PRESENTATION

FOLLOW ALONG WITH YOUR WORKBOOKS

WELCOME BOY SCOUTS

- Grace Covenant Troop 777
- Robotics Merit Badge
- Alan Burdick

ROBOTICS MERIT BADGE PLAN

- Do you have a signed “Blue Card”?
- Using a computer, research career opportunities in the robotics industry.
- In teams, design, plan, and build your robot according to the workbook.
- Show off your work!
- Merit Badge Recognition: Be sure to get “Blue Cards” to the Advancement Chairman.

LESSON PLANS

I. Safety
II. What is Robotics?
    - Major fields of robotics
III. Building a robot
    - The Chassis subsystem
    - The mechanical subsystem
    - The power subsystem
    - The controls subsystem
IV. Robotics competition
V. Careers in Robotics

Session I
SAFETY

REQUIREMENT-1

- 1. Safety, Do the following:

___Explain to your counselor the most likely hazards you may encounter while working with robots.

___What should you do to anticipate, mitigate, and prevent, and respond to these hazards.

___Describe what appropriate safety gear and clothing should be used when working with robots.

REQUIREMENT-1

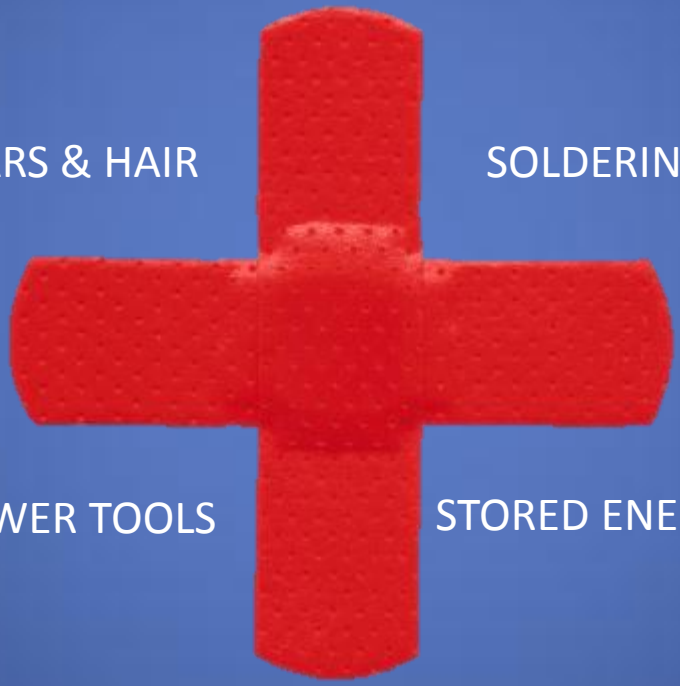
- 1. Safety, Do the following:
- b. Explain five hazards using AMR.
  - Hazard_____
    - Anticipate_____
    - Mitigate & Prevent:_____
    - Respond:
  - Describe the appropriate safety gear that should be used when working with robots_____
    _____
    _____

Safety – First Aid

CUTS & PINCHES

GEARS & HAIR

SOLDERING



ELECTRICAL SHOCK

BATTERY LEAKS

POWER TOOLS

STORED ENERGY

LOOSE PARTS PROJECTILES

Safety Precautions

- When working with robots you must be concerned with electrical safety, materials safety, chemical safety, and power tool safety

- Before beginning to build, fix, or work on moving parts, make sure the energy sources are all disconnected.
  - Turn off power switch
  - Disconnect batteries
  - Unplug power cord

Safety with Mechanical Energy

- Be aware that mechanical energy parts move with great force and speed.
  - Springs can provide tension and release a large amount of force quickly. Be sure springs are released prior to working on them.
  - A large raised arm can fall unexpectedly. Before working on it , be sure it is in a locked position.
  - A pneumatic (air pressure) system can release large amounts of energy quickly. Be sure air lines are purged (emptied) before working on them.
  - Loose clothing, long hair, hanging jewelry, neckerchiefs, or probing hands are easily caught in mechanisms. Wear appropriate clothing and protective equipment.

Safety with Electricity

- Your robot will probably run on electricity. Take proper precautions.
  - Almost everyone is familiar with dry-cell batteries in sizes from AAA to D. These batteries are not designed to be recharged. Dispose of depleted batteries safely at a toxic waste pickup station.
  - Equivalent rechargeable batteries such as nickel-metal hydride (NiMH) will be clearly marked as rechargeable. To recharge these batteries, use only approved and matched chargers.
  - Sealed gel batteries provide even more energy to robots. Gel batteries are designed to be rechargeable.

Robotics and First Aid Basics

First Aid:

- Minor cuts & scrapes: flush w/ clean water for >=5 minutes or until foreign matter is out. Apply antibiotic ointment (if no allergies), cover with dry sterile bandages.

- Chemical burns: quickly brush off w/ gloved hand as much of chemical as possible. Flush area w/ tap water.

- 1st degree or minor burns: hold under cold water or apply cool wet compresses until pain eases. Cover loosely w/ sterile gauze and bandages.

- Foreign object in eye: do not rub; blink eyes for tears flush out. If that doesn't work, flush w/ clean running water or from bottle.

**For more serious injuries, seek immediate medical attention.

Other Safety Precautions

- Most serious injuries are when a person gets too close to the machinery. Stay outside the 3 foot operating radius when robotics are in use. Some machines have sensors to detect human presence and automatically stop operating.

- Before beginning to build, fix, or work on moving parts, make sure the energy sources are all disconnected.

Safety – Potential hazards

A - Anticipate

M - Mitigate & Prevent

R - Respond

Use A.M.R. on five different hazards

Safety – First Aid (cuts)

1. **Stop the bleeding.**
2. **Clean the wound.**
3. **Apply an antibiotic.**
4. **Cover the wound.**
5. **Change the dressing.**
6. **Get stitches for deep wounds.**
7. **Watch for signs of infection.**
8. **Get a tetanus shot.**

(source: The Mayo Clinic)

Safety – first aid (burns)

For minor burns (1st degree and 2nd degree burns)

- **Cool the burn.**
- **Cover the burn with a sterile gauze bandage.**
- **Take an over-the-counter pain reliever.**

For major burns, call 911 or emergency medical help. Until an emergency unit arrives, follow these steps:

- **Don't remove burned clothing.**
- **Don't immerse large severe burns in cold water.**
- **Check for signs of circulation (breathing or movement).**
- **Elevate the burned body part or parts.**
- **Cover the area of the burn.**

(source: The Mayo Clinic)

Robotics and First Aid Basics

Prevention of Injuries:

- Dress appropriately and wear safety protection, such as goggles and ear plugs. Do not wear loose fitting clothing, hanging jewelry, long hair, or anything else that could get caught in equipment.
- Work in well-ventilated areas
- Do not drink or eat in the work area.
- Have a fire extinguisher nearby
- Work under proper supervision as required.

Safety – Proper Attire

1. • LONG SLEEVED SHIRT

2. • WORK GLOVES

3. • SAFETY GLASSES

Safety at Competitions

- Always wear eye protection, such as safety glasses.
- Wear ear protection since the noise is extreme at these events.
- Dress appropriately and apply basic first aid techniques if injury occurs.

Safety Part 1

- This completes part one. Please complete the workbook on safety.
- Be sure to put your name and date.