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2018 - CONVERSION CONTRAPTION

PURPOSE:

To design and build a contraption that utilizes as many different forms of energy and as many energy conversions as possible.

GENERAL INFORMATION:

1. A team will consist of 1 or 2 individual(s) working together to accomplish a common purpose.
2. Teams will be assigned a sequential number at event check-in, which will be used to call teams to the competition area. Teams not present when their number is called, will not earn points related to contraption's performance.
3. The Angelina County Science & Tech Fair, George H. Henderson, Jr. Exposition Center (Expo Center), and the Lufkin/Angelina County Chamber of Commerce are not responsible for any loss or damage to materials/projects.
4. The electronic submission must be submitted one week prior to project check-in/competition.
5. The Contraption must be present to check-in.

MATERIALS PROVIDED BY SCIENCE & TECH FAIR STAFF AT EVENT:

1. Competition Area
 - a. Table provided for contraption to sit on.
 - b. Marked area on the Expo Center floor.
 - c. Note: Science & Tech Fair Staff will setup and level the table and marked area on the ground as much as possible on the dirt floor of the Expo Center.
2. Stop watch (to be operated by judge)
3. Lighter, if required (to be operated by judge)

SCORING GUIDELINES (See Attached Scoring Rubric):

1. Safety and Check In Dimensions/Labels
 - a. Participant and spectator safety is the primary concern. Any contraption that appears unsafe or uncontrollable at check-in will be disqualified by Science & Tech Fair Staff prior to the competition. No combustible materials allowed. If a candle is used, only the judge is allowed to light it.



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- b. Entire contraption (including themed decorations) must fit within an 80 cm x 80 cm x 80 cm cube (See
 - c. Figure 1: Dimensions of Contraption). Failure to meet dimension guideline will result in disqualification.
 - d. Number and label each energy transformation on the contraption platform.
2. Electronic Submission:
- a. For the purpose of the Angelina County Science & Tech Fair, an **electronic submission** can be created using a provided template on line or using your own creation provided it contains the required content.
 - b. The presentation will provide specific information regarding topics and content for the following sections:
 - i. Title Page
 1. Project Title
 2. Event
 3. Name(s) of Participant(s) with Grade
 4. School
 5. Teacher
 - ii. Table of Contents or Tabs with each Section labeled and numbered.
 - iii. Section 1: Define the Problem and Constraints – Questions might include but not limited to:
 1. What is the problem?
 2. What do we want to design?
 3. What do we want to accomplish?
 4. What are the specifications or limitations?
 - iv. Section 2: Research and Background Information
 1. Research energy transformations in real world situations.
 2. Journal entries showing project progress (date/time and accomplishments of meetings)
 3. Provide a reference section/bibliography to give credit to the sources of information (ex. websites, books, etc.) and people who helped with your project
 - v. Section 3: Develop Possible Solutions – BRAINSTORM IDEAS
 1. Show various ideas through sketches, diagrams or notes
 - vi. Section 4: Select a Promising Solution



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1. List of materials, quantities, and source for each item.
 - a. Procedure: Step by step instructions for constructing the contraption
 - vii. Section 5: Build a Prototype – include photos.
 - viii. Section 6: Test and Evaluate Prototype
 1. Trial data used to solve the problem, using tables and/or graphs (if applicable)
 2. Diagram(s) of the sequence of events and an energy conversion analysis. The diagram shows the parts of your contraption while the analysis shows the energy conversions involved during each part.
 - ix. Section 7: Improve and Redesign if needed
 1. Description of at least one modification made between design and final product. Description should include:
 - a. Why the change was made
 - b. Any positive and/or negative effect(s) of the change.
3. Performance Evaluation:
- a. Contraption must utilize at least three (3) different forms of (PE) potential energy (examples: chemical, gravitational PE, stored energy or elastic PE) which must be converted to kinetic energy (KE) (examples: electrical, mechanical, thermal, sound and light). Each form **MUST** be labeled.
 - b. At least four different (KE) kinetic energy transformations from one object to another object must take place.
 - c. For each transformation, identify the types of energy that are created – and which are useful and non-useful forms. For more information, see this YouTube video:

<https://www.youtube.com/watch?v=TOC9A9pAaKg>
4. Presentation:
- a. Ability to explain contraption's design to judges during competition
 - b. Teams are encouraged to develop a theme for their contraption.
 - c. Scored on the basis of originality, exterior decorations, and overall appearance.



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COMPETITION PROCESS:

1. At event check in, teams must present their Conversion Contraption
2. Contraptions will be measured at check-in. Contraptions exceeding the size limit will be disqualified (Scoring Guidelines 1b).
3. Teams are responsible for moving contraption from staging area to competition area.
 - a. Once contraption is placed on the table or in the competition area, adult interaction is prohibited.
 - b. Students will be allowed two (2) minutes to adjust their contraption once it is set in place.
 - c. The contraption should run without any assists from the students, there will be a deduction of five (5) points for every assist.
4. Teams not present when their number is called, will not earn points related to contraption's performance.
5. Each team will be give two (2) minutes to explain their contraption to the judges.
6. Each team will have three (3) minutes to demonstrate their contraption.
7. At the conclusion of competition, contraptions must be removed from the Expo Center. Teams are responsible for moving contraption from competition area to late pick-up area. (See the Official Rules document for additional information)
8. Electronic submission will be used as the tie breaker.



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ILLUSTRATIONS

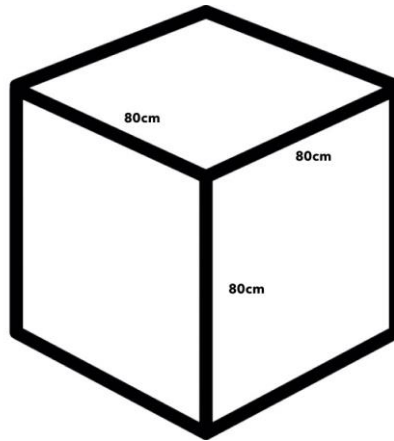


Figure 1: Dimensions of Contraption



2017 – CONTRAPTION CONVERSION

Team Number (Provided at Check-In):

<u>Team Member Name</u>	<u>School</u>	<u>Grade</u>
(1)		
(2)		

DIVISION:

Middle School (Grades 6-8)

High School (Grades 9-12)

SCORING:

SAFETY AND CHECK IN DIMENSIONS/LABELS (Circle One)	PASS	FAIL
ELECTRONIC SUBMISSION	Available Points	Awarded Points
Overall Neatness and Organization of Template	5	
Define the Problem	5	
Research and Background Information	5	
Develop Solutions - Brainstorm	5	
Select Promising Solution	5	
<ul style="list-style-type: none"> - Process used to construct the contraption - List of materials, quantities, and source 		
Build a Prototype (include pictures)	5	
Test and Evaluate Prototype	10	
<ul style="list-style-type: none"> - Diagram(s) and Analysis - Description of design modification(s) 		
Improve & Redesign	10	
ELECTRONIC SUBMISSION TOTAL	50	

PRESENTATION		
Verbal presentation to the judges	5	
Creativity of Design & Overall Appearance	5	
PRESENTATION TOTAL	10	

PERFORMANCE EVALUATION			
Qty. Energy Conversions from PE to KE (Minimum 3)		x 5 pts	15
Qty. Objects Picking Up Mechanical Energy (KE) (Minimum 4)		x 5 pts	20
Includes heat, light, sound, and electric energy		x 5 pts	20
Assist (Deduction of 5 points each)			-5
PERFORMANCE EVALUATION TOTAL			Variable

TOTAL PROJECT SCORE	Variable
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