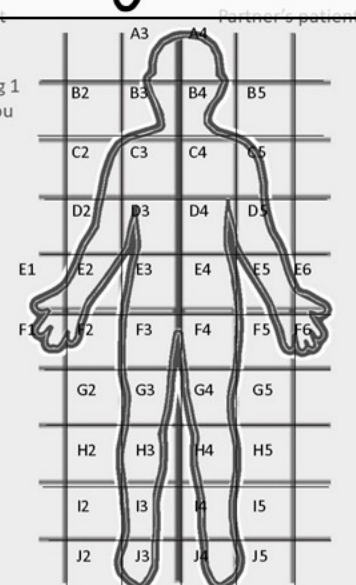
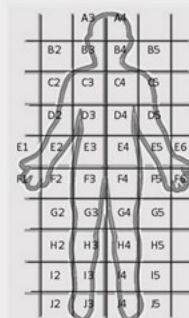
Find My Wound Game Sample Pages

Goal: Locate the wound on your partner's patient within the correct space on the body.

Procedure: You and your partner alternate asking 1 question at a time. The only directional terms you may use are located on the chart above.

Scoring: If you are the first person to guess the correct box, you win!

Your patient





Results
Table 1: Subject's heart rate and respiratory rate before and after exercise

| Subject ID | Rest | | | Exercise | | |
|------------|------------|-----------|-----|------------|-----------|-----|
| | Heart Rate | Resp Rate | PRQ | Heart Rate | Resp Rate | PRQ |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |

Homeostasis in Cardiovascular and Respiratory Systems

Homeostasis

The body's ability to constantly preserve stable internal conditions (equilibrium) is called **homeostasis**. As the external environment is ever changing, the human body regulates internal mechanisms to compensate for these changes. The concentration of different molecules in the blood is one of the delicate balances your body needs to maintain.

The Cardiovascular System

The cardiovascular system consists of the heart and blood vessels. It works in conjunction with the respiratory system to transport oxygen and carbon dioxide within the body. Oxygen is transported from the lungs and tissues via the arteries after picking up oxygen in the lungs. Because the oxygen levels in the blood are higher than those of the tissues, the oxygen diffuses from the blood into the surrounding tissues for use in cellular respiration. As cellular respiration progresses, carbon dioxide is released and diffuses from the tissues into the blood. The blood then carries the carbon dioxide to the lungs for exhalation.

Relationship to Respiratory System

Heart rate can be monitored through the pulse. The pulse is caused by blood surging from the heart into the blood vessels. You can find your pulse using the radial artery on the inside of your wrist or the carotid artery in your neck. The pulse should be taken with the index and middle finger because the thumb has its own pulse. The pulse-respiration quotient is a calculation of the relationship between the heart rate and respiratory (breathing) rate. The pulse-respiration quotient can be calculated as $PRQ = HR/RR$. It is thought that the PRQ is dependent on a few parameters: time of day, physical activity, sex, and individual physiology.

In this lab, you will compare the heart rate and respiratory rate of several individuals to determine if the PRQ changes after exercise. Pulse can be taken at either the wrist or neck and respiratory rate will be based on the number of breaths in the given time period.

Hypotheses:

- Heart rate will _____ after exercise.
- Respiratory rate will _____ after exercise.
- The pulse-respiration quotient will _____ after exercise.

Homeostasis Lab Sample Pages

Oxygen levels drop

Chemoreceptors detect imbalance

Liver and kidneys respond

More red blood cells are created

Oxygen levels rise to normal

Blood glucose levels rise

Ch

Homeostasis Sorting Activity Teacher Page

Objectives:

- To understand the role of stimuli, receptors, control centers, responses, and effectors in the homeostatic process.
- To become familiar with a few examples of homeostasis

Set-up:

- Cut out the strips below and on the sorting page. For each example, strips can be kept in sets of 5.
- Scissors
- Chalk markers
- Students will place the strips in the correct order to show the process of homeostasis at work.
- Students will identify the part of the homeostasis process that it illustrates. The steps are: stimulus, receptor, control center, effector, response

Homeostasis Sorting Activity Sample Pages

Test strips detect imbalance

Pool person responds

Chlorine is added

Chlorine levels rise to normal

Extension Pages

Digging Deeper: Cell Differentiation

Cells in the human body are known to show complementarity. In fact, the **principle of complementarity** is such an important concept in the study of anatomy that it can be used when studying every system of the body. The principle of complementarity states that the function of a cell is dependent on the structure of that cell. Essentially, anatomists can determine the function of a cell by simply observing its structure. Likewise, the structure of a cell can be predicted based on its function. This principle holds true for organs, as well.

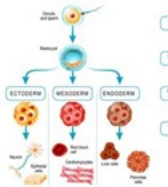
structure ↔ **function**



To protect the underlying layers and provide support

An example of complementarity is given above. Bones are known to be strong and rigid. Naturally, you might expect that they can protect organs in underlying layers (like the heart lying beneath the ribcage) and to provide support for the softer systems of the body. As you move through this course, you will learn about the microscopic anatomy within the body systems and organs. The structure of these tissues and cells will give you clues to the function they provide within the body.

Cell potency



Human cells do not begin with the unique structures you will see during this course. When a sperm fertilizes an egg, the single cell that forms has the potential to form all the cells in an entire organism. This cell is known as **totipotent** ("whole potent"). In the first few days after fertilization, the single cell has divided to form a ball of cells known as a **blastocyst**. These cells are **pluripotent**, meaning they can differentiate into many types of specialized cells but they cannot form a whole organism. As the cells of the

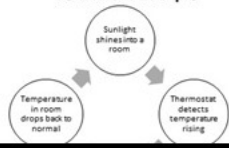
Digging Deeper: Feedback Loops

Homeostasis

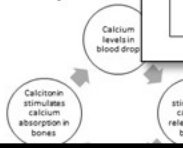
Biological systems operate through continual inputs and outputs, each part of a large to maintain homeostasis. **Homeostasis** is the body's ability to constantly preserve stable conditions (equilibrium). As the external environment is ever changing, the human body internal mechanisms to compensate for these changes. These mechanisms maintain body nutrient levels, waste levels, gas exchange, pressure, and many more conditions that are human life.

Negative feedback loops help the body maintain homeostasis by *reducing* changes in it back into balance. Most systems of feedback within the body are negative feedback loops. **Positive feedback loops** continue to drive the body further away from its typical state. Infrequent events that lead to a necessary result. Childbirth is a common example of a mechanism.

Real World Example:



Example in human



Negative Feedback:

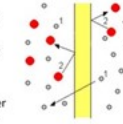
Positive Feedback:

Discussion Questions:

1. Explain the processes of negative feedback and positive feedback in terms a 5th grader could understand.
2. Which are more common in the human body- positive or negative feedback loops?

Review: Cellular Tonicity

Osmosis is the diffusion of water through a membrane. Some membranes are selectively permeable, meaning that they will only allow some molecules to pass through, usually small molecules. Because H_2O is a small molecule, water can pass through a membrane and get trapped on one side because the other particles are unable to get across to equalize the concentration.



It looks like this: Because the concentration of solute (red) is higher on the left side, the water (grey) will move to the left side as well to create the same solute to solvent concentration on both sides.

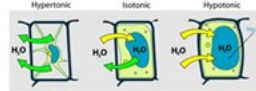
Consequently, the left side of the membrane will fill with water until it does not look balanced with the other side. In fact, it is precisely because the water molecules are trying to balance that they fill up one side.

When solutions are originally balanced on both sides of a membrane, scientists say that the cell is in an **isotonic** solution. In an isotonic solution, water will flow equally in and out of the cell because the concentrations of solutes are already balanced. This is called **dynamic equilibrium**, because although it is equal, the water is still moving in and out.

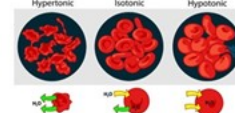
When a cell is in a solution that has a higher concentration of solute than the cell does (called a **hypertonic solution**), the water inside the cell will rush out to equalize the concentrations. This is called **plasmolysis** and the cell will eventually dry out and die if the situation continues.

When a cell is in a solution that has a lower concentration of solute than the cell does (called a **hypotonic solution**), the water will rush into the cell to equalize the concentrations. In animal cells, this can cause the cell to burst from the influx of too much water. In plant cells, however, it is called turgor pressure, because the plant cell vacuoles will contain the water and push out on the cell walls. This allows a well-watered plant to stand upright from stacks of rigid cell walls lining up together.

Osmosis in Plant Cells



Osmosis in Animal Cells



Discussion Questions:

1. When osmosis occurs in a cell, what happens?

Data Analysis: Cell Cycle

Mitosis

A regular cycle of cell division allows cells to maintain a small size. This is essential for the quick removal of wastes from the cell and the efficient absorption of nutrients (oxygen, glucose, etc.) into the cell. However, it is equally critical that the cell continues to have the full set of genetic information and the organelles required for daily activities. To this end, the cell duplicates its genetic material during interphase, then neatly divides it between the two daughter cells during **mitosis**. The result is two identical daughter cells with the same genetic information as the parent cell.

Meiosis

Meiosis is the cell division process that occurs in **gametes** (sex cells). It begins similarly to mitosis, but the cells eventually divide twice, resulting in four daughter cells each with half the amount of genetic information as the original parent cell.

Cancer

During a normal cell cycle, hundreds of genes control the process of cell division. Normal cell growth requires a balance between the genes that stimulate cell division and those that inhibit it. When many of the genes that control the cell cycle, cell division can continue uncontrollably. These uncontrolled cells are considered to be cancerous and the masses of cells that result from their uncontrolled growth are called tumors.

When a mutation occurs in one of the genes that control the cell cycle, the cell can divide many times, passing on the mutated gene. When these mutated cells divide, they pass on the mutated gene to their daughter cells. When these mutated cells divide, they pass on the mutated gene to their daughter cells. When these mutated cells divide, they pass on the mutated gene to their daughter cells.

Which mutation is causing the abnormal cell growth? When these mutated cells divide, they pass on the mutated gene to their daughter cells. When these mutated cells divide, they pass on the mutated gene to their daughter cells. When these mutated cells divide, they pass on the mutated gene to their daughter cells.

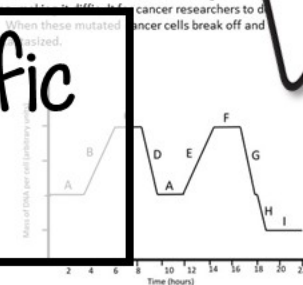
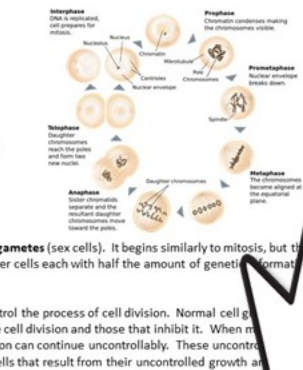
This graph shows the cell division of one cell. The number of cells is represented in the y-axis.

- a. A cancerous cell
- b. A normal cell
- c. A stem cell
- d. A stomach cell

3. Explain why you chose your answer to the previous question.

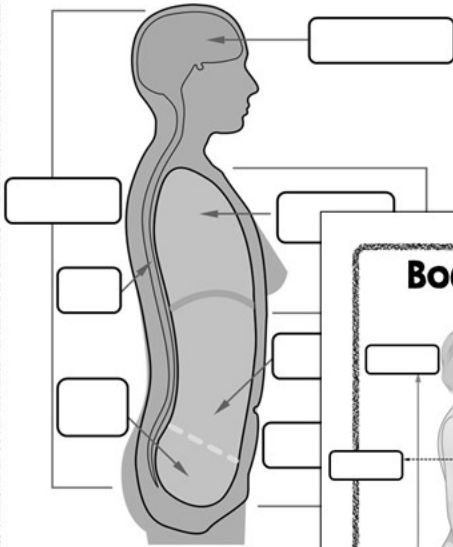
Skills check!
Interpretation of graphs
(great for standardized test prep)

Greater depth of knowledge, scientific literacy, & critical thinking



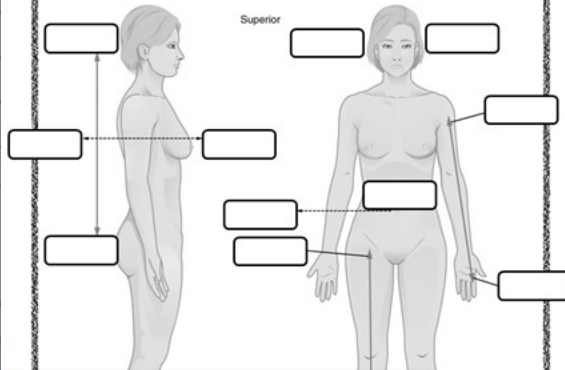
Anatomical Diagrams

Body Cavities- Lateral View



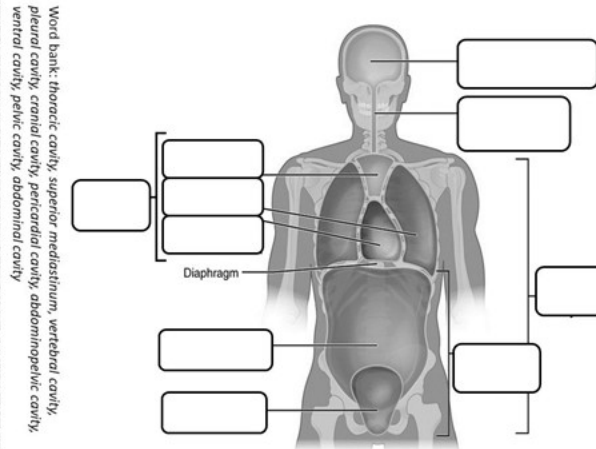
Word bank: pelvic cavity, abdominal cavity, thoracic cavity, cranial cavity, spinal, abdominopelvic cavity

Body Directional Terms



e), lateral,
medial, right

Body Cavities- Frontal View

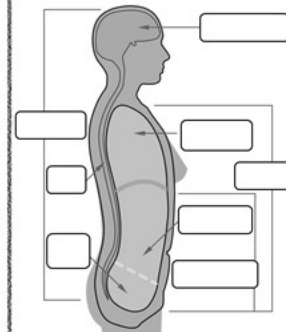


Word bank: thoracic cavity, superior mediastinum, vertebral cavity, pleural cavity, cranial cavity, pericardial cavity, abdominopelvic cavity, ventral cavity, pelvic cavity, abdominal cavity

Each diagram comes in 4 versions:

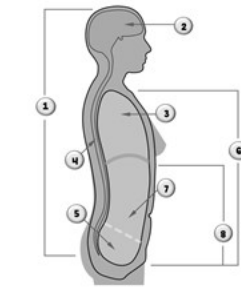
1. Fill-in the blank
2. Numbered quiz
3. Labeled black & white
4. Labeled color

Body Cavities- Lateral View



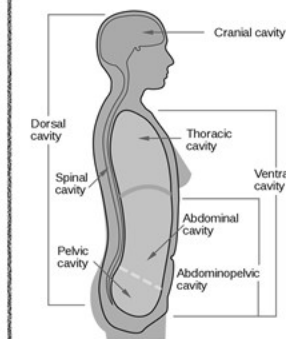
Word bank: pelvic cavity, abdominal cavity, dorsal cavity, ventral cavity, thoracic cavity, cranial cavity, spinal cavity, abdominopelvic cavity

Body Cavities- Lateral View

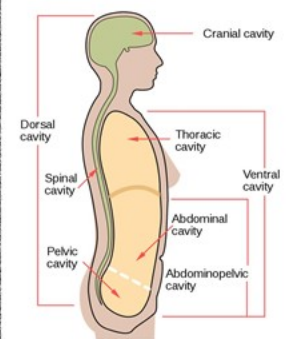


1. _____ 5. _____
2. _____ 6. _____
3. _____ 7. _____
4. _____ 8. _____

Body Cavities- Lateral View



Body Cavities- Lateral View



24 Editable Task Cards for Review

1

Give a human body example of anatomy and one of physiology.

2

Fill in the levels of organization:

- Cell
- _____
- Organ
- _____
- Organism

3

What are the 2 major sections of the dorsal cavity?

4

Name a body part that is distal to the vertebral cavity?

Sample Task Cards

17

What are the 4 types of tissues found in the human body?

18

What organelle is responsible for storing food and water?

19

What is the principle of complementarity?

20

How are totipotent stem cells different from unipotent stem cells?

Using Editable Task Cards

How to set-up:

1. Print the cards on cardstock or paper.
2. Cut the pages so that each card is separate. If you'd like to use them in future years, it may be worth laminating them to protect them from student writing and other damage.
3. Place each task card at a seat around the room.
4. Students will rotate to each seat until all cards are finished. Answers are recorded on their "Task Card Answer Sheet" or notebook paper.

*TIP: It is important to set a timer. Usually 1-2 minutes is appropriate. Without a timer, students will get backed up while rotating and chaos will ensue. ☺

Teacher Tips

Modifications:

- These task cards are editable so you can change the text on any card.
- There are additional cards at the end of the document for adding questions. Be sure to add the correct number, as well!
- Each card has an icon in the bottom right corner.



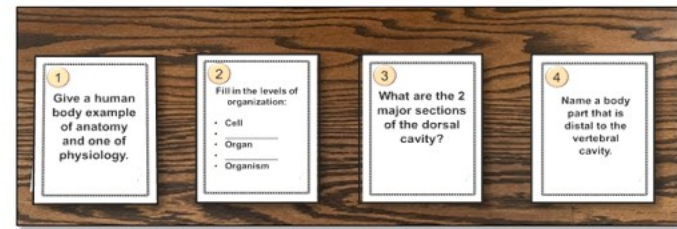
Questions about anatomical language



Questions about cellular processes

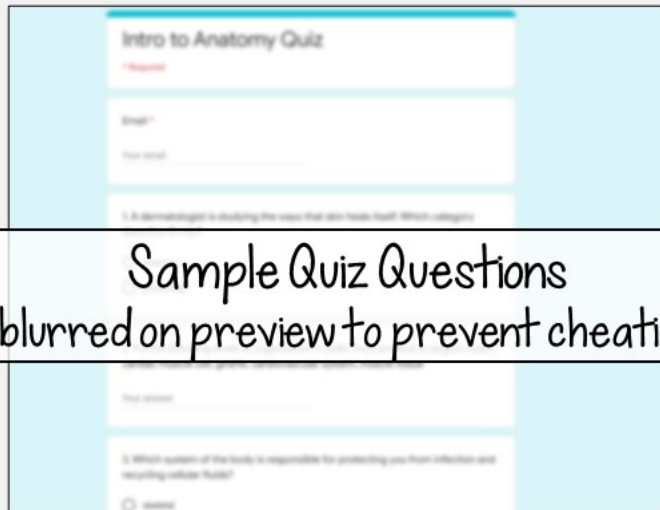
If you'd prefer to divide the unit, you can use the anatomical language task cards only, then use the cellular processes questions later.

- If moving around your room isn't possible, you can have students pass the cards in one direction.
- Other options:
 - Students can use notes or not depending on the level of memorization you expect prior to reviewing.
 - Students can work in pairs, which adds confidence.



Assessments

Editable Online Quiz through Google Forms

A screenshot of a Google Form titled "Intro to Anatomy Quiz". The form has a light blue header and footer. The main content area is white. It contains several questions, some with multiple choice options and some with text input fields. The questions are partially obscured by a text box.

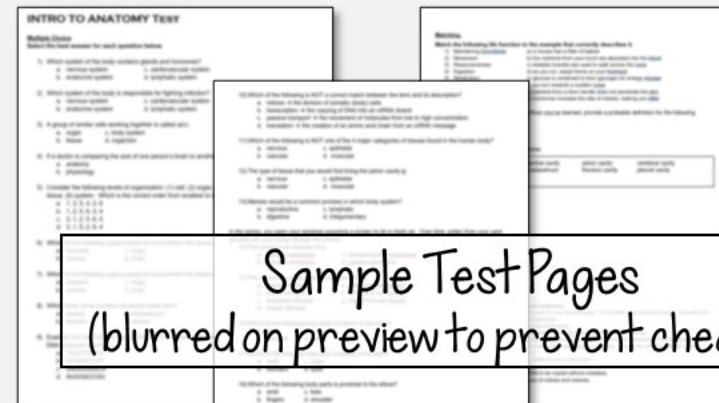
Sample Quiz Questions
(blurred on preview to prevent cheating)

- 9 multi-part questions
- Fully editable
- Answer key included for automatic grading

Editable Unit Test

- 20 multiple choice questions
- 8 matching questions
- 2 Greek/Latin term questions
- 1 labeled diagram
- 8 free response questions

Two Versions: Honors & Regular

A collage of sample test pages for the "Intro to Anatomy Test". The pages are white with black text. They contain multiple choice questions, matching questions, and a labeled diagram. The questions are partially obscured by a text box.

Sample Test Pages
(blurred on preview to prevent cheating)

A student answer sheet for the "Intro to Anatomy Test". It is a white page with black text. It contains a header with the title "INTRO TO ANATOMY TEST" and a line for the student's name. Below the header, there are sections for "Multiple Choice", "Matching", and "Free Response" questions. Each section has a list of questions with corresponding answer lines.

Student answer
sheet & answer keys
included
(both fully editable)

I'd love to hear from you!

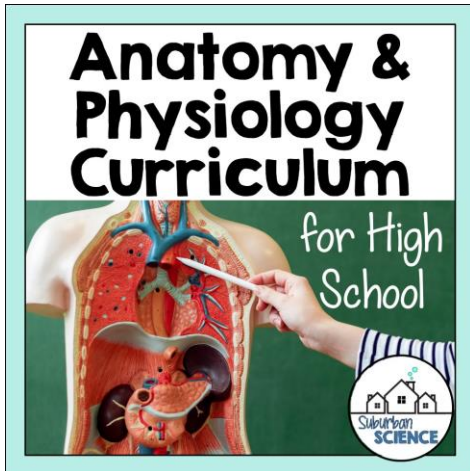
Like this resource?

You can **leave feedback** on your "My Purchases" section of TpT. Feedback also allows you to **earn credits** towards future purchases.

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Sincerely,
Anne from Suburban Science

