

## Course: AG 534 Zoology - Science of Animal Reproduction

Unit	Objective	CAERT Lesson Plan Library	Unit	Problem Area	Lesson
Introduction to Animal Science	Match terms associated with an introduction to the livestock industry to their correct definitions.	Animal. Plant & Soil Science	B	1	1,2,3
Introduction to Animal Science	Name the types of livestock.	Animal. Plant & Soil Science	B	2	1-6
Introduction to Animal Science	Name the products and services livestock provide.	Animal. Plant & Soil Science	B	1	2
Introduction to Animal Science	Identify the sources of Idaho cash farm receipts.				
Introduction to Animal Science	Identify Idaho's rank in the nation's agriculture for crops, livestock and livestock products.				
Introduction to Animal Science	Distinguish between primary and secondary food sources.				
Introduction to Animal Science	Describe reasons for and against using livestock as a food source.	Animal. Plant & Soil Science	B	1	2
Introduction to Animal Science	List three specific careers in each of the seven areas of livestock industry employment.	Animal. Plant & Soil Science	B	1	3
Introduction to Animal Science	Develop an opinion on the future of livestock production..	Animal. Plant & Soil Science	B	1	1
Introduction to Animal Science	Conduct a community survey on the types of livestock raised in the area.				
Introduction to Animal Science	Be familiar with current employment information in the livestock industry.	Animal. Plant & Soil Science	B	1	3
Introduction to Animal Science	Explain general laboratory procedures, equipment and report writing.	Animal. Plant & Soil Science	A	1	2-4
Introduction to Animal Science	Demonstrate the use of a compound microscope	Agriscience	C	3	1
The Organisms	Define terms related to the organisms.	Agriscience	C	5	1
The Organisms	List the seven categories of the classification system in order from largest to smallest.				
The Organisms	Outline the classification system for humans.				
The Organisms	List three traits that help place an organism into a kingdom.				
The Organisms	List and define the five kingdoms in the classification system.				
The Organisms	State two biological principles for each of the categories that demonstrate commonness among organisms.				
The Organisms	Outline the classification of the major livestock animals in the United States.				
The Organisms	Examine cells from the five kingdoms				

The Organisms	Classify organisms				
Cell Structure	Match terms associated with cell structure to their correct definitions.	Agriscience	C	3	1
Cell Structure	List three things which define a cell.	Agriscience	C	3	1
Cell Structure	State the four basic ideas of the cell theory.	Agriscience	C	3	1
Cell Structure	List three ways that cells can differ from one another	Agriscience	C	3	1
Cell Structure	Label the correct parts of an animal cell	Agriscience	C	3	1
Cell Structure	List and describe the cell components and their functions.	Agriscience	C	3	1
Cell Structure	Name and describe the functions of the cell organelles.	Agriscience	C	3	1
Cell Structure	Describe the difference between plant and animal cells.	Agriscience	C	3	1
Cell Structure	List and describe the functions of the major types of specialized animal cells.	Agriscience	C	5	2
Cell Structure	Identify and describe cells.				
Cell Structure	Study cell parts.	Agriscience	C	3	1
Cell Structure	Identify differences between plant and animals cells.	Agriscience	C	3	1
Functions of the Cell	Match terms associated with cell function to the correct definitions.	Agriscience	C	3	1
Functions of the Cell	Explain the different ways materials can pass through a cell membrane (Cellular Transport).	Biological Science Application in Agriculture	B	2	7
Functions of the Cell	List three reasons why photosynthesis is the most important process in the world.	Animal, Plant & Soil Science	C	3	3
Functions of the Cell	Explain the processes involved in photosynthesis.	Animal, Plant & Soil Science	C	3	3
Functions of the Cell	List five factors that affect photosynthetic rate.	Animal, Plant & Soil Science	C	3	3
Functions of the Cell	Explain the process of respiration.				
Functions of the Cell	Outline the relationship between photosynthesis and respiration.	Animal, Plant & Soil Science	C	3	4
Functions of the Cell	Explain the process of aerobic respiration.	Animal, Plant & Soil Science	C	3	4
Functions of the Cell	Explain the process of fermentation.	Animal, Plant & Soil Science	C	3	4
Functions of the Cell	Define homeostasis and explain how cells achieve this state.				
Functions of the Cell	Study the movement of substances across membranes.	Biological Science Application in Agriculture	B	2	7
Animal Tissues, Systems and Organs	Describe the four primary animal tissues.				

Animal Tissues, Systems and Organs	Identify the types of epithelial tissue when given a description of each.				
Animal Tissues, Systems and Organs	Identify the types of connective tissue when given a description of each.				
Animal Tissues, Systems and Organs	Identify the types of muscular tissue when given a description of each.				
Animal Tissues, Systems and Organs	Identify the types of nervous tissue when given a description of each.				
Animal Tissues, Systems and Organs	State the functions and list the three major organs of the circulatory system.	Agriscience	C	5	a
Animal Tissues, Systems and Organs	State the functions and list the seven major organs of the digestive system.	Agriscience	C	5	2
Animal Tissues, Systems and Organs	State the function and list the two major organs of the respiratory system.	Agriscience	C	5	2
Animal Tissues, Systems and Organs	State the function and list the two major organs of the excretory system.	Agriscience	C	5	2
Animal Tissues, Systems and Organs	State the function and list the three major organs of the nervous system.	Agriscience	C	5	2
Animal Tissues, Systems and Organs	State the function and list the major organ of the endocrine system.	Agriscience	C	5	2
Animal Tissues, Systems and Organs	State the function and list the major organ of the skeletal system.	Agriscience	C	5	2
Animal Tissues, Systems and Organs	State the function and list the major organ of the muscular system.	Agriscience	C	5	2
Animal Tissues, Systems and Organs	State the function and list the two major organs of the reproductive system.	Agriscience	C	5	2
Animal Tissues, Systems and Organs	Discuss the nervous system anatomy.	Agriscience	C	5	2
Animal Tissues, Systems and Organs	Discuss the respiratory system.	Agriscience	C	5	2
Animal Tissues, Systems and Organs	Discuss the structure of the heart.	Agriscience	C	5	2
Genetic and Heredity	Define terms related to genetics and heredity.	Animal, Plant & Soil Science Biological Science in Ag	B B	4 1	4 B1-1
Genetic and Heredity	Identify the phases of mitosis and meiosis.				
Genetic and Heredity	Explain why genes are important in animal breeding.	Biological Science in Ag	B	1	B1-1
Genetic and Heredity	List and describe the two ways in which genes control inherited traits.	Animal, Plant & Soil Science Biological Science in Ag	B B	4 1	4 B1-1
Genetic and Heredity	Define dominant gene and recessive gene.	Animal, Plant & Soil Science	B	4	1

Genetic and Heredity	Define and give an example of incomplete dominance.	Animal, Plant & Soil Science	B	4	1
Genetic and Heredity	Demonstrate the use of the punnett square to predict the traits of the offspring when the male and female carry heterozygous gene pairs of a given trait.	Animal, Plant & Soil Science Biological Science in Ag	B B	4 1	4 B1-1
Genetic and Heredity	Explain how the sex of the offspring is determined in mammals and poultry.				
Genetic and Heredity	Define and give an example of sex-linked characteristics.	Animal, Plant & Soil Science Biological Science in Ag	B B	4 1	4 B1-1
Genetic and Heredity	Explain linkage, crossover and mutation.	Animal, Plant & Soil Science Biological Science in Ag	B B	4 1	4 B1-1
Genetic and Heredity	Match traits of beef animals to their respective heritability estimates.	Biological Science in Ag	B	1	B1-1
Genetic and Heredity	Calculate estimated annual progress from genetic selection.	Biological Science in Ag	B	1	B1-1
Genetic and Heredity	Describe the components of the modified contemporary comparison system for dairy bull evaluation.				
Genetic and Heredity	List the pairs of chromosomes for each of the various species of livestock.	Biological Science in Ag	B	1	B1-1
Genetic and Heredity	Examine the phases of meiosis and mitosis.				
Genetic and Heredity	Predict inheritance.	Biological Science in Ag	B	1	B1-1
Genetic and Heredity	Study genetics by breeding fruit flies.				
Macroscopic Male Functional Anatomy	List the male primary and accessory sex organs and the copulatory organ.	Animal, Plant & Soil Science	B	4	1
Macroscopic Male Functional Anatomy	Describe the functions of the male reproductive organs.	Animal, Plant & Soil Science	B	4	1
Macroscopic Male Functional Anatomy	Label the reproductive tract of a bull.	Biological Science in Ag	B	3	B3-1
Macroscopic Male Functional Anatomy	Arrange in order the pathway of the spermatozoan in the male reproductive tract.	Biological Science in Ag	B	3	B3-1
Macroscopic Male Functional Anatomy	List four problems related to the temperature of the testes and the three structures that regulate the temperature.				
Macroscopic Male Functional Anatomy	Define monorchid and explain how it may be determined in the stallion.				
Macroscopic Male Functional Anatomy	Explain the cause of a scrotal hernia.				

Macroscopic Male Functional Anatomy	Indicate where sperm is mixed with the accessory fluids first to become semen.	Animal, Plant & Soil Science	B	4	1
Macroscopic Male Functional Anatomy	Describe the differences between the penis structure of the bull and stallion.	Biological Science in Ag	B	3	B3-1
Microscopic Anatomy of Spermatogenesis	Define terms related to microscopic anatomy and spermatogenesis.				
Microscopic Anatomy of Spermatogenesis	Match cell types to their correct descriptions.				
Microscopic Anatomy of Spermatogenesis	Match reproductive organs to their correct cell types.				
Microscopic Anatomy of Spermatogenesis	Identify the types of cells found in the scrotum, parietal vaginal tunic, testis, visceral vaginal tunic and seminiferous tubules.				
Microscopic Anatomy of Spermatogenesis	Describe the function of the sustentacular cells.				
Microscopic Anatomy of Spermatogenesis	Identify the primary cells found in the seminiferous tubules.				
Microscopic Anatomy of Spermatogenesis	Explain spermatogenesis in detail, from its beginning to the mature spermatozoa.	Biological Science in Ag	B	3	B3-2
Microscopic Anatomy of Spermatogenesis	Diagram to show how many spermatozoa form from one spermatogonia.	Biological Science in Ag	B	3	B3-2
Microscopic Anatomy of Spermatogenesis	Indicate the number of days to complete spermatogenesis in the bull, ram and boar.	Biological Science in Ag	B	3	B3-2
Microscopic Anatomy of Spermatogenesis	List two factors that arrest spermatogenesis in bulls.	Biological Science in Ag	B	3	B3-2
Hormones and Puberty in the Male	Describe a hormone.				
Hormones and Puberty in the Male	Identify the complete hormone names from the abbreviations.				
Hormones and Puberty in the Male	Identify the action of the major reproductive hormones.				
Hormones and Puberty in the Male	Describe puberty.	Animal, Plant & Soil Science	B	4	2
Hormones and Puberty in the Male	List and describe the factors affecting attainment of puberty.	Animal, Plant & Soil Science	B	4	2
Hormones and Puberty in the Male	Describe the relationship of size, weight and age to puberty.				
Hormones and Puberty in the Male	List and discuss factors to consider when selecting breeding stock at puberty.				
Hormones and Puberty in the Male	Define gonadotropic.				

Male					
Hormones and Puberty in the Male	Describe the functions of the four parts of the hypophysis.				
Hormones and Puberty in the Male	List the effects of testosterone on secondary sex characteristics in the bull.	Animal, Plant & Soil Science	B	4	1
Hormones and Puberty in the Male	List the bull-to-cow ration when using young bulls for the first time and when using mature bulls.				
Ejaculation and Semen Collection	Explain the process of mating.	Biological Science in Ag	B	3	B3-2
Ejaculation and Semen Collection	Describe the composition of semen.	Biological Science in Ag	B	3	B3-2
Ejaculation and Semen Collection	List the point of semen disposition in the female by the bull, ram, boar and stallion.				
Ejaculation and Semen Collection	Describe the passage of sperm through the tract during ejaculation.	Biological Science in Ag	B	3	B3-1
Ejaculation and Semen Collection	List the males that have fractionated ejaculated and describe the three fractions of each.				
Ejaculation and Semen Collection	Describe the various methods of collecting semen and one advantage and disadvantage of each.				
Ejaculation and Semen Collection	Describe in detail the use of the artificial vagina for collecting semen from the bull, ram, boar and stallion.	Biological Science in Ag	B	3	B3-1
Ejaculation and Semen Collection	Describe in detail the use of the electroejaculate for collecting semen from the bull and ram.				
Ejaculation and Semen Collection	Name the parts of the sperm cell.	Biological Science in Ag	B	3	B3-2
Ejaculation and Semen Collection	Label the types of abnormal sperm.	Biological Science in Ag	B	3	B3-2
Ejaculation and Semen Collection	Describe the three factors used in semen evaluation.	Biological Science in Ag	B	3	B3-2
Ejaculation and Semen Collection	Describe the quality of bovine semen based on color, foreign material, wave pattern and progressive motility.				
Ejaculation and Semen Collection	Evaluate semen based on color, foreign material, wave pattern, motility and abnormal sperm.				
Ejaculation and Semen Collection	Collect and evaluate sperm.	Biological Science in Ag	B	3	B3-2
Breeding Soundness Evaluation	List and describe in detail the criteria used for evaluating the outward signs of fertility in the male.				

Breeding Soundness Evaluation	List the internal reproductive organs that are evaluated for breeding soundness.				
Breeding Soundness Evaluation	Explain how the internal reproductive organs that are evaluated for breeding soundness.				
Breeding Soundness Evaluation	Describe two problems that may be found when evaluating the internal reproductive organs for breeding soundness.				
Breeding Soundness Evaluation	List and discuss the kinds of performance records which might be used when selecting breeding stock.	Animal, Plant & Soil Science	B	2	2
Breeding Soundness Evaluation	Explain how a pedigree might be used when selecting breeding stock.	Animal, Plant & Soil Science	B	2	1-4
Breeding Soundness Evaluation	List the desirable and undesirable characteristics to look for when evaluating beef breeding stock.	Animal, Plant & Soil Science	B	2	1
Breeding Soundness Evaluation	Match the parts of a dairy cow to a description of how they should look in an ideal animal.	Animal, Plant & Soil Science	B	2	2
Breeding Soundness Evaluation	Distinguish between desirable and undesirable general appearance, body capacity, mammary system and dairy character when evaluating dairy animals.	Animal, Plant & Soil Science	B	2	2
Breeding Soundness Evaluation	Describe the components of the modified contemporary comparison system for bull evaluation.	Animal, Plant & Soil Science	B	2	2
Breeding Soundness Evaluation	List desirable and undesirable characteristics of breeding swine.	Animal, Plant & Soil Science	B	2	3
Breeding Soundness Evaluation	Describe the reasons for considering various selection factors when choosing quality swine breeding stock.	Animal, Plant & Soil Science	B	2	3
Breeding Soundness Evaluation	Describe the primary difference between sheep selection and selection of other meat animals.	Animal, Plant & Soil Science	B	2	4
Breeding Soundness Evaluation	List characteristics to avoid when selecting breeding sheep.	Animal, Plant & Soil Science	B	2	4
Semen Production, Processing and Storage	Discuss the processing of fresh bull semen, including the extenders used.				
Semen Production, Processing and Storage	List and describe the three methods of processing frozen sperm.				
Semen Production, Processing and Storage	List the five components of semen extender.				
Semen Production, Processing and Storage	Explain how to calculate semen extension for processing fresh semen when given volume,	Biological Science in Ag	B	3	B3-2

	concentration, motility, normality, and number of viable cells per insemination.				
Semen Production, Processing and Storage	List six advantages and three disadvantages of packaging semen in straws.				
Semen Production, Processing and Storage	List four advantages and five disadvantages of packaging semen in ampules.				
Semen Production, Processing and Storage	List four advantages and six disadvantages of packaging semen in pellets.				
Semen Production, Processing and Storage	Explain which method of selecting a sire is most effective.				
Semen Production, Processing and Storage	Explain what 60-90 NR means.				
Macroscopic Female Functional Anatomy	Identify the parts of the female reproductive tract.	Animal, Plant & Soil Science Biological Science in Ag	B B	4 3	1 B3-1
Macroscopic Female Functional Anatomy	Match the parts of the female reproductive tract to their correct descriptions.	Animal, Plant & Soil Science Biological Science in Ag	B B	4 3	1 B3-1
Macroscopic Female Functional Anatomy	List the order of the ovum pathway in the female reproductive tract.	Animal, Plant & Soil Science Biological Science in Ag	B B	4 3	1 B3-1
Macroscopic Female Functional Anatomy	Identify the function and the three portions of the broad ligament.				
Macroscopic Female Functional Anatomy	List the three functions of the follicle.	Animal, Plant & Soil Science	B	4	1
Macroscopic Female Functional Anatomy	Describe the corpus hemorrhagicum.				
Macroscopic Female Functional Anatomy	Describe the corpus luteum and state its function.				
Macroscopic Female Functional Anatomy	Describe the corpus albicans and state its two functions.				
Macroscopic Female Functional Anatomy	Describe the differences in the ovaries of the cow, ewe, sow, and mare.				
Macroscopic Female Functional Anatomy	State the two general functions of the oviduct.	Animal, Plant & Soil Science	B	4	1
Macroscopic Female Functional Anatomy	Match structures of the oviduct with their correct functions and descriptions.				
Macroscopic Female Functional Anatomy	Explain how the sow's oviduct differs from the cow's oviduct.				
Macroscopic Female Functional Anatomy	Explain how the mare's oviduct differed from the cow's oviduct.				
Macroscopic Female Functional Anatomy	Explain how the ewe's oviduct differs from the cow's oviduct.				

Macroscopic Female Functional Anatomy	List and describe the three types of uteruses.	Animal, Plant & Soil Science	B	4	1
Macroscopic Female Functional Anatomy	Describe the caruncles and state their function.				
Macroscopic Female Functional Anatomy	Describe the uterus of the cow and ewe, sow and the mare.	Animal, Plant & Soil Science	B	4	1
Macroscopic Female Functional Anatomy	List five functions of the uterus.	Animal, Plant & Soil Science	B	4	1
Macroscopic Female Functional Anatomy	List the three functions of the cervix.	Animal, Plant & Soil Science Biological Science in Ag	B B	4 3	1 B3-1
Macroscopic Female Functional Anatomy	Describe the cow's cervix structure.				
Macroscopic Female Functional Anatomy	Describe how the cervix of the ewe, sow and mare differs from that of the cow.				
Macroscopic Female Functional Anatomy	State the functions of the vagina.	Animal, Plant & Soil Science	B	4	1
Macroscopic Female Functional Anatomy	Describe the structure of the vagina.	Animal, Plant & Soil Science	B	4	1
Macroscopic Female Functional Anatomy	Describe and list the function of the vestibule.				
Macroscopic Female Functional Anatomy	State the function of the vulva and clitoris.	Animal, Plant & Soil Science	B	4	1
Macroscopic Female Functional Anatomy	Examine the anatomy of the female reproductive tract.				
Microscopic Female Functional Anatomy	Describe in detail a follicle, corpus hemorrhagicum, corpus luteum, corpus albicans, and an atretic follicle.				
Microscopic Female Functional Anatomy	List and describe the steps in follicular growth.				
Microscopic Female Functional Anatomy	Describe cell division during oogenesis.		B	3	B3-2
Microscopic Female Functional Anatomy	List the types of cells found in the oviduct, uterus, cervix, vagina, vestibule and vulva.				
Microscopic Female Functional Anatomy	Indicate where the majority of the oocytes are located at birth.	Biological Science in Ag	B	3	B3-2
Microscopic Female Functional Anatomy	Explain how one would distinguish between a follicle and a corpus luteum by palpation in the cow.				
Microscopic Female Functional Anatomy	Indicate when the myometrium is most active.				

Hormones and Puberty in the Female	List the hormones originating in the hypothalamus, hypophysis and the gonads that are related to female reproduction.				
Hormones and Puberty in the Female	Identify the target organs of the various hormones related to female reproduction.				
Hormones and Puberty in the Female	Identify the action of each of the various hormones related to female reproduction.				
Hormones and Puberty in the Female	Describe the four factors related to puberty and their effects.				
Hormones and Puberty in the Female	List the ages and ranges for the onset of puberty in the various species.				
Hormones and Puberty in the Female	Explain why one would want to shorten the prepubertal interval.				
Estrus and the Estrous Cycle	Describe the following terms: proestrus, estrus, metestrus, diestrus, an anestrus	Biological Science in Ag Animal, Plant and Soils Science	B A	3 4	B3-1 2
Estrus and the Estrous Cycle	Describe in detail the symptoms of estrus in the cow.				
Estrus and the Estrous Cycle	Describe in detail the symptoms of estrus in the ewe.				
Estrus and the Estrous Cycle	Describe in detail the symptoms of estrus in the sow.				
Estrus and the Estrous Cycle	Describe in detail the symptoms of estrus in the mare.				
Estrus and the Estrous Cycle	Describe the growth of ovarian structures through an estrous cycle.				
Estrus and the Estrous Cycle	Indicate the length of the estrous cycle for the cow, sow, ewe, and mare.				
Estrus and the Estrous Cycle	Describe the activity of the oviduct at the time of ovulation.				
Estrus and the Estrous Cycle	Explain the menstrual cycle and how the cyclic pattern of women differs from that of the domestic animals.				
Ovulation Control	List six advantages and four disadvantages of synchronized ovulation.				
Ovulation Control	List the various compounds used for ovulation control and the class (or classes) of livestock they are used for.				
Ovulation Control	Distinguish between the action of progesterone, progestrogens, and prostaglandins for ovulation control.	Biological Science in Ag	B	3	B3-1

Ovulation Control	Explain why it is necessary to have a functional CL before suing prostaglandins.				
Ovulation Control	Explain why two injections of prostaglandins are needed to control ovulation.	Biological Science in Ag	B	3	B3-1
Ovulation Control	Explain why intramuscular injection requires a higher dosage than intrauterine injections.				
Ovulation Control	Explain the difference between prostaglandin and prostaglandin analogue.				
Ovulation Control	List the detrimental side effects that are present in swine when synchronized with progestogens.				
Ovulation Control	Outline a general plan for breeding sheep in anestrus.				
Ovulation Control	Outline a method for increasing the number of pigs per litter.				
Ovulation Control	List the four programs used to superovulate mares.				
Ovulation Control	State the hormone sequence that is used to superovulate a cow.				
Ovulation Control	Explain why one would want to breed calves before they normally reach puberty.				
Artificial Insemination	List seven advantages of artificial insemination of the cow.	Biological Science in Ag	B	3	B1-3
Artificial Insemination	List four disadvantages of artificial insemination of the cow.	Biological Science in Ag	B	3	B1-3
Artificial Insemination	Describe the signs of estrus in cows.	Biological Science in Ag	B	3	B1-3
Artificial Insemination	State which sign of estrus is the most important with regard to time of insemination.	Biological Science in Ag	B	3	B1-3
Artificial Insemination	Describe the three methods of checking for estrus in cattle.	Biological Science in Ag	B	3	B1-3
Artificial Insemination	List the necessary records need in an artificial insemination program.	Biological Science in Ag	B	3	B1-3
Artificial Insemination	Explain the A.M. – P.M. insemination rule.	Biological Science in Ag	B	3	B1-3
Artificial Insemination	Indicate the optimum time for insemination for cows.	Biological Science in Ag	B	3	B1-3
Artificial Insemination	Label equipment necessary for artificial insemination.	Biological Science in Ag	B	3	B1-3
Artificial Insemination	Describe and outline the steps of the rectocervical technique for artificially inseminating a cow.	Biological Science in Ag	B	3	B1-3
Artificial Insemination	Indicate the best temperature of thaw frozen semen to be used immediately.	Biological Science in Ag	B	3	B1-3

Artificial Insemination	List five advantages and three disadvantages of artificial insemination of the ewe.	Biological Science in Ag	B	3	B1-3
Artificial Insemination	Explain why sheep artificial insemination is so poorly accepted in the United States.				
Artificial Insemination	Discuss five areas of management of a sheep artificial insemination program.				
Artificial Insemination	Indicate the optimum time of insemination for ewes.				
Artificial Insemination	Describe and outline the steps of the speculum technique for artificially inseminating a ewe.				
Artificial Insemination	List five advantages and five disadvantages of artificial insemination of the sow.	Biological Science in Ag	B	3	B1-3
Artificial Insemination	Discuss three areas of management of a swine artificial insemination program.				
Fertilization and Embryo Transfer	Describe the mechanisms involved in sperm and ovum transport.	Biological Science in Ag	B	3	B3-2
Fertilization and Embryo Transfer	List in order the barriers to sperm penetration of the ovum.	Biological Science in Ag	B	3	B3-2
Fertilization and Embryo Transfer	Define syngamy.				
Fertilization and Embryo Transfer	Indicate where fertilization takes place.	Biological Science in Ag Animal, Plant and Soils Science	B B	3 4	B3-2 2
Fertilization and Embryo Transfer	Indicate how long it takes sperm to reach the point of fertilization in the cow, ewe, and sow.				
Fertilization and Embryo Transfer	Explain where sperm is deposited in the normal copulation of the horse.				
Fertilization and Embryo Transfer	List six advantages and four disadvantages of embryo transplants.				
Fertilization and Embryo Transfer	Discuss synchronization, condition, superovulation and insemination as related to embryo transfer.				
Fertilization and Embryo Transfer	Describe the main reason for transferring embryos in swine.				
Fertilization and Embryo Transfer	Describe in outline form the surgical procedure for embryo transplant in the cow.				
Fertilization and Embryo Transfer	Describe in outline form the non-surgical procedure for embryo transplant in the cow.				
Fertilization and Embryo Transfer	Describe in outline form the surgical procedure for embryo transplant in the ewe.				
Fertilization and Embryo Transfer	Describe in outline form the surgical procedure for				

Transfer	embryo transplant in the sow.				
Fertilization and Embryo Transfer	Describe in outline form the non-surgical procedure for embryo transplant in the sow.				
Fertilization and Embryo Transfer	Describe in outline form the non-surgical procedure for embryo transplant in the mare.				
Fertilization and Embryo Transfer	Distinguish between "good" and "bad" eggs.				
Biotechnology	Define biotechnology.	Animal, Plant & Soil Science	B	4	6
Biotechnology	List four broad applications of biotechnology in agriculture	Animal, Plant & Soil Science	B	4	5
Biotechnology	List four common uses of biotechnology in agricultural science that have been around for some time.	Animal, Plant & Soil Science	B B	4 4	5 6
Biotechnology	List and explain the three major techniques of biotechnology.	Animal, Plant & Soil Science	B	4	6
Biotechnology	Describe five current genetic research projects in plants of major impact on agriculture.				
Biotechnology	Describe five current genetic research projects in animals of major impact on agriculture.				
Biotechnology	List four areas of biotechnology applications in food processing.	Animal, Plant & Soil Science	B	4	5
Biotechnology	Describe four areas of public concern about biotechnology.	Animal, Plant & Soil Science	B	6	3
Biotechnology	Match the occurrence in the history of genetic engineering to the correct year of occurrence.				
Biotechnology	List eight areas of career opportunities in biotechnology.				
Biotechnology	List eight specific occupational titles in agricultural biotechnology.				
Biotechnology	Determine the ethics of biotechnology.	Animal, Plant & Soil Science	B	6	3
Biotechnology	Research a career in biotechnology.				
Biotechnology	Make yogurt.				
Gestation and Pregnancy Determination	List the gestation lengths for the cow, mare, sow and ewe.				
Gestation and Pregnancy Determination	Describe the importance of progesterone to maintenance of pregnancy.				
Gestation and Pregnancy Determination	Indicate the source of progesterone in the cow, mare, sow and ewe.				
Gestation and Pregnancy Determination	List and describe the three stages of development of prenatal young.				

Gestation and Pregnancy Determination	List and describe the three cell layers of the gastrula.				
Gestation and Pregnancy Determination	List and describe the three extraembryonic membranes.				
Gestation and Pregnancy Determination	List the age of the embryo developmental periods of the calf.				
Gestation and Pregnancy Determination	List the age of the embryo developmental periods of the lamb.				
Gestation and Pregnancy Determination	List the age of the embryo developmental periods of the pig.				
Gestation and Pregnancy Determination	List the age of the embryo developmental periods of the foal.				
Gestation and Pregnancy Determination	List the three types of placentae structure, the layers of cell types in each, and the species in which each is found.				
Gestation and Pregnancy Determination	List and describe the three placentae shapes and the species in which each is found.				
Gestation and Pregnancy Determination	List four reasons for pregnancy determination.				
Gestation and Pregnancy Determination	Name five distinct indications of pregnancy detectable in rectal examination.				
Gestation and Pregnancy Determination	Name the techniques used in pregnancy testing of ewes and sows.				
Gestation and Pregnancy Determination	List the determining characteristics for age of the fetus in the cow at 30 days of gestation, 120 days of gestation, and 270 days of gestation.				
Gestation and Pregnancy Determination	Pregnancy test a cow using rectal examination.				
Parturition and the Postpartum Period	Define terms associated with parturition and the postpartum period.				
Parturition and the Postpartum Period	List the six factors influencing parturition.				
Parturition and the Postpartum Period	Explain what changes occur in progesterone and estrogen at parturition in the cow, ewe, sow, and mare.				
Parturition and the Postpartum Period	Describe the process of parturition in the cow and ewe.				
Parturition and the Postpartum Period	Describe the process of parturition in the mare.				
Parturition and the Postpartum	List the problems that may arise during the birth of				

Period	a calf and methods of alleviating them.				
Parturition and the Postpartum Period	List the problems that may arise during the birth of a lamb and methods of alleviating them.				
Parturition and the Postpartum Period	List the problems that may arise during the birth of piglets and the methods of alleviating them.				
Parturition and the Postpartum Period	List the problems that may arise during the birth of a foal and the methods of alleviating them.				
Parturition and the Postpartum Period	Discuss the relationship of the postpartum period to ensuing estrous activity and conception in the cow.				
Parturition and the Postpartum Period	Discuss the relationship of the postpartum period to ensuing estrous activity and conception in the ewe.				
Parturition and the Postpartum Period	Discuss the relationship of the postpartum period to ensuing estrous activity and conception in the sow.				
Parturition and the Postpartum Period	Discuss the relationship of the postpartum period to ensuing estrous activity and conception in the mare.				
Reproductive Diseases	Identify symptoms of major reproductive diseases.				
Reproductive Diseases	List the necessary specimens needed for diagnosing by the veterinarian or diagnostic laboratory.				
Reproductive Diseases	Identify the five diseases transmitted by coitus only (venereal diseases).				
Reproductive Diseases	Describe the importance of preventive measures and the need for the veterinarian and diagnostic laboratory.				
Reproductive Diseases	Indicate the hormone that may be deficient during gestation.				
Reproductive Diseases	Explain what causes torsion of the umbilical cord and why it would cause abortion.				