Dyersburg High School

Career and Technical Education Instructor: Seth Coleman

email: scoleman@dyersburgcityschools.org

|  |
| --- |
| **STEM I: Foundations Pacing Guide First Semester** |
|  | **1st Quarter** | **TN Standards** | **Lesson Focus** | **Additional Notes** |
|  | Week 1 | Accurately read and interpret safety rules, including but not limited to rules published by the National Science Teachers Association (NSTA), rules pertaining to electrical safety, Occupational Safety and Health Administration (OSHA) guidelines, and state and national code requirements. Be able to distinguish between the rules and explain why certain rules apply. (TN Reading 3, 4, 6) | Safety | NSTA/OSHA/Code |
| Week 2 | Identify and explain the intended use of safety equipment available in the classroom. For example, demonstrate how to properly inspect, use, and maintain safe operating procedures with tools and equipment. Incorporate safety procedures and complete safety test with 100 percent accuracy. (TN Reading 3, 4) | Safety Equipment | Safety procedures, proper use of equipment, state required safety test |
| Week 3 | Explore several occupations within the STEM field (such as manufacturing, computer science/programming, aviation, forensics, health science, engineering, transportation/ distribution & logistics, actuarial science) and describe the many sources and types ofinformation that these occupations use. Determine how various industries employ | STEM Careers | Collaboration with library to explore valid online resources for STEM career researchCreate a presentation for a given STEM career |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | different kinds of data to meet their needs. (TN Reading 4, 6, 9)Investigate an assortment of skills and education required for STEM professionals. Write an informative text that identifies the typical educational and certification requirements, working environments, and career opportunities for these occupations. For example, participate in an information-gathering tour of a local organization that uses computer-aided design, and report on the roles and responsibilities of STEM professionals on staff, including the kinds of software and equipment they use. (TNReading 2; TN Writing 2) |  |  |
| Week 4-9 | Research the terms engineering design and scientific inquiry. Compare and contrast the steps of the engineering design process to the steps of the scientific inquiry in a graphic illustration or presentation. (TN Reading 2, 7, 9; TNWriting 2, 8) | Engineering Design Process | Intro activity to EDP Measurement Exercises Bridge Design |
|  | **End of 1st Quarter** |  |
|  | **Fall Break** |
|  | **2nd Quarter** | **TN Standards** | **Lesson Focus** | **Additional Notes** |
|  | Week 1-3 | Evaluate a question to determine if it is testable and can produce empirical data. Plan an investigation that outlines the steps of the design process to collect, record, analyze, and evaluate data. | Physics testing | Roller Coaster Physics Testing |
| Week 4-5 | Design and develop several solutionprototypes, conduct feasibility testing, | Solution prototypes | Flight construction and testing |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | and use the data to justify the solution selected. |  |  |
| Week 6-7 | Conduct research to create a list of problems that are considered major global challenges. Choose one to analyze. Evaluate possible solutions, aligning work with the steps of the scientific method or the engineering design process. Consider possible constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. Identify trade- offs and defend decisions that weremade as a result of those trade-offs. | Critical Thinking in Context | Water Filtration |
| Week 8-9 | Given a real-world STEM scenario, identify the problem and develop meaningful questions. Differentiate between necessary and non-essential information as well as needs and wants for applying the scientific method of investigation or the engineering designprocess. | Critical Thinking in Context | Transportation Modeling Safe PackagingPlate Display Package |
|  | **End of 2nd Quarter** |  |
|  | **End of 1st Semester** | **Semester Exam** |
|  | **Winter Break** |
| **STEM I: Foundations Pacing Guide Second Semester** |
|  | **3rd Quarter** | **TN Standards** | **Lesson Focus** | **Additional Notes** |
|  | Week 1-2 | Research the history of science, math, and engineering related to technology. Examine how these technologies have evolved, and evaluate their influence on present-day society, citing specific textual | STEM Exploration (History) | History of Inventions Tomorrowland (Significance) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | evidence from news articles and scholarly journals. (TN Reading 1, 2; TN Writing 2) |  |  |
| Week 3-4 | Collaborate to write a fictional, yet plausible, STEM problem-based scenario. Evaluate possible solutions, aligning work with the steps of the scientific method or the engineering design process. Consider possible constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, andenvironmental impacts. | Critical Thinking in Context | Children’s Game Design |
| Week 5-9 | Given a real-world problem, identify several possible solutions using both the engineering design process and the scientific inquiry. | Problem Resolution Skills | Movie/Music Production |
|  | **End of 3rd Quarter** |  |
|  | **4th Quarter** | **TN Standards** | **Lesson Focus** | **Additional Notes** |
|  | Week 1-2 | Analyze solutions to a real-world problem collaboratively, to identify critical factors of the steps of the design process. Explain why these factors are critical. | Problem Resolution Skills | Hurricane Defender |
| Week 3-4 | Identify multiple forms of data and list mechanisms for collection that areessential to solving a problem. Prepare written documentation to justify findings. | STEM Field Readiness | Project Skydive |
| Week 4-5 | Use available data to create an original prototype/solution to a scenario. | STEM Field Readiness | Build a Better Animal TrapCatapult Design |
| Week 6-7 | Analyze multiple aspects of a problem scenario to identify cause/effect patterns. Consider the history of a problem to identify factors such as risks and benefits. | Cause and Effect Relationships in STEM | Life in Space Space Station Build |
| Week 8-9 | Sort and evaluate data for its significance and/or meaning in the process of solving | STEM Field Readiness | Boat DesignSailing Vessel |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | a problem as a STEM professional would. Examine the data in ways that reveal the relationships, patterns, and trends that can be found within it. Differentiate between quantitative and qualitative data. |  |  |
|  | **End of 4th Quarter** |  |
|  | **End of 2nd Semester** | **Semester Exam** |