IB Biology HL 1 – Juniors | Curriculum Map: 2008 – 2009

Essential Question: Why do the small things matter?

Topic	Specific Content	Corresponding Research Labs and Projects
Understanding Scientific Experimental Research *September*	Utilizing the scientific method in real time research Statistical Analysis Science writing	**Investigation #1: Investigation of factors that affect seed germination** *Teachers Notes: Students design experiments to investigate factors that affect the germination of seeds. Application to crops and foods*
Biochemistry *October - November*	Chemical elements and water Carbohydrates, lipids and proteins DNA structure DNA replication Transcription and translation Enzymes	**Investigation #2: Investigation of the effect of various types of urban runoff on living organisms.** *Teachers Notes: connection with water chemistry and biochemistry with application to urban environmental issues. Scaffolding activities include using duckweed as a model organism in smaller experiments, assessing the health of the Hudson/Mohawk, examining existing Hudson River quality data.* **Investigation #3: Investigation on the effect of various factors that affect enzyme catalysis of H2O2** *Teachers Notes: AP Lab will be included as a prep activity. Connection to role of vitamins in health, biofuels.*
Cell Biology *December - January*	Cell theory Prokaryotic cells Eukaryotic cells Membranes Cell division Cell respiration Photosynthesis	**Investigation #4: Investigation on different factors that affect the efficiency of sugar production from biomass in order to yield the maximum amount of ethanol fuel.** *Teachers Notes: Use Cornell BTI Lab. Post lab include the investigation of the efficiency of different biofuels to connect back to molecular structure and energy.* **Investigation #5: Investigation on the factors that affect the rate of photosynthesis in plants.** *Teachers Notes: Pre labs include chromagraphy, using computer sensors to gather data (CO2, O2, temperature), stomata analysis, cell analysis*
Genetics *February - March*	Chromosomes, genes, alleles and mutations Meiosis Theoretical genetics Genetic Engineering and biotechnology Meiosis Dihybrid crosses and gene linkage Polygenic inheritance	**Baby Project** **Investigation #6: Investigation on the factors that affect the genetic traits of Drosophila melangaster and their offspring.** *Teachers Notes: Students dive into their own designs – selection of specific traits*
Microbes and Biotechnology *April - June*	Diversity of microbes Microbes and the environment Microbes and biotechnology Microbes and food production Metabolism of microbes Microbes and disease The Hardy-Weinberg Principle	**Investigation #7: Investigation on the factors that affect successful transformation in E.coli.** *Teachers Notes: connection with microbiology, natural selection. Application to antibiotic resistance and gene therapy.* **Investigation #8: Investigation on the factors that affect the production of E.Coli in fresh river systems.** *Teachers Notes: Pre lab includes Family Secrets, and an analysis of the health of the Hudson using the same techniques. Connection with issues with urban runoff (revisit). Side bar activities including examining the race gene using the same techniques with post follow-up with past student investigation on the topic.*

The labs listed here are major lab research projects. Smaller activities that enrich the content on a daily basis are not listed here.