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| **Essential Understandings** | * The reproductive system ensures continuity of the species by producing offspring. * Male and female gonads produce both gametes and hormones. * Fertilization and embryo development occur in the female reproductive tract. * Labor is initiated by hormones and has three stages. |
| **Essential**  **Questions** | * What are the organs of the male and female reproductive organs and what are their functions? * How are sperm cells made in the male reproductive system? * How are egg cells made in the female reproductive system? * What are the phases and controls of the menstrual cycle? * How and where does fertilization occur? * What occurs during the first eight weeks of embryo development? * How does an embryo differ from a fetus? * How is labor initiated and what are the three stages of labor? * What agents can interfere with normal fetal development? * How do the male and female reproductive systems change as people age? |
| **Essential Knowledge** | * The male reproductive organs produce sperm cells that are made during spermatogenesis. * The female reproductive organs produce egg cells that are made during oogenesis. * The menstrual cycle is made of the menstrual phase, the proliferative phase, and the secretory phase and is influenced by lutenizing hormone, follicle stimulating hormone, estrogen and progesterone. * Fertilization occurs in the fallopian tubes and cells division and tissue development lays the groundwork for all of the organ systems in the first eight weeks. * At the beginning of the ninth week the embryo is referred to as a fetus and from that point on growth and organ specialization occurs. * Labor is initiated by hormones and the three phases of labor are the dilation stage, the expulsion stage, and the placental stage. * Menopause occurs in women when a whole year passes without menstruation. |
| **Vocabulary** | Gonads or primary sex organs  Gametes  Accessory reproductive organs  Sperm  Ova  Testes  Tunica albuginea  Seminiferous tubules  Interstitial cells  Testosterone  Duct System:  Epididymis  Ductus Deferens or vas deferens  Spermatic cord  Ampulla  Ejaculatory duct  Ejaculation  Urethra  Prostatic urethra  Membranous urethra  Spongy (penile) urethra  Seminal vesicles  Prostate  Cystitis  Prostatitis  Prostatic cancer  Bulbourethral glands  Semen  Male infertility  Semen analysis  Scrotum  Penis  Shaft  Glans penis  Prepuce  Foreskin  Erectile tissue  Erection  Spermatogenesis  Spermatogonia  Follicle-stimulating hormone (FSH)  Primary spermatocyte  Meiosis  Spermatids  Spermiogenesis  Acrosome  Testosterone  Luteinizing hormone (LH)  Secondary sex characteristics  Sexual infantilism  Sterility  Ovaries  Ovarian follicles  Oocyte  Follicle cells  Vesicular or Graafian follicle  Ovulation  Corpus luteum  Suspensory ligaments  Ovarian ligaments  Broad ligament  Uterine or fallopian tubes  Fimbriae  Gonorrhea  Pelvic inflammatory disease (PID)  Uterus  Round and uterosacral ligaments  Body  Fundus  Cervix  Endometrium  Implantation  Cancer of the cervix  Myometrium  Perimetrium  Vagina  Hymen  External genitalia  Vulva  Mons pubis  Labia majora  Labia minora  Vestibule  Greater vestibular glands  Clitoris  Perineum  Oogenesis  Oogonia  Primary oocytes  Ovarian cycle  Secondary oocyte  Polar body  Ovum  Uterine or menstrual cycle  Menstrual phase  Proliferative phase  Secretory phase  Estrogens  Progesterone  Mammary glands  Areola  Nipple  Alveolar glands  Lactating  Lactiferous ducts  Breast cancer  Mammography  Fertilization  Zygote  Cleavage  Embryo  Blastocyst  Chorionic vesicle  Human chorionic gonadotropin (hCG)  Trophoblast  Inner cell mass  Ectoderm  Endoderm  Mesoderm  Chorionic villi  Placenta  Amnion  Umbilical cord  Fetus  Pregnancy  Relaxin  Abortion  Parturition  Labor  Oxytocin  Braxton Hicks contractions  False labor  Prostaglandins  Stages of Labor:  Dilation stage  Expulsion stage  Dystocia  Cesarean section or C-section  Placental stage  Afterbirth  Puberty  Menarche  Menopause |
| **Essential**  **Skills** | * Label diagrams of both the male and female reproductive systems. * Label diagrams of cell development during spermatogenesis and oogenesis. * Diagram the fluctuation of hormones during the menstrual cycle. * Describe embryo development through the three germ layers. * Describe the three phases of labor. |
| **Related**  **Maine Learning**  **Results** | Science  A. Unifying Themes  A1.Systems  Students apply an understanding of systems to explain and  analyze man-made and natural phenomena.  a. Analyze a system using the principles of boundaries,  subsystems, inputs, outputs, feedback, or thesystem’s  relation to other systems and design solutions to a system  problem.  b. Explain and provide examples that illustrate how it may not  always be possible to predict the impact of changing some  part of a man-made or natural system.  A3.Constancy and Change  Students identify and analyze examples of constancy and change  that result from varying types and rates of change in physical,  biological, and technological systems with and without  counterbalances.  B. The Skills and Traits of Scientific Inquiry and Technological Design  B1.Skills and Traits of Scientific Inquiry  Students methodically plan, conduct, analyze data from, and communicate results of in-depth scientific investigations, including experiments guided by a testable hypothesis.   1. Identify questions, concepts, and testable hypotheses that guide scientific investigations. 2. Design and safely conduct methodical scientific investigations, including experiments with controls. 3. Use statistics to summarize, describe, analyze, and interpret results. 4. Formulate and revise scientific investigations and models using logic and evidence. 5. Use a variety of tools and technologies to improve investigations and communications. 6. Recognize and analyze alternative explanations and models using scientific criteria. 7. Communicate and defend scientific ideas.   B2.Skills and Traits of Technological Design  Students use a systematic process, tools and techniques, and a variety of materials to design and produce a solution or product that meets new needs or improves existing designs.   1. Identify new problems or a current design in need of improvement. 2. Generate alternative design solutions. 3. Select the design that best meets established criteria. 4. Use models and simulations as prototypes in the design planning process. 5. Implement the proposed design solution. 6. Evaluate the solution to a design problem and the consequences of that solution. 7. Present the problem, design process, and solution to a design problem including models, diagrams, and demonstrations.   C. The Scientific and Technological Enterprise  C1.Understandings of Inquiry  Students describe key aspects of scientific investigations: that they are guided by scientific principles and knowledge, that they are performed to test ideas, and that they are communicated and defended publicly.   1. Describe how hypotheses and past and present knowledge guide and influence scientific investigations. 2. Describe how scientists defend their evidence and explanations using logical argument and verifiable results.   C2.Understanings About Science and Technology  Students explain how the relationship between scientific inquiry and technological design influences the advancement of ideas, products, and systems.   1. Provide an example that shows how science advances with the introduction of new technologies and how solving technological problems often impacts new scientific knowledge. 2. Provide examples of how creativity, imagination, and a good knowledge base are required to advance scientific ideas and technological design.   C3.Science, Technology, and Society  Students describe the role of science and technology in creating and solving contemporary issues and challenges.  b. Explain how ethical, societal, political, economic, and cultural factors influence personal health, safety, and the quality of the environment.   1. Explain how ethical, societal, political, economic, religious,   and cultural factors influence the development and use of science and technology.  C4.History and Nature of Science  Students describe the human dimensions and traditions of science, the nature of scientific knowledge, and historical episodes in science that impacted science and society.   1. Describe the ethical traditions in science including peer review, truthful reporting, and making results public. 2. Select and describe one of the major episodes in the history of science including how the scientific knowledge changed over time and any important effects on science and society. 3. Give examples that show how societal, cultural, and personal beliefs and ways of viewing the world can bias scientists. 4. Provide examples of criteria that distinguish scientific explanations from pseudoscientific ones.   D. The Physical Setting  D2.Earth  Students describe and analyze the biological, physical, energy, and human influences that shape and alter Earth Systems.  c. Describe and analyze the effects of biological and  geophysical influences on the origin and changing nature of  Earth Systems.  d. Describe and analyze the effects of human influences on Earth Systems.  D3.Matter and Energy  Students describe the structure, behavior, and interactions of matter at the atomic level and the relationship between matter and energy.  h. Describe radioactive decay and half-life.  E. The Living Environment  E1.Biodiversity  Students describe and analyze the evidence for relatedness among and within diverse populations of organisms and the importance of biodiversity.   1. Explain how the variation in structure and behavior of a population of organisms may influence the likelihood that some members of the species will have adaptations that allow them to survive in a changing environment. 2. Describe the role of DNA sequences in determining the degree of kinship among organisms and the identification of species. 3. Analyze the relatedness among organisms using structural and molecular evidence. 4. Analyze the effects of changes in biodiversity and predict possible consequences.   E2.Ecosystems  Students describe and analyze the interactions, cycles, and factors that affect short-term and long-term ecosystem stability and change.   1. Explain why ecosystems can be reasonably stable over hundreds or thousands of years, even though populations may fluctuate. 2. Describe dynamic equilibrium in ecosystems and factors that can, in the long run, lead to change in the normal pattern of cyclic fluctuations and apply that knowledge to actual situations.   E3.Cells  Students describe structure and function of cells at the intracellular and molecular level including differentiation to form systems, interactions between cells and their environment, and the impact of cellular processes and changes on individuals.  a. Describe the similarities and differences in the basic  functions of cell membranes and of the specialized parts  within cells that allow them to transport materials, capture  and release energy, build proteins, dispose of waste,  communicate, and move.  b. Describe the relationship among DNA, protein molecules,  and amino acids in carrying out the work of cells and how this  is similar among all organisms.  c. Describe the interactions that lead to cell growth and division  (mitosis) and allow new cells to carry the same information as  the original cell (meiosis).  d. Describe ways in which cells can malfunction and put an  organism at risk.  e. Describe the role of regulation and the processes that  maintain an internal environment amidst changes in the  external environment.  f. Describe the process of metabolism that allows a few key  biomolecules to provide cells with necessary materials to  perform their functions.  g. Describe how cells differentiate to form specialized systems  for carrying out life functions.  E4.Heredity and Reproduction  Students examine the role of DNA in transferring traits from generation to generation, in differentiating cells, and in evolving new species.  c. Explain how the instructions in DNA that lead to cell  differentiation result in varied cell functions in the organism  and DNA.  d. Describe the possible causes and effects of gene mutations.  E5.Evolution  Students describe the interactions between and among species, populations, and environments that lead to natural selection and evolution.   1. Describe the premise of biological evolution, citing evidence from the fossil record and evidence based on the observation of similarities within the diversity of existing organisms. 2. Describe the origins of life and how the concept of natural selection provides a mechanism for evolution that can be advantageous or disadvantageous to the next generation. 3. Explain why some organisms may have characteristics that have no apparent survival or reproduction advantage. 4. Relate structural and behavioral adaptations of an organism to its survival in the environment. |
| **Sample**  **Lessons**  **and**  **Activities** | * Locate and name structures of both the male and female reproductive systems on a model and diagram * Look at starfish embryology microscope slides * View male and female reproductive systems during rat and fetal pig dissections. * Read articles related to disorders caused by homeostatic imbalance in the male and female reproductive systems. |
| **Sample**  **Classroom**  **Assessment**  **Methods** | * Quiz * Chapter Test * Worksheets * Labs |
| **Sample**  **Resources** | * Publications:   + Essentials of Human Anatomy and Physiology, 9th edition by Elaine N. Marieb   + Anatomy and Physiology Coloring Workbook: A Complete Study Guide by Elaine N. Marieb   + Essentials of Human Anatomy and Physiology Laboratory Manual by Elaine N. Marieb * Videos:   + National Geographic: Inside the Living Body   + National Geographic: The Incredible Human Machine   + Nova: Life’s Greatest Miracle * Other Resources   Lab Supplies |