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Students work independently and collaboratively in an inquiry-based learning environment that encourages finding creative solutions to authentic and complex problems.

Munster High School is dedicated to offering all students the opportunity to work independently and collaboratively in an inquiry-based learning environment that encourages finding authentic solutions to real-world complex problems. Each class includes a variety of activities in which teachers facilitate lessons that require students to solve authentic, complex problems. These lessons include but are not limited to Mars Mission, Trebuchet Zombie Attack and Nuclear Issue Project. Each of these higher-level cognitive tasks require students to apply content knowledge in a creative and authentic manner. All students have the opportunity to participate in STEM clubs, such as Science Olympiad, TEAMS and Robotics that allow them to actively explore STEM related topics and issues.

One example of inquiry-based learning is the Mars Missions Experience. This unit allowed our students to draw on their knowledge of biology as well as previous years of science and math education to design a way to colonize Mars after learning that an extinction-level asteroid is hurdling toward Earth. Team members assume the roles of biologists, engineers, chemists and other occupations to provide the expertise required by the group. The objective is to design a method to escape Planet Earth and arrive safely on Mars. Next, the groups will need to design a habitat that will support life for an extended period of time. Students are also asked to make a list of supplies to take with them and be able to support the necessity of each item. In the past, students have used various approaches to traveling to Mars as well as sustaining life on Mars. A strength of this project is the realistic possibility of this issue. This is potentially a real-world scenario as asteroids and other extrinsic forces are always a possible extinction-level occurrence to Earth. There are multiple companies currently working to position themselves to be the first to go to Mars and successfully colonize it. Students must independently identify the problems and collaboratively find authentic solutions. An area of improvement for this project is the need for an improved, more detailed professional presentation of the students' judgements and solutions. In the future, more time will be given to the students to develop a quality video of their findings and solutions.

Another exciting inquiry-based project is the Trebuchet Experience, in which students work both independently and collaboratively to research and design a method of defending their "refuge" from an impending Zombie horde attack. The objective of this project is to construct mathematical models to predict the trajectory of the different projectiles. They then build a working model of a trebuchet and study how their real-life models compare with the projected model.

The strength of the Zombie Attack scenario is that this topic relates to the real-world pop culture fascination of a zombie apocalypse, which adds a sense of excitement for the students. We do realize that by limiting this experience to trebuchets versus other weapons, it does limit the creative possibilities. However, this is a weakness we are willing to accept because the safety of our students is most important.

The third problem-based learning experience is presented to Physics students as a public announcement through the local newspaper. Students are presented with an article from the Northwest Indiana Times announcing that NIPSCO is planning to build a Nuclear Power Plant in Munster at the location of the old Munster Steel Plant. This is a very controversial proposal and the community will be meeting in the Munster High School Auditorium to discuss the potential advantages and risks associated with this issue.

Students will independently brainstorm the possible pros and cons of building a Nuclear Power Plant in Munster. In the next activity, students are asked to serve on a committee that will research all the issues that they have determined important to the community as a whole. The idea is that this committee will report their findings to the community of Munster at a Town Board meeting. A list of potential issues is given to students in order to ignite their creative thoughts. Students will deliver their findings and stance on this potentially controversial project through the use of a multi-media presentation of their choice.

Here is a list of possible issues students may address include but are not limited to:

- How is nuclear power produced? Is it safe? What are the dangers?
- How can it affect Munster?
- What are the advantages of nuclear power?
- What are the disadvantages of nuclear power?
- Should people be scared of this proposal or is it a very safe thing?
- What are the different types of radiation? How do they affect people?
- What kinds of accidents have nuclear power had and could those happen here?
- Each group is asked to identify at least 1 additional issue facing the Munster population that has not already been identified. (The issue can have a perceived positive or negative effect.)

A strength of this project is the real life problem and solution platform. Students will need to think on their feet and develop a proposal which will benefit their community directly.

A weakness we have identified is making sure all students have the same, solid foundation of knowledge surrounding nuclear power. A way to improve on this factor is a field trip to a local nuclear power plant, so students could learn firsthand the effects of nuclear power. Another improvement opportunity is through the integration of the Algebra II radioactive decay project.