



# 2019 Revised (1-20-2019) MICHIGAN INDUSTRIAL AND TECHNOLOGY EDUCATION SOCIETY STUDENT COMPETITION RULES BOOK

Only members in good standing and their students may enter this contest. To join: contact the Membership Chairman through the [www.mites.cc](http://www.mites.cc) website. Entry fee is \$2.00 per project. **COST FOR ONSITE COMPETITIONS ARE LISTED WITH THE RULES FOR THOSE COMPETITONS.**

## New important information

- The MITES website will be used to relay important information to the membership. It is each member's responsibility to check it regularly to receive the most current information.
- Make sure the Membership Chairman has your email address. Important information will be sent when necessary.
- Project registration will open September 1st. The Membership Chairman will assign your ID Number for Project Registration. You will need to be current with your membership dues in order to register.
- Registration information will be posted on the MITES website. Read completely first, then follow the instructions. It takes about a minute to register a project. A Student Project Sheet is online that can be printed and given to the student to fill out and give back to the instructor to aid in registration.
- We recommend that only the instructor, **NOT** students go online to enter projects. There are several security features built into the system, but the instructor is our first line of defense. One security feature is that the IP address and time of log in is recorded every time someone logs on.
- Registration deadlines will be posted on the MITES website by Region. **Project Registration closes at 4:00 PM the day before Regional project check-in. Check the MITES website for local Regional information.**
- **THERE WILL BE NO LATE REGISTRATION.**
- It is illegal and unethical to use another teacher's ID number to enter a project. This will result in a disqualification

**2019 MITES CONVENTION**  
Shanty Creek  
Bellaire, Michigan  
May 8-11, 2019

First through fourth place Regional winners must enter no later than 12:00 p.m. May 9th, 2019. Pick-up will be Saturday from 12 Noon to 1:00 p.m. Absolutely No Exceptions Will Be Made **MITES, nor its representatives, assume no responsibility for projects left after checkout.**

## RULES COMMITTEE

Kevin Bidwell (989) 245-2688 (c) [klbidwel@stcs.org](mailto:klbidwel@stcs.org)  
[mitrulescommittee@gmail.com](mailto:mitrulescommittee@gmail.com)  
Marvin Gage (269) 337-0300 (w) [gagemr@kalamazoo.k12.mi.us](mailto:gagemr@kalamazoo.k12.mi.us)  
Chuck Luchies (269) 569-0463 (w) [cluchies@ccs.coloma.org](mailto:cluchies@ccs.coloma.org)  
Josh Burkhard (989) 289-7260 (c) [miteswebmaster@gmail.com](mailto:miteswebmaster@gmail.com)

## Mission Statement

To encourage and recognize fine craftsmanship in the field of Industrial Technology and Career Technical Education.

## Student Eligibility

Any student in grades K through 12 enrolled in Industrial, Technology, or Career Technical education courses taught by a MITES member in any Michigan, Indiana, or Illinois public, private, or parochial school is eligible. Thirteenth year students (graduates who are completing secondary Career Technical program course requirements) and mid-year graduates may participate if the project was completed in the semester prior to program completion/graduation. Post-secondary students pursuing TX, IX, or VT certification may enter a project in the FT division only.

## Project Eligibility

Competition projects must be started no earlier than the previous year's Regional Competition and be completed by the current year's Regional Competition. Projects must be entered in the grade level in which they are completed. A student who has graduated from high school may not enter the competition except in the FT category. Projects made from commercial kits with pre-fitted, pre-assembled, or pre-machined parts are not eligible. A list of parts and labor (ordinary hardware excluded) not completed by the student must be noted on the entry form. Project size is limited to 64 square feet of floor space. Unlock all items.

Projects such as bows, arrows, crossbows, knives, guns, letter openers, swords, and other weapons **must be mounted on a base board**. Projects not meeting this criteria will not be accepted. Projects containing bullets, fuel, gunpowder, explosives, or combustibles will not be accepted.

## Project Classification

All projects must be physically on the Convention floor to be judged. Entries are separated into 14 divisions, and each division is divided into smaller classifications. Each classification is further divided into grade levels to promote competition among students of similar abilities. Projects must be entered in the classifications in which most of the work was done. If a project qualifies under different classifications, a statement explaining the rationale for entry into the classification must be provided. The Rules Committee reserves the right to reclassify a project.

## Number of Entries

A student may enter only one project in one grade level per classification, but may enter as many classifications as desired.

## Delivery and Pick Up

**Project drop off begins Wednesday 12:00 PM – ends on Thursday at 12:00 noon.** No entry may be picked up without the required claim check. MITES nor its representatives cannot be responsible for breakage, theft, or projects left after checkout. Pick-up is on Saturday from 12:00 noon to 1:00 PM. **No exceptions.**

## Judging Criteria

- A. Craftsmanship

- B. Degree of difficulty
- C. Optional project documentation in a 3-ring binder: students are encouraged to supply plan sheets, photographs, descriptions, calculations, and/or other information used to produce the project.

### Regional Project Competition

Regional Project Competitions are under the direction of the Regional Administrative Officer (RAO). Projects must be entered within the MITES region for your school. First through tenth place and Honorable Mention will be awarded in each grade level at each classification. Only first through fourth place will be reported on the MITES website. Honorable Mention ribbons are given for all awards after tenth place. Projects winning first through fourth place awards at the Regional Project Competition are the only projects eligible for the State Project Competition. If a project is the only project in its category, it is awarded first place and allowed to move on to the State Project Competition.

### State Project Competition

First through tenth place and Honorable Mention will be awarded in each classification. MITES will also recognize the outstanding achievements of Grand Award and Division Award winners.

### Didn't Meet Requirements

Projects will not be accepted if:

1. Does not fully meet the classification requirements, even though the project was inadvertently accepted at the Regional Competition.
2. The entry form is not complete or has been altered by anyone other than a MITES official.
3. The entry was not awarded first through fourth place at the Regional Competition or the entry does not have the State sticker.
4. Changes have been made to the project between the Regional Competition and the State Competition.
5. The entry is not at the State Competition by the published time.
6. Any project the Rules Committee decides is unsafe to the floor workers, judges, or the general public.
7. All entered projects must be complete. Any project the Rules Committee decides is unfinished or partly done will not be allowed on the floor. Only finished projects will be judged.
8. Any project removed from the exhibit area after judging or before 12:00 noon Saturday will be disqualified.

### Instructors' Note:

When you register the student's entry form on the website, you are stating that you understand the rules and classifications and that the project meets all the criteria for that classification. The Rules Committee has the right to reclassify or disqualify a project which does not fully meet a classification's requirements. If after judging, but before public viewing, a project is discovered that does not meet the requirements of a classification, any awards will be withdrawn. No other awards will be changed. If the discovery is made after public viewing has begun, no changes will be made. The Rules Committee's decisions are final.

## Classification Descriptions Grade Level

### Grade Level

All entries are separated into 14 divisions and each division is divided into smaller classifications. Each classification is further divided into grade levels to promote competition among students of similar abilities.

**Level A** is for students in vocational or C.T.E. spending more than 2 hours or more per day or 8 hours per week or through a related co-op program receiving instruction in the subjects represented by their entries.

**Level B** is for students in grades 11 and 12 who receive instruction for less than 2 hours per day in Industrial Education in the subjects represented by their entries.

**Level C** is for students in grades 9 and 10 who receive instruction for less than 2 hours per day in Industrial Education in the subjects represented by their entries.

**Level D** is for students in grades 6 through 8.

**Level E** is for students in grades K through 5. The projects in this level are not eligible for Grand Prize or Division Grand Prizes.

### DIVISIONS

- AD** - Architectural Drawing
- AN** - Animation
- AT** - Applied Technology
- CT** - Construction Trades
- EL** - Electrical
- FT** - Future Teacher
- GA** - Graphic Arts
- MD** - Mechanical Drawing
- MS** - Machine Shop
- OP** - Open
- PL** - Plastics
- PM** - Pattern Making & Molding
- WM** - Wrought Metal
- WO** - Wood

### Grand and Divisional Awards

Projects eligible for Grand Divisional Award must have a first place ribbon. Projects eligible for Divisional Awards do **NOT** have to have a first place ribbon.

### Division Group Project

Group Projects exist in each division except in the Applied Technology (AT) division – see note below. Group projects are those in which two or more students are involved and will be awarded by grade level categories – i.e. MD-GP B or EL-GP C. The GP designation replaces the category number as in the following example: AD-5B, if done by 2 or more students, becomes AD-GP B. Grade level GP items compete against all other grade level GP items even if the others are from different categories. So, you can have a project from AD-1 compete against one from AD-8 if they are in the GP category for that division. List the names of all students involved on the back of the entry form. Duplicate ribbons will be given but no plaques will be awarded. No group project is eligible for a Grand or Divisional Awards except in the AT Division with the exceptions noted below. The student on-site competition categories of AT-8, AT-9, FT, and CT are not eligible for Grand or Divisional awards.

**NOTE:** There is no GP category in the Applied Technology (AT) division. In those divisions, projects compete against each other regardless of how many students worked on the project.

**Check the MITES  
website [www.mites.cc](http://www.mites.cc)  
regularly for the  
latest information  
and updates.**

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### HOW TO OBTAIN RULES COMMITTEE ASSISTANCE:

Regional Administrative Officers and individual teachers may communicate with the MITES Rules Committee or Division Representatives who will follow-up directly.

### MITES DIVISION REPRESENTATIVES

#### AT - Applied Technology

Mark Skiles (989) 245-3359 (c)

#### AN – Animation

Dr. Matt Assenmacher (810) 626-2286  
[mathewassenmacher@hartlandsschools.us](mailto:mathewassenmacher@hartlandsschools.us)

#### AD - Architectural Drafting

Rechelle Goosen (616) 706-5073 [rgoosen@hpseagles.net](mailto:rgoosen@hpseagles.net)  
 Rosa Everitt (248) 425-1762 [reveritt@birmingham.k12.mi.us](mailto:reveritt@birmingham.k12.mi.us)

#### Auto Contest

Scott Westenberg [swestenb@inghamisd.org](mailto:swestenb@inghamisd.org)

#### CT - Construction Technology

Andy Romes (734)476-8680 (h) [romesa@gardencityschools.com](mailto:romesa@gardencityschools.com)

#### EL - Electrical

Dan Gardner (586) 752-0245 (w)

#### FT - Future Teacher

Beth Arledge (269) 329-0152 (h)

#### GA - Graphic Arts

Allen Talcott (231) 526-4801 (w)  
 Kellie Vagts (248) 570-8966 [kvagts@birmingham.k12.mi.us](mailto:kvagts@birmingham.k12.mi.us)

#### MS - Machine Shop

Paul Driggers (989) 775-2210 (w) [pdriggers@mtpleasant.edzone.net](mailto:pdriggers@mtpleasant.edzone.net)  
 Beau Everitt (248) 425-1625 [bleverit@oaklandcc.edu](mailto:bleverit@oaklandcc.edu)

#### MD - Mechanical Drawing

John Mayes (517) 543-0383  
 Lois Davis [ldavis1@rochester.k12.mi.us](mailto:ldavis1@rochester.k12.mi.us)

#### Metric 500

Mark Skiles (989) 245-3359

#### OP - Open Division

Harry Istok (586) 383-0275  
 Bob Crocker (231) 271-3207 (h)  
 Kurt Chysler (Autobody) (989) 529-3475 (c) [kchysler@tuscolaisd.org](mailto:kchysler@tuscolaisd.org)

#### PM - Pattern Making

Frank Koehle (231) 845-7259 (h)  
 Greg Meyer (313) 274-3832 (w)

#### PL - Plastics

Pete Twork (616) 997-3433 [ptworks@copsk12.org](mailto:ptworks@copsk12.org)

#### WO - Woods

Dave Barresi (231) 492-4139 [barresid@perry.k12.mi.us](mailto:barresid@perry.k12.mi.us)  
 Wally Wheeler (269) 503-1148 (c) [wwheeler@sturgisps.org](mailto:wwheeler@sturgisps.org)  
 Rick Tank (231) 924-7371 [rtank@fremont.net](mailto:rtank@fremont.net)

#### WM - Wrought Metal

Glen Zorn (734) 265-3694 (w) [zorn@monroe.k12.mi.us](mailto:zorn@monroe.k12.mi.us)  
 Dave Morrell (734) 735-9890  
 Chuck Luchies (269) 569-0463

## AD – Architectural Drawing

Display size must be 26" X 38" or less. Models must be 30" X 36" or less including base. Scaled Appropriately, (For example, 1/8" = 1'0" and 1/4" = 1'0")

An entry consisting of more than one sheet must be fastened together and the entire set mounted on poster board, foam board or mat board, no cardboard. Single drawing entries must be mounted on poster board, foam board or mat board. Drawings used for tracing must be drawn by the student entering the project.

Entry forms are to appear on the front upper left hand corner. If stapled, the back of the staple **MUST** be taped. **No wood, glass, or metal allowed on any entries, except AD-4, AD-5, samples for AD-2. Staples used to hold drawings on the poster, foam, or mat mounting material must be covered on the back.**

### AD-1 Manual Architectural Working Drawing - Single Family and Multi-Family Residential

Maximum of 12 sheets. Working drawings must show acceptable construction techniques and specifications dictated by building codes and ordinances. Perspectives are not to be included. Lettering with template and/or transfer letters will not be allowed except for section call-outs, view designations and title blocks.

### AD-2 Interior Design Board

Limit one sheet/board per entry on one side only. The project must have original work by the student, drawn on CAD or by hand. The project must include drawings necessary to indicate the scope of the project such as floor plans, elevations, etc. Any photo copied work should be of sample items which would be purchased for the project. Samples of cloth, carpet, tile, etc. need to be securely attached to the sheet/board.

### AD-3 Architectural Presentation Drawings (Manual)

Limit one sheet per entry on one side only. Projects must be an original rendered student design, not of any preexisting structure. This may not be traced or copied from preexisting material. Lettering with templates and/or transfer letters will not be allowed except for section callouts, view designations and title blocks. The entry should include drawings necessary to indicate the scope of the project such as floor plans, elevations, etc.

### AD-4 Architectural Model

Any architectural scale model made as part of a problem in an architectural drafting class may be submitted. Models must be of a single family residence, multiple family dwelling, commercial building, industrial building or public works building. The model must be the type shown to a client by an Architect. Floor plan(s) and elevations only must accompany the model. Removable roofs are optional. (Open framing construction models are eligible **only** in the AD-5 Open Framing, Architectural Models category.

### AD-5 Open Framing, Architectural Model

Any architectural scale model depicting open framing techniques, which was made as part of a problem in an architectural drafting class to teach structures may be submitted. Models must be of a single family residence, multiple family dwelling, commercial building, industrial building or public works building. Floor plan(s) and elevations must accompany the model.

### AD-6 CAD Architectural Working Drawing-Single Family Residential

Maximum of 12 sheets. Working drawings must show acceptable construction techniques and specifications dictated by building codes and ordinances. All drawings must be plotted or printer plotted on a drawing media to scale. No photo realistic drawings or color allowed.

### AD-7 CAD Architectural Working Drawing-Multi-Family Residential

Maximum of 12 sheets. Working drawings must show acceptable construction techniques and specifications dictated by building codes and ordinances. The structure must have two or more independent units (duplex, apartment building, etc.)

All drawings must be plotted or printer plotted on a drawing media to scale. No photo realistic drawings or color allowed.

### AD-8 CAD Architectural Working Drawing - Commercial Building

Maximum of 12 sheets. Working drawings must show acceptable construction techniques and specifications dictated by building codes and ordinances. All drawings must be plotted or printer plotted on a drawing media to scale. No photo realistic drawings or color allowed.

### AD-9 CAD Architectural Presentation Rendering Manual

Limit one sheet per entry on one side only. The entry may include drawings necessary to indicate the scope of the project such as floor plans, elevations, etc. All drawings must be completely done by CAD except manual (hand) rendering. (Pencil and or marker renders are acceptable.)

The entries in the below categories (AD-10 thru AD-13) are to be produced through CAD or design software. The design must come from the student.

NEW: Recommended but not required:

The entries in the below categories (AD-10 thru AD 13) are to be produced through a CAD or design software. The design **MUST** come from the student.

The following information should be specified on the face of the entry, or taped in the upper left corner behind the entry form:

1. A brief description of the techniques used to produce the entry.
2. List all the elements NOT produced by the student, i.e. background image; do not include downloaded components/families.
3. List all Software and versions used to create the project, such as: AutoCAD, Revit, Showcase, Sketchup, Photoshop, Illustrator, InDesign, etc.

### AD-10 CAD Architectural Presentation Rendering - Software

Limit one sheet per entry on one side only. The entry may include drawings necessary to indicate the scope of the project such as floor plans, elevations, etc. All drawings must be completely done by CAD and shaded/rendered by using only hatching materials attached by the student. All drawings must be 2D with No dimensions and no photo-realistic , render, ray traced, or attached materials allowed. A room size description legened or labels are acceptable.

### AD-11 Architectural Interior CAD Photo-Realistic/CAD Rendered Presentation

Limit one sheet per entry on one side only. Any interior view or **views** that are done in CAD, has color or attached software materials and is displayed as a photo-realistic/CAD rendered presentation. (No physical materials must be attached to this board, Interior board are entered into AD-2.)

### AD-12 Topographical Mapping Drawings (CAD)

Maximum of 4 sheets. Drawings to include the representation of a portion of the Earth's surface. The project might include: natural features, man-made objects, elevations contours of land, subdivisions plats, utilities, and cross sections to illustrate the total scope of the project. All drawings must be to scale.

**AD-13 Architectural Exterior CAD Photo-Realistic/CAD Rendered Presentation**

Limit one sheet per entry on one side only. Any exterior view or views that are done in CAD, must be in color or attached software materials

and is displayed as a photo-realistic/CAD rendered presentation. (Please do not attach physical exterior materials to this board.)

ORIGINAL

## **AN – Animation**

### **Animation/Simulation**

All original animation entries must be submitted electronically through either the Google Drive folder provided by the Animation Representative, on a flash drive, or on a CD/DVD. Animations must be submitted in either QuickTime or Windows Media format only. All animations are limited to a maximum duration of 30 seconds. Edited submissions are accepted. Any audio will not be judged. No photographs or still images will be accepted. All submissions must be properly labeled to include the category and division (numbers and letters), the school name, and the corresponding barcode provided on the entry form. **All projects must be school appropriate (i.e.: no violence).**

### **AN-1 Entertainment (Digital)**

Any 2-D or 3-D animation that uses digital production methods for the purpose of entertainment. Entries may include: motion study, character development, environment study, animated short, digital media, and digital effects.

*JUDGING: Overall completeness of animation, complexity of animation, lighting and textures, timing, visual quality, entertainment value, and techniques used.*

### **AN-2 Entertainment (Traditional)**

Any 2-D or 3-D animation that uses traditional production methods for the purpose of entertainment. Entries may include: motion study, character development, environment study, animated short, stop-motion, flip book, and cel.

*JUDGING: Overall completeness of animation, complexity of animation, lighting and textures, timing, visual quality, entertainment value, and techniques used.*

### **AN-3 Gaming**

This category is for digital gaming animation. All entries must be submitted as a moving screen capture walk-through of the game being played. The animation should highlight all visual aspects of the game. Do not submit any programmable or playable games.

*JUDGING: Overall completeness of game animation, game quality, visual effects, and program complexity.*

### **AN-4 Structural**

Any technical animation that features residential or commercial structures for the purpose of visual communication. Entries may include: fly-through, construction, materials, layers, sections, and layout.

*JUDGING: Overall completeness of animation, complexity of animation, lighting and textures, timing, visual quality, and effectiveness to communicate structural information.*

### **AN-5 Mechanical**

Any technical animation that features a single part, assembly, or mechanical system for the purpose of visual communication. Entries may include: motion and directional functions, assembly, fly-through, model turn-table, and working demonstration.

*JUDGING: Overall completeness of animation, complexity of animation, lighting and textures, timing, visual quality, and effectiveness to communicate mechanical design information.*

## AT – Applied Technology

Projects entered in this area are to be student original solutions to the problems stated. All entries must be on display at the respective Regional Competitions where entry fees are collected and State qualifying stickers will be put on entry forms. Regional judging is at the discretion of each region. Limits on number of entries per teacher are listed in the individual category descriptions. If the number of student entries per teacher limits are not listed, you may enter any amount.

NOTE: There is no GP category in the Applied Technology (AT) divisions. In specific divisions, projects compete against each other regardless of how many students worked on the project.

### AT-1 Biotechnology Activity Handicapped Device

PROBLEM: The student is to design and construct a device that will allow a person with a specific handicap to be able to perform a normal everyday activity in a more efficient manner.

#### LIMITATIONS:

- (1) No copying of existing devices allowed.
- (2) Students may make changes in existing devices.
- (3) A working model of the device must be included.
- (4) A set of written instructions on how the device is used must be included. The opening paragraph of these instructions will state what the specific handicap is and what daily activity the device will benefit.

#### CRITERIA FOR JUDGING:

Judging will be based on quality of instructions and the working model.

### AT-2 Mass Production

Manufacturing of a multi-part product. Any material is acceptable. Materials that can be used include: wood, metal, plastic, leather, etc. All production must have a notebook (three-ring binder) and one product with:

- (1) Photo display of jigs and tooling. Display must be smaller than 2 pieces of 22" x 28" poster board or not to exceed 9 square feet.
- (2) Routing operations sheet for each part.
- (3) Check sheet with all the dimensions of the part (for each operation).
- (4) Photograph of 20 or more finished products.
- (5) Prints or sketches of each part and an assembly print/sketch of the product on A or B sized paper.

All forms can be produced by the teacher except flow charts and prints/sketches. If CNC or computer is used, list equipment, software, etc.

### AT-3 Inventions/New Project Development

This project must be an original invention created by the student. The invention may be a new product or process for doing something useful and needed. Entrants should show the developmental work and problem solving that went into the creation of the invention. A model of the invention must be included. Judging will be based on creativity and originality. Any project that violates the intent of this category will be given an Honorable Mention.

### AT-4 MITES Dragsters (Individual Students)

- (1) The MITES Dragster Race is planned to bring the best five entries of each instructor in each level to compete for State Honors.
- (2) The competition levels will be A, B, C, D, E, and group.
- (3) Only one entry per student or group. All entries must have a dimensional drawing. Drawing must not exceed 11" x 17".
- (4) Follow rules on the MITES website.
- (5) Instructors please make sure the car is balanced when the Co2 cartridge is put in new tank.
- (6) Not eligible for Division or Grand awards because of the large traveling trophy and race occurring on Friday.
- (7) Project number must be on project, drawing, and any instructions.

### AT-5 Mousetrap Mechanics (Individual Students)

PROBLEM: The student will design and construct a vehicle that will travel 20 feet as fast as possible, as straight as possible, and stop as close to the 20 foot line as it can.

- (1) The only power source for energy shall be a standard Victor mousetrap.
- (2) Each vehicle must carry all of its parts for the duration of the race.
- (3) There can be no guides or tracks used to aid the vehicle.
- (4) Follow rules on the MITES website.
- (5) No items can be used to make the spring more powerful.
- (6) Standard items may be purchased and used in construction.
- (7) All distance and time measurements will be made from the front center of the vehicle body.
- (8) A set of step-by-step instructions on how the vehicle is to be set up and released must be included to have the vehicle run at the competition.
- (9) Project number must be on project, drawing, and any instructions.

#### CRITERIA FOR JUDGING:

The vehicle will be judged by the total time for one run on the track. One second will be added to the total time for every quarter inch the vehicle ends up away from the center line and the finish line.

### AT-6 Structure Construction – Bridges

PROBLEM: The student is to design and construct the lightest possible bridge to hold 10 pounds. The bridge must be built according to the specifications.

SPECIFICATIONS: (1) The bridge must span a minimum of 10 inches. (2) The bridge must be open down the center so that a 2" x 2" x 2" block can slide through the center from end to end. This block will support the weight and may be positioned in locations listed under #3. (3) The road bed and top of the bridge must be open to allow a 3/8 inch load bearing rod to pass through the road bed at the center of the bridge (measured end to end) and 2 inches either side of the center. Testing may occur at any one of these three positions. (4) Only balsa wood, 1/8" x 1/4" in cross section or smaller, and glue may be used in construction of the structure. No other materials may be in the final project. (5) A drawing must be submitted with the structure. (6) If one or more structural members or glue joints break, the bridge will be determined not to have held the 10 pounds.

CRITERIA FOR JUDGING: The lightest bridge to hold the 10 pounds wins. In case of a tie, the quality of the drawing will be considered.

### AT-7 Technical Writing (Individual Students)

PROBLEM: The student will write a technical paper on any technical subject or activity that was done in a technology class. This can be a research paper or a report on an activity done in class.

#### LIMITATIONS:

- (1) Only four entries are allowed from each teacher in each classification level.
- (2) Use a five body paragraph.
- (3) Maximum of five (5) pages.
- (4) The last paragraph must be an original conclusion or observation by the student.

Continued on page 8

## **AT – Applied Technology - *Continued***

### **AT-8 Automotive Advanced Service Technology**

State Competition only: there will be no Regional Contest. The contest will consist of a hands-on practical exam lasting approximately 4 hours, requiring the students to test, diagnose, repair, and/or identify specific automotive components.

#### **Check MITES website for date, place and registration information.**

Each school may enter two students in this contest. In order for the student to be eligible for the State Contest:

- (1) He/she must be able to obtain release time from school and secure transportation to and from the Conference to compete.
- (2) The student's instructor must be a current member of the MITES and attend the Conference on Friday to assist with the judging.
- (3) The student must have his/her parent or guardian complete a "Parent Consent Form" and return it to their instructor before the State Contest.
- (4) The student must have safety glasses.
- (5) All students must be registered for this contest at the same time as Regional registrations are due for other contests. Contact your RAO for this information.
- (6) The student must be enrolled in a secondary level Automotive Technology/Mechanics program.
- (7) Student must be registered online.

### **AT-9 Automotive Basic Maintenance Service**

State Competition only: there will be no Regional Contest. This contest is for first year Automotive Technology/Mechanics students only. The contest will focus on basic skills generally covered in the first year of Automotive Education programs. The following items may be covered in this contest:

- (A) General Automotive Knowledge Multiple Choice Test
- (B) Safety Inspection
- (C) Oil Change and Lubrication Services
- (D) Tire Service, Balance, and Rotation
- (E) Basic Cooling System Services

#### **Check MITES website for date, place and registration information.**

Each school may enter two students in this contest. In order for the student to be eligible for the State Contest:

- (1) He/she must be enrolled in an Automotive Technology/Mechanics program.
- (2) He/she must be in the first year of the training program.
- (3) The student's instructor must be a current member of MITES and attend the Conference on Friday to assist with the judging.
- (4) The student must have safety glasses.
- (5) All students must be registered for this contest at the same time as Regional registrations are due for other contests. Contact your RAO for this information.
- (6) Student must be registered online.



## CT - GP Construction Trades

This contest is for any high school Construction Trades program wanting to place a team of three students and one alternate student (in case someone becomes sick prior to the contest) currently enrolled in a Construction Trades program. There is no subbing of team members during the contest. This is an on-site building contest that will be held only at the State Competition and consists of three students building a pre-determined project from a print handed to the team on Thursday evening May 9th. **THERE IS NO REGIONAL COMPETITION UNLESS TWO TEAMS ARE IN THE SAME REGION.** The first ten (10) teams to enter registration from different Regions will be in the competition. The deadline will be **March 22, and the teachers must contact Andy Romes at (734) 476-8680.** The teachers will need to register on-line through the MITES web site **starting now** but must be in the system by March 22. Teachers must do the following:

1. Become a MITES member in March or sooner ([www.mites.cc](http://www.mites.cc)), right click on "New Registration Process", follow the direction process..
2. **Register your team on-line will be secondary starting now** on the top tab "MEMBER LOGIN", any problems please contact Pete Twork 616-550-1056.
3. Click on the "Click here to enter your students into the MITES Competitions".
4. Enter your teacher # and "AGREE TO THE TERMS", then SUBMIT.
5. Enter your team in the blank fields – fill in the top field as CT – 1GP.
6. Go to your REGIONAL COMPETITION and enjoy.
7. Team teachers will be notified by e-mail, and all paperwork will be postmarked by March 22. The following paperwork will be e-mailed, faxed, or mailed in to the Construction Coordinator:
  - a. Page 1: Title page with school name, teacher's name, contact information for teacher, and four team member names.
  - b. Page 2: Liability Release Form A (MITES web site) for each student.
  - c. Page 3: Liability Release Form B (MITES web site) for each student.
  - d. Page 4: Copy of insurance card, front and back, for each student.
  - e. Page 5: Copy of schools' "Permission to Medically Treat" for each student.
  - f. All fees for the contest should be paid by check made out to MITES and to the MITES construction coordinator at:  
Andy Romes  
Garden City High School  
6500 Middlebelt Road, 48135  
[romesa@gardencityschools.com](mailto:romesa@gardencityschools.com)

This will be on a first-come-first serve bases. If there are more than 10 teams and two from the same regional, there will be a regional contest for those teams. A test will be administered by the RAO per the test submitted by the Construction Coordinator. We are limited to 10 teams and should have one team per regional. The cost per team will be \$700.00 unless the coordinator contacts you. All of the funds will be for prizes, tables, uprights, skirts, food, materials, etc. All fees shall be paid at the Regional Competition in full when entering projects (make sure you are checked in with your RAO in your region).

On **Thursday, May 9** all teams will be meeting at 5:00 PM at the Competition site (Shanty Creek) to do the following:

1. Report to the Construction Coordinator by 5:00 PM.
2. By lottery, the teams will pick a contest area.
3. Set all materials given by a lumber supplier.
4. Set all tools out for proper tool inventory.
5. Safety and tool inspection.
6. Safety debriefing.
7. Material list and building plans.
8. Team written test (tie breaker).

On **Friday, May 10**, all teams will check-in at the Shanty Creek Construction area by 7:30 AM and be ready to do the following:

1. Make sure Construction area is ready.
2. Construction and safety debriefing with coordinator and Construction judges.
3. Construction schedule for Friday, May 10 will be:
  - a. Start at 8:00 AM approximately.
  - b. 10 minute break at 10:00 AM.
  - c. Lunch at Noon.
  - d. 10 minute break at 2:00 PM.
  - e. Stop Construction approximately at 4:30 PM.
4. In the event a Construction team makes a mistake, the team will be deducted points and extra materials may not be available – they need to make the correction as best as they can per the plans during the contest. The team will be responsible for the project and quality.
5. The project plans will be e-mailed in pdf format to each of the instructors on May 7 after 2:30 PM.

All students must have MiOSHA approved dress: no shorts or sleeveless shirts, no jewelry of any type will be permitted. Hard hats, boots and safety glasses are always required to be worn during the contest at all times; a team may not participate in the competition if they do not have the proper safety equipment. All students are responsible for providing their own equipment and tools (listed below). Points will be deducted if the team does not have the tools listed or too many tools, no other tools will be allowed. The project will be removed on Friday night before the team leaves – make arrangements to have the project broken down and removed from the property.

### Individual Tools

Smooth face hammer  
Tool belt  
Utility knife  
2 Pencils  
Speed square  
Cats claw  
Tape measure  
Framing hammer  
Chalk line

### Team Tools

2 saw horses  
Framing square  
2 Framing buttons  
Philips screw bits  
Hand saw  
Power miter saw and stand  
1-6' Ladder  
1-8' Ladder  
4 Clamps (any kind)  
50' Extension cord  
GFCI splitter cord  
25' Extension cord  
Set of spade bits  
3/8 Drill motor  
Circular saw w/break  
Push broom and dust pan  
½" HP router or bigger with  
router wrenches  
½" flush trim bit  
Cordless drill  
First aid kit  
Replacement flush trim bit  
Replacement circular saw  
blade

## EL – Electrical

Projects/circuits made from commercial assembly kits (Chaney, Velleman, Graymark etc.) using prepackaged parts and a circuit board are not eligible in this competition.

Projects may utilize manufactured circuit board(s) if the student completing the project designed the circuit board and **the students' names and current school year are also manufactured onto the PCB.** Regardless of manufacturing technique or the place/company of manufacture, these two requirements must be met for projects using a PCB.

Perf-boards and prototype circuit boards which are purchased to wire a circuit together are OK. Point-to-point wiring and wire-wrapping are accepted methods for entering electrical projects. Breadboard analog, digital, or microprocessor based projects will be accepted in EL-5. **Projects in EL-5 are not eligible for a Division or Grand Award.**

**Projects cannot be sealed** so that the judges cannot look at the circuit board (top and bottom side), wiring, or the primary electrical content of the project.

All projects must be complete and in operating condition to enable the judges to test their operation. If the project cannot be tested by the judges for any reason, it will receive an Honorable Mention.

Projects must be made electrically safe to operate. Any unsafe condition could result in the disqualification of a project.

Clearly written operating instructions, schematic diagram(s), electrical parts list, and the name and function of the project must accompany each entry in EL-1 through EL-5. Microprocessor/Microcontroller based projects must also include a printout of the program code utilized in the project. All of the written documentation for each project must be submitted in an 8 1/2" x 11" standard folder – no poster/presentation boards allowed or the project will not be judged.

### EL-1 Basic Electrical Devices/Wiring

Any project predominately composed of basic electrical devices or wiring. This includes lights, switches, relays, motors, electromagnets, speakers, etc.

### EL-2 Analog Electronics

Any project predominately analog in nature. This includes transistors, SCRs, op-amps, amplifiers, radios, lasers, power supplies, photocells, any project based on an analog IC, etc.

### EL-3 Digital Electronics

Any project predominately digital in nature. This includes digital IC circuits, logic devices, displays, fiber optics, digital clocks, logic probes, any project based on a digital IC, etc.

### EL-4 Microprocessor/Microcontroller Electronics

Any project that uses a microprocessor/microcontroller base. This includes all computer-interfaced projects, PIC based projects or other microcontroller based projects. Robot kits of any type are not allowed. FIRST robotic contest projects are not eligible in this category. **All programming must be done by the student completing the project – preprogrammed microcontrollers are not eligible.**

### EL-5 Breadboard Electronics

Any project that is built on a breadboard. All entries in this category must follow these rules: **The breadboard area itself cannot exceed 150 square inches;** circuits must be battery operated or use a self powered breadboard; circuits must be neatly wired with components and point-to-point connections laid flat against the breadboard. **Batteries must be supplied by the entrant.**

### EL-6 Construction Electrical Wiring On-Site Competition

The student will install on site a number of required electrical components on a panel in front of judges. This on-site building contest will be held only at the State Conference and consists of students building a pre-determined project from a blueprint.

THERE IS NO REGIONAL COMPETITION.

The first 10 contestants to enter registration from different regions will be in the competition. Students will be entered from the same Region only if fewer than 10 Regions enter. These later registering teams will be entered into the competition, up to the total of 10, based on their registration dates and times. There can be only one additional team per school.

This contest is for any high school Electrical or Construction program wanting to place a student currently enrolled in a Construction Trades program. All students must have MIOSHA approved dress, no shorts or sleeveless shirts. Hard hats, boots and safety glasses are required to be worn during the contest. All students are responsible for providing their own equipment and tools, no others tools will be allowed. The instructor must be a member in good standing with MITES. All students MUST be registered online starting April 1. This MUST be done before your Region's entry deadline. Cost for this event is \$55 per student. There is no individual student cost on top of this.

Each student must be registered online, have the appropriate paper work filled out completely and turned in to the proper personal on time in order to compete. All paperwork is available from the EL-6 Category Representative listed below.

Checks with the correct fees made out to MITES must be given to the EL-6 Category Representative (listed below) at the Competition before the contest begins.

Each contestant must bring the following tools:

- |                             |                                 |
|-----------------------------|---------------------------------|
| 1. Straight Screwdriver     | 6. Phillips Screwdriver         |
| 2. Wire Strippers (14/2 NM) | 7. Pencil                       |
| 3. Calculator               | 8. 1/2" EMT Bender (No Kickers) |
| 4. Ground Lug Crimper       | 9. Electrical Tape              |
| 5. Meter                    | 10. Tool Pouch                  |

Contestants must clean up their work area at the end of the Competition.

A tool safety inspection will be conducted on Friday morning.

To qualify, each student's teacher must have the following postmarked to the Convention Chair by April 1:

1. The teacher's name and school (cover page).
2. Student's MITES Release Forms A & B.
3. A copy of each student's insurance card front and back.
4. Each student's "Permission to Medically Treat" form.

Contact the Convention Chair for more information.

## **FT – Future Teacher**

The FT (Future Teacher) division is for Post-Secondary/High School/CTE students pursuing a IX or VT certification at a Michigan or Indiana college or university.

### **FT-1 Instructional Display**

The student will create an instructional display to be used in an Industrial Technology, Technology Education, or Vocational class. The display must include a written explanation of the purpose and student objectives or outcomes. Size of the display is limited to 16 sq. ft. of table or floor space. The display can demonstrate how something works: i.e. a project, prototype, concept, student activity, etc. which is taught in a class.

### **FT-2 Media Presentation**

A media presentation to be used in an Industrial Technology, Technology Education, or Vocational class. The presentation is limited to 15 minutes in length and can include slides, PowerPoint, video, visual displays, or other media to cover the topic of the presentation. The project must be demonstrated at the State Competition before judges. Student must provide all equipment to make the presentation at the State Competition.

Must include a written explanation of the objective and student outcomes and indicate how the presentation relates to the Michigan Benchmarks and Standards for Industrial Technology, Technology Education, Vocational Classes, or Career and Technical Education classes. It may include written instructions, student handouts, evaluation materials, etc.

The presentation can show how something works: i.e. a project, prototype, concept, student activity, etc. which is taught in an Industrial Technology, Technology Education, or Vocational class.

Students will need to pre-register with the FT Division Representative to schedule times for presentations and to possibly coordinate equipment needed for the presentation. See page 2 in the Rules Sheet for the listing of Division Representatives.

Student must be registered as a member and enter the Competition as a project online.

These entries need to be identified at the Regional Contest by the RAO so they will be registered at the State Competition. Entrant does not have to attend the Regional Competition, but must contact the RAO to make sure their project is identified.

## GA – Graphic Arts

- The entry must not exceed ONE side of single 22" X 28" poster board.
- More than one specimen on the same related project may be mounted within the size limitation but will be submitted as one entry.
- No frames, plastic covers, or glass allowed.
- Do not laminate project.
- The judges must have access to the project.
- Remember to supply ALL the information that is required for each category. List all elements not produced by the student such as clip art, photos, artwork, plates, negatives etc. on the entry form. Entry forms must be affixed to the front upper left- hand corner. Dye sublimation or heat transfer products (Example: mouse pads, mugs, t-shirts) are not included in any of the Graphic Arts categories. If you have any questions, please call the GA Division Representatives.
- No copywritten material is allowed.

If you have any questions, please call the GA Division Representatives.

### Graphic Design

The entries in this classification are to be produced through electronic publishing methods and software. They should show compositional structure, design aesthetics and principles applied, typography (if appropriate), and appropriateness to an intended audience. Designs must require a user experience and have purpose. Designs cannot be recreated exercises or tutorials. The design must come from the student. This is NOT a cut and paste or live trace contest. Designs would be intended for "commercial" use. Graphic Design does NOT include CAD, digital illustration, or photographs alone. Examples of electronically produced items include but are not limited to: stationary, book covers, flyers, brochures, advertisements, newsletters, packaging, etc. Judging will be based on quality of design, degree of difficulty, and production techniques. *Dimensional* dye sublimation or heat transfer products (Example: mouse pads, mugs, t-shirts) are not included in any of the Graphic Arts categories. You may show *designs* in the Graphic Design categories if they apply.

The following information must be specified on the face of the entry:

1. A brief description of the techniques used to produce the entry.
2. List all elements not produced by the student. Example: clip art, photos, artwork etc. Photos need to be copyright released or original.
3. List all Graphic Arts software and versions used to create the project such as: Photoshop, Illustrator, InDesign, PageMaker, Quark and Coral Draw.
4. List the make and model of hardware used. Example: computer, printer, scanner, etc.
5. Presentation of material is neat, easy to understand, broke down (if appropriate) in steps to show the process.

### GA-1 Graphic Design- Single Color

This category is for single color layout intended for a single-color composition produced as offset, vinyl, digital press, or other appropriate substrate. (If a poster, put in poster category below)

### GA-2 Graphic Design- Spot Color

This category is for trapping and spot color printing. The ink colors to be used for printing must be **listed** with the required information. Maximum: three colors of ink.

### GA-3 Graphic Design- Process 4 Color

This category is for CMYK process color printing. Depending upon the job specs, additional colors may be used and must be listed with the required information such as thermography. (If a poster, put in poster category below)

### Offset Printing

The entries in this classification are to be produced by offset printing. Judging will be based on quality of printing, degree of difficulty, quality of design and production techniques. The following information must be specified on the face of the entry:

1. Brief description of techniques used to produce the entry. Specify if traditional flats and plates or direct-to-plate method was used.
2. List all elements not produced by the student. Examples: clip art, photos, artwork, plates, negatives, etc.
3. Number of press passes.
4. Type, weight, and size of press sheet.
5. Type and color of ink(s).
6. Number of copies printed.
7. Make and model of offset press or presses used.

### GA-4 Offset Printing - Single Color

This category is for a single color of ink.

### GA-5 Offset Printing - Spot Color

This category is for trapping and spot color offset printing. The ink colors to be used for printing must be listed with the required information. Separations should not be indicated.

### GA-6 Offset Printing - Process 4 Color

This category is for CMYK process color printing. Depending upon the job specs, additional colors and varnishes may be used and must be listed with the required information. Progressive Color Press Proofs must be part of this entry. Access to both sides of the sheets is necessary for judging.

### Screen Printing

The entries in this classification are to be produced directly on the substrate by screen printing. Judging will be based on quality of printing, degree of difficulty, quality of design, and production techniques.

The following information must be specified on the face of the entry:

1. A brief description of technique used to produce the project.
2. List all elements not produced by student. Examples: clip art, photos, artwork, etc.
3. Source of design.
4. Type and colors of inks.
5. Number of passes.
6. Kind of stencil, mesh, and screen fabric.
7. Number printed.

### GA-7 Screen Printing - Paper Products

The entries must have been printed on a paper product such as paper, card stock, poster board, etc.

### GA-8 Screen Printing -Textiles

Entries must have been printed on a textile product such as pella, strikeoff cloth, t-shirt, jacket, hat, towel, etc. No heat transfers. For safety reasons, absolutely no straight pins allowed.

### GA-9 Digital Illustration

Entries in this category would be meant for digital images created in software and intended as illustrations for commercial use such as articles, game screens, digital collage, typographic collage.

A brief summary of the purpose for the image, media/software and techniques used should be included in your project description.

### **GA-10 – Commercial Photography**

Entries in this category would include images photographed and edited by students for intended commercial use. Examples of this type of photography can include, but not limited to, professional portraits, family portraits, wedding, food, office/business, sports, and architectural images.

Projects would need to include a print of the raw image and a print of the edited image.

Project description should include:

- camera used
- lighting/equipment used
- manual settings (if applied)
- software used for editing (if applied)
- editing techniques (if applied)
- intended use for the image

### **GA-11 – Large Format/Signage**

Entries in this category would include images produced on large format devices. Examples of this type of image could be banners, indoor/outdoor signage, car wraps, mall kiosks, door wraps, menu boards, etc.

Projects would need to include a scaled down print (fitting on the 22" x 28" inch board) and scale indicated. An image of the installed project should be shown as well. Include the intended use for the image should be in the description.

### **GA-12 – Poster Design – Single or Spot color**

Entries in this category would be a poster that would advertise and event or activity. Appropriate information should be added to communicate the event. Production process and color or inks used should be indicated in the description. Letter (8 ½" x 11") to maximum size 18" x 24". (1-3 colors Max)

### **GA-13 – Poster Design – Full color**

Entries in this category would be a poster that would advertise and event or activity. Appropriate information should be added to communicate the event. Production process and color or inks used should be indicated in the description. Letter (8 ½" x 11") to maximum size 18" x 24".

### **GA-14 – Digital Graphic Design/User Experience**

This category is intended for websites, apps, or other screen layouts that would be designed and customized for an intended audience and purpose. Though the designs are intended to be developed for RGB, screen shots of your page(s), wireframes and sitemaps could all be printed to show layout(s).

### **GA Group Project**

Maximum size of display for a Group Project will be 36" x 48". Only ONE side of the board may be used. An example of this is the commercial display boards that are sold in office supply stores. They are self-standing and tri-fold. These display boards stand 36" tall and have three panels 12" x 24" x 12" wide. Appropriate information must accompany this project for judging.

## MD – Mechanical Drawing

All display sizes must not exceed 26" x 38". All entries must be mounted on a single sheet of poster board or mat board. No cardboard. No frame or glass allowed in any category. All drawings should conform to current ASME/ANSI and ISO standards. Please see website for additional information regarding dimensioning standard. **(Entry forms are to appear on the front upper left corner. All staples must be taped on the backside.)**

### MD-1 Manual Detail Mechanical Drawing –SINGLE PART

This classification includes a single orthographic detail drawing of a manufactured part. Working assembly drawings consisting of more than one part or parts held together will not be acceptable. No pictorials are to be on the drawing. Lettering with templates and/or transfer letters will not be allowed except for section call-outs, view designations, and title blocks. LIMITED TO ONE SHEET.

### MD-2 Manual Detail and Assembly Drawing

A complete set of orthographic details and an assembly drawing. No pictorials are to be on the drawing. Lettering with templates and/or transfer letters will not be allowed except for section call-out, view designations, and title blocks. LIMITED TO SIX SHEETS.

### MD-3 Manual Product Development

Any part or parts 3 mm thick or less such as surface development drawing of sheet metal or cam development or ASBE contest drawing that may have a practical application or be a descriptive geometry problem. Pictorials are allowed on the drawing. Some views must be dimensioned except pictorial. Lettering with templates and/or transfer letters will not be allowed except for section call-outs, view designations, and title blocks. LIMITED TO ONE SHEET.

### MD-4 Manual Pictorial Illustration Drawing

A pictorial drawing of a single part which may involve shading and rendering techniques. No assembly drawings or parts held together will be allowed. No orthographic views or dimensions will be allowed. Judging shall be on the total scope of the project. LIMITED TO ONE SHEET.

### MD-5 Manual Pictorial Information Exploded Assembly Drawing

Pictorial exploded assembly drawings that are dimensioned and/or use callout notes are in this category. No orthographic views or shading of any kind will be allowed. Judging shall be on the total scope of the project. LIMITED TO ONE SHEET.

### MD-6 Manual Pictorial Illustration Exploded Assembly Drawing

DELETED

### MD-7 Manual Pictorial Illustration Assembled Drawing

Pictorial assembly drawings, which may involve shading or rendering techniques. No orthographic views or dimensions will be allowed. Judging shall be on the total scope of the project: freehand or mechanical. LIMITED TO ONE SHEET.

### MD-8 CAD Detail Mechanical Drawing –SINGLE PART

This classification includes a single drawing of a manufactured part. Working assembly drawings consisting of more than one part, or parts held together will not be acceptable. No pictorials are to be on drawing. Black Line Drawings Only. No shading or rendering allowed. All drawings must be plotted to scale. LIMITED TO ONE SHEET.

### MD-9 CAD Detail and Assembly Drawing

A complete set of details and an assembly drawing. No pictorials are to be on the drawing. Black line drawings only. No shading, rendering, or color fills allowed. All drawings must be plotted to scale. LIMITED TO SIX SHEETS.

### MD-10 CAD Product Development

Any part or parts 3 mm thick or less such as surface development drawing of sheet metal, plastic, cam development drawing that may have a practical application or be a descriptive geometry problem. Pictorials are allowed on the drawing. Some views must be dimensioned except pictorial. Black line drawings only. Shading, rendering, or color fills allowed only on pictorial views. All drawings must be plotted to scale. **An orthographic drawing must be attached to the back of the project.** LIMITED TO ONE SHEET.

### MD-11 CAD Pictorial Drawing –SINGLE PART

A pictorial drawing of a single part. No assembly drawings or parts held together will be allowed. No orthographic views or dimensions will be allowed. No shading, rendering or color fills allowed. AutoCAD ISO lines do not constitute a rendering technique. More than one view acceptable. **An orthographic drawing must be attached to the back of the project.** LIMITED TO ONE SHEET.

### MD-12 CAD Exploded Information Pictorial Assembly Drawing

Includes exploded pictorial drawings. Rounds and fillets can be used to show an entire radius edge. If done as an ISO drawing, rounds and fillets can be used to show an entire radius edge. Dimensions and callouts required. No orthographic views permitted. Must include bill of materials. Each part of the assembly must be exploded. No sub-assemblies will be permitted. No shading, rendering, or color fills allowed. AutoCAD ISO lines do not constitute a rendering technique. **An orthographic drawing must be attached to the back of the project.** LIMITED TO ONE SHEET.

### MD-13 CAD Exploded Pictorial Assembly Drawing

DELETED

### MD-14 CAD Pictorial Assembly Drawing

Pictorial assembly drawing. No orthographic views or dimensions will be allowed. No shading, rendering, or color fills allowed. AutoCAD ISO lines do not constitute a rendering technique. No call-outs, dimensions, or material specifications will be allowed on project. More than one view acceptable. **An orthographic drawing must be attached to the back of the project.** LIMITED TO ONE SHEET.

### MD-15 CAD Photo-Realistic Rendering –SINGLE PART

Any CAD drawing drawn by the student that is a rendered image that has colors or attached materials and is displayed as a photo-realistic presentation with shadows on any media. Backgrounds must be solid color and/or gradient. No photos (jpg, gif, etc.) will be permitted as backgrounds. **An orthographic drawing with all of the hidden lines of each part or parts must be attached to the back of the entry.** Judging shall be on the total scope of the project. LIMITED TO ONE SIDE.

### MD-16 CAD Detail Drawing with a Pictorial –SINGLE PART

This classification includes a single drawing of a manufactured part. Working assembly drawings consisting of one or more parts will not be accepted. **A pictorial drawing and dimensioned orthographic views must be included on the layout.** LIMITED TO ONE SHEET.

*Continued on page 15*

## **MD – Mechanical Drawing - Continued**

### **MD-17 CAD Presentation Package**

This classification will include all of the following items: a photo-realistic rendering on a white background with no shadows on the background, a pictorial exploded with dimensions and or callouts, and a selection of orthographic views with dimensions. Judging shall be on total scope of the project.

ONLY ONE RENDERED OR PHOTO-REALISTIC DRAWING ALLOWED.  
LIMITED TO SIX SHEETS.

### **MD-18 CAD Rendering - Manual**

A drawing done in CAD and rendered by hand (manually) using ruled, freehand, stippled, or any hatching materials in the software can be used. Color fills not allowed. Judging shall be on the total scope of the project.

**An orthographic drawing with hidden lines must be attached to the back of the project.**

LIMITED TO ONE SHEET.

### **MD-19 CAD Promotional Product Imagery**

Any CAD drawing drawn by the student that is a rendered image that has colors or attached materials. Product must be presented in promotional/advertisement fashion (i.e.: include product name and specifications on the presentation.) No photos (jpg, gif, etc.) will be permitted as backgrounds. Multiple rendered images acceptable. **An orthographic drawing with hidden lines must be attached to the back of the entry.** LIMITED TO ONE SHEET.

### **MD-20 CAD Rapid Prototyping Models – SINGLE PART**

Any single part or single build rapid prototype model. These are models made from CAD data and completed as a solid 3-D model. Any models consisting of more than one part or parts held together with any sort of fastening devices will not be acceptable. No drawings will be on the front of the project. **Model must be attached to some type of mount board. Model not to exceed 15" X 15". Models can be attached to mount board using glue, wire, string, or zip ties. An orthographic drawing with all of the hidden lines must be attached to the back of the entry.**

### **MD-21 CAD Rapid Prototype Models – Assembly**

Any multiple part rapid prototype model. These are models made from CAD data and completed as a solid 3-D model. Assembly must be held together with purchased fasteners or fasteners created by modeling machine. Assembly may snap together. Moving parts are acceptable. No drawings will be on the front of the project. **Model must be attached to some type of mount board. Models can be attached to mount board using glue, wire, string, or zip ties. Model not to exceed 18" X 18". An orthographic drawing with all of the hidden lines of each part must be attached to the back of the entry.**

### **MD-22 CAD Photo-Realistic Rendering - Assembly**

Any CAD drawing drawn by the student that is a **rendered** image of an assembly that has colors or attached materials and is displayed as a photo-realistic presentation with shadows on any media. Backgrounds must be solid color and/or gradient. No photos (jpg, gif, etc.) will be permitted as backgrounds. Judging shall be on the total scope of the project. **An orthographic drawing with all of the hidden lines must be attached to the back of the entry.**

LIMITED TO ONE SHEET.

### **MD-23 CAD Rapid Prototype Models**

Games/Entertainment/Toy

No drawings will be on the front of the project. Examples include: chess sets, 3-D puzzles, mind teasers, etc. May include multiple parts. **Model must be attached to some type of mount board. Model not to exceed 18" X 18". Models can be attached to mount board using glue, wire,**

**string, or zip ties. An orthographic drawing with all of the hidden lines of each part must be attached to the back of the entry.**

## **MS – Machine Shop**

Projects in this division are those that are produced in a machine shop. Any part in the MS division may include parts that have been produced using Computer-Aided-Machining (CAM) or Computer-Numerical-Control (CNC) equipment. **If CAM or CNC is used, it must be listed on the entry form.**

### **MS-1 Machine Crafts**

This area includes ferrous or non-ferrous metals or a combination of both machined metal projects. Examples: candlestick holders, lamps, gavels, etc. (No models, meat tenderizers, or clocks.)

### **MS-2 Single Machined Hand Tools and Parts**

This area includes ferrous or non-ferrous metals or a combination of both that is held in the hands when used and has simple assembled parts. Examples: hammer, screwdriver, punch, machined chisel, hacksaw, plumb bob, flywheel, crankshaft, etc.

### **MS-3 Simple Machined Parts (single) Hand Tool**

This area includes simple assembled units that have moveable parts and are held in the hands when used. Examples: slide hammer, slide punch, hammer with interchangeable heads, hammer and punch, screwdriver with changeable blades, screw jack, screw slide, etc.

### **MS-4 Hand Tool Sets and Combinations**

This area includes any sets of hand tools or combination of hand tools as described in MS-2 or MS-3. Examples: set of punches, two or more slide hammers, etc.

### **MS-5 Single Machined Tool (Precision Tool)**

This area includes ferrous or combination ferrous and non-ferrous metals and have no moveable parts in its normal use. Examples: V-block without clamp, angle plate, sine bar, matched pair or parallels, matched pair of 1-2-3 blocks, faceplate, fly cutter, etc.

### **MS-6 Simple Moving Parts Single (Precision Tool)**

This area includes simple assembled units that have moveable parts and fit in an 8" square box. Examples: precision vise, planer gage, V-block and clamp, sine plate, sine bar with ground gage block, etc.

### **MS-7 Precision Tool Sets and Combinations**

This area includes any sets or combinations of precision tools as described in MS-5 and MS-6. Examples: set of parallels, sine bar and precision vise, angle blocks, set of V-blocks and clamps, etc. Tool sets may include a hammer.

### **MS-8 Mating Moving Parts**

This includes assemblies that move or produce movement through the use of gears, lead screws, slides, and/or levers. May include cast parts. Examples: vise, rotary table, cross slide table, arbor press, compound sine plate, dies, mold, vise larger than 4", etc. Handle or key must be included.

### **MS-9 Games**

Examples: games/puzzles, mind teasers, chess set, cribbage board, cue stick, darts, checkers, yo-yo, tick tac toe, etc.

### **MS-10 Sporting Goods**

May include multiple parts. Examples: fly reel, paint ball barrel, bow sight, stabilizer, camp tool, spear, arrow strengthener, hand held clay bird thrower, etc.

### **MS-11 Machine Models**

Entries in this division may include models machined from metal. The model may be a car, boat, airplane, train, cannon, etc. I.E.: a model you can see all around (three dimensional).

### **MS-12 Flat Machine Craft**

Entries in this division may include a model machined from a ferrous or non-ferrous metals or a combination of both machined metal. Any project using CAD or CAM to design and cut the part in metal will be entered here. List hardware, software, and a short statement of the process used. The model may be a sign, picture, plaque, personal license plate, 2-D clocks, etc. Two (2) dimensional.

### **MS-13 Engines**

Any gas, steam, or hot air driven engine with moving parts (working) will be entered here. All others will be entered in models.



## OP - Open

This project is limited to 64 sq. ft. (longest length X longest width) floor space in its normal operating position.

### OP-1 Transportation Vehicles

Any vehicle capable of carrying a person or cargo and constructed in an Industrial Technology course. Examples: boat, canoe, mini-bike, go-cart, automobile, dune buggy, dragster, or **trailer**. Gasoline must be removed. Projects in this category must be complete and in operating condition.

### OP-2 Glass Work

Any project made of one or more materials with the major portion of the work involved being glass. Examples: etched or sandblasted mirror or engraved, sculptured or stained glass. (No commercial patterns.)

### OP-3 Instructional Aid

This division will include any project developed by the student which is specifically designed to be used by a teacher in providing instruction on a particular topic. Must include a typewritten explanation of how a teacher would use this aid.

### OP-4 Safety Poster

Contest Purpose - the purpose of the Safety Poster Contest is to inform and familiarize students with effective and efficient safety slogans and rules which can be applied or established in their own school system. Any size 8 1/2" X 11" to 22" X 28". Entry form will be on the front upper left hand corner. Must be computer generated. Poster will be judged on the following: eye appeal, content, originality, organization, and neatness.

### OP-5 Upholstery

DELETED

### OP-6 Flexible Lamination

Any project which includes flexible movement as part of its normal operation. Examples: crossbow, bow, skis, and sleds. No strings on bows or crossbows. Any project in this category that could be considered or used as a weapon must be securely affixed to a backboard or base plate for display. Bows must be assembled but not strung up for judging. **Instructor must note all lamination not done by the student (i.e.: pink camo laminated riser block). Instructor must also note factory cut wood pieces that make up the limb.**

### OP-7 Student/Industry Product or Project Development

A product or project planned and designed by students but produced by industry. Documentation showing student input and development must be included.

### OP-8

DELETED

### OP-9 Auto Body - General

Project must relate to auto body and fit in a 2' X 2' space. Must include a portfolio of students' auto body work that documents their work in progress. Entries will be judged on project workmanship and overall appearance, panel size, the portfolio, creativity, and relationship to auto body.

### OP-10 Auto Body – Custom Paint Panel

A finished contoured panel that is no larger than 2' X 3'.

- Panel must be contoured. (Flat panels will not be accepted.)
- A minimum of 3 colors must be used.
- Panel must have air brushing (shading will be considered as airbrushing and will be acceptable).
- Portfolio that documents the work in progress must be turned in.

Judging is based on overall appearance, custom painting, design, creativity, sheet metal workmanship, and portfolio.

### OP-11 Automotive Clay Sculpting

#### Automotive Scale Models

Suggested sizes, materials and construction:

- a. 1/2 model, divided down the centerline of vehicle.
- b. 18" x 3', 3/4" plywood base or melamine particle board.
- c. Armature constructed from 2" "pink foam" readily available at Home Depot or Lowe's.
- d. Foam buck mounted to base with two 2" x 2" x 6" long pieces of pine screwed to the base from the bottom side.
- e. Foam built up in layers and glued together with "Gorilla Glue".

Applying the polymer (oil based) clay:

- a. Heat clay in commercial toaster (bread) oven to 145 degrees.
- b. Apply clay in long pressured strokes wearing non-stick work gloves.
- c. Set 12" x 3' closet door mirror at centerline of car using 90 degree angle brackets. Mirrors available at Ikea Furniture Store.

Sealing and painting the clay model:

- a. Seal the model with brush or spray on Bull's Eye Shellac or paint with suitable automotive epoxy sealer.
- b. Optional - apply surfacing primer and block sand.
- c. Paint with automotive type paint: base/clear or enamel.

Wheels and tires:

- a. Wheels can be made out of wood or aluminum and turned on a lathe.
- b. Other options are cardboard, foam, or similar shop materials.
- c. Tires can be cast with epoxy, foam, or rubber.

Trim and decals:

- Airbrush, pinstripe, or machine-cut graphics acceptable. .Dinoc water decals applied on glass areas.

### OP-12 single Pen

This category is for **all** pens. (Examples: acrylic, plastic, metal, wood, corncob, deer antler, etc.)

### OP-13 multiple Pens

This category is for **all** pens. (Examples: acrylic, plastic, metal, wood, corncob, deer antler, etc.)

### OP-14 Industrial Furniture

The products in this category incorporates multiple materials (I.E. welding, woodworking, CNC/ETC.) The overall artistic design of the whole product shall be emphasized as opposed to just judging the individual components. Example: Tables with metal bases and wooden tops, wooden topped tables with stain glass/tile/plastic inserts, benches/tables that incorporate machine parts as bases (tractor wheel/wooden top/CNC lettering)

## **PM – Patternmaking and Molding**

### **PM-1 Patternmaking**

Any pattern to be used in preparing a mold or casting metal can be entered here. An entry in Pattern Making which consists of more than one piece should have each piece marked to show that the pieces belong to one entry. A ROUGH CASTING MUST ACCOMPANY THE PATTERN and/or be entered in PM-2 or PM-4. If an investment (lost) pattern is used, mounted photos must be provided. No CNC or computer made patterns. Student must make all parts of the pattern.

### **PM-2 Rough Casting - Unfinished - From Student Pattern**

Any project cast of metal must be clean but not filled, painted, polished, machined, sandblasted, wire brushed, filed, or assembled. All gates, spurs, and risers must be left on a casting entry. Examples: wall plaque, engine part, etc. Pattern must accompany part or be entered in PM-1.

### **PM-3 Finished Casting - Using Commercial or Pattern Not Made By Student**

Casting must be cleaned, filed, polished, or finished. It must be machined and ready for assembly. Project may be mounted to a display board.

### **PM-4 Finished Casting - Using Pattern Made By Student**

Pattern must accompany the casting. If an investment (lost) pattern is used, mounted photos must be provided. Casting must be cleaned, filed, polished, or finished. It must be machined and ready for assembly. Project may be mounted to a display board. Pattern must accompany casting or be entered in PM-1.

### **PM-5 Finished Casting CNC - Using Pattern Made By Student on Computer Controlled Equipment**

Pattern must accompany the casting. Casting must be cleaned, filed, polished, or finished. It must be machined and ready for assembly. Project may be mounted to a display board.

### **PM-6**

DELETED

### **PM-7 Die Casting**

Any project cast from metal using a metal or plaster die are to be entered in this category. The dies may be commercially produced or student created and must be stated as one or the other. Statement must be attached to casting. If student developed die is used, at least one die is to accompany the project. Examples: chess set, screw driver, etc.

### **PM-8 The Total Project - For the Student Who Has Done It All**

When the student has done all of the following: made his/her own pattern, proven it works with a rough casting, and possesses the finished project, all three can be entered here as one entry. Individual category rules will apply for the pattern: PM-1 or PM-8, rough casting, PM-2 and finished, PM-3, PM-4, or PM-5. Student must make all parts of the pattern.

### **PM-9 Rough Casting - Unfinished - From Commercial Pattern**

Any project cast of metal must be clean but not filled, painted, polished, machined, sandblasted, wire brushed, filed, or assembled. All gates, spurs, and risers must be left on a casting entry. Examples: wall plaque, engine part, etc.

## **PL – Plastics**

### **PL-1 Casting**

Any plastic project involving a casting, pattern, and/or mold in conjunction with the casting. Examples: paper weight, book ends, pen holder, jewelry, etc.

### **PL-2 Fabrication**

Any project in which plastic is the predominant material which has been joined together by lamination, jointery, and/or mechanical fasteners. Examples: lamp, game, toy, shelves, etc.

### **PL-3 Carving**

This area includes projects that have been carved, sculpted, or turned using hand tools and/or power equipment. Examples: flowers, animals, etc. **All pens must be entered in OP-12.**

### **PL-4 Forming**

Any project where the predominant material is plastic that has been formed by thermoforming and/or expansion molding/forming. Examples: lamp, utensils, tray, bowl, etc.

### **PL-5 Miscellaneous Plastic**

This classification will include any project not covered by other classifications. Examples: plastic laminate projects, solid surface, vinyl products, dispersion molding, compression molding, extrusion, injection molding, tracer, duplication, and fiberglass. Any fiberglass vehicles must be entered in OD-1. Tables with laminate tops must be entered in WO-9 or WO-10.

### **PL-6 Plastic Model**

Entries in this division will include a model made of plastic. The model may be a car, boat, airplane, train, cannon, etc. A model that one can see all around (three dimensional). Multiple parts.

### **PL-7 Plastic - Using Computer Controlled Equipment (Student Design Data Input: I.E.: G Code etc. No Scanner Input)**

Any project using CAD or CAM to design and cut the part in plastic will be entered here. List hardware, software, and short statement of the process used.

### **PL-8 The Total Project - For the Student Who Has Done It All**

When the student has made his own pattern, proven it works with a rough casting, and possesses the finished project, all three can be entered here as one entry. Individual category rules will apply. Student must make all parts of the pattern. **Must be made out of plastic.**

### **PL-9 3-D Print – 1 Piece**

A 3-D print using any medium created by a student generated design that is a non-functional, non-moving part.

### **PL-10 3-D Print – Multiple Piece**

A 3-D print using any medium created by a student generated design that is functional and contains moving parts or a single **assembled** object.

## **WM – Wrought Metal**

Project is limited to 64 sq. ft. of usable floor space. Bed sideboards not to exceed a length of 12". All small items such as knives, belt buckles, and letter openers must be mounted and securely fastened to a panel or a board.

### **WM-1 Nonferrous**

Any project made primarily from non-ferrous materials. Jewelry and other small projects must be securely mounted to a panel or board.

### **WM-2 Small Fixture/Furniture Under 3'**

Any single piece of free-standing furniture with a maximum dimension of less than 3'. Examples include: night stands, magazine racks, foot stools, end tables, lamps, light fixtures, and hanging planters.

### **WM-3 Large Fixture/Furniture Over 3'**

Any single piece of free standing furniture with a maximum dimension of more than 3'. Examples include tables, chairs, coat racks, benches, and swings.

### **WM-4 Forging**

Any project where the main process used to develop the part is by means of heat such as forged parts. Examples include: chisels, letter openers, wrecking bars, and grill tools.

### **WM-5 Tin Knocking**

Any project using light gauge sheet steel to develop angles, cylindrical, radial, or transitional lines. Examples include: tool boxes, pails, buckets, and watering cans. **Must be functional and/or service.**

### **WM-6 Small Sculptures/Models Under 30"**

Entries in this division will include models and or sculptures made from wrought metal with maximum dimension not exceeding 30". **Includes flowers.**

### **WM-7 Large Sculptures/Models Over 30"**

Entries in this division will include models and or sculptures made from wrought metal with a maximum dimension of over 30".

### **WM-8**

DELETED

### **WM-9 Automotive/ATV**

Any project whose main purpose is to be used in conjunction with an automobile or all-terrain vehicle. Examples include brush guards, headache racks, bumpers, etc. **Trailers must go in OP-01.**

### **WM-10 Signs**

Primarily 2-D projects made without any CNC procedures or machines whose main purpose is to relate a logo, phrase, direction, or picture.

### **WM-11 The Total Project**

For the student who has done it all. This is any project beyond the scope of the projects in other categories. Can include multiple parts/pieces, machine shop processes, blueprints, CNC work, etc.

### **WM-12 CNC Cutting Process**

Any project where the main components are CNC plasma, laser, or water jet cut.

### **WM-13 Outdoor/Sporting Good Projects**

Any project produced to be used outdoors. Examples include: fire pits, grills, wood stoves, wagons, skate rails, etc. **Must be under 36"**.

### **WM-14 Outdoor/Sporting Good Projects**

Any project produced to be used outdoors. Examples include: fire pits, grills, wood stoves, wagons, skate rails, etc. **Must be 36" or over.**

## WO – Wood

**Project is limited to 64 sq. ft. (longest length X longest width) in its normal operation position.** Unlock all locks. Architectural models should be entered in the Architectural Drawing Division. Bed sideboards must not exceed a length of 12" except for waterbeds. No electric hookups allowed.

### WO-1 General Woodworking

Projects whose intent is to sit on a table or hang on a wall are acceptable in this category and may have a lid or drawer. Examples: wall mirrors, coat racks, wall shelves, etc. May include scroll work. **No tabletops. No boxes.**

### WO-2 Sporting Goods and Games

Examples: games/puzzles, mind teasers, chess set, cribbage board, darts, checkers, skate boards, snowshoes, fishing nets, etc. May include multiple parts. **Nothing that qualifies as furniture or case work may be entered here. Game boxes must be entered in WO-3. Bows must be entered in OP 6. Dog Sleds must be entered in OP-1. All turnings must be entered in WO-07 or WO-08.**

### WO-3 Boxes

A box designed to be set or displayed on a table that has sides, a bottom, and may or may not have a drawer or lid. This is not furniture or casework. Examples: jewelry box, small display box, etc.

### WO-4 Wood Clocks (Table or Wall)

Wood clocks that sit on a table or hang on a wall must be entered in this area. Examples: mantle, table, wall, etc.

### WO-5 Sculpture and Carving

This area includes projects which have been carved or sculpted using hand tools and/or power equipment. (i.e. **chisels, dremel, chainsaw, drawknife, etc.**) Examples: statue, sign, decoy, animal, etc. Intaglio and Intarsia must be entered in this category.

### WO-6 Wood Models

Entries in this division will include a model made of wood. Model may be a car, boat, train, airplane, canoe, etc. A model you can see all around (three dimensional). Solid body guitars are entered in this category.

### WO-7 Wood Turning (Between Centers)

Any project on which the major portion of the work involves turning between centers. Multiple pieces may be glued before turning but is not required. A project with more than one piece turned which gives the appearance of a continuous piece. Example: lamp with base, body and top separately turned, etc. Bats are included in this category. Tape entry form on bottom. Tables, chairs, or other furniture must go in WO-9 or WO-10. **Pens must be entered in OP-12.**

### WO-8 Face Turnings

Any project that is turned on a lathe using a faceplate. Examples: bowls, coasters, round jewelry boxes, etc. Tape entry form on bottom.

### WO-9 Furniture (under 26")

A single piece of free-standing furniture measuring under 26" classified as a table, chair, bench, stool, or stand. May include a drawer. Height is determined as measured from the floor. Usually has legs.

### WO-10 Furniture (26" and Over)

A single piece of free-standing furniture measuring 26" and taller classified as a table, chair, bench, stool, or stand. May include a drawer. Height is determined as measured from the floor.

### WO-11 Wall Case Work

Anything that can hang on a wall. Must include the construction of doors, lids, or drawers. Examples: spice rack, display cabinet, bookcase, curio cabinet, etc.

### WO-12 Case Work (Under 30")

A single piece of free-standing furniture measuring under 30" that may be open-faced or include the construction of doors, lids, or drawers. Casework consists of a box that may be fitted with dividers, shelves, frames, drawers, or doors. Examples: hutch, desk, chest, bookcase, blanket chest, trunk, etc. Height is determined as measured from the floor.

### WO-13 Case Work (30" to 60")

A single piece of free-standing furniture measuring 30" to 60" that may be open-faced or include the construction of doors, lids, or drawers. Casework consists of a box that may be fitted with dividers, shelves, frames, drawers, or doors. Examples: hutch, desk, chest, bookcase, blanket chest, trunk, etc. **Height is determined as measured from the floor.**

### WO-14 Case Work (over 60")

A single piece of free-standing furniture measuring over 60" that may be open-faced or include the construction of doors, lids, or drawers. Casework consists of a box that may be fitted with dividers, shelves, frames, drawers, or doors. Examples: hutch, desk, chest, bookcase, grandfather clock, etc. **Height is determined as measured from the floor.**

### WO-15 DELETED

### WO-16 DELETED

### WO-17 Outdoor Furniture and Accessories

Any wood project produced to be used outdoors. The project may have a door, drawer, lid, movable, and/or non-movable parts. Examples: lounge chairs, benches, picnic tables, storage cabinets, planters, and swings.

### WO-18 Tables and Beds 30" and Over

This category is for only tables and beds that are over 30". Tables designed to sit at (all game tables, pub tables, dining tables, poker tables, etc.) with or without chairs and beds not involving casework must be entered in this category. Projects may include the construction of drawers. Bed rails must not exceed 12" in length. Height must be measured from the floor to the tallest part of the project.