

Cancer Biology Curriculum Standards Alignment – J Thompson, C Tanner, B McKay

Lesson	NGSS standard	AP Standards	Notes
Structures	HS-LS1-1: Structure and Function- Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.		Cell structure and function
Overview of cancer	<p>HS-LS1-4- Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.</p> <p>HS-LS3-2- Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.</p>	<p>IST-1.B - Describe the events that occur in the cell cycle.</p> <p>IST-1.C - Explain how mitosis results in the transmission of chromosomes from one generation to the next.</p> <p>IST-1.D - Describe the role of checkpoints in regulating the cell cycle.</p> <p>IST-1.E - Describe the effects of disruptions of the cell cycle on the cell or organism.</p> <p>SYI-1.C - explain how a change in the subunits of a polymer may lead to the changes in structure or function of the macromolecules.</p> <p>IST-1.O - Describe how the phenotype of an organism is determined by its genotype</p> <p>IST-2.A - Describe the types of interactions that regulate gene expression</p> <p>IST-2.B - Explain how the location of regulatory sequences relates to their function</p> <p>IST-2.E - Describe the various types of mutation</p> <p>IST-4.A - Explain how changes in genotype may result in changes in phenotype</p>	<p>Cell cycle</p> <p>Cell cycle regulation</p> <p>Mutations</p> <p>Protein structure and function</p> <p>(transcription and translation? If so, IST-1.N)</p> <p>(cell signaling?)</p> <p>(DNA?)</p> <p>(DNA replication?)</p>

Cancer card sort	<p>HS-LS3-1- Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parent to offspring.</p> <p>HS-LS3-2- Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.</p> <p>HS-LS3-1- Ask questions that arise from examining models or a theory to clarify relationships.</p>		
Solutions and micropipetting			
ELISA test and antibodies Immunity	<p>HS-LS1-1- Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.</p> <p>HS-LS3-2- Make and defend a claim based on evidence about the natural world that reflects scientific knowledge, and student generated evidence.</p>	<p>IST-3.A - Described the ways that cells can communicate with one another.</p> <p>IST-3.B - Explain how cells communicate with one another over short and long distances.</p>	Immune system
BRCA Blast and sequencing informatics	HS-LS1-1- Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students own investigations, models, theories, simulations, peer review) and the assumption	SY1-3.A - Explain the connection between variation in the number and types of molecules within cells to the ability of the organism to survive and/or reproduce in different environments.	

	that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.		
PCR for BRCA gene	<p>HS-LS1-1- Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.</p> <p>HS-LS3-2- Make and defend a claim based on evidence about the natural world that reflects scientific knowledge, and student generated evidence.</p>	IST-1.P - Explain the use of genetic engineering techniques in analyzing or manipulating DNA	
Cell Staining	HS-LS1-3- Investigation or designing new systems or structure requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to review its function and/or solve a problem.	SYI-1.D - Describe the structure and/or function of subcellular components and organelles	