



MONTANA
Standards for Science – End of Grade 12
***Biology: The Dynamics of Life* © 2004**

BENCHMARKS	PAGE REFERENCES
Science Content Standard 1	
Students design, conduct, evaluate and communicate scientific investigations.	
Students will:	
1. identify a testable question, formulate a hypothesis based on prior scientific knowledge, identify dependent and independent variables, safely conduct the experiment, collect and analyze data.	SE: 11-17 <i>MiniLab</i> 22 <i>Design Your Own BioLab</i> 58-59, 164-165, 330-331, 522-523, 756-757, 834-835 <i>Internet BioLab</i> 274-275 TWE: UA 11 Da 30
2. select appropriate means for representing, communicating, and defending results of investigations and scientific and technological arguments using appropriate mathematical analysis and graphical representation.	SE: <i>MiniLab</i> 92, 102, 268, 350 <i>Problem-Solving Lab</i> 95, 101 TWE: A 23 UM 260 P 400
3. question conclusions with insufficient supporting evidence, and recognize that the results of a scientific investigation are always open to revision by further experiments.	SE: 22, 172, 212-213, 255-258, 380-382, 393 <i>Problem-Solving Lab</i> 16 <i>Biology and Society</i> 26 TWE: CA 376 UM 381
4. analyze and apply the concepts of change and equilibrium in a variety of systems (e.g., geochemical systems, global climate).	SE: 65-69, 91-93, 111, 115-120 TWE: CA 82 E 83 RM 114
5. compare observations of the real world to observations of a constructed model.	SE: <i>MiniLab</i> 92, 268, 350 TWE: CA 50 QD 196
6. investigate and evaluate science studies and identify strengths and weaknesses in experimental design.	SE: 12, 16, 23 <i>Design Your Own BioLab</i> 58-59, 164-165, 354-355, 964-965 TWE: CD 407
Science Content Standard 3	
Students demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.	
1. investigate and use appropriate technology to demonstrate that all cells have common features as well as differences that determine function and that they are composed of common building blocks (e.g., proteins, carbohydrates, nucleic acids, lipids).	SE: 172-174, 288-295, 487 <i>Problem-Solving Lab</i> 176, 180 <i>Connection to Literature</i> 190 TWE: Ch 183 Da 187

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2. describe and explain the complex processes involved in energy use in cell maintenance, growth, repair and development.	SE: 175-178, 195-200, 225, 231-237 <i>Problem-Solving Lab</i> 176 TWE: CD 181 I 197
3. model the structure of DNA, protein synthesis, and the molecular basis of heredity and how it contributes to the diversity of life.	SE: 263-266, 281-287, 316-318, 328-329 <i>Problem-Solving Lab</i> 291 TWE: A 264 Co 269 UA 341
4. predict and model the interaction of biotic and abiotic factors, which limit populations (natural selection), and contribute to the change of a species over time (evolution).	SE: 370-371, 393, 399-403, 409-411, 423-427 <i>Problem-Solving Lab</i> 115 <i>Biology and Society</i> 388 <i>MiniLab</i> 429 TWE: CD 411 A 435
5. apply a biological classification scheme to infer and discuss the degree of species divergence using local ecosystems.	SE: 445-449, 456-459 <i>MiniLab</i> 446 <i>Investigate BioLab</i> 460-461 <i>Design Your Own BioLab</i> 570-571 TWE: VL 444 BJ 447
Science Content Standard 5	
Students understand how scientific knowledge and technological developments impact society.	
1. identify and describe key factors (technology, competitiveness, world events, etc.) that affect the development and acceptance of scientific thought.	SE: 21-23 TWE: CD 8, 20, 145 CA 17
2. model the ongoing, collaborative scientific process of gathering and evaluating information (e.g., assess evidence for and against theories, look for patterns, devise and retest different models).	SE: 5, 16-18, 121-123 TWE: En 21 P 142 UM 146
3. analyze benefits, limitations, costs, consequences, and ethics involved in using scientific and technological innovations to make reasoned decisions.	SE: 21-23, 124-125 <i>Biology and Society</i> 26, 498 TWE: I 345
4. give examples of scientific innovation challenging commonly held perceptions.	SE: 128, 172, 255-258, 380-382, 393 TWE: UM 381
Science Content Standard 6	
Students understand historical developments in science and technology.	
1. give examples of scientific discoveries and describe the interrelationship between technological advances and scientific understanding.	SE: 171-173 <i>Biotechnology</i> 304, 356, 1018 <i>Focus On</i> 1064-1065 TWE: Co 394
2. analyze and illustrate the historical impact of scientific and technological advances.	SE: 121-125, 203 <i>Biotechnology</i> 166 TWE: IS 124 CD 145, 233

Codes Used for TWE Pages

A	Assessment
BJ	Biology Journal
CA	Challenge Activity
CD	Cultural Diversity
Ch	Chalkboard Activity
Co	Concept Development
Da	Daily Intervention
E	Extension
En	Enrichment
I	Inquiry
IS	Inclusion Strategies
P	Project
QD	Quick Demo
RM	Revealing Misconceptions
UA	Using an Analogy
UM	Using Models
VL	Visual Learning