Science:
Biology
Unit 6: Behavior of Organisms

Essential Understandings	▪ Multi-cellular animals have nervous systems that generate behavior. ▪ Organisms have behavioral responses to internal changes and to external stimuli. ▪ Behaviors have evolved through natural selection. ▪ Behavioral biology provides links to psychology, sociology, and anthropology.
Essential Questions	▪ How do nervous systems compare in multi-cellular animals? ▪ How does an organism's behavior relate to its nervous system? ▪ How do organisms respond to internal changes and external stimuli? ▪ How do selection pressures influence behavior? ▪ How does the study of behavioral biology relate to psychology, sociology, and anthropology?
Essential Knowledge	▪ Nervous systems are responsible for an organism's behavior. ▪ Organisms maintain homeostasis. ▪ Natural selection drives behavioral adaptations. ▪ Social sciences are interconnected with behavioral sciences.
Vocabulary	▪ <u>Terms</u>: ○ homeostasis, stimulus, response, sense organs, behavior, neuron, adaptation, natural selection, tropism
Essential Skills	▪ Identify simple vs. complex nervous systems. ▪ Explain the relationship between stimulus and response ▪ Identify ways organisms maintain homeostasis. ▪ Use appropriate technology to measure and collect data.

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Related Maine Learning Results	Science 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. a. Identify questions, concepts, and testable hypotheses that guide scientific investigations. b. Design and safely conduct methodical scientific investigations, including experiments with controls. c. Use statistics to summarize, describe, analyze, and interpret results. d. Formulate and revise scientific investigations and models using logic and evidence. e. Use a variety of tools and technologies to improve investigations and communications. f. Recognize and analyze alternative explanations and models using scientific criteria. g. 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. a. Identify new problems or a current design in need of improvement. b. Generate alternative design solutions. c. Select the design that best meets established criteria. d. Use models and simulations as prototypes in the design planning process. e. Implement the proposed design solution. f. Evaluate the solution to a design problem and the consequences of that solution. g. 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. a. Describe how hypotheses and past and present knowledge guide and influence scientific investigations. b. Describe how scientists defend their evidence and

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	explanations using logical argument and verifiable results.
Related Maine Learning Results	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. a. 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. b. Describe the role of DNA sequences in determining the degree of kinship among organisms and the identification of species. c. Analyze the relatedness among organisms using structural and molecular evidence. d. 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. b. 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. c. Explain the concept of carrying capacity and list factors that determine the amount of life that any environment can support. d. Describe the critical role of photosynthesis and how energy and the chemical elements that make up molecules are transformed in ecosystems and obey basic conservation laws. 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 interactions that lead to cell growth and division (mitosis) and allow new cells to carry the same information as the original cell (meiosis).

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Related Maine Learning Results	E5.Evolution Students describe the interactions between and among species, populations, and environments that lead to natural selection and evolution. a. 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. b. 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. c. Explain why some organisms may have characteristics that have no apparent survival or reproduction advantage. d. Relate structural and behavioral adaptations of an organism to its survival in the environment.
Sample Lessons And Activities	▪ Make a model of a neuron ▪ Eye dissection ▪ Germinate seeds to observe tropisms
Sample Classroom Assessment Methods	▪ Quiz ▪ Chapter Test ▪ Lab Reports ▪ Homework ▪ Anatomy Coloring Sheets
Sample Resources	▪ Publications: o Biology – Kenneth Miller and Josephine Levine ▪ Videos: o Cycle of Life videos o The Teenage Brain, PBS ▪ Other Resources: o HHMI Resources