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| **NAME:** | **CLASS PERIOD:** | **DATE:** |

**Foundations of Technology**

**Unit 1. Technological Inventions and Innovations**

**Learning Cycle 2. Inventions and Innovations: An Evolutionary Process**

**File 1.2.3 Evolution of Technology Design Brief**

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| **Background:** | Technological devices are in a constant state of evolution. There will always be a way to improve a device no matter how “great” it already is. |
| **Design Problem:** | Given the 21st-century device assigned by your teacher, research the evolutionary history of the device, identifying the original invention and the series of innovations that have led up to the current device. Create a website that depicts the idea or product’s evolution. |
| **Procedure:** | 1. Teacher assigns topic. 2. Research the topic. 3. Determine the best way to create your website and the overall navigation of the website. 4. Add APA citations for all statements and images. 5. Publish all information electronically. |
| **Materials:** | * Computer w/ internet access * Tools to build a website (any Microsoft Office Tool / Dreamweaver / Online Web Development Tool). |

**21st-Century Achievements:**

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| --- | --- | --- | --- |
| * Electrification | * Radio and Television | * Highways | * Health Technologies |
| * Automobile | * Agricultural Mechanization | * Spacecraft | * Petroleum and Petrochemical Technologies |
| * Airplane | * Computers | * Internet | * Laser and Fiber Optics |
| * Water Supply and Distribution | * Telephone | * Imaging | * Nuclear Technologies |
| * Electronics | * Air-Conditioning and Refrigeration | * Household Appliances | * High-Performance Materials |

The following rubric will be used to evaluate your work:

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| --- | --- | --- | --- |
| **Category** | **Below Target** | **At Target** | **Above Target** |
| **Research and Outline of the Evolutionary History** | The student did not research the topic and did not outline the architecture of the website and/or notes were not recorded in the Engineering Design Journal. | The student documented research in his/her Engineering Design Journal, including the source of the information. The research includes the original idea and a series of innovations. A graphical representation of the website was created prior to constructing the website. | The student documented research in his/her Engineering Design Journal, including the source of the information. The research includes the original idea and a series of innovations. A graphical representation of the website was created prior to its construction. The graphical representation was based on the student’s research and their ideas to display the information. |
| **Original Invention** | The student’s website inaccurately displayed the original invention. | The student’s website accurately displayed the original invention and included pictures and text. | The student’s website accurately displayed the original invention and included short paragraphs and pictures/video. All references were cited. |
| **List Innovations** | The student’s website inaccurately displayed the innovations. | The student’s website accurately displayed a series of innovations to the product that led up to the current idea/device. All documented innovations included pictures and text. | The student’s website accurately displayed a series of innovations to the product that led up to the current idea/device. All documented innovations included short paragraphs and pictures/video. All references were cited. |

The teacher may also use the following rubric to evaluate the Engineering Design Process:

| **Category** | **Below Target** | **At Target** | **Above Target** |
| --- | --- | --- | --- |
| **Define Problem** | Rephrases the problem with limited clarity. | Develops a problem statement that includes the who, what, when, and how the problem will be addressed. Recorded in the Engineering Folio or EDJ. | Develops a problem statement that is clearly and precisely stated. The problem statement includes the who, what, when, and how the problem will be addressed. Recorded in the Engineering Folio or EDJ. |
| **Brainstorm Possible Solutions** | Contributes few or implausible ideas. | Contributes a series of plausible ideas, which are recorded in the Engineering Folio or EDJ. | Contributes multiple plausible ideas, which are expanded upon to show understanding of the concept. All notes are recorded in the Engineering Folio or EDJ. |
| **Research Ideas/ Explore Possibilities** | Contributes ideas, but without documented research. Produces incomplete sketches. | Contributes several additional plausible ideas and includes documented research. Produces accurate conceptual models to show the design concepts. All notes are recorded in the Engineering Folio or EDJ. | Contributes many additional plausible ideas and with clearly documented research. Produces accurate conceptual models to show the design concepts with annotated sketches. All notes are recorded in the Engineering Folio or EDJ. |
| **Specify Constraints and Identify Criteria** | Does not identify the criteria and/or fails to specify constraints. | Clearly identifies the criteria and specifies the constraints listed in the design specifications. All notes are recorded in the Engineering Folio or EDJ. | Clearly identifies the criteria and specifies the constraints that are listed in the design specifications and some that are not but pertain to their suggested design. All notes are recorded in the Engineering Folio or EDJ. |
| **Consider Alternative Solutions** | Inadequate analysis of a variety of possible solutions. | Satisfactorily analyzes a variety of possible solutions, based on research and the relationship of those designs to the criteria and constraints. All notes are recorded in the Engineering Folio or EDJ. | Did not enter the research phase with a preconceived idea of the final design. Satisfactorily analyzes a variety of possible solutions, based on research and the relationship of those designs to the criteria and constraints. All notes are recorded in the Engineering Folio or EDJ. |
| **Select an Approach** | Selection of solution is not justified based on consideration of criteria and constraints. | Selects and justifies a promising solution based on the problem statement as well as the criteria and constraints. Uses some type of evaluation method to determine the final design. All notes are recorded in the Engineering Folio or EDJ. | Selects and thoroughly justifies a promising solution based on the problem statement, criteria, and constraints as well as evidence collected through research. Uses some type of evaluation method to determine the final design. All notes are recorded in the Engineering Folio or EDJ. |
| **Develop a Written Design Proposal** | Design proposal is inadequate and lacking pertinent information. | Design proposal contains the who, what, when, where, and how the solution will be developed as well as how the solution will be evaluated and what tests will be conducted to determine success. Includes annotated sketches, notes, and technical drawings. Recorded in the Engineering Folio or EDJ. | Design proposal is written technically and precisely and contains the who, what, when, where, and how the solution will be developed as well as how the solution will be evaluated and what tests will be conducted to determine success. Includes annotated sketches, notes, and technical drawings. Recorded in the Engineering Folio or EDJ. |
| **Make a Model or Prototype** | The model or prototype meets the task criteria to a limited extent. | The model or prototype is neatly developed to meet the problem statement and the given criteria and constraints. A record of the construction process can be found in the Engineering Folio or EDJ. | The model or prototype is neatly and precisely developed to meet the problem statement and the given criteria and constraints. A record of the construction process can be found in the Engineering Folio or EDJ. |
| **Test and Evaluate** | Testing and evaluation processes are inadequate. | Testing and evaluation processes are defined in the Design Proposal and align to the problem statement. The data collected during evaluation can be used to improve the design. All notes are recorded in the Engineering Folio or EDJ. | Testing and evaluation processes are clearly defined in the Design Proposal and align to the problem statement. The data collected during evaluation is clearly documented and can be used to improve the design. All notes are recorded in the Engineering Folio or EDJ. |
| **Refine/ Improve** | Refinement based on testing and evaluation is not evident. | Refinements were made from data collected during testing and evaluation. Data-driven decision-making is clearly evident, and the solution has improved based on testing. All notes are recorded in the Engineering Folio or EDJ. | Refinements were made from data collected during testing and evaluation. Data-driven decision-making is clearly evident and documented. Refinements to the solution are clearly documented, and the solution has improved based on testing. All notes are recorded in the Engineering Folio or EDJ. |
| **Create/ Make Product** | Finished solution (product) fails to meet specifications. | Finished solution (product) aligns to the design proposal and reflects the Engineering Design Process and includes evidence of refinement based on testing and evaluation of the design. The process(es) used to create the product are recorded in the Engineering Folio or EDJ. | Finished solution (product) aligns to the design proposal and reflects the Engineering Design Process and includes evidence of refinement based on testing and evaluation of the design. The solution (product) is well constructed and easily meets the problem statement. The process(es) used to create the product are recorded in the Engineering Folio or EDJ. |
| **Communicate Results** | Solution presented with limited accuracy. Limited supporting evidence on how the solution meets the task criteria. | Solution is presented accurately and precisely using the Engineering Folio or the EDJ. The Engineering Design Process is well documented, with supporting evidence. All information aligns to how the solution meets the problem statement as well as the criteria and constraints. | Solution is presented accurately and precisely using the Engineering Folio or the EDJ. The Engineering Design Process is well documented, with supporting evidence. All information aligns to how the solution meets the problem statement as well as the criteria and constraints. A more formal presentation/showcase was developed to support the solution. |