



Achievement Level Descriptors for Principles of Biomedical Science (PBS)

Achievement Level Descriptors (ALDs) are statements of what students should know and be able to do in a PLTW classroom. The ALDs can be used to better understand how students are performing on the End of Course examination.

The categories of basic, proficient, and advanced each provide a broad overview of student performance in that category. ALDs complement curriculum materials and can be used by teachers and students to better understand student performance and expectations. Each category builds upon the next category. For instance, a student who demonstrates an advanced understanding for a particular concept also is able to demonstrate basic and proficient understandings.

The ALDs are linked to the EoC score, and students are given an achievement indicator along with their EoC score. The achievement indicator is intended to provide an overall snapshot of the student's performance. Students who score in the proficient category may be advanced in some concepts or basic in others. Overall, their performance on the EoC indicates the level of overall achievement and performance as indicated by the ALDs.

	Basic	Proficient	Advanced
Descriptor	The student demonstrates a minimal or limited understanding of course concepts. Major gaps may be present in the student's knowledge and skills.	The student demonstrates a competent understanding of the course concepts. The student can apply knowledge and skills to familiar situations. There may be minor gaps in the student's understandings.	The student demonstrates a comprehensive and complex understanding of the course concepts. The student has the capability to transfer knowledge and skills to novel situations. Gaps in knowledge and skills are minimal.
Theme or Concept	A student who has reached the highest level of the <u>basic</u> category should be able to perform the following:	A student who has just reached the <u>proficient</u> level should be able to perform the following:	A student who has just reached the <u>advanced</u> level should be able to perform the following:
General Skills	Construct a graph.	Construct and interpolate a graph.	Construct, interpolate, and extrapolate a graph.

	<p>Design an experiment that contains most components, often with frequent errors.</p> <p>Display data, draw limited conclusions, and present results.</p> <p>Demonstrate adequate coverage of main points with limited details in written and oral communications.</p> <p>Recognize that there are standards and practices in place to preserve patient privacy.</p>	<p>Design an experiment that contains all of the components.</p> <p>Evaluate results, provide limited suggestions for revisions and further exploration, and draw conclusions.</p> <p>Demonstrate adequate coverage of main points with sufficient details and limited consideration of the target audience, organized in a somewhat logical sequence in written and oral communications.</p> <p>Analyze patient scenarios to determine whether or not a patient's rights have been violated.</p>	<p>Design an experiment that contains all of the components with consistent detail and minimal errors.</p> <p>Support and justify conclusions, thoroughly suggest necessary revisions and further exploration.</p> <p>Thoroughly and clearly articulate the main points with precise details appropriately designed for the target audience, organized in a logical sequence in written and oral communications.</p> <p>Justify when it is appropriate to violate privacy standards and practices.</p>
Genetics	<p>Identify the structures of DNA.</p> <p>State that gel electrophoresis separates DNA fragments based on size.</p>	<p>Identify complementary base pairs.</p> <p>Explain how restriction enzymes are used to cut DNA.</p>	<p>Identify the components of a nucleotide.</p> <p>Analyze the resulting RFLPs to distinguish differences between individuals.</p>

	<p>Identify that sickled red blood cells take on a different shape than normal red blood cells.</p> <p>Recognize that the sequence of nucleotides in DNA determines the sequence of amino acids in a protein.</p> <p>Recognize that DNA, chromosomes, and genes are related to inheritance.</p> <p>Recognize that chromosomes transfer genetic material through the processes of mitosis and meiosis.</p> <p>Draw and analyze pedigree charts to illustrate passage of a trait</p>	<p>Describe how sickled red blood cells lead to health complications.</p> <p>Explain the process of protein synthesis.</p> <p>Describe the relationship between DNA, chromosomes, and genes.</p> <p>Demonstrate the movement of chromosomes in the processes of mitosis and meiosis.</p> <p>Determine and compare the</p>	<p>Describe in detail how sickled red blood cells lead to health complications and describe corresponding treatments for the condition.</p> <p>Analyze the effect that mutations have on proteins.</p> <p>Describe the relationship between DNA, chromosomes, and genes and how their role in inheritance determines genotypes and phenotypes.</p> <p>Apply knowledge of chromosomal movement to the inheritance of genetic disease.</p> <p>Analyze pedigrees to calculate</p>
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	through generations with errors.	experimental probability and the theoretical probability of inheriting a trait.	the probability of inheriting a trait or disease.
Metabolism	<p>Recognize that blood glucose is regulated by the protein insulin.</p> <p>Identify that there are differences behind the causes of Type 1 and Type 2 diabetes.</p> <p>State that Type 1 and Type 2 diabetes can cause significant complications in many human body systems and a variety of treatments are available.</p> <p>Identify macromolecules as carbohydrates, lipids, or proteins. Recognize that energy is stored in chemical bonds.</p>	<p>Demonstrate the role of insulin in transferring glucose from blood into cells.</p> <p>Describe the physiological basis of Type 1 and Type 2 diabetes.</p> <p>Describe at least one complication in human body systems caused by Type 1 and Type 2 diabetes and describe how Type 1 or Type 2 diabetes leads to this complication.</p> <p>Describe in general terms how macromolecules relate to the function in the human body. Describe how the structure of macromolecules is related to their storage and release of energy.</p>	<p>Diagram the feedback relationship of blood glucose and the insulin and glucagon hormones.</p> <p>Demonstrate the physiological basis of Type 1 and Type 2 diabetes and relate to the corresponding treatments and potential lifestyle changes.</p> <p>Describe at least three complications in human body systems caused by Type 1 and Type 2 diabetes and describe how Type 1 or Type 2 diabetes leads to these complications. Specifically describe how macromolecules relate to the function in the human body.</p> <p>Interpret how the structure of macromolecules is related to their storage and release of energy through dehydration synthesis and hydrolysis.</p>

	Describe in limited detail nutritional terms.	Describe in detail the role of nutrients in the body.	Evaluate how diet choices affect health.
Anatomy and Physiology	<p>Identify the major components of blood.</p> <p>Identify the major structures of the cardiovascular system.</p> <p>Recognize that heart rate, EKG, and blood pressure measurements are indicators of cardiovascular function.</p> <p>Recognize that cholesterol is transported in the blood by protein complexes called high density lipoprotein(HDL) and low density lipoprotein(LDL).</p> <p>Identify general structures and functions of organ systems.</p>	<p>Describe how the major components of blood are related to their function in the body.</p> <p>Describe the function of the cardiovascular system and the flow of blood through the system.</p> <p>Describe how internal and external factors affect heart rate, EKG, and blood pressure measurements.</p> <p>Compare and contrast the role of HDL and LDL in the body.</p> <p>Describe how some body systems work together to maintain homeostasis.</p>	<p>Interpret blood test results and relate to the health of a person.</p> <p>Evaluate how dysfunction of structures within the cardiovascular system impact health.</p> <p>Interpret how internal and external factors can affect heart function and can contribute to the development of heart disease.</p> <p>Relate the role of HDL and LDL in the body to human health.</p> <p>Describe how a dysfunction in one system affects other systems.</p>

Immunology and Infectious Diseases	<p>Recognize that infectious diseases are caused by infectious agents and are transmitted in a variety of manners.</p> <p>Identify the major structures of the immune system.</p> <p>Identify the basic structures of a bacterial cell.</p>	<p>Describe the mode of transmission of various infectious agents.</p> <p>Describe the function of the major structures of the immune system.</p> <p>Explain how bacteria can be classified based on their cell wall structure.</p>	<p>Describe the prevention and types of treatment for various infectious agents.</p> <p>Describe in detail how the immune system responds when an antigen enters the body.</p> <p>Describe how an unknown bacteria may be identified based on their shape, colony morphology, metabolism, and reaction to the Gram stain.</p>
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Note: Assume that the higher levels of achievement include all prior columns.