Western Line SCHOOL DISTRICT

Pacing Guide
2024-2025 School Year

Foundations of Biology

**This course is taught as a double up for Biology I. The instructor will use the Foundation Standards denoted by each BIO I standard, to provide the needed support for the Biology I standards. Foundations for Biology standards denoted after each Biology Standard.*

TERM 1

Term 1 Dates	MS College and Career Readiness Standards
WK 1: Aug 6-16	**SCIENCE and ENGINEERING PRACTICES** • Ask Question and Define Problems • Develop and Use Models • Analyze and Interpret Data • Plan and Conduct Investigations • Use Mathematical and Computational Thinking • Engage in Scientific Argument from Evidence • Construct Explanations and Design Solutions • Obtain, Evaluate, and Communicate Information **BIO.1A.1** Develop criteria to differentiate between living and non-living things. *(FB.6.1)* **BIO.1A.2** Describe the tenets of cell theory and the contributions of Schwann, Hooke, Schleiden, and Virchow. *(FB.1.1)* **BIO.1A.3** Using specific examples, explain how cells can be organized into complex tissues, organs, and organ systems in multicellular organisms. **BIO.1A.4** Use evidence from current scientific literature to support whether a virus is living or nonliving.
Unit Assessment 1	
WK 2: Aug 19-23	**BIO.1B.1** Develop and use models to compare and contrast the structure and function of carbohydrates, lipids, proteins, and nucleic acids (DNA and RNA) in organisms. *(FB.2.6 & FB.2.7)* **BIO.1B.2** Design and conduct an experiment to determine how enzymes react given various environmental conditions (i.e., pH, temperature, and concentration). Analyze, interpret, graph, and present data to explain how those changing conditions affect the enzyme activity and the rate of the reactions that take place in biological organisms. *(FB.2.6 & FB.2.7)*
WK 3: Aug 26-30	**BIO.1C.1** Develop and use models to explore how specialized structures within cells (e.g., nucleus, cytoskeleton, endoplasmic reticulum, ribosomes, Golgi apparatus, lysosomes, mitochondria, chloroplast, centrosomes, and vacuoles) interact to carry out the functions necessary for organism survival. *(FB.3.2)* **BIO.1C.2** Investigate to compare and contrast prokaryotic cells and eukaryotic cells, and plant, animal, and fungal cells. *(FB.3.1)* **BIO.1C.3** Contrast the structure of viruses with that of cells, and explain why viruses must use living cells to reproduce.

WK 4: Sept 2-6	**BIO.1D.1** Plan and conduct investigations to prove that the cell membrane is a semi-permeable, allowing it to maintain homeostasis with its environment through active and passive transport processes. *(FB.3.3)*
Mid-term OR Unit Assessment 2 *(WK 4.5/ WK 5)*	
WK 5: Sept 9-13	**BIO.1D.2** Develop and use models to explain how the cell deals with imbalances of solute concentration across the cell membrane (i.e., hypertonic, hypotonic, and isotonic conditions, sodium/potassium pump). *(FB.3.3)*
WK 6: Sept 16-20	**BIO.1E.1** Construct models to explain how the processes of cell division and cell differentiation produce and maintain complex multicellular organisms. *(FB.3.6)* **BIO.1E.2** Identify and describe the changes that occur in a cell during replication. Explore problems that might occur if the cell does not progress through the cycle correctly (cancer). *(FB.3.6 & B.3.7)*
Unit Assessment 3 *optional due to BMA*	
WK 7: Sept 23-27	**BIO.1E.3** Relate the processes of cellular reproduction to asexual reproduction in simple organisms (i.e., budding, vegetative propagation, regeneration, binary fission). Explain why the DNA of the daughter cells is the same as the parent cell. *(FB.3.6)* **BIO.1E.4 Enrichment:** Use an engineering design process to investigate the role of stem cells in regeneration and asexual reproduction, then develop applications of stem cell research to solve human medical conditions.* *(FB.3.6 & FB.3.7)*
WK 8: Sept 30- Oct 4	*Review for Assessment*
WK 9: Oct 7-11	***Benchmark OR Unit Assessment***

TERM 1	
Recurring Standards **Standards taught the first 4-5 weeks; the mid-term data will indicate the remediation needed.**	
WK 5: Sept 9-13	BIO.1A.1, BIO.1A.2, BIO.1A.3 & BIO.1A.4
WK 6: Sept 16-20	BIO.1B.1 & BIO.1B.2
WK 7: Sept 23-27	BIO.1C.1, BIO.1C.2 & BIO.1C.3

Western Line SCHOOL DISTRICT

Pacing Guide
2024-2025 School Year

Foundations of Biology

TERM 2	
Term 2 Dates	**MS College and Career Readiness Standards**
WK 1: Oct 14-18	**BIO.2.1** Use models to demonstrate that ATP and ADP are cycled within a cell as a means to transfer energy. *(FB.3.4 & FB.3.5)* **BIO.2.2** Develop models of the major reactants and products of photosynthesis to demonstrate the transformation of light energy into stored chemical energy in cells. Emphasize the chemical processes in which bonds are broken and energy is released, and new bonds are formed and energy is stored. *(FB.3.4 & FB.3.5)*
WK 2: Oct 21-25	**BIO.2.3** Develop models of the major reactants and products of cellular respiration (aerobic and anaerobic) to demonstrate the transformation of the chemical energy stored in food to the available energy of ATP. Emphasize the chemical processes in which bonds are broken and energy is released, and new bonds are formed and energy is stored. *(FB.3.4 & FB.3.5)* **BIO.2.4** Conduct scientific investigations or computer simulations to compare aerobic and anaerobic cellular respiration in plants and animals, using real world examples. *(FB.3.4 & FB.3.5)*
Unit Assessment 1	
WK 3: Oct 28- Nov 1	**BIO.2.5 Enrichment:** Investigate variables (e.g., nutrient availability, temperature) that affect anaerobic respiration and current real-world applications of fermentation.* *(FB.3.4 & FB.3.5)* **BIO.2.6 Enrichment:** Use an engineering design process to manipulate factors involved in fermentation to optimize energy production.* *(FB.3.4 & FB.3.5)*
WK 4: Nov 4-8	**BIO.3A.1** Model sex cell formation (meiosis) and combination (fertilization) to demonstrate the maintenance of chromosome number through each generation in sexually reproducing populations. Explain why the DNA of the daughter cells is different from the DNA of the parent cell. *(FB.3.6)* **BIO.3A.2** Compare and contrast mitosis and meiosis in terms of reproduction. *(FB.3.6)*
WK 5: Nov 11-15	**BIO.3A.3** Investigate chromosomal abnormalities (e.g., Down syndrome, Turner's syndrome, and Klinefelter syndrome) that might arise from errors in meiosis (nondisjunction) and how these abnormalities are identified (karyotypes). *(FB.3.7)*
Mid-term OR Unit Assessment 2 *(WK 4.5/ WK 5)*	
WK 6: Nov 18-22	**BIO.3C.1** Develop and use models to explain the relationship between DNA, genes, and chromosomes in coding the instructions for the traits transferred from parent to offspring. *(FB.4.1 & FB.4.2)* **BIO.3C.2** Evaluate the mechanisms of transcription and translation in protein synthesis. *(FB.4.1 & FB.4.2)*

WK 7: Dec 2-6	**BIO.3C.3** Use models to predict how various changes in the nucleotide sequence (e.g., point mutations, deletions, and additions) will affect the resulting protein product and the subsequent inherited trait. *(FB.4.4)*
WK 8: Dec 9-13	*Review for Assessment*
Unit Assessment 3 *optional due to BMA*	
WK 9: Dec 16-20	***Benchmark OR Unit Assessment***

TERM 2	
Recurring Standards **Standards taught the first 4-5 weeks; the mid-term data will indicate the remediation needed.**	
WK 5: Nov 11-15	BIO.2.1 & BIO.2.2
WK 6: Nov 18-22	BIO.2.3 & BIO.2.4
WK 7: Dec 2-6	BIO.3A.1 & BIO.3A.2

Western Line SCHOOL DISTRICT

Pacing Guide
2024-2025 School Year

Foundations of Biology

TERM 3	
Term 3 Dates	**MS College and Career Readiness Standards**
WK 1: Jan 6-10	**BIO.3B.1** Demonstrate Mendel's law of dominance and segregation using mathematics to predict phenotypic and genotypic ratios by constructing Punnett squares with both homozygous and heterozygous allele pairs. *(FB.4.3)* **BIO.3B.2** Illustrate Mendel's law of independent assortment using Punnett squares and/or the product rule of probability to analyze monohybrid crosses. *(FB.4.3)*
WK 2: Jan 13-17	**BIO.3B.3** Investigate traits that follow non-Mendelian inheritance patterns (e.g., incomplete dominance, codominance, multiple alleles in human blood types, and sex-linkage). *(FB.4.4)*
Unit Assessment 1	
WK 3: Jan 20-24	**BIO.3B.4** Analyze and interpret data (e.g., pedigrees, family, and population studies) regarding Mendelian and complex genetic traits (e.g., sickle-cell anemia, cystic fibrosis, muscular dystrophy, color-blindness, and hemophilia) to determine patterns of inheritance and disease risk.
WK 4: Jan 27-31	*(FB.6.4 foundational skills for the following standards)* **BIO.5.1** Illustrate levels of ecological hierarchy, including organism, population, community, ecosystem, biome, and biosphere. **BIO.5.2** Analyze models of the cycling of matter (e.g., carbon, nitrogen, phosphorus, and water) between abiotic and biotic factors in an ecosystem and evaluate the ability of these cycles to maintain the health and sustainability of the ecosystem. *(FB.6.1, FB.6.2 & FB.6.3)* **BIO.5.3** Analyze and interpret quantitative data to construct an explanation for the effects of greenhouse gasses on the carbon dioxide cycle and global climate. **BIO.5.4** Develop and use models to describe the flow of energy and amount of biomass through food chains, food webs, and food pyramids. *(FB.6.5)*
Mid-term OR Unit Assessment 2 *(WK 4.5/ WK 5)*	
WK 5: Feb 3-7	**BIO.5.5** Evaluate symbiotic relationships (e.g., mutualism, parasitism, and commensalism) and other coevolutionary (e.g., predator-prey, cooperation, competition, and mimicry) relationships within specific environments. *(FB.6.6)*
WK 6: Feb 10-14	**BIO.5.6** Analyze and interpret population data, both density-dependent and density-independent, to define limiting factors. Use graphical representations (growth curves) to illustrate the carrying capacity within ecosystems. *(FB.6.7)* **BIO.5.7** Investigate and evaluate factors involved in primary and secondary ecological succession using local, real world examples. *(FB.6.7)*
Unit Assessment 3	

WK 7: Feb 17-21	**BIO.5.8 Enrichment:** Use an engineering design process to create a solution that addresses changing ecological conditions (e.g., climate change, invasive species, loss of biodiversity, human population growth, habitat destruction, biomagnification, or natural phenomena).* *(FB.6.7)* **BIO.5.9 Enrichment:** Use an engineering design process to investigate and model current technological uses of biomimicry to address solutions to real-world problems.* *(FB.1.4)*
Unit Assessment 4 *optional due to BMA*	
WK 8: Feb 24-28	***Review for Assessment***
WK 9: March 3-7	***Benchmark or Unit Assessment***

TERM 3	
Recurring Standards **Standards taught the first 4-5 weeks; the mid-term data will indicate the remediation needed.**	
WK 5: Feb 3-7	BIO.3B.1 & BIO.3B.2
WK 6: Feb 10-14	BIO.3B.3 & BIO.3B.4
WK 7: Feb 17-21	BIO.5.1, BIO.5.2, BIO.5.3 & BIO.5.4

Western Line SCHOOL DISTRICT

Pacing Guide
2024-2025 School Year

Foundations of Biology

TERM 4	
Term 4 Dates	**MS College and Career Readiness Standards**
WK 1: March 17-21	**BIO.4.1** Use models to differentiate between organic and chemical evolution, illustrating the steps leading to aerobic heterotrophs and photosynthetic autotrophs. *(FB.5.2 & FB.5.3)* **BIO.4.2** Evaluate empirical evidence of common ancestry and biological evolution, including comparative anatomy (e.g., homologous structures and embryological similarities), fossil record, molecular/biochemical similarities (e.g., gene and protein homology), and biogeographic distribution. *(FB.5.2 & FB.5.3)*
Unit Assessment 1	
WK 2: March 24-28	**BIO.4.3** Construct cladograms/phylogenetic trees to illustrate relatedness between species. *(FB.5.5)* **BIO.4.4** Design models and use simulations to investigate the interaction between changing environments and genetic variation in natural selection leading to adaptations in populations and differential success of populations. *(FB.5.1)* **BIO.4.5** Use Darwin's Theory to explain how genetic variation, competition, overproduction, and unequal reproductive success acts as driving forces of natural selection and evolution. *(FB.5.1)* **BIO.4.6** Construct explanations for the mechanisms of speciation (e.g., geographic and reproductive isolation). *(FB.4.4)* **BIO.4.7 Enrichment:** Construct explanations for how various disease agents (bacteria, viruses, chemicals) can influence natural selection.
Unit Assessment 2	
WK 3: March 31- April 4	*TBD using Benchmark/ Unit Assessment data and/or remediation time needed for other grade level tested areas*
Checkpoint 1	
WK 4: April 7-11	*TBD using Benchmark/ Unit Assessment data and/or remediation time needed for other grade level tested areas*
Checkpoint 2	
WK 5: April 14-18	*N/A; benchmark testing*
WK 6: April 21-25	*N/A; benchmark testing*
WK 7: April 28- May 2	*N/A; benchmark testing*
WK 8: May 5-9	*N/A; benchmark testing*

WK 9: May 12-21	***Review & EOY Assessment***

TERM 4	
Recurring Standards **Standards taught the first 4-5 weeks; the mid-term data will indicate the remediation needed.**	
WK 5: April 14-18	*Review Term 1 Standards*
WK 6: April 21-25	*Review Term 2 Standards*
WK 7: April 28- May 2	*Review Term 3 Standards*