

What's Included?

Note: Please make sure this unit is age-appropriate for your students. The PPT and notes include illustrations of male and female anatomy, but the STD presentation includes real photos.

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

- PowerPoint: Male & Female Reproductive Systems, Hormones & Menstrual Cycle, Fertilization, Development & Birth (43 slides)
- Cornell Notes Pages
 - Fill-in-the-blank (8 pgs)
 - Editable versions of all Cornell notes
- Doodle Notes Pages (6 pgs)
 - Guide to Using Doodle Notes
 - Doodle Note Keys & Examples

Activities

- STD Gallery Walk with Student Worksheet (12 slides + 2 student pages)
- Pyramid Vocabulary Review (4 pages)
- Answer keys for all activities

Extensions

- Digging Deeper: Comparison of Oogenesis & Spermatogenesis (1 page)
- Data Analysis: Uterine Cycle* (5 pages)
- Digging Deeper: Infertility Research (2 pages)
- Answer Keys for all Extensions

*Honors Option

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.

Review and Assessment

- Editable Task Card Review (24 cards) with answer sheet
- 4 diagrams with answer keys and numbered quizzes (Male anatomy, Female anatomy, sperm, follicular development)
- Reproductive Systems Quiz through Google Forms
- Reproductive Systems 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!

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

<ul style="list-style-type: none"> ➤ Reproductive Systems PPT (43 slides) 	<ul style="list-style-type: none"> ➤ Cornell Notes (8 pgs) ➤ Editable Cornell Notes ➤ Answer Keys for Cornell Notes 	<ul style="list-style-type: none"> ➤ Doodle Notes (6 pgs) ➤ Guide to Using Doodle Notes ➤ Doodle Note Keys & Student Examples
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Activities <ul style="list-style-type: none"> ➤ STD Gallery Walk with Student Worksheet (12 slides + 2 student pages) ➤ Pyramid Review Activity (4 pages) ➤ Answer Keys for all activities 	Extensions <ul style="list-style-type: none"> ➤ Digging Deeper: Comparison of Oogenesis & Spermatogenesis (1 page) ➤ Data Analysis: Uterine Cycle* (5 pages) ➤ Digging Deeper: Infertility Research (2 pages) ➤ Answer keys for all extensions *Honors Option
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Review and Assessment

- Editable Task Card Review (24 cards) with answer sheet
- 4 diagrams- Male Reproductive System, Female Reproductive System, Follicular Development, Sperm
- [Male & Female Reproductive Systems Quiz through Google Forms](#) (Make a copy of this file to your Drive. Do NOT assign to students using this link.)
- Reproductive System Test (paper)- both Honors and Regular versions with answer sheets

Student Pages

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

Supplementary Resources

- Lead your class through a "pregnancy" over 40 weeks of school. Have students record what is happening to the mother and baby each week. On the 40th week, have a baby shower!
- Have students research the benefits and potential risks of different types of births: vaginal, C-section, VBAC, water birth, etc. Depending on the maturity of your students, you may want to let them watch videos of the different types.
- Discuss different contraceptive techniques, if addressed in your state standards.
- [Case Study on Endometriosis](#)

Materials Needed

- General classroom use: colored pencils, scissors, markers, and crayons, index cards for prefixes and suffixes

Standards:

Topic:	State:	Standards:
Diseases & Disorders	OH	AP.1.1 Homeostatic imbalances are explored. These include, but are not limited to, infertility, chromosomal disorders, endometriosis, cancer, HPV, and sexually transmitted diseases.
	CO	Standard XIV, Objective 7 Describe the diseases and disorders of the male and female reproductive systems.
	IN	None
	UT	Strand 15, Standard 14 Identify the following diseases and disorders of the reproductive system: reproductive endometriosis, impotence, polycystic ovarian syndrome, STIs.
	FL	None

Standards:

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-LS1-2: 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.

Topic:	State:	Standards:
Male and Female Anatomy	OH	AP.1.1 The reproductive system is comprised of internal and external organs and hormones. The ovaries and testes produce gametes that fuse to form a zygote, a single cell that develops into an embryo and eventually an infant. A comparison of male and female anatomy should be explored. The female body has the function of providing protection and nourishment for the developing fetus until birth. If all is successful, a new generation of offspring will occur.
	CO	Standard XIV, Objectives 1-3 -Examine the general functions of the reproductive system. -Describe the anatomy and physiology of the male genitalia. -Describe the anatomy and physiology of the female reproductive structures.
	IN	AP.15.1 Identify and locate major and accessory organs of the female and male reproductive systems and discuss their functions.
	UT	Strand 15, Standards 1.1-1.8 -Identify the general functions of the reproductive system. -Describe the anatomy of the male genitalia. -Identify the functions of the testes. -Describe the anatomy of the female reproductive structures. -Identify the functions of the ovaries. -Identify the structures and functions of the uterine tubes, including fallopian and fundus/bulb. -Describe the structures and function of the uterus.
	FL	SC.912.L.14.33 Describe the basic anatomy and physiology of the reproductive system.

*Note: NGSS is a registered trademark of Achieve. Neither Achieve nor the lead states and partners that developed the Next Generation Science Standards were involved in the production of this product, and do not endorse it.

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Standards:

Topic:	State:	Standards:
Gametogenesis	OH	AP.1.3 The processes of the reproductive system include oogenesis, spermatogenesis and fertilization. Additional processes can include sexation and menarche.
	CO	Standard XIV, Objective 5 Compare and contrast the processes of spermatogenesis and oogenesis.
	IN	None
	UT	Strand 15, Standard 11 Contrast the general outcomes of spermatogenesis and oogenesis.
Hormones	FL	SC.912.L.14.33 Describe the basic anatomy and physiology of the reproductive system.
	OH	AP.1.1 The reproductive system is comprised of internal and external organs and hormones.
	CO	Standard XIV, Objectives 2-4 -Describe the anatomy and physiology of the male genitalia. -Describe the anatomy and physiology of the female reproductive structures. -Examine the menstrual cycle.
	IN	AP.15.2 & AP.15.3 -Discuss the role of hormones in the reproductive system. -Create a model showing how fluctuating hormonal changes associated with the reproductive system impact both the uterine and ovarian cycles.
Fertilization & Development	UT	Strand 15, Standards 4, 9, 10 -Examine the functions of testosterone in the male. -Define the menstrual cycle including the ovarian and uterine cycles and changes that occur during menopause. -Describe the physiological effects of estrogens, progesterone and relaxin.
	FL	SC.912.L.14.33 Describe the basic anatomy and physiology of the reproductive system.
	OH	AP.1.1 The female body has the function of providing protection and nourishment for the developing fetus until birth. If all is successful, a new generation of offspring will occur.
	CO	Standard XIV, Objective 6 Identify the stages of fetal development and birth.
Fertilization & Development	IN	AP.15.4 & AP.15.5 -Describe how spermatozoa move through the female reproductive tract and describe the process of fertilization. -Investigate and develop a model of early development which traces the changes of a fertilized cell (zygote) through the blastocyst level of development and the then gastrulation process resulting in the rise of the three primary germ layers.
	UT	Strand 15, Standards 12-13 -Define the following sequence of events that occur during human development: fertilization, zygote, implantation, embryo, fetus. -Identify the principle events associated with the three stages of labor.
	FL	SC.912.L.14.33 Describe the basic anatomy and physiology of the reproductive system.

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Unit Overview Page
 plus
Supplementary Resource Ideas
 and **Materials Lists**

Editable Pacing Guides

	Day	Intro	Instruct	Assess	Homework
Fertilization & Development	7	-Review prefix/suffix flashcards -Discuss quiz answers	<ul style="list-style-type: none"> Reproductive System PPT- Section 8 Cornell Notes (Fetal Development & Delivery) Digging Deeper: Infertility 	<ul style="list-style-type: none"> Cornell Notes summaries Informal discussion and questions 	
Review	8	Review prefix/suffix flashcards	<ul style="list-style-type: none"> Task Card Review 	<ul style="list-style-type: none"> Observe student progress during task cards Informal questioning, if necessary 	Study for test
	9	Study for test and/or check over task card answers	<ul style="list-style-type: none"> Pyramid Review Activity (print cards & blank template for each pair or group of students) 	<ul style="list-style-type: none"> Assess student understanding based on task card answers Informal questioning Informal check of pyramid review activity 	Study for test
Assess	10	Review notes for test	Reproductive Systems Test	<ul style="list-style-type: none"> Formal assessment 	

Reproductive System Unit Pacing Guide

50 min classes

	Day	Intro	Instruct	Assess	Homework
Male & Female Anatomy	1	Students add to prefix/suffix flashcards: <ul style="list-style-type: none"> -didym, ejac-, epi- 	<ul style="list-style-type: none"> Reproductive System PPT- Section 1 & Section 2 Cornell Notes (Male Repro Sys- Internal & Male Repro Sys- External) 	<ul style="list-style-type: none"> Cornell Notes summaries Informal discussion and questions 	
	2	Prefix/suffix flashcards: <ul style="list-style-type: none"> endo-, myo-, peri- 	<ul style="list-style-type: none"> Reproductive System PPT- Section 3 & Section 4 Cornell Notes (Female Repro Sys- Internal & Female Repro Sys- External) 	<ul style="list-style-type: none"> Cornell Notes summaries Informal discussion and questions 	
Hormones	3	Prefix/suffix flashcards: <ul style="list-style-type: none"> oo-, salpingo- 	<ul style="list-style-type: none"> Digging Deeper: Comparison of Oogenesis & Spermatogenesis STD Gallery Walk (Print STD PPT slides and place around room. Have students take notes using chart provided) 	<ul style="list-style-type: none"> Check Digging Deeper answers for informal check of student understanding Informal progress checks and class discussion after gallery walk 	<u>All:</u> Student reflection on STD gallery walk (last question on page)
	4	Discuss STD Gallery Walk (take-aways, questions)	<ul style="list-style-type: none"> Honors: Data Analysis: Uterine Cycle *This is an inquiry type activity. The content will be reviewed the next day during notes. Regular students can do the data analysis activity or simply skip to notes. 	<ul style="list-style-type: none"> Informal discussion during student worktime Optional: review answers or grade work 	<u>All:</u> Diagrams of Male & Female Reproductive Systems (*Honors: Diagrams of sperm and follicular development)
Fertilization & Development	5	Prefix/suffix flashcards: <ul style="list-style-type: none"> hyster, men- 	<ul style="list-style-type: none"> Reproductive System PPT- Section 5 & Section 6 Cornell Notes (Reproductive Hormones & Uterine/Menstrual Cycle) 	<ul style="list-style-type: none"> Cornell Notes summaries Informal discussion and questions 	
	6	Study for quiz	<ul style="list-style-type: none"> Reproductive Systems Online Quiz Reproductive System PPT- Section 7 Cornell Notes (Fertilization & Implantation) 	<ul style="list-style-type: none"> Formal quiz assessment Cornell Notes summaries Informal discussion and questions 	

Using this Pacing Guide as is? You can print all the student pages in order from the "St

The daily topic coincide with the previous standards document.

Lesson planning is now quick and easy!

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™
 - 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
 - Block schedules or classes with longer periods can double up on the 50-minute days laid out in the Pacing Guide (in the Unit Planning folder).
 - Behind schedule? Some items can be skipped, but please check your state standards before doing so.
 - Topics can be eliminated from the editable PPTs or Cornell Notes.
 - Online quizzes can be skipped and students only provided with a text at the end of the unit.

All found on the following page.

Cornell Notes

OR

Doodle Notes

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 the depth of knowledge for honors students. These can certainly be used for all students and can also be helpful for extra credit, homework, or sub days if you need them. Because answers to these assignments are often less straightforward, I recommend grading for completion and then discussing the answers to make sure they are correct.

Assignment	Type of work	Skills addressed
Data Analysis: Uterine Hormones	Math extension	Making and interpreting graphs, critical thinking skills
Diagrams of Sperm & Follicular Development	Greater depth of knowledge	Additional terminology

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

For additional skill-work in pathology or for students thinking of going into the medical field, I also use my Anatomy case studies. There is one for each body system. They require critical thinking, research, and allow students to integrate topics from one 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.
 - 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 doing the Pyramid Review Activity, have students use Version 1 with extra terms on the outside.
 - 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.
 - Include some histology slides of the testes or ovaries from Histology Guide.
- **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.
 - When doing the Pyramid Review Activity, have students use Version 2 with the outside terms removed.
 - 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.

Every student page also comes in a **digital** version on Google Slides

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

Reproductive Hormones

The male reproductive system is dependent on 3 hormones:

	Testosterone	Luteinizing Hormone (LH)	Follicle-stimulating Hormone (FSH)
Produced in:	Interstitial cells of the testes	anterior pituitary	anterior pituitary
Function:	Maturation of reproductive organs -2 nd ary sex char.	stimulates release of testosterone	stimulates sperm production

Secondary sex characteristics in males include:
 Increased muscle mass & strength, increased bone mass, facial & pubic hair growth, deepening of voice, increased sex drive

How do hormones affect the female reproductive system?
 Luteinizing hormone (LH) and follicle-stimulating hormone (FSH) are also produced in females when stimulated by the anterior pituitary gland. Additionally, estrogens are secreted by the ovaries, causing female secondary sex characteristics.
Progesterone is produced by the corpus luteum after ovulation. It helps to maintain the menstrual cycle.

Female secondary sex characteristics include:
 Breast development, pubic hair growth, increased fat deposits on hips & breasts, widening of hips, onset of menstrual cycle

Both sexes have mammary glands, but estrogens cause female mammary glands to increase in size during puberty.
 Within the center of each breast is a darker areola with alveolar glands and fat surrounding a nipple.
 Beneath the skin, 5-25 lobes of alveolar glands are connected by connective tissue and fat.
 When lactating, the alveolar glands produce milk, and pass it via the lactiferous ducts through the nipple.

Summary
 Luteinizing hormone and follicle-stimulating hormone are produced by the anterior pituitary and affect both males and females. Testosterone (produced in the testes) and estrogens (produced in the ovaries) cause secondary sex characteristics like muscle and bone growth and breast maturation.



Reproductive Hormones

The male reproductive system is dependent on 3 hormones:

	Testosterone	Luteinizing Hormone (LH)	Follicle-stimulating Hormone (FSH)
Produced in:	Interstitial cells of the testes	Anterior pituitary	Anterior pituitary
Function:	Maturation of reproductive organs	Stimulates release of testosterone	

Secondary sex characteristics in males include:

Luteinizing hormone (LH) and follicle-stimulating hormone (FSH) are also produced in females when stimulated by the _____ gland. Additionally, _____ are secreted by the ovaries, causing female secondary

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
Reproductive System	-didym	testes
	ejac-	to shoot forth
	endo-	inner, within
	epi-	beside
	hyster-	uterus
	men-	month
	myo-	muscle
	oo-	egg
	peri-	surrounding
	salpingo-	uterine tube

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.



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.

Highly Visual PowerPoint Presentation

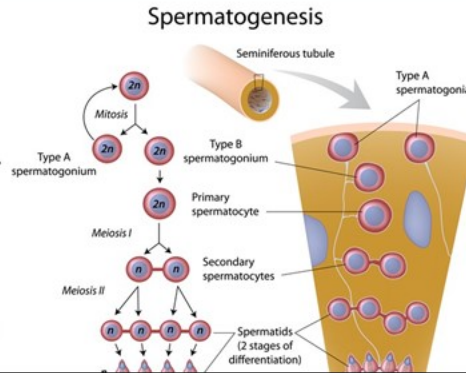
43 editable, fully-animated slides

How do sperm travel through the male reproductive system?

- Sperm are formed in the **testes**. Each testis has many tightly coiled **seminiferous tubules** where sperm are produced.
- After production, sperm are transported into the **rete testis** and then to the **epididymis**.

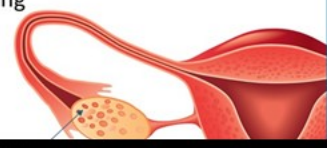


As the sperm develop, they migrate closer to the **lumen** of the **seminiferous tubule**, where they will



How do eggs travel through the female reproductive system?

The reproductive organs of the female reproductive system are the **ovary**, **uterus**, and **vagina**. The **ovary** releases egg cells (**ova**) to be fertilized by sperm. The **uterus** contains about 400,000 **follicles** of cells surrounding the **ovary**. Only one of these follicles will be released as an egg. The **ovulation** of a mature egg is



Sample Slides

The **corpus luteum** secretes **progesterone**, which causes the uterine lining to further **thicken**. **Glands** within the endometrium secrete **nutrients** to sustain an embryo. If the egg is unfertilized, estrogen and progesterone levels **decrease**, causing the uterine lining to stop thickening.

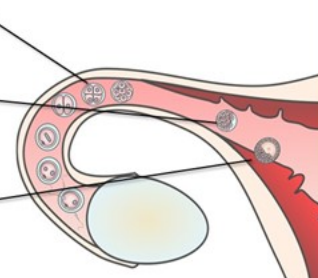


Endometrium is shed through the vagina (called a period).

Day 14- **Ovulation**
LH and FSH levels peak to be released from the **uterine tube**.

What are the stages of embryonic development?

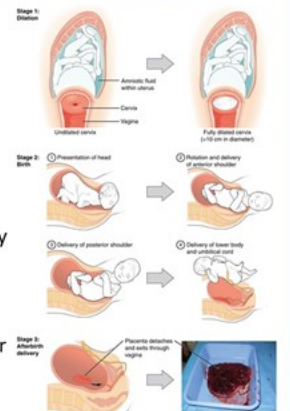
- Two major stages in development occur:
 - Embryonic development: Fertilization – week 8
 - Fetal development: Week 9 – birth
- As the **embryo** moves down the **uterine tube**, it already begins to divide (known as cleavage).
- The embryo is made of 16 cells by the time it reaches the **uterus**. It is now known as a **morula**.
- The morula divides further and at 100 cells, it is known as a **blastocyst**. The blastocyst implants itself into the uterine wall **6-7 days** after fertilization.



What are the stages of labor?

After 40 weeks, **oxytocin** and **prostaglandins** cause powerful contractions of the uterus through a **positive feedback mechanism**. Labor follows in 3 stages:

- Dilation stage:** Amniotic sac ruptures (aka. water breaking) and cervix becomes thinner and widens, eventually up to 10 cm.
- Expulsion stage:** Baby is pushed out through the vagina and cervix.
- Placental stage:** Within 15 minutes after the baby is delivered, the uterus contracts again to expel the placenta. This prevents unnecessary bleeding.




Two note-taking styles are included:

Cornell Notes

Fetal Development & Delivery

How does the blastocyst develop?
 During the first two weeks, the blastocyst arranges itself into two layers— an inner cell mass and an outer trophoblast.
 The trophoblast forms projections (chorionic villi) that embed it into the uterus, eventually becoming the placenta.
 The inner cell mass is made of embryonic stem cells which differentiate into 3 germ layers:
 - Ectoderm
 - Mesoderm
 - Endoderm



How does the fetus develop?
 After 8 weeks, the clearly recognizable human embryo is called a fetus.
 Name something that occurs by:
 12 weeks: fetal circulation & organ systems are complete.
 16 weeks: Heartbeat, kidneys start functioning
 20 weeks: Movement felt by mother, lanugo covers body
 24 weeks: vernix caseosa appears
 28 weeks: Eyes open & close
 32 weeks: Fetus is viable, fingerprints are set
 36 weeks: Lanugo disappears, amniotic fluid decreases
 40 weeks: Bones are ossified & nearly fused

What are the stages of labor?
 After 40 weeks, oxytocin and prostaglandins cause powerful contractions of the uterus through a positive feedback mechanism.
 Labor follows in 3 stages:
 1. Dilation stage - cervix widens & thins (10 cm)
 2. Expulsion stage - baby is pushed out
 3. Placental stage - placenta is pushed out

Summary: The blastocyst differentiates into three germ layers, which will eventually become the body systems for the baby. The embryo grows into a fetus, eventually being expelled through contractions of the uterus.

Doodle Notes™

Embryonic Development:

- After fertilization, oocyte nucleus completes 2nd meiotic division & joins with sperm nucleus.
- Embryo moves down uterine tube & begins to divide (cleavage).
- Reaches uterus at 16 cells (called morula).
- At 100 cells, known as blastocyst. Will implant into uterine wall 6-7 days after fertilization.

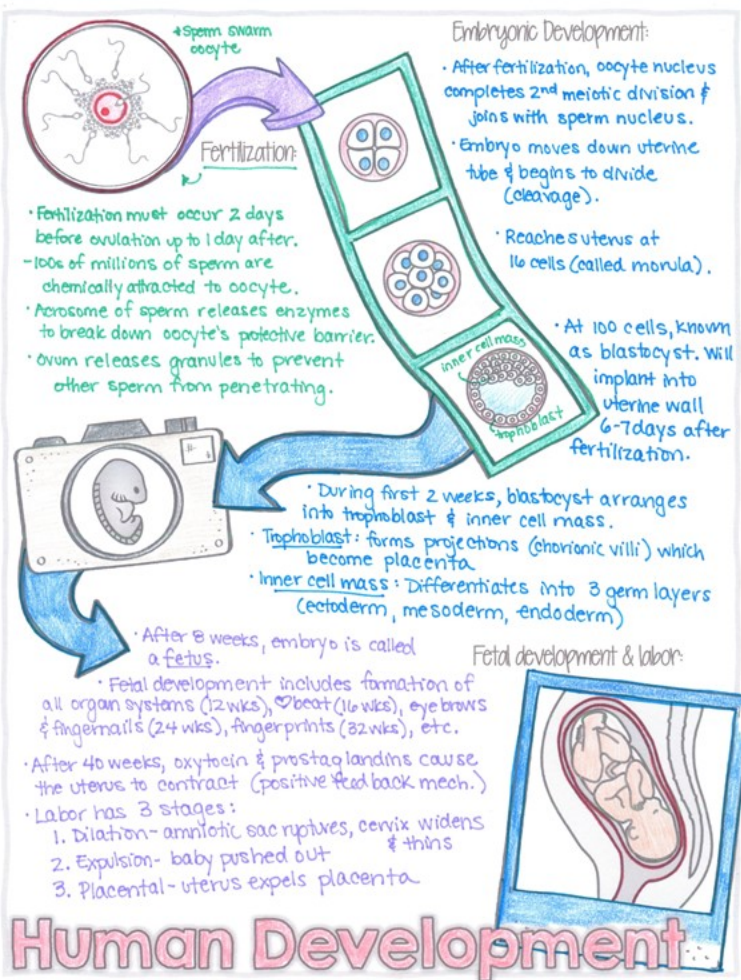
Fertilization:

- Fertilization must occur 2 days before ovulation up to 1 day after.
- 100s of millions of sperm are chemically attracted to oocyte.
- Acrosome of sperm releases enzymes to break down oocyte's protective barrier.
- Ovum releases granules to prevent other sperm from penetrating.

Fetal development & labor:

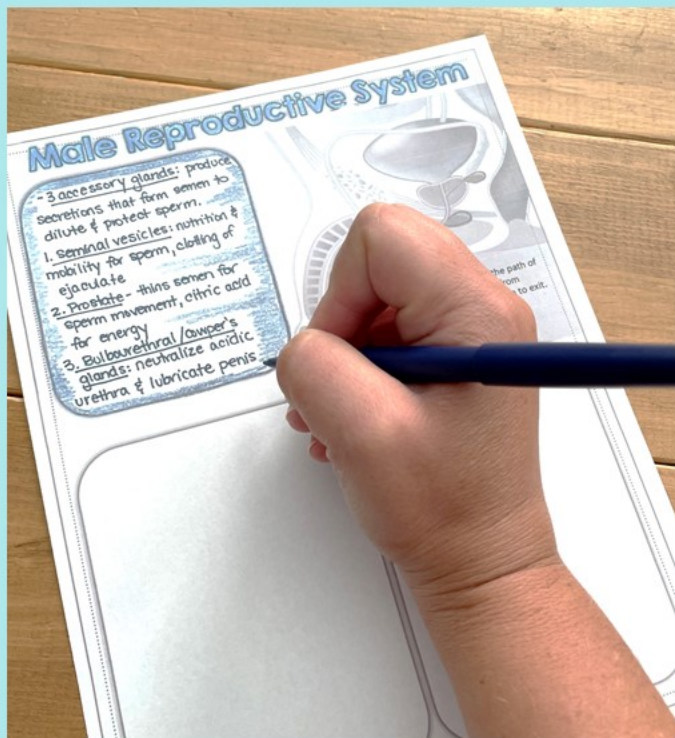
- During first 2 weeks, blastocyst arranges into trophoblast & inner cell mass.
- Trophoblast: forms projections (chorionic villi) which become placenta.
- Inner cell mass: Differentiates into 3 germ layers (ectoderm, mesoderm, endoderm)
- After 8 weeks, embryo is called a fetus.
- Fetal development includes formation of all organ systems (12 wks), heart (16 wks), eye brows & fingernails (24 wks), fingerprints (32 wks), etc.
- After 40 weeks, oxytocin & prostaglandins cause the uterus to contract (positive feedback mech.)
- Labor has 3 stages:
 1. Dilation- amniotic sac ruptures, cervix widens & thins
 2. Expulsion- baby pushed out
 3. Placental- uterus expels placenta

Human Development



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

6 pages of Doodle Notes



Male Reproductive System

- 3 accessory glands: produce secretions that form semen to dilute & protect sperm.
- 1. Seminal vesicles: nutrition & mobility for sperm, clotting of ejaculate
- 2. Prostate - thins semen for sperm movement, citric acid for energy
- 3. Bulbo-urethral/Cowper's glands: neutralize acidic urethra & lubricate penis

Trace the path of sperm from formation to exit.

2 major external structures:

1. Scrotum - flap of skin that contains testes
2. Penis - has many folds called the foreskin. Sperm are formed in the testes.

Female Reproductive System

- Mature ova are released into fallopian tubes that extend from the uterine tubes.
- The ovum is fertilized in the fallopian tube then carried through uterine tubes by cilia towards the uterus.
- Uterus: hollow, muscular structure that receives and nourishes an egg
- Walls of uterus have 3 layers:
 1. Endometrium: mucosal layer; nourishes embryo or sloughs off during menstruation
 2. Myometrium: muscular layer; contracts during childbirth
 3. Perimetrium: outer uterine wall

Internal

- Release eggs (ova)
- Contains 100,000 follicles (clusters of cells around an egg) at birth, but only 400 follicles will mature
- Vagina: thin-walled tube inferior to cervix
- Receives penis during intercourse and is passage for menses and for baby

Gametogenesis

Male Spermatogenesis

- Spermatogenesis (sperm production) begins with stem cells (spermatogonia)
- Diploid spermatogonia divide through meiosis to create 4 spermatozoa with only 23 chromosomes each.
- In a final process (spermiogenesis) the spermatozoa become mature sperm.
- Sperm have 3 sections:
 1. Head - nucleus & centrosome with enzymes to break into egg cell
 2. Midpiece - mitochondria for energy
 3. Tail - movement

Female Oogenesis

- Oogenesis (egg production) also begins with stem cells (oogonia)
- Oocytes mature into ootidies in follicles
- At puberty a few follicles make the follicle
- This divides large secondary oocyte & small polar body
- During oocyte release a secondary oocyte is released
- If it is fertilized it develops into an embryo
- After oocyte degenerates

Uterine Cycle

- Menstrual Phase:** Endometrium is shed through the vagina (called a period).
- Proliferation Phase:** The follicles in the ovaries grow and produce estrogens, which cause the endometrial lining to thicken.
- Secretory Phase:** The corpus luteum secretes progesterone, which causes the uterine lining to further thicken. Glands within the endometrium secrete and nutrients to sustain an embryo.

Reproductive Hormones

- Testosterone:** produced in interstitial cells of the testes; maturation of reproductive organs & secondary sex characteristics
- Luteinizing Hormone (LH):** from anterior pituitary; stimulates release of testosterone
- Follicle-stimulating hormone (FSH):** stimulates sperm production (anterior pit.)
- FSH:**
 - Increased muscle mass & strength
 - Increased bone mass
 - Facial & pubic hair growth
 - Deepening of voice
 - Increased sex drive
- LH:** stimulates testosterone

Breast Anatomy:

- Estrogens cause female mammary glands to grow during puberty
- Nipple surrounded by areola
- Lobes of alveolar glands connected by connective tissue & fat
- When lactating, alveolar glands produce milk & pass it via lactiferous ducts through nipple
- Breast development
- Pubic hair growth
- Increased fat on hips & breasts
- Widening of hips

Hormones:

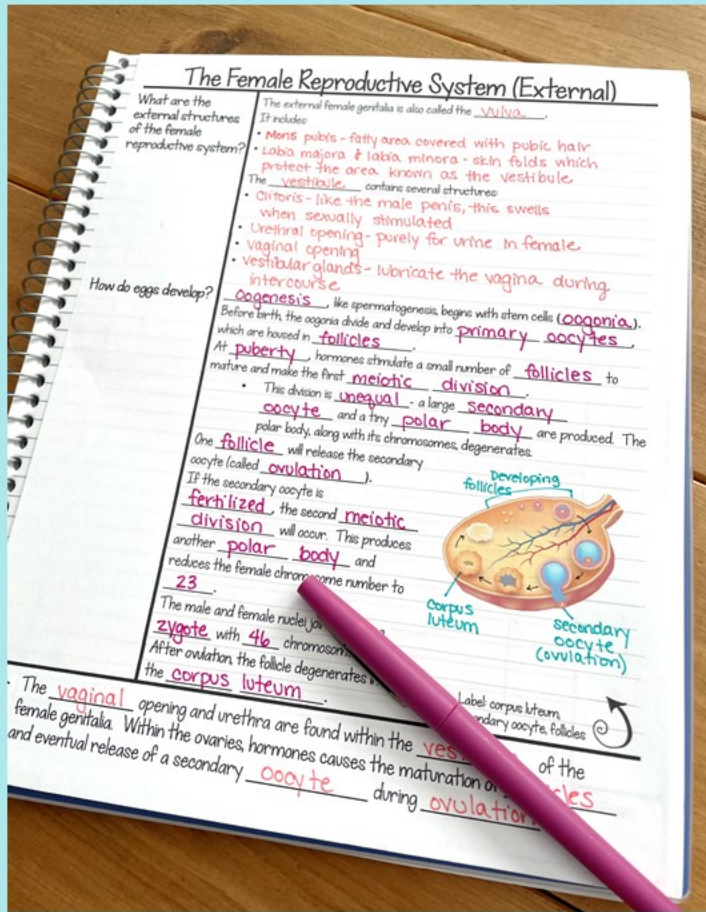
- LH & FSH also produced in females when stimulated by anterior pituitary
- Estrogens secreted by ovaries; cause secondary sex characteristics
- Progesterone produced by corpus luteum after ovulation; maintains menstrual cycle

Human Development

- Fertilization:** Sperm & ovum combine to form a zygote.
- Embryonic Development:** After fertilization, zygote nucleus completes 2nd meiotic division & joins with sperm nucleus. Embryo moves down uterine tube & begins to divide (cleavage).
- Implantation:** Reaches uterus at 10 cells (called morula).
- Fetal Development:** At 100 cells, known as blastocyst. Will implant into uterine wall 6-7 days after fertilization.
- Developmental Milestones:**
 - Fertilization must occur 2 days before ovulation up to 1 day after.
 - 100s of millions of sperm are chemically attracted to oocyte.
 - Acrosome of sperm releases enzymes to break down oocyte's protective barrier.
 - Ovary releases granules to prevent other sperm from penetrating.
 - After 8 weeks, embryo is called a fetus.
 - Fetal development includes formation of all organ systems (24 wks), 2nd trimester (16 wks), eye brows & fingerprints (24 wks), fingerprints (32 wks), etc.
 - After 40 weeks, oxytocin & prostaglandins cause the uterus to contract (positive feedback mech.).
 - Labor has 3 stages:
 1. Dilation - amniotic sac ruptures, cervix widens & thins
 2. Expulsion - baby pushed out
 3. Placental - uterus expels placenta.

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

8 pages of Cornell Notes



Big
concept
questions

Content
summary for
each page

The Female Reproductive System (External)

What are the external structures of the female reproductive system?

The external female genitalia is also called the vulva.
It includes:

- Mons pubis - fatty area covered with pubic hair
- Labia majora & labia minora - skin folds which protect the area known as the vestibule

The vestibule contains several structures:

- Clitoris - like the male penis, this swells when sexually stimulated
- Urethral opening - purely for urine in female
- Vaginal opening
- vestibular glands - lubricate the vagina during intercourse

How do eggs develop?

Oogenesis, like spermatogenesis, begins with stem cells (oogonia). Before birth, the oogonia divide and develop into primary oocytes, which are housed in follicles.

At puberty, hormones stimulate a small number of follicles to mature and make the first meiotic division.

- This division is unequal - a large secondary oocyte and a tiny polar body are produced. The polar body, along with its chromosomes, degenerates.

One follicle will release the secondary oocyte (called ovulation).

If the secondary oocyte is fertilized, the second meiotic division will occur. This produces another polar body and reduces the female chromosome number to 23.

The male and female nuclei join to form a zygote with 46 chromosomes.

After ovulation, the follicle degenerates into the corpus luteum.

Label corpus luteum, secondary oocyte, follicles

Summary: The vaginal opening and urethra are found within the vestibule of the female genitalia. Within the ovaries, hormones causes the maturation of follicles and eventual release of a secondary oocyte during ovulation.

Each page is **editable**.

Add and delete text, questions, and summaries to meet the needs of your students.

Includes 2 Activities

- STD Gallery Walk

- Pyramid Vocab Review


Human Papillomavirus (HPV)

HPV is a group of related viruses that can be spread through sexual contact or intimate skin-to-skin contact.

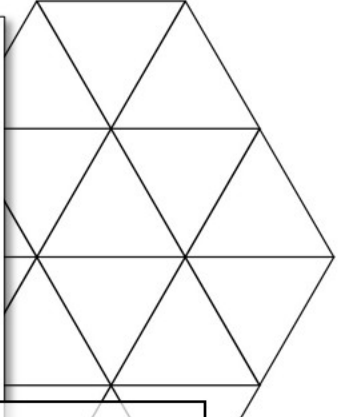
Two categories of HPV:

- Low-risk:** causes warts on genitals, mouth, anus, or throat
- High-risk:** can cause various types of cancers (cervical, anal, throat, vulvar, vaginal, penile)

Nearly all cases of cervical cancer are thought to be caused by HPV.



Blank Puzzle Template



Reproductive Review Puzzle

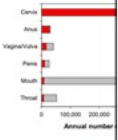
Objective: Review terminology from the reproductive unit.

Differentiation: Version 1 of the puzzle is more challenging because it has terms on every side of every triangle and some of the terms aren't used. This is good for advanced students or if you have a little more time to allow students to struggle. Version 2 does not have terms on the outside edge. This gives students a clue about which triangles go on the outside. This version is good for struggling students or if you have less class time to work.

Set-up: Use Version 1 or Version 2. Cut the triangles out completely, SHUFFLE them, and place into a plastic or paper bag. One bag should be made for each pair of students. During class, each pair or group of students get a bag of triangles and a "Blank Puzzle Template" to practice matching the terms.

STD Gallery Walk

What age group makes up nearly 50% of all new STD infections in the US?

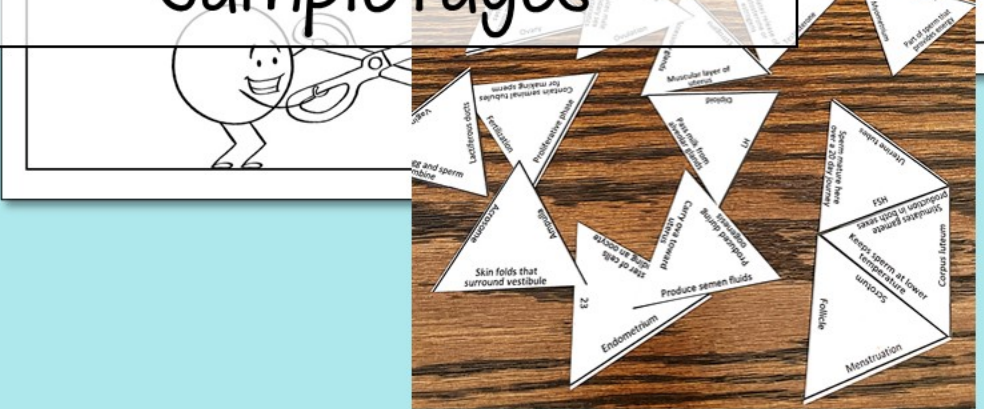


Age Group	Annual Number
0-14	~10,000
15-24	~100,000
25-34	~150,000
35-44	~100,000
45-54	~50,000
55-64	~20,000
65-74	~10,000
75+	~5,000

STD Gallery Walk Sample Slide & Page

	Type of Disease (bacterial, viral, protozoan)	Symptoms	Prevention	Treatment
Trichomoniasis				
Gonorrhea				
Syphilis				
Herpes				
Hepatitis B				
Chlamydia				
HIV				

Pyramid Vocab Review Sample Pages



2 versions for easy differentiation!

Extension Pages

Forming & interpreting graphs is great for standardized test prep!



Digging Deeper: Comparison of Oogenesis & Spermatogenesis

Complete the chart below to show the similarities and differences between the processes of oogenesis and spermatogenesis.

	Males	Females
Gonads		
Immature Gamete		
Mature gamete		
When are gametes made?		
Number of meiotic divisions- when?		
Type of meiotic division- or unequal		
Hormones involved		

Data Analysis: Uterine Cycle

Males begin to produce sperm during puberty and do so continually throughout the remainder of their lives. In contrast, when females are born, their ovaries contain all of the immature eggs that they will release later in life. Beginning in **puberty**, the **follicles** surrounding the eggs grow and produce **estrogens**. These estrogen hormones cause the **endometrial lining** of the uterus to thicken and trigger the immature eggs to go through the first meiotic division, creating mature eggs. Eggs mature one at a time and, after maturation, are released in alternating ovaries. This process is known as **ovulation** and occurs about every 28 days, on average.

After ovulation, the follicles surrounding the mature egg degenerate, forming the **corpus luteum** ("yellow body"). This glandular tissue releases the hormone **progesterone**. High levels of progesterone continue the thickening of the endometrium. Glands form within the endometrium and secrete nutrients in preparation to **nourish the fertilized egg**.

If the egg is not fertilized by sperm, however, the level of progesterone begins to drop. These hormonal changes cause both the unfertilized egg to be shed and passed out of the body in the form of **menstruation**.

The cycles of ovulation and menstruation are highly regulated. The **pituitary gland** secretes **follicle-stimulating hormone (FSH)** which trigger the maturation of the egg and surrounding follicles. The **ovary** secretes estrogens and progesterone, which prepare the uterine lining for a fertilized egg.

Part A. Formation of Eggs and Sperm

1. What is the process of sperm formation called? What is the process of egg formation called?

2. In a female that hasn't yet reached menarche, what are the primary sex cells called?

3. After the first meiotic division, what are the two cells called?

4. Besides the oocyte, what else is produced during oogenesis?

Digging Deeper: Infertility

Infertility, the inability to conceive a child after trying for at least one year, affects 10-15% of couples in the United States. Because many processes need to work correctly in order to have a baby, there are a number of different reasons for infertility. They can arise from either partner and sometimes the cause of infertility can't be found.



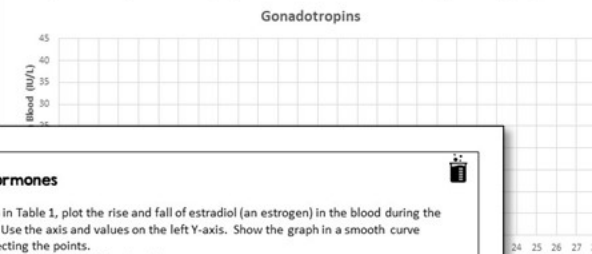
Discussion Questions:

- Name the reproductive process described:
 - Production of sperm- _____
 - Release of sperm/semen- _____
 - Production of eggs- _____
 - Release of eggs- _____
 - Formation of uterine lining- _____
 - Joining of egg and sperm- _____
- Research each of the following causes of infertility. Explain what process is affected and why. Then, describe any possible treatments or preventions for the condition.

Cause	Process(es) affected- how?	Treatment or Prevention?
Polycystic Ovary Syndrome		
Salpingitis		

Part B. Gonadotropins

FSH: Using the data in Table 1 on the previous page, plot the rise and fall of FSH in the blood during the 28-day menstrual cycle. Show the graph in a smooth curve rather than simply connecting the points.



Part C. Ovarian Hormones

Estrogen: Using the data in Table 1, plot the rise and fall of estradiol (an estrogen) in the blood during the 28-day menstrual cycle. Use the axis and values on the left Y-axis. Show the graph in a smooth curve rather than simply connecting the points.



- What secretes estrogen?
- On which day does estradiol reach its peak concentration in the blood?
 - What happens to the endometrium during the days that estradiol is rising?
- Using the data in Table 1, plot the rise and fall of progesterone in the blood on the same graph as the estradiol levels. Again, show the graph in a smooth curve rather than simply connecting the points but this time use a different color pen or a dotted line to differentiate the two data sets. Use the axis and values on the right Y-axis. Make a legend above the graph to show which hormone is represented by each line.
 - What secretes progesterone?
 - What happens to the endometrium when progesterone levels decrease?

Greater depth of knowledge & critical thinking

Anatomical Diagrams

Female Reproductive System

Word bank: fundus, fallopian tube, ovary, fimbriae, endometrium, vagina, cervix, ligament of ovary, infundibulum

Male Reproductive System

Word bank: urinary bladder, ureter, prostate gland, bulbourethral gland, corpora cavernosa, urethra, corpus spongiosum, body of penis, glans penis, urethral opening, testis, epididymis, ductus deferens, seminal gland

Follicular Development

Word bank: primary follicle, theca follicle, oocyte, secondary oocyte, corpus albicans, ovulation

Sperm Anatomy

Word bank: midpiece, acrosome, tail, mitochondria, nucleus, head, flagellum

Each diagram comes in 4 versions:

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

Female Reproductive System

Word bank: fundus, fallopian tube, ovary, fimbriae, myometrium, endometrium, vagina, cervix, ligament of ovary, infundibulum, uterus

Female Reproductive System

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____

Female Reproductive System

fundus, fallopian tube, infundibulum, ovary, uterus, cervix, vagina, fimbriae, ligament of ovary, endometrium, myometrium

Female Reproductive System

fundus, fallopian tube, infundibulum, ovary, uterus, cervix, vagina, fimbriae, ligament of ovary, endometrium, myometrium

24 Editable Task Cards for Review

1 Name the 3 sections of a sperm cell and the major function of each.

2 Name the purpose of the following male reproductive structures:

- Scrotum
- Testes
- Erectile tissue

3 Name 5 structures sperm pass through before exiting the body.

4 What are the 3 male accessory glands and how do they contribute to reproduction?

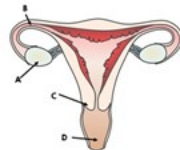
Sample Task Cards

13 What are the 3 phases of the uterine cycle? What major event occurs in each phase?

14 When a sperm cell joins with an egg cell, the process is called _____ and a(n) _____ is formed.

15 Where is breast milk produced and how is it released?

16 What are these 4 structures?



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 use 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.



Male System



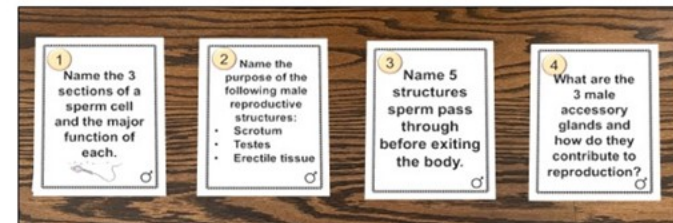
Female System



Fertilization & Development

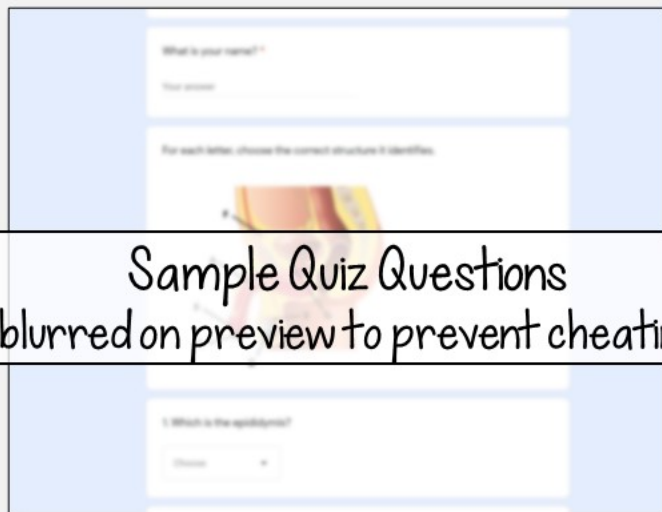
If you'd prefer to divide the unit, you can use the task cards in separate sections.

- 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



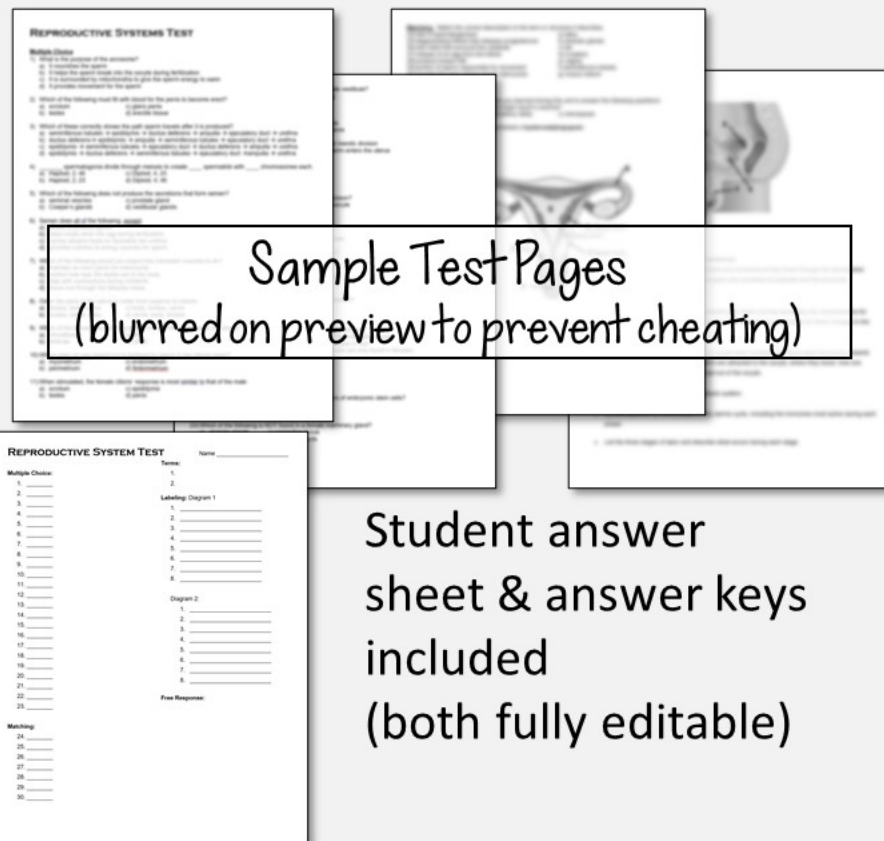
Sample Quiz Questions
(blurred on preview to prevent cheating)

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

Editable Unit Test

- 23 multiple choice questions
- 7 matching questions
- 2 Greek/Latin term questions
- 2 labeled diagrams
- 6 free response questions

Two Versions: Honors & Regular



Sample Test Pages
(blurred on preview to prevent cheating)

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

I'd love to hear from you!

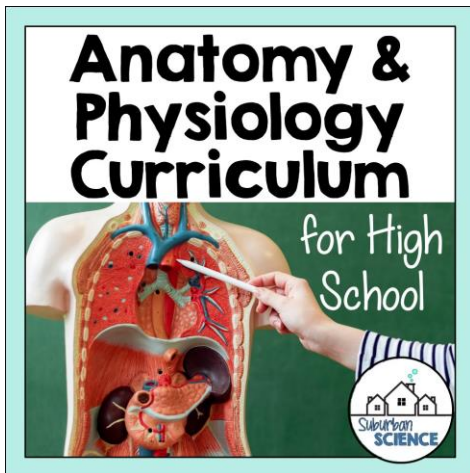
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