Advisor's Handbook

2017-2018

Early Academic Outreach

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Welcome Letter

About M.E.S.A.

Our Mission

AZ Mathematics, Engineering, Science and Achievement (MESA) is a program designed to increase access to Science, Technology, Engineering, and Mathematics (STEM) pathways and encourage college readiness for low-income, minority, or first-generation college-bound students in grades 6-12.

Four Pillars of MESA

- Active Learning – students learn and implement the MESA Engineering Design Process through numerous highly-engaging, relevant, hands-on activities in which their experience of project-based learning, while supported by the teacher, is driven mainly by student teams.
- Exposure to STEM – through college and career mentors and university campus events.
- College Readiness – through activities, resources and events developed by the UA Office of Early Academic Outreach as part of its Start Now college knowledge campaign (startnow.arizona.edu).
- Peer Support – by supporting the development of college-minded peer groups that support and encourage each other throughout the K-16 pipeline.

MESA USA

The AZ MESA program is based on a model that originated in 1970 at the University of California, Berkley. Established in 1984, AZ MESA has grown dramatically. Statewide programs currently provide thousands of middle and high school students with year-round support and college and career guidance.

AZ MESA is one of ten national MESA programs. MESA programs are located in Arizona, California, Colorado, Illinois, Maryland, New Mexico, Oregon, Pennsylvania, Utah, and Washington.

Goals

The AZ MESA Program is a structured, multi-year, precollege program dedicated to supporting and developing the interests, skills, and abilities of K-12 students in STEM. The program aims to increase the number of engineers, scientists, mathematicians, and related professionals at technical and management levels in the workforce. Additionally, it serves to encourage and increase the number historically underrepresented and economically disadvantaged students in achieving academic and professional success in STEM fields. Through AZ MESA's efforts, participating students receive the educational enrichment experiences and support needed to achieve academic success and prepare for college STEM majors.

Educational Outreach and Activities

To achieve its goals, the AZ MESA program offers the following educational outreach components:

- Field trips and academic competitions
- College counseling
- Advisor Professional Development (MATI)
- Saturday Enrichment programs
- Scholarships/incentives
- Science, Technology, Engineering, Math (STEM) activities
- Industry Involvement

Industry Partnerships and Mentoring Programs

Arizona industries work as partners with Early Academic Outreach staff in a number of valuable ways. Industries provide engineers and other professionals to serve as mentors in the schools, and they fund programs and events such as MESA Day and the Engineering is Fun poster contest. Notably, the Tucson office of Raytheon supports the Adopt-a-School engineer program, which won an award from the National Science Foundation. Members of local area industries also serve on the Arizona MESA Industry Advisory Board, which makes recommendations and decisions about issues related to MESA at the statewide level.

Contact Information

Location

University Services Building

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Tucson, AZ 85721-0158

Mailing Address

P. O. Box 210158

Tucson, AZ 85721-0158

Phone Numbers

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Fax: (520) 626-2307

Website

http://eao.arizona.edu

http://azmesa.arizona.edu/

MESA Staff

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Director

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Manny Leon

Assistant Director

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Bill Pike

MESA Coordinator

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Advisor's Responsibilities

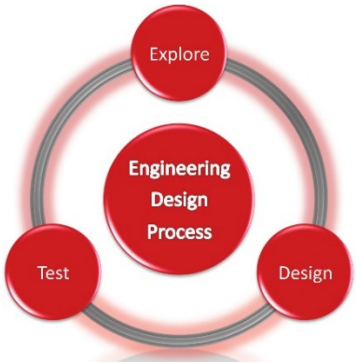
As a MESA Advisor, you agree to:

- Recruit 15 or more students to join MESA
- Hold weekly meetings
- Encourage and support college and STEM exposure
- Facilitate use of Engineering Design Process and Engineering Design Notebooks
- Share best practices with the MESA community
- Register students for competitions
- Incorporate college access monthly during meetings
- Have students fill out Student Information Form (SIF) and return them to MESA office
- Maintain communication with MESA office

Administration's Responsibilities

School administration agrees to:

- Identify and recruit advisor(s) for MESA
- Maximize opportunities for available funds to support MESA
- Encourage and support advisor participation in MATI
- Identify school facilities in addition to classroom, if necessary
- Support recruitment of students
- Support in gathering data for program evaluation
- Assist in finding district transportation to MESA Day
- Secure funding for MESA program fees
- Make every effort to compensate Advisor for their time in MESA financially



Ideas for Recruiting Students

One of the biggest challenges to running MESA can be recruiting students to the club. Students have a lot of choices for after school activities (sports, clubs, work, caring for siblings, etc.). The following is a list of ideas for recruitment. It is by no means all inclusive. Different strategies work at different sites. If you have something else that works, please use it and share it.

Personal Touch – Reach out directly to students

Students will come if they are feel a personal connection. Some of the best MESA students are those who come because of the advisor. Reach out to students and personally invite them. Ask Math and Science teachers to recommend students who may be interested and send them a note or visit them in class.

Meeting Time

Have the students set the meeting day and time. This does 2 things: 1) It gives the students a sense of ownership over the program and 2) It gives you a sense of when most of the students are available.

Advertise

Hang up posters to advertise your meetings. Put the meetings into the announcements. If you have video announcements, make a quick commercial. Encourage students to invite their friends. Have students post on social media. If possible, put previous year's projects on display. The more the word is out in the general public, the more diverse the students who attend.

Groups of friends

Research shows that when friend groups do an after school activity together, they are 50% more likely to stay in the program for the duration of the year. Friend groups offer support, comradery, and a set of dynamics to work together.

Structure

Have a plan for the meetings. Make them fun, engaging, and organized. The students don't want to sit in a class after school but you can provide a structure so the students feel that they aren't wasting their time. If you are unsure what to present, use the MESA Curriculum or have students plan the meetings.

MESA Meetings

Determine the weekly meeting time and location for students. A typical meeting may include the following agenda items:

1. Introduction of Guest Speaker (if applicable)
2. Team Building Activity
3. Attendance and Announcements
4. Administrative Business (forms due, academic status reports, etc.)
5. Activity (guest speaker, STEM projects, tutoring, career development sessions, college or financial aid workshops, goal setting and problem solving activities, tutoring, and/or guest speakers)
6. Activity Summary and Evaluation
7. Next Meeting/Activity (time/date/location)

The structure of your meetings is your choice. Find a structure that works for you. MESA is an academic club and needs to have a structure similar to a classroom. Always try to have a starting point and ending point for your time with the students.

Chaperones

When going to an event, chaperones are an important component. The University of Arizona is not responsible for you or your team members while attending any MESA event. Please make sure you:

- Have 1 adult for every 10 children
- Have cell phone numbers of all chaperones
- Let students know your cell phone number
- Have a pre-arranged meeting point in case someone gets lost
- Have student's cell phone numbers, just in case

We want to provide a safe and fun atmosphere for your students. Please help us to keep them safe.

Ideas for Funding

- 21st Century CCLC Grant – About 75% of MESA schools also have the 21st Century Community Learning Center grant. The mission of the grant is *"To assist 21st Century Community Learning Centers in building and sustaining comprehensive out of school time programs that provide high-quality academic enrichment opportunities for all children, and that meaningfully engage adult family members in helping their children succeed academically"* The 21st CCLC grant and MESA aim to provide the same thing to students. Ask your principal/site coordinator how you can get involved with the grant.
- Tax Credit Money - There are pools of tax credit monies. If you can get parents and/or businesses to donate directly to your program, that is always the best. If not, ask your principal about Undesignated Tax Credit Money. It is money that people and/or businesses have donated to be used as the school sees fit. Schools use it throughout the year for field trips, events, etc. It is a source of funding that can go quickly.
- Partnerships with companies – Go to local companies and ask for donations. Donations can be for money, supplies, or expertise (using tools, writing proposals, etc.). Some places (Home Depot, Lowes, Ace Hardware) will let you have unusable pieces of wood (i.e. a 2"x4" that they can't sell) for either free or a drastically reduced cost. You can write a letter asking for support and/or materials to any company. A good tip is to have students sign it as well.
- Start a GoFundMe account – GoFundMe is a great crowd sourcing site that can provide funding for materials. It works best when cast to a large audience. Have students post it on social media. Have the school post it on their social media. Have the district post it on their social media.
- Supermarket or fast food fundraisers – Some supermarkets (Fry's) and fast food restaurants (Rubio's and McDonald's) will sponsor schools and/or clubs by giving a percentage of proceeds from sales on a specified day to the designated groups. Contact stores to see if they offer this fundraiser.

Sample Donation Letter

Month Day, Year

Dear [Insert Name Here]

My name is [Insert Name]. I am writing you on behalf of M.E.S.A. at [Insert School Name]. M.E.S.A. is Mathematics, Engineering, Science, Achievement. The goal of the program is to excite first generation, minority, and low income students to become excited about Science, Technology, Engineering, and Math (STEM) careers. The program has problems that the students are to solve using these skills and compete with other students all over Arizona. You can find more information at the Arizona M.E.S.A. website. http://azmesa.arizona.edu

We are asking if you could donate materials to our efforts. We are looking for:

[Insert list of materials here]

We plan to use these materials to make

[Insert copy of design here]

We hope that [Insert Company Name] would be willing to donate some or all of these supplies to help us complete our project.

If you donate to our school, it is a charitable donation. Our school tax ID is[Insert Tax ID here]. We can also add your company logo to our final product and thank you in our presentation. We look forward to establishing a partnership with you and [Insert Company Name].

Thank you for your support.

[Team Members Names and Signatures]

[Advisor Name and Signature]

[Address]

[Phone Number]

[Email]

Recommended Timeline

(Revise to reflect program implementation date)

August

- Enlist the assistance of the "veteran" AZ MESA students and the math and science faculty to identify potential MESA students that meet the general requirements

September

- Attend MESA Advisors Training Institute (MATI)
- Organize the first MESA student meeting and select the meeting times and places for the remainder of the semester
- Describe MESA program so all members will remember the goals are college preparation and fun with math and science
- Discuss Science, Technology, Engineering, and Mathematics (STEM) as career options
- Introduce Engineering Design Process
- Begin to identify guest speakers for meetings, Raytheon partner engineer, and possible teams for competitions.
- If desired, start building trebuchet for Tucson Pumpkin Toss

October

- Introduce concepts that students will need as the begin preparing for competition
- Show students how to critically and comprehensively read the specifications
- Continue to discuss Science, Technology, Engineering, and Mathematics (STEM) as career options
- Continue to discuss the Engineering Design Process

November

- Continue introduction of important concepts
- Have students identify competition interests and build their teams
- Have students begin researching and brainstorming designs

December

- Have students develop of plan of action for design development
- Have students organize all notes, research, drawings
- Teams build projects based on designs, test, analyze, and generate improvements

January

- Teams re-visit plan of action and set calendar to be prepared for Regional MESA Day Competitions
- Teams build projects based on designs, test, analyze, and generate improvements

February

- Teams continue improving designs
- Encourage seniors to apply for MESA scholarship
- Participate in Regional MESA Day Competition

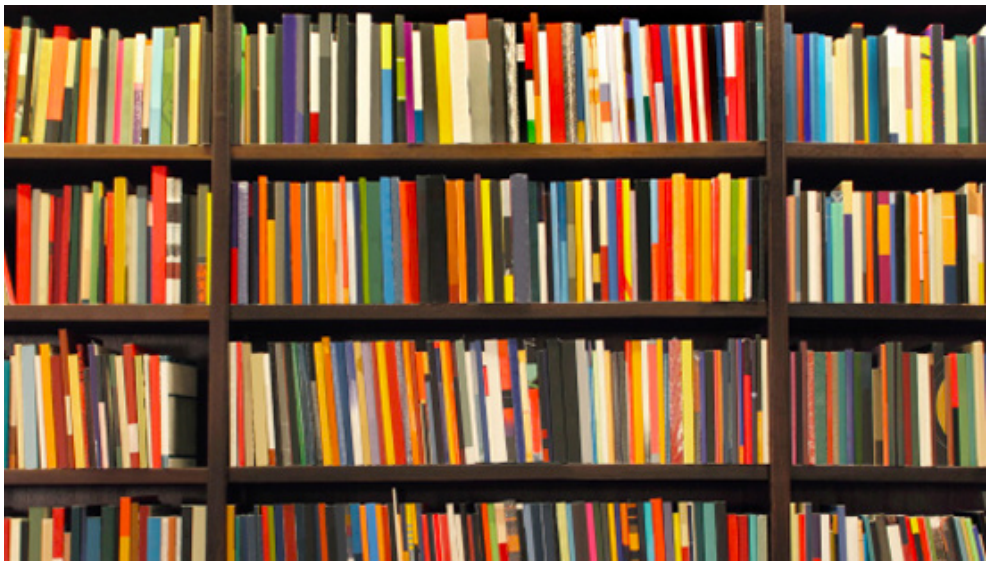
March and April

- Finalize teams and submit registration for MESA Day.
- Teams finalize designs, formally present their projects to their peers.
- Teams participate in MESADay (with College Signing Day & Student of the Year Recognition) on April 28 @ GCU.

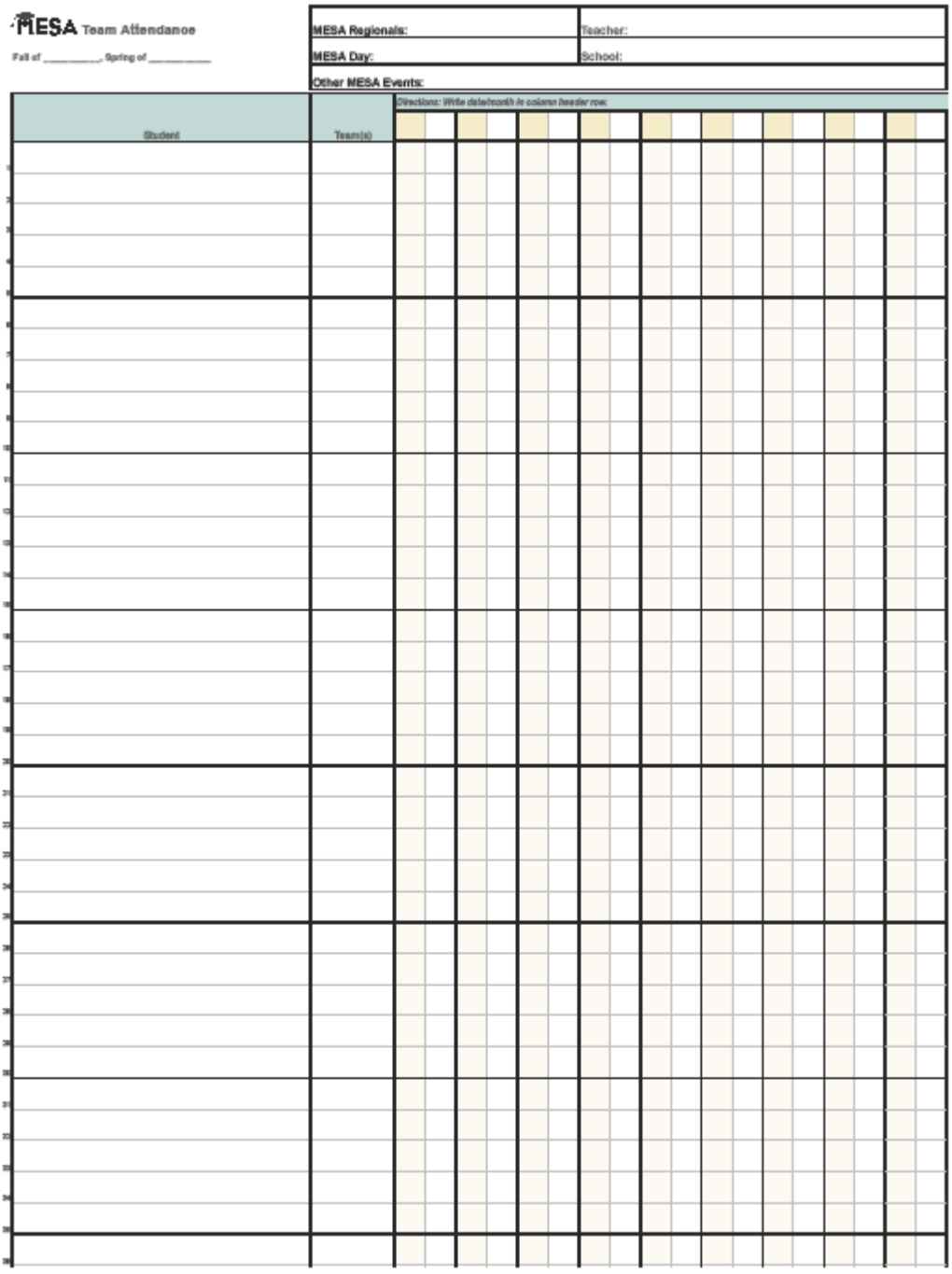
May

- Teams reflect on performance at MESA Day.
- Youth Recognition and/or End of Year Celebration at Your School (_____)

Resources



Attendance Roster



MESA Team Attendance

Fall of _____, Spring of _____

MESA Regionals:	Teacher:
MESA Day:	School:
Other MESA Events:	

Student	Team(s)	Directions: Write date/month in column header row.											

Mini Design Notebook

MESA Mini-Design Notebook

Name (Student/Team): _____

Design: _____ **Date:** _____

Design Cycle # (circle one) 1 2 3 4 5

Explore (Imagine/Brainstorm/Research)

Design Problem (in your own words)	
Success Criteria (e.g. height, speed)	**Constraints** (e.g. cost, materials)
Other Design Variables (e.g. Cost, Height, Wind, Energy)	
IMAGINE: Brainstorm What You Already Know Or Might Research? What Key Features Matter To You?	

Design (Draw and Build New Prototype or Modifications)

Goal & Why? (rationale for this cycle)	**Plan for this cycle** (e.g. timeline)

Sketches:

Test (Create Testing Process, Gather Data, Reflect)

APPROACH: What tools do you need to measure quality?

HYPOTHESIS: What do you predict for this round of testing – and why?

REFLECT: What worked – or didn't – with your latest design? What materials might you change? What features might you add? How might you improve your team's process in the next design cycle?

Basic Goal Checklist

School: _____ **Design Team:** _____

MESA Design Goal Checklist

Plan & Prioritize

Priority (e.g. 1st, 3rd)	Goals	Team Members Responsible	Deadline	☑	To do at MESA only, outside of MESA or both?
	1.				
	2.				
	3.				
	4.				
	5.				
	6.				
	7.				
	8.				
	9.				
	10.				

Common Notebook Rubric

Rubric for Engineering Design Notebooks (EDN).

EDN Goals	3	2	1	0
1. Explore				
1.1 Problem Statement. Accurately describes, in your words, the design objective (includes success criteria, constraints constants and variables)	**Specific** description of problem, success criteria, constraints, variables and constants	Basic...	Weak...	No...
1.2 Depth of Free exploration. Prior knowledge, brainstorming & hands-on exploration documented.	**Numerous** examples of brainstorming and hands-on exploration observations.	Regular...	Few...	No...
1.3 Research in Design: Research ideas about your design that might be useful. Record information using different sources (e.g. books, websites, interviews from experts).	**Clear** analysis of other design pros/cons.	Basic...	Scant...	No...
2. Design				
2.1 Design Plan. Includes reasoning on your design choices (materials used, modifications, etc.). Use data from past trials, research and design considerations.	**Clear** reasons given (based on data or research) for each design choice.	Basic...	Scant...	No...
2.3 Design sketching and/or photos. Prior & during build, team sketches, 2-D or 3-D perspective drawings.	**Numerous** representations of each design iteration.	Regular...	Scant...	No...
3. Test				
3.1 Observation. Data & written observations (tables, graphs, labeled drawings, etc.).	**Numerous** presentation of quantitative & qualitative data, graphs & charts follow design progression.	Regular...	Scant...	No...
3.2 Reflection/Analysis. Assesses pros and cons of design/materials, testing procedure, etc. Apply test results and analysis to pose a theory, recommend and argue for a next step, or draw an insightful conclusion. Restate the purpose in your conclusion.	**Detailed** reflection shows how design considerations and logic flowing from research, test analysis, etc.	Basic...	Scant...	No...
4. EDN Organization				
4.1 Structured. Includes Table of Contents with key elements. Elements of EDN can be used to answer judges questions easily	**Clear** organization utilizes defined sections.	Basic...	Minimal...	No...
4.2 Labeled. Clearly labeled with School and Team Members names.			Yes	No
Column Totals (for selected categories)				
			Subtotal (out of 25)	
			Modifier	(S ÷ 25) x P
			Score (out of P)	

Comments/Suggestions:

Scholarship WebSites

Scholarship Universe – U of A site for scholarships. Most are for U of A but there are non- Arizona scholarships. https://scholarshipuniverse.arizona.edu/suha

ASU Scholarships – ASU site for scholarships. https://students.asu.edu/scholarships

NAU Scholarships – NAU site for scholarships. https://nau.edu/finaid/aid-types/scholarships/

GCU Scholarships – GCU site for scholarships. http://www.gcu.edu/admissions/tuition-and-financing.php

Fast Web –A terrific, free resource where you'll find thousands of scholarships at your fingertips. Not only does Fastweb offer a massive database of monetary awards, but it also features helpful career planning services and learning tools for its registered users! http://www.fastweb.com/

Cappex – A site that will help find scholarships throughout college as well as college searches. Very thorough and offers a $2,500 scholarship to current college students. https://www.cappex.com/

College Success Arizona – A program designed to help Arizonans finish college. http://collegesuccessarizona.org/college-success-services/our-scholarships/

Scholarships.com – The name says it all. A resource with scholarships for any level of college. https://www.scholarships.com/

Big Future – Collegeboard's site to search for scholarships. Students do not need to be AP students to apply. https://bigfuture.collegeboard.org/scholarship-search

Unigo – A scholarship site that has categories to help guide to the scholarship that is right for you. https://www.unigo.com/scholarships#/fromscholarshipexperts

Super College – A site to help you throughout your schooling. Has college and scholarships for any student at any level. http://www.supercollege.com/

My College Scholarship – A resource of the best methods to find and earn scholarships. http://www.mycollegescholarship.org/

Yes College – A huge collection of scholarships categorized by who can apply. http://yescollege.com/scholarships/

Safety Contract

The safety of all students and advisors is paramount for MESA. We want everyone to experience MESA in the safest way possible. The importance of proper usage of tools is tantamount to a full experience. Students need to develop safe work attitudes and habits as outlined by school rules as well as develop building and construction skills.

Students will be completely responsible for the construction of their projects. This process will require the use of tolls that are not normally found in a classroom environment. All tools have inherent dangers and can cause injury to the user as well as people in the immediate area. The following are tools that may be used in the construction process.

Parents must initial each of the tools that their child is allowed to use and is allowed to be near any other student who may be using it.

_____ Manual Screwdriver	_____ Soldering Iron	_____Power Drill
_____ Hammer	_____ PVC Cutter	_____ Power Saw
_____ Hand Saw	_____ Clamps	_____ Rotary Tool
_____ Pliers and wire cutters	_____ Miter Box	

Intentionally left blank to add in tools used at MESA Schools

Parents must initial next to each of the tools AND sign the next page

Training Material can be found at http://azmesa.arizona.edu/tool-usage-links

I RECOGNIZE THAT:

- Safety is ultimately the responsibility of the person using the tool.
- Safety regulations and training has been provided to me and I am responsible for applying them when using the tools.
- It is possible for accidents to occur even when everyone involved is following safety guidelines. The likely hood of accident and injury increases if I do not follow all the safety guidelines.
- Because there will usually be more students using tools than adults supervising them, I must act responsibly to ensure my own safety AND the safety of others in the work area.

I AGREE TO:

- Never work in the shop without adult supervision.
- Read and practice all the safety regulations that have been distributed to me in this course or have been posted in the work areas.
- Act in a responsible manner at all times during building and construction time.
- Follow all instructions given by the instructors and mentors.
- Immediately report any unsafe condition or activity to my instructor or mentor.
- Know where all safety equipment is located and what should be done in an emergency.
- Wear eye protection at all times when working with tools or working anywhere near someone who is using tools.
- Tie back long hair, remove dangling jewelry, secure loosed clothing, and wear shoes with closed toes in the shop.
- Clean all work areas and put equipment away before being dismissed.

I, _____, recognize that the robotics work area is a safe place in which to work and learn, if I conduct myself in a responsible manner. I have read through, and I agree with, all of the statements on this two-page form with my parent or guardian. I agree to assume responsibility for my own safety and work diligently to make the work area a safe place for others. I have read and understand my instructor's safety regulations. I agree to abide by the safety regulations and any additional instructions, written or verbal, provided by the district and/or instructor.

Student signature_____date_____

Parent/Guardian Permission

I have read through all the statements on this two-page form with my child. I believe that my child understands his/her responsibility with regard to safety in the work area. I believe that my child is able to act responsibly in the work area. I authorize my child to undergo safety training only for the tools that I've indicated by my initials on the previous page. I authorize my child to use the tools and be in the immediate area while other students are using the tools specified below.

Parent/Guardian signature_____date_____