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| **Project Livingston & Haven Aluminum Design Project (2016-2017)** |

Introduction

Livingston & Haven is looking for the most creative and useful product designs that utilize Bosch Rexroth’s Aluminum Extrusion. Entries will be judged on how well they demonstrate the design and manufacturing advantages of extruded aluminum.

Resources

* L&H Resources
* Rexroth Bosch Books and Website Resources
* Inventor
* OlympicAoE Main website: [www.OlympicAoE.org](http://www.OlympicAoE.org)
* Shark-tank event website: <http://www.olympicaoe.org/lh-design-project-shark-tank.html>

Design Specifications

Your specific design must meet the below design constraints and design portfolios described below for you to solve. You will work in teams of two. The procedure detailed below must be repeated for each problem solved.

* Designs must be original and contain extruded aluminum component.
* Designs cannot include pneumatic, electronic or automation components.
* Designs cannot exceed a work envelope of 3 meters x 3 meters x 3 meters
* Accepted design formats include, hand-sketched artwork in digital format, CAD drawing and 3D rendering.
* For your cost estimations for this project use the following parameters
  + Structural members of extruded aluminum $100.00 per meter
  + Connectors and Accessories found within Bosch’s catalog $10.00 each per item

Time Limit

* 1st Semester (December 15, 2016 thru January 23, 2017) 40 days
* 2nd Semester (February 15, 2017 thru March 27, 2017) 40 days

Regional Competition at Livingston & Haven

* April (exact date TBD)

**Cross Curricular Requirements**

* Each member of your team is required to have the following subject area teacher’s sign off on your project. You MUST make uses of the wide array of expertise and resources available throughout your school and facility.
  + Math
  + English
  + Science
  + Social Studies
  + STEM (CTE)
* Upon Successful competition of this project and with the signature of your lead STEM teacher on the completion form. YOU will receive a FORMAL grade in ALL your core academic classes within the current semester.

The Design Process Requirements (3D Modeling & Sketches)

**ALL Dimensions and Descriptions of measurements MUST be in metric units**

1. As a team read the requirements, constraints, and components that must be used for the Design Project.
2. Document your teams, discuss and brainstorm of possible solutions.
3. Sketch (hand drawn) two potential physical solutions with annotation. Be sure to include labels, descriptions, signatures, and dates on all sketches.
4. Create a final physical (hand drawn or 3D software) solution as a detailed sketch. Be sure to include labels, descriptions, signatures, and dates.
5. Create an Excel inventory spreadsheet of the parts for your design, making necessary modifications. Include descriptions and part number of all parts and materials throughout the design process for clarification.
6. Create inventor drawing(s) ( .ipt, .idw, and .iam ) with a parts list to identify and locate all Bosch Rexroth components used.
7. Create PowerPoint or MS Movie Maker to be used as a: “commercial or sells pitch “to a review board of judges.
8. Prepare the following for documentation:

**Deliverables / Portfolio Report (Engineering Notebook)**

* Title Page: Include the title of the problem, names of team members, course title, school name, and date.
* Table of Contents: Include all major headings below, in addition to any other necessary sections.
* Brainstorming- **Two potential physical sketches:** This should include brainstorming sketches and electronic 3D models of your ideas. Each sketch should be signed, dated, and should include labels and descriptions for communication.
* Final Design- Final physical sketch with descriptions. This section will include information pertinent to the design solution in the form of images (e.g., photographs of final solution, photographs of testing solution, orthographic and isometric drawings, assembly, schematics, exploded views, flow charts, calculations, and data tables).
* Reflection:
  + - * + How well did you accomplish your objectives?
        + What would your team do differently with your design solution and why?
        + Do the results fulfill the problem statement?
        + Provide a brief explanation of what you learned, the challenges of working in a design team, and the purpose of the design problem. The reflection should be 200-250 words.
* References: Using APA format, cite all sources used to obtain information pertaining to your design problem (e.g., books, magazines, journals, Internet sources, etc.). Refer to Citations in APA Style.

**Written Project Description (Research Paper)**

**Provide complete answers to each question about your product and be prepared to defend your answers.**

* + Written product/design specifications
  + How does your project, achieves its purpose?
  + What is the need for your product?
  + Evidence showing that this is an original design
  + What is unique about your project?
  + What attributes or advantages does your product provide?
  + What makes extruded aluminum a preferred choice over other materials?

**EVALUATION - Project Presentation (Juried Audience)**

**REGULATIONS**

1. The entire solution (including model/prototype, design portfolio, display and any equipment needed for the presentation) must be contained within a 3’ deep x 3' wide x 4' high.
2. The model/prototype must include the use of extruded aluminum
3. A documentation notebook is required and must be submitted with the display. A standard three (3)-ring binder with a clear plastic front sleeve for the cover page should be used for this notebook. The cover page must include an original graphic design that incorporates aspects of the student/team engineering design, as well as the event title, conference city and state, and the current year. The cover page must be placed in the front sleeve of the binder. The inside of the binder must include the following single-sided, 8½" x 11" pages:
   1. Title page with the event title, the conference city and state, and the year; one (1) page
   2. Table of contents
   3. A design brief (format that follows) that describes the design and its constraints; one (1) or more pages
      1. **DESIGN BRIEF**
      2. **Context:** States the nature of the engineering design
      3. **Task:** Clearly states what the team will be involved in doing
      4. **Restrictions:** Identifies any restrictions
      5. **Investigations:** Identifies the research involved
      6. **Development:** States essential elements involved in planning
      7. **Production:** Identifies the expected end result
      8. **Evaluation:** Identifies the expected assessment procedure and criteria
   4. A description of the problem solving steps; one (1) or more pages
   5. Plan of Work log that indicates preparation for the event, as noted by date, task, time involved, team member responsible and comments; one (1) page
   6. Evidence of research conducted by the design team; two (2) or more pages
   7. Documentation of brainstorming; one (1) or more pages
   8. Descriptions and illustrations of a minimum of three (3) possible solutions with a brief but concise evaluation of the merits of each; three (3) or more pages
   9. A detailed description of the final solution, including an explanation of the steps of operation; one (1) or more pages
   10. A three (3)-dimensional technical or CAD drawing and/or rendering of the final solution; one (1) or more pages (the maximum sheet size is drawing sheet cut size B—11" x 17"; when this sheet size is used, the sheet must be hole-punched and folded or placed in a sheet protector for insertion in the binder)
   11. Math and science concepts and applications involved in the final design solution; one (1) page
   12. Explanation of the areas of technology that are an integral part of the solution, including as many as apply; one (1) or more pages:
       1. Medical technology
       2. Agriculture and biotechnology
       3. Energy and power
       4. Information and communication
       5. Transportation
       6. Manufacturing
       7. Construction
   13. A list of references and resources utilized; APA style must be used in citing all references and resources; one (1) or more pages
   14. Evaluation of how well the final solution meets the design brief problem and explains the possible impact of the solution on society and/or the environment, one (1) or more pages
4. Any special set-up and/or equipment required for the display or semifinalist interview is the responsibility of the participants.

**Scored Areas**

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| **Each area judged 1-10 scale by a panel of industry professionals** | | | | | | | | | | |
| **Scored Areas** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **Creativeness** |  |  |  |  |  |  |  |  |  |  |
| **Inventiveness** |  |  |  |  |  |  |  |  |  |  |
| **Uniqueness** |  |  |  |  |  |  |  |  |  |  |
| **Practicality** |  |  |  |  |  |  |  |  |  |  |
| **Usefulness** |  |  |  |  |  |  |  |  |  |  |
| **Cost Effectiveness** |  |  |  |  |  |  |  |  |  |  |
| **Marketability** |  |  |  |  |  |  |  |  |  |  |
| **Impactfulness** |  |  |  |  |  |  |  |  |  |  |
| **Potential Customers** |  |  |  |  |  |  |  |  |  |  |
| **Presentation** |  |  |  |  |  |  |  |  |  |  |
| **Research** |  |  |  |  |  |  |  |  |  |  |
| **Overall Impression** |  |  |  |  |  |  |  |  |  |  |
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**Each team member must save and maintain a digital copy of all work.**

Livingston & Haven Design Project (STEM) INTEGRATION

In recent years, not only educators, but also political, civic and industry leaders have pushed for a greater emphasis on science, technology, engineering and mathematics (STEM) education in our schools. These groups feel that in order for our nation to be competitive, healthy and vibrant, our young people must have competency in the 21st century skills afforded through the STEM fields.

STEM education is not just the isolated and discreet acquisition of knowledge and skills related to science, technology, engineering, and mathematics. Rather, STEM education demands the interweaving and application of these academic fields for the purpose of comprehending, communicating, and solving problems. Indeed, it is now commonly accepted that to understand (and apply) any one of these STEM areas, one must, at the same time, have a grasp of and apply the others. (For example, to design and engineer with any degree of complexity, one also must be familiar with technology, mathematics and science; or to practice science, one must have a firm knowledge of mathematics and technology.)

Beyond necessity, there is another reason for STEM education in our schools — and why the Livingston & Haven Design activities inherently align with STEM goals. This reason revolves around teaching and learning, and what motivates students. STEM education is intrinsically exciting, rewarding and meaningful for instructors and students alike. It is our belief that, as with STEM education, Livingston & Haven Design activities provide the same kind of stimulation, challenge and relevancy for all involved.

Deserving of mention are two other essential areas imbedded in the Livingston & Haven Design competitive events – those of art and ethics. It is difficult to design without considering aesthetics, and it is irresponsible to create without contemplating ethical consequences. When students participate in Livingston & Haven Design competitions they find they must not only embrace the value of design when they compete, they also must envision and assess the effects of what they develop.

The Livingston & Haven Design Project provide a hands-on venue for learning about science, technology, engineering and mathematics. By participating in the project, students gain a broader understanding of these specific content areas, and at the same time experience the satisfaction that comes from applying them to real-life problem solving situations.

*This guide includes commonly accepted national standards for the areas of science, technology and mathematics, as well as ABET, Inc. criteria for accrediting higher education engineering programs. As you make use of these materials, keep in mind that their power and beauty lie in their synergistic nature.*

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|  | **INTEGRATION STANDARDS incorporated in the Livingston & Haven Design Project** | | | | | | | | | | | | | | | | | | | |
| PRINCIPLES AND STANDARDS FOR SCHOOL MATHEMATICS | 1A | 1B | 1C | 2A | 2B | 2C | 2D | 3A | 3B | 3C | 3D | 4A | 4B | 5A | 5B | 5C | 5D | 6A | 6B | 6C |
| 6D | 7A | 7B | 7C | 7D | 8A | 8B | 8C | 8D | 9A | 9B | 9C | 10A | 10B | 10C |  |  |  |  |  |
| SCIENCE CONTENT STANDARDS | A1 | A2 | B1 | B2 | B3 | B4 | B5 | B6 | C1 | C2 | C3 | C4 | C5 | C6 | D1 | D2 | D3 | D4 | E1 | E2 |
| F1 | F2 | F3 | F4 | F5 | F6 | G1 | G2 | G3 |  |  |  |  |  |  |  |  |  |  |  |
| TECHNOLOGY CONTENT STANDARDS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| ACCREDITING ENGINEERING PROGRAMS (ABET, INC.) | A | B | C | D | E | F | G | H | I | J | K |  |  |  |  |  |  |  |  |  |

**SCIENCE CONTENT STANDARDS (GRADES 9-12)**

1. Science as inquiry
   1. Abilities necessary to do scientific inquiry
   2. Understandings about scientific inquiry
2. Physical science
   1. Structure of atoms
   2. Structure and properties of matter
   3. Chemical reactions
   4. Motions and forces
   5. Conservation of energy and the increase in disorder
   6. Interactions of energy and matter
3. Life science
   1. The cell
   2. Molecular basis of heredity
   3. Biological evolution
   4. Independence of organisms
   5. Matter, energy, and organization in living systems
   6. Behavior of organisms
4. Earth and space science
   1. Energy in the earth system
   2. Geochemical cycles
   3. Origin and evolution of the earth system
   4. Origin and evolution of the universe
5. Science and technology
   1. Abilities of technological design
   2. Understandings about science and technology
6. Science in personal and social perspective
   1. Personal and community health
   2. Population growth
   3. Natural resources
   4. Environmental quality
   5. Natural and human-induced hazards
   6. Science and technology in local, national and global challenges
7. History and nature of science
   1. Science as a human endeavor
   2. Nature of scientific knowledge
   3. Historical perspectives

The standards listed above are reprinted with permission from *National Science Education Standards, 1995* by the National Academy of Sciences, courtesy of the National Academies Press, Washington, DC.

**TECHNOLOGY CONTENT STANDARDS**

Standard 1: Students will develop an understanding of the characteristics and scope of technology.

Standard 2: Students will develop an understanding of the core concepts of technology.

Standard 3: Students will develop an understanding of the relationships among technologies and the connections between technologies and other fields of study.

Standard 4: Students will develop an understanding of the cultural, social, economic, and political aspects of technology.

Standard 5: Students will develop an understanding of the effects of technology on the environment.

Standard 6: Students will develop an understanding of the role of society in the development and use of technology.

Standard 7: Students will develop an understanding of the influence of technology on history.

Standard 8: Students will develop an understanding of the attributes of design.

Standard 9: Students will develop an understanding of engineering design.

Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Standard 11: Students will develop the abilities to apply the design process.

Standard 12: Students will develop the abilities to use and maintain technological products and systems.

Standard 13: Students will develop the abilities to assess the impact of products and systems.

Standard 14: Students will develop an understanding of and be able to select and use medical technologies.

Standard 15: Students will develop an understanding of and be able to select and use agricultural and related biotechnologies.

Standard 16: Students will develop an understanding of and be able to select and use energy and power technologies.

Standard 17: Students will develop an understanding of and be able to select and use information and communication technologies.

Standard 18: Students will develop an understanding of and be able to select and use transportation technologies.

Standard 19: Students will develop an understanding of and be able to select and use manufacturing technologies.

Standard 20: Students will develop an understanding of and be able to select and use construction technologies.

These technology content standards are noted in *Standards for Technological Literacy: Content for the Study of Technology* (ITEEA/ITEA, 2000/2002/2007) and are used with permission. ([www.iteea.org](http://www.iteea.org))

**CRITERIA FOR ACCREDITING ENGINEERING PROGRAMS (ABET, INC.)**

Engineering programs must demonstrate that their students attain the following outcomes:

1. An ability to apply knowledge of mathematics, science and engineering
2. An ability to design and conduct experiments, as well as to interpret data
3. An ability to design a system, component, or process to meet desired needs
4. An ability to function on multi-disciplinary teams
5. An ability to identify, formulate and solve engineering problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of engineering in global and social contexts
9. A recognition of the need for and an ability to engage in life-long learning
10. A knowledge of contemporary issues
11. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice

The outcomes listed above are found in *2008-2009 Criteria for Accrediting Engineering Programs* and used with permission from the Engineering Accreditation Commission of ABET, Inc.

(The outcomes were designed for higher education engineering programs but are relevant for middle school and high school level engineering-related courses.)

**PRINCIPLES AND STANDARDS FOR SCHOOL MATHEMATICS**

1. Numbers and operations
   1. Understand numbers, ways of representing numbers, relationships among numbers and number systems
   2. Understand meanings of operations and how they relate to one another
   3. Compute fluently and make reasonable estimates
2. Algebra
   1. Understand patterns, relations, and functions
   2. Represent and analyze mathematical situations and structures using algebraic symbols
   3. Use mathematical models to represent and understand quantitative relationships
   4. Analyze change in various contexts
3. Geometry
   1. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships
   2. Specify locations and describe spatial relationships using coordinate geometry and other representational systems
   3. Apply transformations and use symmetry to analyze mathematical situations
   4. Use visualization, spatial reasoning and geometric modeling to solve problems
4. Measurement
   1. Understand measurable attributes of objects and the units, systems and processes of measurement
   2. Apply appropriate techniques, tools and formulas to determine measurements
5. Data analysis and probability
   1. Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them
   2. Select and use appropriate statistical methods to analyze data
   3. Develop and evaluate inferences and predictions that are based on data
   4. Understand and apply basic concepts of probability
6. Problem solving
   1. Build new mathematical knowledge through problem solving
   2. Solve problems that arise in mathematics and in other contexts
   3. Apply and adapt a variety of appropriate strategies to solve problems
   4. Monitor and reflect on the process of mathematical problem solving
7. Reasoning and proof
   1. Recognize reasoning and proof as fundamental aspects of mathematics
   2. Make and investigate mathematical conjectures
   3. Develop and evaluate mathematical arguments and proofs
   4. Select and use various types of reasoning and methods of proof
8. Communication
   1. Organize and consolidate mathematical thinking through communication
   2. Communicate mathematical thinking coherently and clearly to peers, teachers and others
   3. Analyze and evaluate the mathematical thinking and strategies of others
   4. Use the language of mathematics to express mathematical ideas precisely
9. Connections
   1. Recognize and use connections among mathematical ideas
   2. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole
   3. Recognize and apply mathematics in contexts outside of mathematics
10. Representation
    1. Create and use representations to organize, record, and communicate mathematical ideas
    2. Select, apply, and translate among mathematical representations to solve problems
    3. Use representations to model and interpret physical, social and mathematical phenomena

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| **Livingston & Haven Design Project (English Integration)** | | | | | | |
| **#** | **Item** | **Pts.** | **Pts.  Scored** | **Subject Area** | **Sub Area** | **Major Area** |
| 1 | Cover page | 3 |  | English | Design notebook | ENGINEERING DESIGN |
| 2 | Title page | 3 |  | English | Design notebook | ENGINEERING DESIGN |
| 3 | Table of contents | 3 |  | English | Design notebook | ENGINEERING DESIGN |
| 4 | Clarity | 5 |  | English | Artisanship of writing | ESSAYS ON TECHNOLOGY |
| 5 | Convincing | 5 |  | English | Artisanship of writing | ESSAYS ON TECHNOLOGY |
| 6 | Insightful | 5 |  | English | Artisanship of writing | ESSAYS ON TECHNOLOGY |
| 7 | Introduction | 5 |  | English | Organization-structure-flow | ESSAYS ON TECHNOLOGY |
| 8 | Body | 5 |  | English | Organization-structure-flow | ESSAYS ON TECHNOLOGY |
| 9 | Conclusion | 5 |  | English | Organization-structure-flow | ESSAYS ON TECHNOLOGY |
| 10 | Flow | 5 |  | English | Organization-structure-flow | ESSAYS ON TECHNOLOGY |
| 11 | Thesis (position) statement clarity | 10 |  | English | Organization-structure-flow | ESSAYS ON TECHNOLOGY |
| 12 | Punctuation | 10 |  | English | Mechanics | ESSAYS ON TECHNOLOGY |
| 13 | Spelling | 10 |  | English | Mechanics | ESSAYS ON TECHNOLOGY |
| 14 | Neatness | 10 |  | English | Mechanics | ESSAYS ON TECHNOLOGY |
| 15 | Bibliography format (APA) References/resources | 16 |  | English | Mechanics | ESSAYS ON TECHNOLOGY |
|  |  | 100 |  |  |  |  |
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| **Livingston & Haven Design Project (Math Integration)** | | | | | | |
| **#** | **Item** | **Points** | **Pts.  Scored** | **Subject Area** | **Sub Area** | **Major Area** |
| 1 | Dimensioning (correct size and proportion) | 15 |  | Math | Modeling technique | (CAD) 3D, ENGINEERING |
| 2 | Correct geometry | 20 |  | Math | Modeling technique | (CAD) 3D, ENGINEERING |
| 3 | Math and science concepts | 25 |  | Math | Model/prototype | ENGINEERING DESIGN |
| 4 | All dimensions, descriptions, measurements are presented in metric units | 40 |  | Math | Model/prototype | ENGINEERING DESIGN |
|  |  | 100 |  |  |  |  |
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| **Livingston & Haven Design Project (Science Integration)** | | | | | | |
| **#** | **Item** | **Points** | **Pts.  Scored** | **Subject Area** | **Sub Area** | **Major Area** |
| 1 | Technology areas | 5 |  | Science | Model/prototype | ENGINEERING DESIGN |
| 2 | Appropriate procedures | 5 |  | Science | Modeling technique | (CAD) 3D, ENGINEERING |
| 3 | Supported by research | 10 |  | Science | Concepts | ESSAYS ON TECHNOLOGY |
| 4 | Design | 20 |  | Science | Design, originality, and creativity | (CAD) 3D, ENGINEERING |
| 5 | Functionality | 20 |  | Science | Design, originality, and creativity | (CAD) 3D, ENGINEERING |
| 6 | Originality | 20 |  | Science | Design, originality, and creativity | (CAD) 3D, ENGINEERING |
| 7 | Solution’s impact on the environment | 20 |  | Science | Model/prototype | ENGINEERING DESIGN |
|  |  | 100 |  |  |  |  |
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| **Livingston & Haven Design Project (Social Studies Integration)** | | | | | | |
| **#** | **Item** | **Points** | **Pts.  Scored** | **Subject Area** | **Sub Area** | **Major Area** |
| 1 | Important and relevant | 10 |  | Social Studies | Concepts | ESSAYS ON TECHNOLOGY |
| 2 | Effectiveness of design | 10 |  | Social Studies | Model/prototype | ENGINEERING DESIGN |
| 3 | Clear and effective presentation of the design | 10 |  | Social Studies | Model/prototype | ENGINEERING DESIGN |
| 4 | Appearance and quality | 10 |  | Social Studies | Model/prototype | ENGINEERING DESIGN |
| 5 | Marketability and usefulness | 30 |  | Social Studies | Model/prototype | ENGINEERING DESIGN |
| 6 | Solution’s impact on society | 30 |  | Social Studies | Model/prototype | ENGINEERING DESIGN |
|  |  | 100 |  |  |  |  |
|  |  |  |  |  | **Total Points** |  |
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| **Livingston & Haven Design Project (STEM Integration)** | | | | | | |
| **#** | **Item** | **Points** | **Pts.  Scored** | **Subject Area** | **Sub Area** | **Major Area** |
| 1 | Technically correct | 5 |  | STEM | Concepts | ESSAYS ON TECHNOLOGY |
| 2 | Problem solving steps | 5 |  | STEM | Design notebook | ENGINEERING DESIGN |
| 3 | Plan of Work log | 5 |  | STEM | Design notebook | ENGINEERING DESIGN |
| 4 | Research | 5 |  | STEM | Design notebook | ENGINEERING DESIGN |
| 5 | Relevance | 5 |  | STEM | Research and references | ESSAYS ON TECHNOLOGY |
| 6 | Creativity and innovation | 5 |  | STEM | Model/prototype | ENGINEERING DESIGN |
| 7 | Appearance and quality of construction | 5 |  | STEM | Model/prototype | ENGINEERING DESIGN |
| 8 | Technical drawing | 5 |  | STEM | Model/prototype | ENGINEERING DESIGN |
| 9 | Craftsmanship | 5 |  | STEM | Product | MANUFACTURING PROTOTYPE |
| 10 | Product function | 5 |  | STEM | Product | MANUFACTURING PROTOTYPE |
| 11 | Product solution | 5 |  | STEM | Product | MANUFACTURING PROTOTYPE |
| 12 | Aesthetics | 5 |  | STEM | Product | MANUFACTURING PROTOTYPE |
| 13 | Originality | 5 |  | STEM | Product | MANUFACTURING PROTOTYPE |
| 14 | Overall quality | 5 |  | STEM | Product | MANUFACTURING PROTOTYPE |
| 15 | Conventions | 5 |  | STEM | Use of engineering | (CAD) 3D, ENGINEERING |
| 16 | Aesthetics | 5 |  | STEM | Use of engineering | (CAD) 3D, ENGINEERING |
| 17 | Design brief | 5 |  | STEM | Design notebook | ENGINEERING DESIGN |
| 18 | Brainstorming | 5 |  | STEM | Design notebook | ENGINEERING DESIGN |
| 19 | Three (3) solutions | 5 |  | STEM | Design notebook | ENGINEERING DESIGN |
| 20 | Final solution description | 5 |  | STEM | Design notebook | ENGINEERING DESIGN |
|  |  | 100 |  |  |  |  |
|  |  |  |  |  | **Total Points** |  |
|  | **Teacher Sign Off** | | | |
|  | Students Name (Print): | | | | | |
|  | Students Signature: | | | | | |
|  |  |  |  |  |  |  |
|  | Teacher Name (Print): | | | | | |
|  | Teacher's Subject Area: | | | | | |
|  | Teachers Signature: | | | | | |
|  | Date: | | | |  | Page 5 |
|  |  |  |  |  |  |  |
| Notes: | | | | | | |
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| **Livingston & Haven Design Project Judge's Sheet** | | | | | | | | | | |
| **Team #** | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |
| **Team Name:** | | | | | | | | | | |
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| **Each area judged 1-10 scale by a panel of industry professionals** | | | | | | | | | | |
| **Scored Areas** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **Creativeness** |  |  |  |  |  |  |  |  |  |  |
| **Inventiveness** |  |  |  |  |  |  |  |  |  |  |
| **Uniqueness** |  |  |  |  |  |  |  |  |  |  |
| **Practicality** |  |  |  |  |  |  |  |  |  |  |
| **Usefulness** |  |  |  |  |  |  |  |  |  |  |
| **Cost Effectiveness** |  |  |  |  |  |  |  |  |  |  |
| **Marketability** |  |  |  |  |  |  |  |  |  |  |
| **Impactfulness** |  |  |  |  |  |  |  |  |  |  |
| **Potential Customers** |  |  |  |  |  |  |  |  |  |  |
| **Presentation** |  |  |  |  |  |  |  |  |  |  |
| **Research** |  |  |  |  |  |  |  |  |  |  |
| **Overall Impression** |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | **Total Points** | | | |  | | |
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| Judges Notes: | | | | | | | | | | |
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