



The Real Story of Where Babies Come From
An overview of the male and female reproductive systems and the process of fertilization
 By: Leila Greene & Heather Miller
 An original lesson

Focus on Inquiry

Students will be able to sort and characterize the male and female reproductive anatomy. They will also be able to use a model, identify why the pictures of the anatomy are considered models, and explain the limitations of the model.

Lesson Content Overview

The student will be able to identify the main organs/structures of the female/male reproductive systems and understand their functions as well as describe the process of fertilization. This activity will ask students to match various picture cards containing parts of the female and male reproductive systems with the appropriate description cards. Upon matching the cards correctly, students will collaborate with each other and write a creative story on the release of sex cells and how fertilization occurs in order to form a fetus. After completing their stories, students will share their understanding of the reproductive system with the rest of the class.

Duration 80-90 minutes	Setting Classroom	Grouping 3-4 students/group	PTI Inquiry Subskills 3.3, 4.2, 5.2, 5.8, 5.9, 7.2, 7.3
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Lesson Components	Estimated Time	Inquiry Subskills Used	Technology Used	Level of Student Engagement	Brief Description
Engage	5 min	5.2	Internet & Video	2	Students will watch a video and make observations on the process of fertilization.
Explore	20 min	3.3, 4.2	None	3	Students will work in groups of 4 to match pictures of reproductive parts of the body (both male and female) with cards that contain the appropriate descriptions.
Explain	20 min	4.2, 5.9	None	3	Students will take turns explaining the functions of major organs/structures of the female/male reproductive systems. Students will explain the process of ovulation and release of sperm (ejaculation) to each other. Students will respond to reflection questions and complete tables.
Elaborate	20 min	4.2, 5.8, 7.2, 7.3	Computer, phones, digital recorders	2	Students will work together to create a story (digital story, skit, drawing, etc.) on the process of fertilization. Students will share their stories with the class.
Further extension activities (beyond scope of standards)	10-15 minutes	4.2, 5.8, 7.2, 7.3	Computer, phones, digital recorders	2	<i>**Students can discuss what would happen if the fertilized egg does not implant in the uterus (implanted in fallopian tube a condition called ectopic pregnancy) or if it does not get fertilized at all (menstrual cycle). ** Students can investigate other forms of reproduction by comparing sexual and asexual reproduction.</i>
Evaluate	5-10 min	7.3	None	1	Students will use a grading rubric to evaluate their story on the process of fertilization. Students will complete a summative assessment on the reproductive systems and the process of fertilization.

Level of Student Engagement

1	Low	Listen to lecture, observe the teacher, individual reading, teacher demonstration, teacher-centered instruction
2	Moderate	Raise questions, lecture with discussion, record data, make predictions, technology interaction with assistance
3	High	Hands-on activity or inquiry; critique others, draw conclusions, make connections, problem-solve, student-centered

Next Generation Science Standards – Inquiry 

- NGSS Practice 1: Asking Questions
- NGSS Practice 2: Developing and Using Models
- NGSS Practice 4: Analyzing and Interpreting Data
- NGSS Practice 6: Constructing Explanations
- NGSS Practice 7: Engaging in Arguments from Evidence
- NGSS Practice 8: Obtaining, Evaluating and Communicating Information

Next Generation Science Standards –Life Science 

HS-LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms

Florida Science Standards - Inquiry 

SC.912.N.1.1: Use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), (Collect data or evidence in an organized way. Pose answers, explanations, or descriptions of events, Generate explanations that explicate or describe natural phenomena (inferences), Use appropriate evidence and reasoning to justify these explanations to others, Communicate results of scientific investigations, and Evaluate the merits of the explanations produced by others

SC.912.N.1.6: Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied

SC.912.N.3.5: Describe the function of models in science, and identify the wide range of models used in science.

Florida Science Standards – Life Science 

SC.912.L.16.13: Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy (*focusing on the anatomy and physiology and fertilization*)

Materials and Advance Preparation

Materials List

Class set:

- Female Reproductive System Cards – Blackline Master #1 (1 set for half of groups)
- Male Reproductive System Cards – Blackline Master #2 (1 set for half of groups)
- Student Lab Sheet - Blackline Master #3 (1 copy per student)
- Envelopes or paper bags for collection of cards
- Poster Board
- Velcro/Sticky-Tack

Blackline Masters

1. Blackline Master # 1: Female Reproductive System Cards
2. Blackline Master # 2: Male Reproductive System Cards
3. Blackline Master # 3: Student Lab Sheet-The Real Story of Where Babies Come From
4. Blackline Master # 4: The Reproductive System & Fertilization Quiz

Advance Preparation

1. Print out the Blackline Master #3, and run copies one per student.
2. Print out the Blackline Master #'s 1, 2 and cut the Female Reproductive System Cards and Male Reproductive System Cards apart and place each system in a separate envelope (at least four sets of cards for each system).
3. Make sure you can view the Human Reproduction Video.
<https://drive.google.com/file/d/0B3ft7TkiNrXxNHVPR0ICV0IndHc/view?usp=sharing>
 If you have problems viewing the video in Google Docs, try downloading it to your computer.

Lesson Information

Learning Objectives

The learner will be able to:

- Identify the basic anatomy/physiology of the female/male reproductive system.
- Assess the function of the ovaries, oviduct (fallopian tubes), uterus, cervix, and vagina and how these structures relate to the development of the fetus.
- Assess the function of the seminal vesicle, prostate gland, vas deferens, urethra, epididymis, scrotum, penis, and testes and how these structures relate to the development of the fetus.
- Correctly match the description of various reproductive structures /organs to a reproductive system picture card.
- Formulate appropriate conclusions on how sex cells interact during the process of fertilization.
- Clearly communicate the process of fertilization.

Prior Knowledge Needed by the Students

- Students should be able to distinguish between the male and female reproductive anatomy as a whole.

Background Information

Female Reproductive System- *Cervix*= the lower part of the uterus which is strong and muscular. It has an opening to allow for the passage of menstrual blood, sperm, or a baby; *Oviduct (fallopian tube)*= narrow tubes that attached to the upper part of the uterus and serve as tunnels for the ova (egg cells) to travel from the ovaries to the uterus. This is normally where fertilization takes place; *Ovary*=small, oval-shaped glands that are located on either side of the uterus. These produce eggs and hormones; *Uterus*= A hollow, pear-shaped organ that is the home to a developing fetus. Also called the womb. *Vagina*= a muscular canal that joins the cervix (the lower part of the uterus) to the outside of the body. It is also known as the birth canal.

Male Reproductive System- *Epididymis*= A set of coiled tubes that connects to the vas deferens. This is where sperm are stored after they are produced; *Penis* = the male sex organ which is made of the shaft and the glans; *Prostate gland* = a gland at the base of the urethra which produces some parts of the semen; *Scrotum* = A pouch-like structure that the epididymis and testicles hang in outside the pelvis. This acts as a climate control system for the testes; *Seminal Vesicle* = sac-like structures attached to the vas deferens that produce semen which lubricates and nourishes the sperm; *Testicle* = an oval body that is responsible for producing sperm and the male hormone, testosterone; *Urethra* = the channel that carries the semen and urine outside of the body through the penis; *Vas deferens* = A muscular tube that passes upward alongside the testicles and transports sperm from the epididymis to the seminal vesicle.

Project:

Students should describe how sperm are produced in the testes, a paired organs surrounded by a scrotum. Sperm is then temporarily stored in the epididymis until sexual arousal. From there, sperm travels through the vas deferens. At the same time, the prostate gland releases a fluid to help sperm travel more easily. In addition the seminal vesicle produces semen to help neutralize the acidity in the urethra. Once combined with semen, the sperm travel through the urethra and out of the penis. Students should describe how eggs mature in the ovary and once a month are released from the ovaries. The egg then passes through a tube known as the fallopian tubes (oviduct) where it could potentially be fertilized. During fertilization, sperm travel up the vagina, through the cervix, up the uterus and into the fallopian tubes. If an egg is available, the sperm swim to the egg and penetrates it using specific enzymes. Upon being fertilized the egg continues to travel through the fallopian tubes into the uterus where it implants along the uterine wall.

Further Reading & Resources:

- The Male Reproductive System <http://www.webmd.com/sex-relationships/guide/male-reproductive-system>

- The Female Reproductive System <http://www.webmd.com/sex-relationships/guide/your-guide-female-reproductive-system>
- Pregnancy and Conception <http://www.webmd.com/baby/guide/understanding-conception?page=1>

Lesson Procedure

Engage

- To introduce the lesson, choose from the following questions to activate prior knowledge:
 - Males have both internal and external sex-organs. What are the major organs that make up the male reproductive system?
 - Females have internal sex-organs. What are the major organs that make up the Female reproductive system?
 - Males and Females are often said to be “opposite,” but physically speaking this isn’t entirely true. In what ways are the male and female reproductive systems similar?
 - How do they depend on each other to create a new individual?
 - Why would it be important for a person to know about the reproductive system?
- Watch a short video (approx. 3 mins) on the Human Reproductive System <https://drive.google.com/file/d/0B3ft7TKiNrXxNHVPR0ICV0IndHc/view?usp=sharing>
If you have problems viewing the video in Google Docs, try downloading it to your computer.
- After the video, choose from the following follow-up questions:
 - What did you observe about the male reproductive system? Female reproductive system?
 - How did both systems work together?
 - What do you think will need to occur in order for both systems to create an individual?
 - What parts of the reproductive system did you see? Did you recognize?
 - Is there anything from the video that you would like to see again or discuss?

Explore

- In this activity students will be scientists by investigating the human reproductive system.
- Distribute **Blackline Master #3** (one per student) and divide the class into groups of 3 or 4 students (you will want an even number of groups so that half can work on the male anatomy and half can work on the female anatomy).
- Distribute **Blackline Master #1** Female Reproductive System Cards and Descriptions (pre-cut and in envelope) to one half of the class.
- Distribute **Blackline Master #2** the Male Reproductive System Cards and Descriptions (pre-cut and in envelope) to the other half of the class.
- Try to have the same number of male reproductive system groups as you have female reproductive system groups because they will have to pair up for the next part of the lab.
- Working in their groups, students will follow the directions on **Blackline Master #3**. Students will match the picture of the reproductive organ/structure to the appropriate description and complete the lab activity diagram and table for the reproductive system they were assigned.
*Modification of Lab- Teachers can laminate pictures of the reproductive organ/structures as well as description cards and using poster board and sticky tack/velcro, ask students to match the pictures to the appropriate descriptions.
- During the EXPLORE part of the lesson, the TEACHER MUST walk around to monitor the students’ progress and assist in correcting misconceptions & mistakes when the students think they are finished with the match-up. Failure to correct the students’ mistakes on the match-up before the EXPLAIN and ELABORATE will result in the learning and teaching of misinformation.**
- While students are exploring, some questions that the teacher can ask to help guide their learning include:

- Were there characteristics of the description, name, or shape of the organs that helped you match their name and function to the picture?
- What made you decide to match that structure up with that function?
- Which structures were the easiest or most difficult to match up with their description? Why?
- Which structures are you still uncertain about?

Explain

1. Students will complete the reflection questions for the reproductive system they were assigned and complete the tables.
2. Once the students are finished with the reflection questions and complete the tables, students that worked on the male reproductive system will pair up with a group that worked on the female reproductive system.
3. Students will explain the various structures/organs of the reproductive system and their correct functions to the other group. The other group will record these findings on their lab sheet and vice versa.
4. The questions on the lab sheet include:
 - The female reproductive cell is the egg. Where do you think the eggs come from? Predict what their journey might be like once ovulation has occurred. Tell about the journey of the egg and the parts of the female reproductive system that they encounter along the way.
 - Explain why the picture of the female reproductive system is considered a model. Explain some of the limitations of the model of the female reproductive system.
 - The male reproductive cell is the sperm. Where do you think the sperm come from? Predict what their journey might be like once ejaculation has occurred. Tell about the journey of the sperm and the parts of the male reproductive system that they encounter along the way.
 - Explain why the picture of the male reproductive system is considered a model. Explain some of the limitations of the model of the male reproductive system.
5. Some questions you might ask students within their groups or as a whole class include:
 - Did anything surprise you about the organs of the male reproductive system? Female reproductive system?
 - In what ways are the male and female reproductive systems similar? Different?
 - How is the structure of each organ important to the job that it does?
 - What would happen to an individual if one of the parts were missing? (choose different parts to probe about)
 - Why do you think there are more male reproductive parts than female reproductive parts?
6. A quick review of the correct anatomy and functions may still be necessary so that students do not have misconceptions of the names, locations, and/or functions of the male and female reproductive system.

Elaborate

1. Have the new groups (one male reproductive system and one female reproductive system) work together to write a story, digital story, drawing, skit or activity of their choosing to explain how these systems work together to create an individual (process of fertilization).
2. Students will then share their project with the class. Students will use this time to compare how each journey to fertilization is similar/different.
3. Some questions you might ask students during/after their presentations include:
 - What evidence do you have that supports that this is the CORRECT journey to fertilization?
 - Would you expect a different outcome if the egg and sperm cells do not meet?

- What would happen if the egg did not implant in the uterus?
- What if the egg implanted somewhere other than the uterus?
- What do you suppose is the timeframe that the sperm has to find the egg?
- Are there any obstacles that the egg and/or sperm have to overcome to meet?

Evaluate

1. Informal/Formative Evaluation
Observation of students' progress and understanding throughout the activity.
Responses to probing questions in small groups.
2. Formal/Summative Evaluation
 - Final project and completed worksheet (**Blackline Master #3**) can be graded and based on two components:
 - Accuracy of pairing the picture cards with the appropriate descriptions (completing the table correctly.)
 - Accuracy of the explanation of the process of fertilization and how both systems worked together to create an individual.
 - 5 Question Summative Quiz (**Blackline Master #4**)

Supplementary Resources

Teachers

Nemours Foundation. (2015). *Male Reproductive System*. Retrieved from http://kidshealth.org/teen/sexual_health/changing_body/male_repro.html

Nemours Foundation. (2015). *Female Reproductive System*. Retrieved from http://kidshealth.org/teen/sexual_health/changing_body/female_repro.html

Rubistar. (2008). Create Rubrics for your Project-Based Learning Activities. Retrieved from <http://www.rubistar.4teachers.org>

Students

Nemours Foundation. (2015). *Male Reproductive System*. Retrieved from http://kidshealth.org/teen/sexual_health/changing_body/male_repro.html

Nemours Foundation. (2015). *Female Reproductive System*. Retrieved from http://kidshealth.org/teen/sexual_health/changing_body/female_repro.html

Nowicki, S. (2012). *Biology*. Houghton Mifflin Harcourt. Chapter 34- Reproduction and Development.

CITATION OF SOURCES.

Center for Disease Control. (2007). Picture of Female Reproductive System. Retrieved from http://commons.wikimedia.org/wiki/File:Scheme_female_reproductive_system-en.svg

Frenulum, M. (2013) Human Growth and Development [Clip]. Retrieved from <https://www.youtube.com/watch?v=UgT5rUQ9EmQ>

National Cancer Center. (N.D.). Picture of the Male Reproductive System. Retrieved from http://commons.wikimedia.org/wiki/File:Illu_repdt_male.jpg

Nemours Foundation. (2015). *Male Reproductive System*. Retrieved from http://kidshealth.org/teen/sexual_health/changing_body/male_repro.html

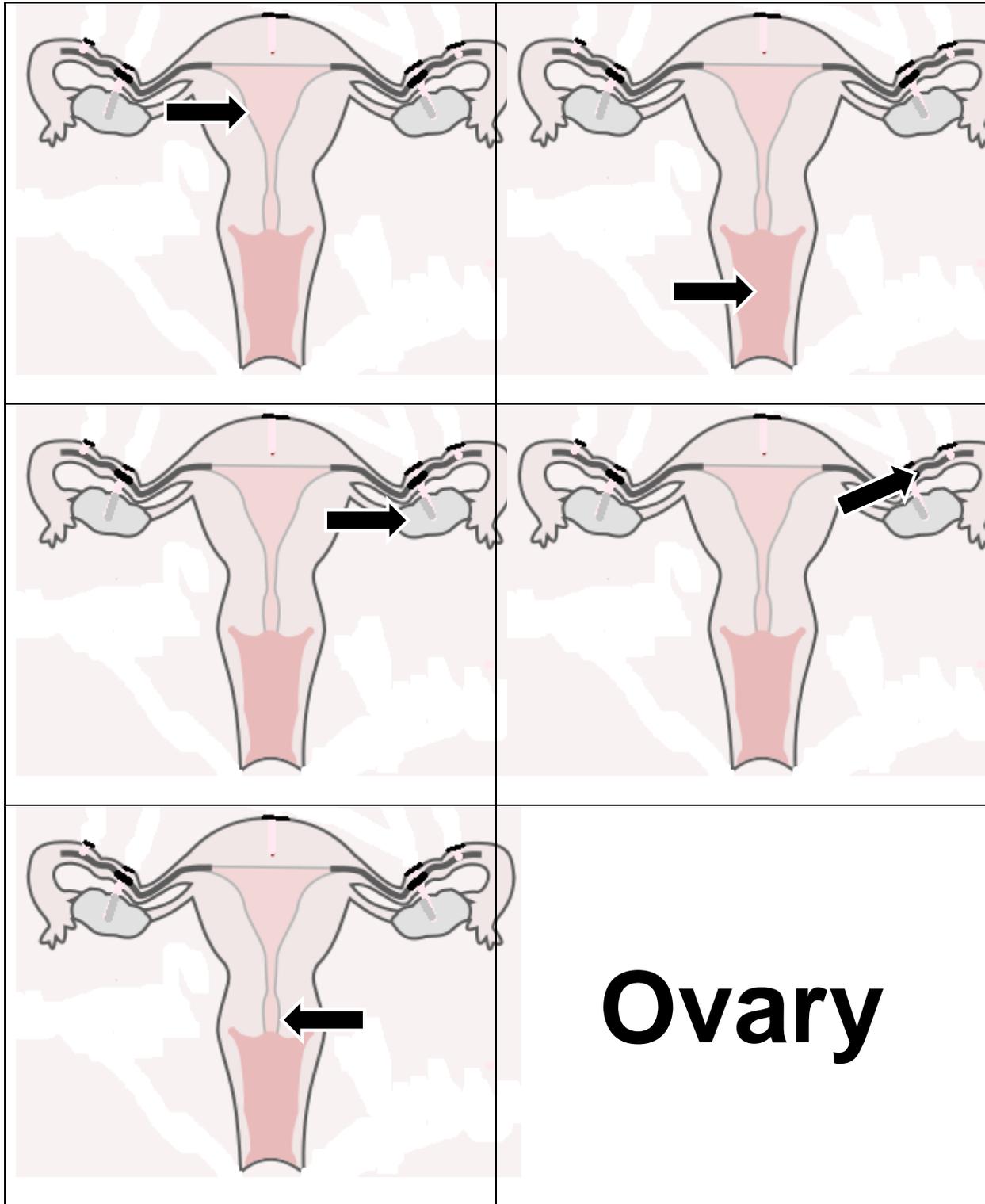
Nemours Foundation. (2015). *Female Reproductive System*. Retrieved from http://kidshealth.org/teen/sexual_health/changing_body/female_repro.html

Yes, I cited all materials and resources used in this lesson.

Heather Miller & Leila Greene

Lesson author signature

Blackline Master #1a



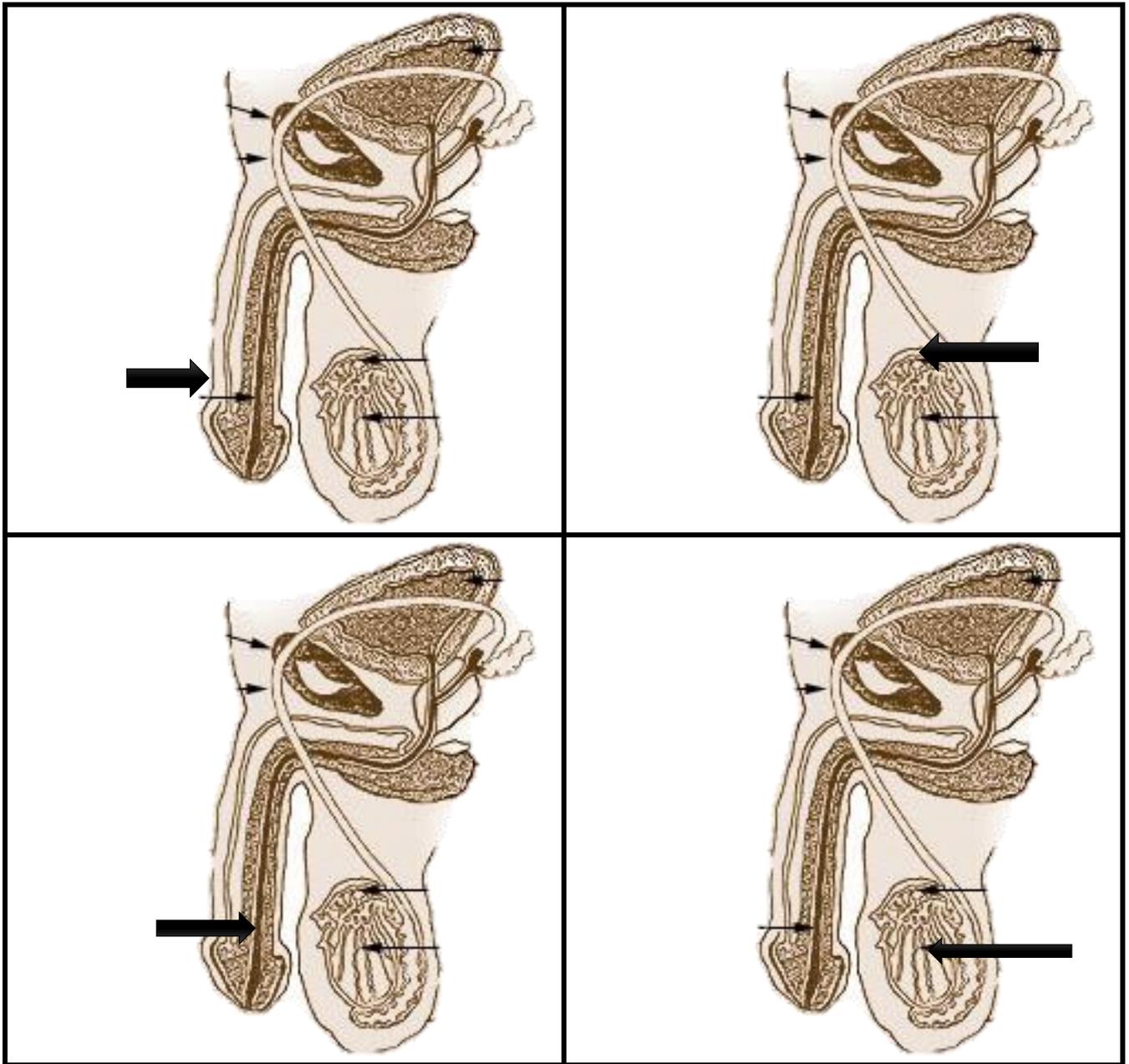
Blackline Master #1b

Oviduct (fallopian tube)	Uterus
Cervix	Vagina
A muscular canal that joins the cervix (the lower part of uterus) to the outside of the body. It also is known as the birth canal.	A hollow, pear-shaped organ that is the home to a developing fetus. Also called the womb.

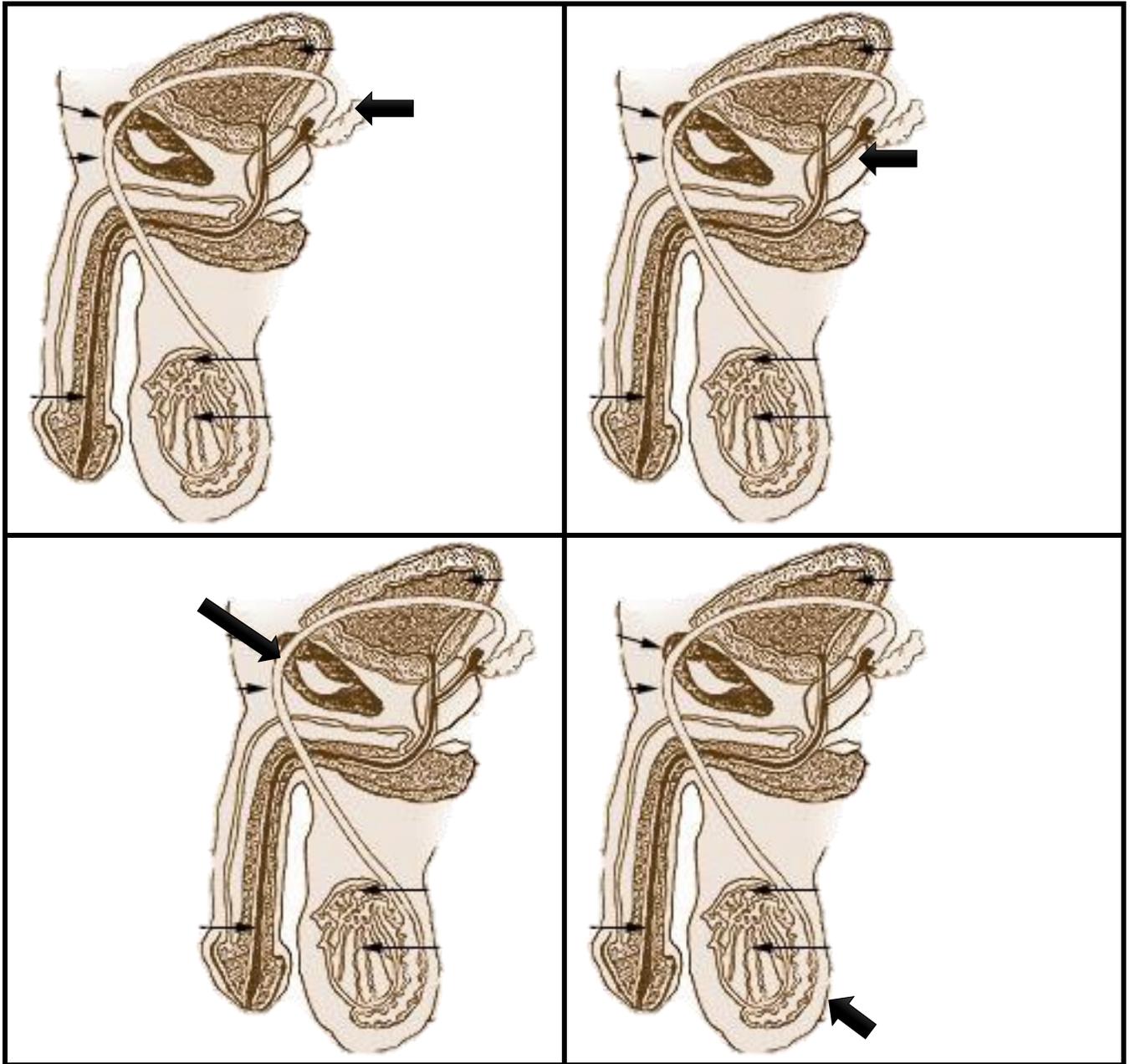
Blackline Master #1c

<p>The lower part of the uterus which is strong and muscular. It has an opening to allow for the passage of menstrual blood, sperm, or a baby.</p>	<p>Small, oval-shaped glands that are located on either side of the uterus. These produce eggs and hormones.</p>
<p>Narrow tubes that are attached to the upper part of the uterus and serve as tunnels for the ova (egg cells) to travel from the ovaries to the uterus. This is normally where fertilization takes place.</p>	

Blackline Master #2a



Blackline Master #2b



seminal vesicle	prostate gland
epididymis	scrotum
vas deferens	urethra
penis	testicle
A muscular tube that passes upward alongside the testicles and transports sperm from the epididymis to the seminal vesicle.	A set of coiled tubes that connects to the vas deferens. This is where sperm are stored after they are produced.
A pouch-like structure that the epididymis and testicles hang in outside the pelvis. This acts as a climate-control system for the testes.	An oval body that is responsible for producing sperm and the male hormone, testosterone.
The channel that carries the semen and urine outside of the body through the penis.	Sac-like structures attached to the vas deferens that produce semen which lubricates and nourishes the sperm.
The male sex organ which is made of the shaft and the glans.	A gland at the base of the urethra which produces some parts of the semen.

Blackline Master #3a

Name _____ Period _____ Date _____

The Real Story of Where Babies Come From

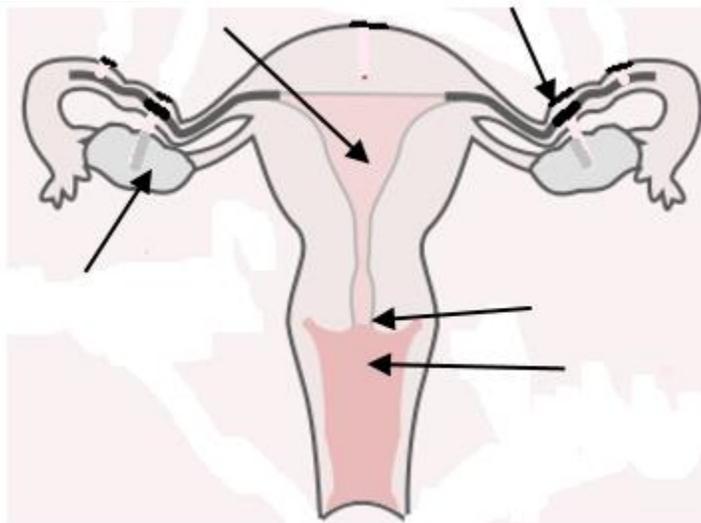
Instructions: You are a scientist who is studying the sexual reproduction system and trying to understand how an individual is formed. For this activity your task is to learn about the different reproductive organs/structures and then develop a story explaining how an embryo is formed.

This activity is divided up into four parts: matching, reflecting, collaborating, and creating.

1.) Matching - Working with your group, match the picture of the reproductive organ/structure with the correct name and description card.

2.) Reflecting - Complete the diagram and table below for the reproductive system that you investigated. Answer the questions about the system that you investigated.

Female Reproductive System:



Organ/Structure	Main Function

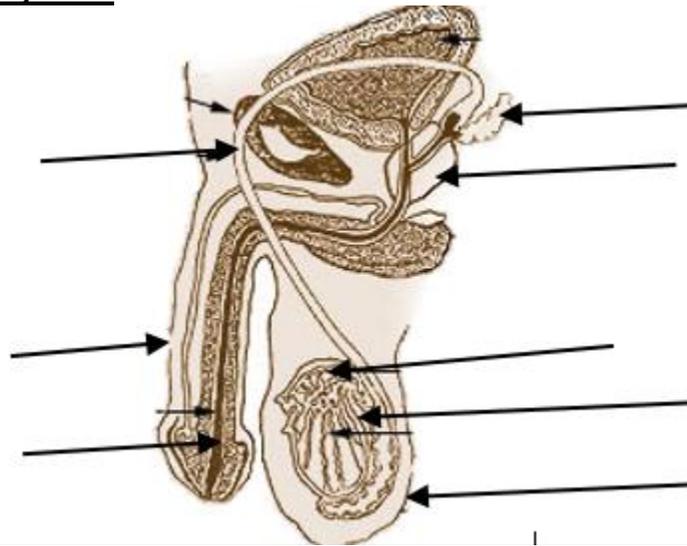
Blackline Master #3b

Female Reproductive System Continued

a.) The female reproductive cell is the egg. Where do you think the eggs come from? Predict what their journey might be like once ovulation has occurred. Tell about the journey of the egg and the parts of the female reproductive system that they encounter along the way.

b.) Explain why the picture of the female reproductive system is considered a model. Explain some of the limitations of the model of the female reproductive system.

Male Reproductive System:



Organ/Structure	Main Function

Blackline Master #3c

Male Reproductive System Continued

a.) The male reproductive cell is the sperm. Where do you think the sperm come from? Predict what their journey might be like from the time they are formed to the time they exit the body. Tell about the journey of the sperm and the parts of the male reproductive system that they encounter along the way.

b.) Explain why the picture of the male reproductive system is considered a model. Explain some of the limitations of the model of the male reproductive system.

3.) Collaborating - Working in your same groups, join a different group (with the opposite reproductive system) and explain your findings. Also, be sure to record the other groups' findings in the appropriate table (above).

4.) Creating - Working in your new groups, create a story of your combined observations on the male and female reproductive systems and explain how these systems work together to create an individual. You may create a digital story, skit, picture book or something of your choosing to tell your story. Be sure to refer to the grading rubric for clarifications on expectations. At the end, all groups will share their stories with the entire class.

Grading Rubric

Category	4	3	2	1
Title	Title is creative, sparks interest and is related to the story and topic	Title is related to the story and topic	Title is present, but does not appear to be related to the story and topic	No title
Creativity	The story contains many creative details and/or descriptions that contribute to the reader's enjoyment. The author has really used his imagination	The story contains a few creative details and/or descriptions that contribute to the reader's enjoyment. The author has used his imagination	The story contains a few creative details and/or descriptions, but they distract from the story. The author has tried to use his imagination	There is little evidence of creativity in the story. The author does not seem to have used much imagination
Focus on assigned topic	The entire story is related to the assigned topic and allows the audience to understand much more about the topic	Most of the story is related to the assigned topic. The story wanders off at one point, but the audience can still learn something about the topic	Some of the story is related to the assigned topic, but a audience does not learn much about the topic	No attempt has been made to relate the story to the assigned topic
Accuracy of facts	All facts presented in the story are accurate	Almost all facts presented in the story are accurate	Most facts presented in the story are accurate (at least 70%)	There are several factual errors in the story
Spelling and Punctuation	There are no spelling or punctuation.	There is one spelling or punctuation error	There are 2-3 spelling and punctuation errors	There are more than 3 spelling and punctuation errors

Blackline Master #4

Reproductive System & Fertilization Quiz

1. Sperm are created through meiosis in an area of the testes called the seminiferous tubules. Which of the following accurately describes the path that sperm take to exit the body?

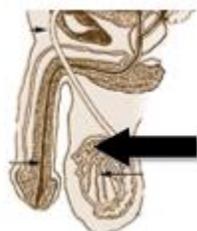
(SC.912.L.16.13)

- A. through the epididymis to the urethra to the vas deferens
- B. through the epididymis to the vas deferens to the urethra
- C. through the vas deferens to the epididymis to the urethra
- D. through the vas deferens to the urethra to the epididymis

2. Eggs are created through meiosis in an area of the ovary called a follicle. Which of the following accurately describes the path that an egg would take to exit the body? (SC.912.L.16.13)

- A. through the fallopian tube to the vagina to the uterus
- B. through the fallopian tube to the uterus to the vagina
- C. through the uterus to the vagina to the fallopian tube
- D. through the uterus to the fallopian tube to the vagina

Use the diagrams of the male and female reproductive systems below to answer questions 3 & 4.



3. In the **MALE** reproductive system, which structure is the arrow pointing to? (SC.912.L.16.13)

- A. epididymis
- B. prostate gland
- C. scrotum
- D. testicle

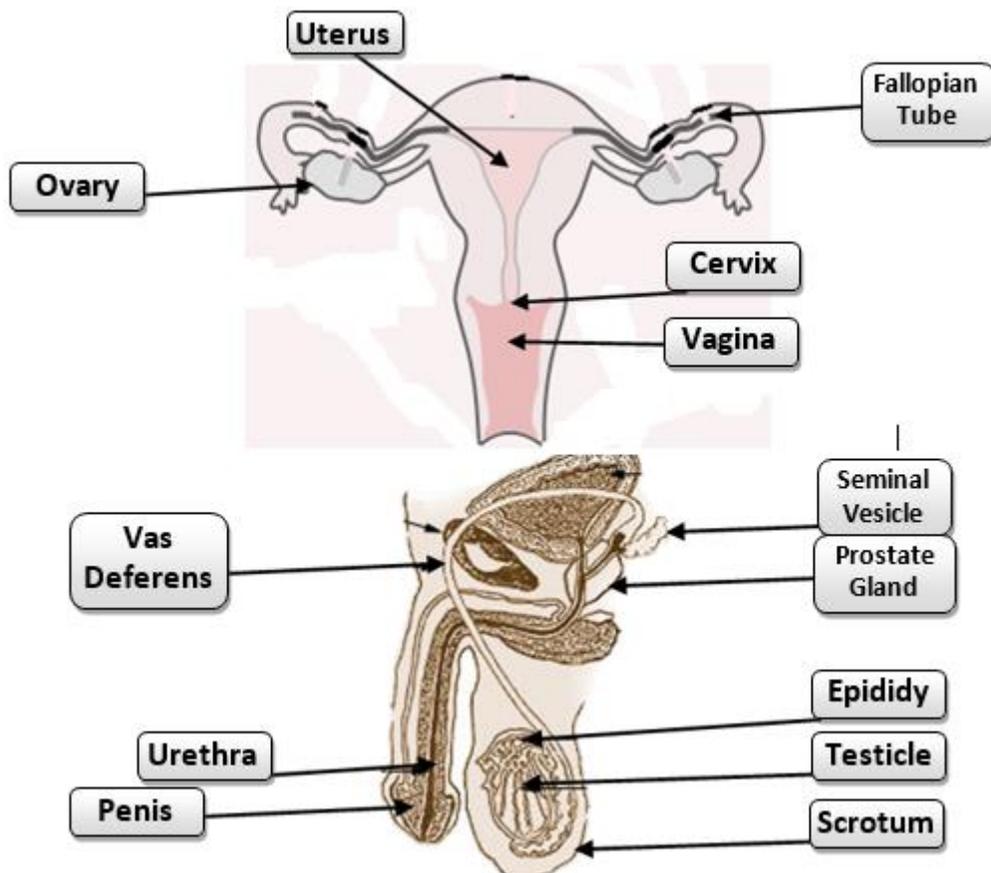
4. In the **FEMALE** reproductive system, which structure is the arrow pointing to? (SC.912.L.16.13)

- A. cervix
- B. ovary
- C. uterus
- D. vagina

5. Models of the male & female reproductive systems, as well as a model of fertilization were used in this activity. Why are models important in science? (SC.912.N.3.5)

- A. Models are the only tool that can help you communicate your ideas to other scientists.
- B. Models can decrease the danger when you have to work in dangerous conditions.
- C. Models can simplify or substitute for what you are actually studying.
- D. Models can show you an exact replica of what is happening or what you are studying.

Blackline Master Answer Keys



Female Reproductive System-

Cervix: the lower part of the uterus which is strong and muscular. It has an opening to allow for the passage of menstrual blood, sperm, or a baby; **Oviduct (fallopian tube):** narrow tubes that attached to the upper part of the uterus and serve as tunnels for the ova (egg cells) to travel from the ovaries to the uterus. This is normally where fertilization takes place; **Ovary:** small, oval-shaped glands that are located on either side of the uterus. These produce eggs and hormones; **Uterus:** A hollow, pear-shaped organ that is the home to a developing fetus. Also called the womb; **Vagina:** a muscular canal that joins the cervix (the lower part of the uterus) to the outside of the body. It is also known as the birth canal.

Male Reproductive System- Epididymis: A set of coiled tubes that connects to the vas deferens. This is where sperm are stored after they are produced; **Penis:** the male sex organ which is made of the shaft and the glans; **Prostate gland:** a gland at the base of the urethra which produces some parts of the semen; **Scrotum:** A pouch-like structure that the epididymis and testicles hang in outside the pelvis. This acts as a climate control system for the testes; **Seminal Vesicle:** sac-like structures attached to the vas deferens that produce semen which lubricates and nourishes the sperm; **Testicle:** an oval body that is responsible for producing sperm and the male hormone, testosterone; **Urethra:** the channel that carries the semen and urine outside of the body through the penis; **Vas deferens:** A muscular tube that passes upward alongside the testicles and transports sperm from the epididymis to the seminal vesicle.

Quiz Answers:

1. B 2. B 3. A 4. A 5. C