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Course/Grade: BioMedical Science & Engineering

Lesson Title: How can I change the world? Applying what I know to solving real-world issues and learning from others.

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| **Stage 1 Desired Results** | | |
| ESTABLISHED GOALS  G1: NM 9-12 Health 4.1.i: Explain how cultural practices (both positive and negative) in the school and community contribute to health, safety and personal choices.  G2: NM 9-12 Health 4.3.i: Analyze the purposes for technology and its impact on personal, family, peer, and community health  G3: NM 9-12 Health 4.3.ii: Analyze the purpose of technology and its impact on personal, family, peer and community health.  G4: NM 9-12 Health 5.2.i: Analyze how cultural diversity influences verbal and non-verbal communication.  G5: NM 9-12 Scientific Thinking and Practice 1.1.ix: Describe how scientific knowledge helps decision makers with local, national, and global challenges.  G6: NM 9-12 Scientific Thinking and Practice 1.1.x: Describe major historical changes in scientific perspectives and the experimental observations that triggered them. | ***Transfer*** | |
| *Students will be able to independently use their learning to…*  T1: Investigate the world beyond their immediate environment.  T2: Translate their ideas into appropriate actions to improve conditions.  T3: Demonstrate the skills, knowledge and attitudes of global competence and perspective. | |
| ***Meaning*** | |
| UNDERSTANDINGS  *Students will understand that…*  U1: Many people throughout the world suffer from hunger and malnutrition.  U2: Advances in technology and education can address challenges faced in international crises.  U3: Individuals have the right and responsibility to act to create positive change. | ESSENTIAL QUESTIONS  E1: How can individuals and groups affect change?  E2: How can biomedical and engineering advances help prevent or lessen the effects of future crises?  E3: How can individuals and groups share resources and knowledge to create positive change? |
| ***Acquisition*** | |
| *Students will know…*  K1: The causes, policies, and challenges that impact global food shortages.  K2: Challenges such as climate change adaptation, preparedness, and disaster risks internationally.  K3: The impact of technology and education on the health of individuals and communities.  K4: How to apply the skills, knowledge and attitudes of global competence and perspective to participate in positive exchange as a global citizen. | *Students will be skilled at…*  S1: Analyzing causes, policies and situations critically by using a variety of sources to weigh evidence.  S2: Designing technology and education plans and or solutions for global food shortage issues.  S3: Applying scientific and engineering skills to solve real-world problems.  S4: Marketing a product to improve the quality of life for individuals or communities. |
| **Stage 2 - Evidence** | | |
| **Evaluative Criteria** | **Assessment Evidence** | |
| Communication skills and Communication Technology skills will be assessed based on the students ability to apply those skills professionally to accomplish the goals of the project.  Research will be assed based on a rubric to ensure quality, source appropriateness, citation, accuracy of information, etc.  Web Design and Presentation will be evaluated with a rubric to ensure quality, source appropriateness, citation, accuracy of information, etc.  Business Plan will be evaluated with a rubric to ensure quality, source appropriateness, citation, accuracy of information, etc.  Reflection will be evaluated with a rubric to ensure quality of contribution and depth of initiative to reflect. | TRANSFER TASK(S):  1. Communication Skills: students will collaborate with a group of students in another country  2. Research: students will research the area where their collaborating partners live to learn about challenges of every day life.  Additional Lesson: Students compile a complete profile of the country of interest- demographic information, industry information, etc. as part of developing a needs-assessment as well as developing a list of in-country resources and strengths.  3. Communications Technology: students will use tools such as email, Skype, webconferencing, etc. to communicate with their student partners.  4. Business Plan: Students will create a business plan to explain their solution, goals and plan for implementation.  5. Web Design: Students will create a web page to explain their project to others.  Additional Lesson: Students create a “Public Service Announcement” video that explains the scope and nature of their identified project area to broadcast their project in an additional format.  6. Presentation: Students will create a presentation to market their project to potential investors.  7. Reflection: Students will reflect on their growth and experiences | |
| observation | OTHER EVIDENCE:  1. Group cooperation  2. Presentation Skills | |
| **Stage 3 – Learning Plan** | | |
| *Summary of Key Learning Events and Instruction*  **Engage:** Students will use technology tools to interface with a group of students in another country in particular an area of high poverty. This group of students might be selected through ePals or one of our partner organizations such as RoboRAVE, Botball, Teachers for Global Classrooms, Project Lead the Way, Innovate Educate, etc. Using these tools the students will introduce themselves and their community and in turn learn about the partner students and their community.  **Explore:** Students will research the area where our corresponding students live to learn about the challenges of daily living such as issues related to food supply or health. They will correspond with their new partner students to learn more about the issue on a personal level and to understand the issue from a local perspective rather than merely as an outsider looking in.  **Explain**: Working in teams and in collaboration with their partner students as engineering and development (E&D) teams students will create a business plan for a solution for their selected daily living issue. This might be a way to purify water, a sustainable food growth plan, a medical intervention, etc.  Additional Lesson: Students put their plan into action by building a working prototype and addressing design and engineering flaws through the design and testing of their prototype.  **Elaborate:** Students will create a presentation to give to recruit local investors. They will also create a website to explain their project and attract funding as well as explore grant possibilities. During this portion students work to try to begin to put the plan into action.  Additional Lesson: If a working prototype can be created and investors secured- put the plan into action. Build, travel and implement in conjunction and cooperation with the corresponding school either in person or virtually.  **Evaluate:** Students will reflect upon their work each week in their science logbook. At the culmination of the semester they will reflect on their overall progress and how they intend to continue work on their project in order to meet their goals as stated in their business plan. They will also reflect on the ability of students to create positive change as well as their knowledge of their ability to apply the skills they have learned in their career pathways to a real-life situation.  Additional Lesson: Take the PSA and lessons learned beyond the school- collaborate with local media outlets, opportunities to give public talks, etc. to get the word out about the work that is being done and the issue that students are addressing. | | |