

<b>Course</b>	Agricultural Science I
<b>Unit</b>	Introduction to Animal Reproduction
<b>Lesson</b>	Female Reproductive System
<b>Estimated Time</b>	50 minutes

### Student Outcome

Explain the purpose of female reproductive parts and hormones.

### Learning Objectives

1. Identify the female reproductive parts.
2. Describe the functions/purposes of the female reproductive parts.
3. Identify the female reproductive hormones.
4. Describe the role each female hormone plays in reproduction.

### Grade Level Expectations

SC/LO/3/A/09-11/a

### Resources, Supplies & Equipment, and Supplemental Information

#### Resources

1. PowerPoint Slides
  - ☐ PPt 1 – Reproductive System of the Cow – Top View
  - ☐ PPt 2 – Reproductive System of the Cow – Side View
  - ☐ PPt 3 – Reproductive System of the Sow – Top View
  - ☐ PPt 4 – Reproductive System of the Sow – Side View
  - ☐ PPt 5 – Reproductive System of Fowl – Hen
  - ☐ PPt 6 – Reproductive System of the Ewe
  - ☐ PPt 7 – Reproductive System of the Mare
  - ☐ PPt 8 – Reproductive System of the Bitch
  - ☐ PPt 9 – Reproductive System of the Doe
  - ☐ PPt 10 – Hormone Cycle
2. Activity Sheets
  - ☐ AS 1 – Reproductive System of the Cow
  - ☐ AS 2 – Dissection of a Female Reproductive Tract
3. *Introduction to Animal Reproduction (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1996.
4. *Introduction to Animal Reproduction Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

#### Supplies & Equipment

- ☐ Obtain a female reproductive tract from a processing plant or veterinarian for dissection. Keep the reproductive tract frozen until the dissection is performed.

#### Supplemental Information

1. Internet Sites
  - ☐ Animal Science Publications. MU Extension. University of Missouri-Columbia.

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Accessed April 12, 2007, from

<http://extension.missouri.edu/explore/agguides/ansci/>.







- ❑ Embryology in the Classroom (the hen's reproductive tract). Penn State College of Agricultural Sciences. Accessed June 14, 2007, from <http://4hembryology.psu.edu/female.html>.
  - ❑ Female anatomy. University of Bristol, England. Accessed June 15, 2007, from <http://137.222.110.150/calnet/abdpel11/page3.htm>.
  - ❑ Female Anatomy and Histology. University of Wisconsin. Accessed June 15, 2007, from [http://www.wisc.edu/ansci\\_repro/lec/lec1/female\\_hist.html](http://www.wisc.edu/ansci_repro/lec/lec1/female_hist.html).
  - ❑ Female reproductive tract. University of Bristol, England. Accessed June 15, 2007, from <http://137.222.110.150/calnet/vetrep7/page2.htm>.
  - ❑ Loch, W. and J. W. Massey. *Horse Breeding Arithmetic: 2 + 2 = 1*. MU Extension. University of Missouri-Columbia. Accessed June 14, 2007, from <http://extension.missouri.edu/explore/agguides/ansci/g02790.htm>.
  - ❑ Löfstedt, R. *Reproductive Physiology of Mares*. University of Prince Edward Island, Canada. Accessed June 15, 2007, from <http://people.upei.ca/lofstedt/opence/horsephysiol.html>.
  - ❑ Schoenian, S. "Reproduction in the Ewe." *Sheep 201: A Beginner's Guide to Raising Sheep*. Accessed June 15, 2007, from <http://www.sheep101.info/201/ewerepro.html>.
  - ❑ Singleton, W. and M. Diekman. *Reproductive Physiology and Anatomy of the Sow*. Purdue University Department of Animal Sciences. Accessed June 15, 2007, from <http://www.ansc.purdue.edu/swine/porkpage/repro/physiol/reppaper.htm>.
  - ❑ Sterle, J. and T. Safranski. *Artificial Insemination in Swine: Breeding the Female*. University of Missouri-Columbia. Accessed June 15, 2007, from <http://extension.missouri.edu/explore/agguides/ansci/g02312.htm>.
  - ❑ Wattiaux, M. A. and W. T. Howard. "The Reproductive Function of Dairy Cattle." *Dairy Essentials*. University of Wisconsin. Accessed June 14, 2007, from [http://babcock.cals.wisc.edu/downloads/de\\_html/ch08.en.html](http://babcock.cals.wisc.edu/downloads/de_html/ch08.en.html).
  - ❑ Whittier, J. C. *Reproductive Anatomy and Physiology of the Cow*. University of Missouri-Columbia. Accessed June 15, 2007, from <http://extension.missouri.edu/explore/agguides/ansci/g02015.htm>.
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### Interest Approach

Display a reproductive tract to be used for the dissection in AS 2. Ask students if they can identify the different parts of the reproductive tract.

### Communicate the Learning Objectives

1. Identify the female reproductive parts.
2. Describe the functions/purposes of the female reproductive parts.
3. Identify the female reproductive hormones.
4. Describe the role each female hormone plays in reproduction.

Instructor Directions	Content Outline
<b>Objective 1</b>  <i>Hand out AS 1. Label all the reproductive parts of the cow using PPT1. Display the PPTs for the other species and discuss any differences. Have students complete AS 2.</i>   AS 1 – Reproductive System of the Cow   AS 2 – Dissection of a Female Reproductive Tract   PPT 1 – Reproductive System of the Cow – Top View   PPT 2 – Reproductive System of the Cow – Side View   PPT 3 – Reproductive System of the Sow – Top View   PPT 4 – Reproductive System of the Sow – Side View	<b>Identify the female reproductive parts.</b>  Cow reproductive parts <ol style="list-style-type: none"><li>1. Ovaries</li><li>2. Infundibulum</li><li>3. Oviducts (also called fallopian tubes)</li><li>4. Uterus</li><li>5. Uterine horns</li><li>6. Cervix</li><li>7. Vagina</li><li>8. Urinary bladder</li><li>9. Urethra</li><li>10. Clitoris</li><li>11. Vulva</li></ol> Sow reproductive parts <ol style="list-style-type: none"><li>1. Uterine horns more prominent</li><li>2. Cervix with protruding areas rather than folds as in the cow</li></ol> Ewe reproductive parts - very similar to the cow's  Mare reproductive parts - smoother cervix without folds like the cow's  Bitch reproductive parts - more prominent uterine horns than the cow  Doe reproductive parts <ol style="list-style-type: none"><li>1. Prominent uterine horns</li><li>2. Two cervices</li></ol>

Instructor Directions	Content Outline
<ul style="list-style-type: none"> <li><input type="checkbox"/> PPt 5 – Reproductive System of Fowl – Hen</li> <li><input type="checkbox"/> PPt 6 – Reproductive System of the Ewe</li> <li><input type="checkbox"/> PPt 7 – Reproductive System of the Mare</li> <li><input type="checkbox"/> PPt 8 – Reproductive System of the Bitch</li> <li><input type="checkbox"/> PPt 9 – Reproductive System of the Doe</li> </ul>	<p>Fowl reproductive parts</p> <ol style="list-style-type: none"> <li>1. Only the left ovary and oviduct are functional</li> <li>2. Oviduct with five parts - infundibulum, magnum, isthmus, uterus, and vagina</li> <li>3. Cloaca</li> <li>4. Vent</li> </ol>
<p><b>Objective 2</b></p> <p><i>Discuss how each part of the female reproductive system works. Use PPt1 to guide the discussion on the functions of the cow's reproductive parts. Discuss any differences among the species.</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> PPt 1 – Reproductive System of the Cow – Top View</li> </ul>	<p><b>Describe the functions/purposes of the female reproductive parts.</b></p> <p>Functions of the cow's reproductive parts</p> <ol style="list-style-type: none"> <li>1. Ovary - produces ova (eggs) and female sex hormones</li> <li>2. Infundibulum - receives the egg from the ovary</li> <li>3. Oviduct - carries the egg from the ovary to uterus and is the site of fertilization</li> <li>4. Uterus - location of the development of the fertilized egg</li> <li>5. Uterine horns - the part of the uterus where the fertilized egg attaches and the fetus develops; litter-bearing animals have more pronounced uterine horns</li> <li>6. Cervix - acts as a passageway to the uterus for sperm and keeps foreign material out during pregnancy by forming a waxy mucus plug; also acts as a part of the birth canal</li> <li>7. Vagina - the site through which male semen is deposited into the female reproductive system, as well as a part of the birth canal and the passageway for urine</li> <li>8. Urinary bladder - stores urine; has no reproductive function</li> <li>9. Urethra - carries urine to the vagina from the bladder; has no reproductive function</li> <li>10. Clitoris - stimulated during mating</li> <li>11. Vulva - external opening to the vagina</li> </ol>

Instructor Directions	Content Outline
	<p>Functions of the sow's reproductive parts - the same as the cow's</p> <p>Functions of the ewe's reproductive parts - the same as the cow's</p> <p>Functions of the mare's reproductive parts - the same as the cow's</p> <p>Functions of the reproductive parts of the bitch - the same as the cow's</p> <p>Functions of the reproductive parts of the doe - the same as the cow's</p> <p>Functions of the reproductive parts of the fowl</p> <ol style="list-style-type: none"> <li>1. Ovary - produces ova, with the nucleus of an egg attached to a yolk sac</li> <li>2. Oviduct - transports the mature yolk to the cloaca; carries semen</li> <li>3. Infundibulum - the site of fertilization; it receives the mature yolk from the ovary and stores semen in its folds</li> <li>4. Magnum - secretes the albumen that surrounds the yolk</li> <li>5. Isthmus - adds the shell membranes to the egg yolk and white</li> <li>6. Uterus - adds a thin white, shell, and pigment</li> <li>7. Vagina - produces the cuticle, or exterior egg coat, and stores the egg before laying</li> <li>8. Cloaca - the junction of the digestive and reproductive systems; receives the male's semen and passes the egg during laying</li> <li>9. Vent - opening through which the egg is laid</li> </ol>
<p><b>Objective 3</b></p> <p><i>Ask students why hormones are important in the female reproductive system. Discuss the female hormones.</i></p>	<p><b>Identify the female reproductive hormones.</b></p> <p>Mammals</p> <ol style="list-style-type: none"> <li>1. Gonadotrophin releasing hormone (GnRH)</li> <li>2. Follicle stimulating hormone (FSH)</li> <li>3. Luteinizing hormone (LH)</li> <li>4. Estrogen</li> <li>5. Progesterone</li> <li>6. Prostaglandin</li> </ol>

Instructor Directions	Content Outline
	<p>Fowl</p> <ol style="list-style-type: none"> <li>1. FSH</li> <li>2. LH</li> <li>3. Estrogen</li> <li>4. Progesterone</li> </ol>
<p><b>Objective 4</b></p> <p><i>Discuss the role of hormones in successful reproduction. Use PPt 10 to show how the hormones function in the female reproductive system.</i></p> <p><input type="checkbox"/> PPt 10 – Hormone Cycle</p>	<p><b>Describe the role each female reproductive hormone plays in reproduction.</b></p> <p>GnRH - stimulates the release of FSH and LH</p> <p>FSH - stimulates the development of a mature ovum</p> <p>Estrogen - causes the development of sex organs and secondary sex characteristics and a desire to mate; also suppresses further FSH secretion from the pituitary and encourages the production of LH; assists in sperm transport by causing uterine contractions</p> <p>LH - causes the follicle to release the ovum and develops the corpus luteum</p> <p>Progesterone - prevents FSH and LH production, as well as follicle development and the secretion of estrogen; maintains a pregnancy by preventing uterine contractions and triggering secretions to nourish the egg and blocks further ovarian activity by inhibiting the secretion of GnRH</p> <p>Prostaglandin - ends progesterone production by causing the deterioration of the corpus luteum</p> <p>Hormones in fowl</p> <ol style="list-style-type: none"> <li>1. FSH - stimulates the reproductive system, developing the yolks and causing the secretion of estrogen and progesterone</li> <li>2. Estrogen - increases blood calcium, protein, fats, vitamins, and other egg formation substances and separates the pubic bones and enlarges the vent for egg laying</li> <li>3. Progesterone - causes the hypothalamus to trigger LH production</li> <li>4. LH - stimulates the release of the mature yolk</li> </ol>



Instructor Directions	Content Outline
	<ol style="list-style-type: none"> <li>10. Cervix</li> <li>11. Opening of urethra</li> <li>12. Vulva</li> <li>13. i</li> <li>14. c</li> <li>15. g</li> <li>16. f</li> <li>17. e</li> <li>18. a</li> <li>19. j</li> <li>20. b</li> <li>21. c</li> <li>22. c</li> <li>23. a</li> <li>24. Infundibulum, magnum, isthmus, uterus, and vagina</li> <li>25. Progesterone maintains the pregnancy by preventing uterine contractions and triggering secretions to nourish the egg. It also blocks further ovarian activity by inhibiting the secretion of GnRH.</li> <li>26. FSH production is stimulated by increasing light. FSH develops the yolks and causes the secretion of estrogen and progesterone.</li> </ol>