Training L1

Leadership Through Project Management

Objectives

Understand:

- ❑Understand project management language
- ❑ Understand project management process
- ❑ Understand Team 2228 leadership skills

Most Important Questions of Life

What are the four most important words in life?

What is the PLAN.

What are the two words that predict the future?

The PLAN.

Why is Project Management Important

Successful projects:

- ❑ Provide high quality results
- ❑ Have well-motivated teams
- ❑ Projects are done on time

Poorly Planned Projects:

- ❑ Tasks are not done on time
- ❑ Confusion on what has to be done
- ❑ Deadlines are missed
    - ➢ Sub-teams are frustrated and feel unsuccessful.

The bottom line: A well planned project minimizes frustration, surprises, and extra work

Project Management - Definitions

Project:

*"A project is a **sequence of unique and connected tasks** which together lead to one end deliverable which must be **completed according to requirements, within budget and to time**"*

(http://www.my-project-management-expert.com/what-is-a-project.html)

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Project Management - Definitions

Milestones:

- Milestones are **important checkpoints** or interim goals for a project
- Use **noun-verb form;** e.g. prototype completed

Tasks

- Tasks are **action activities** to meet milestones
- Use **verb-noun form;** e.g. "create drawings" or "build prototype"
- Each task has a time duration

Work Break down Structure(WBS)

- The **WBS** is a really big “to-do” list that **defines milestones and tasks** required to complete the project.

Project Management Process Steps

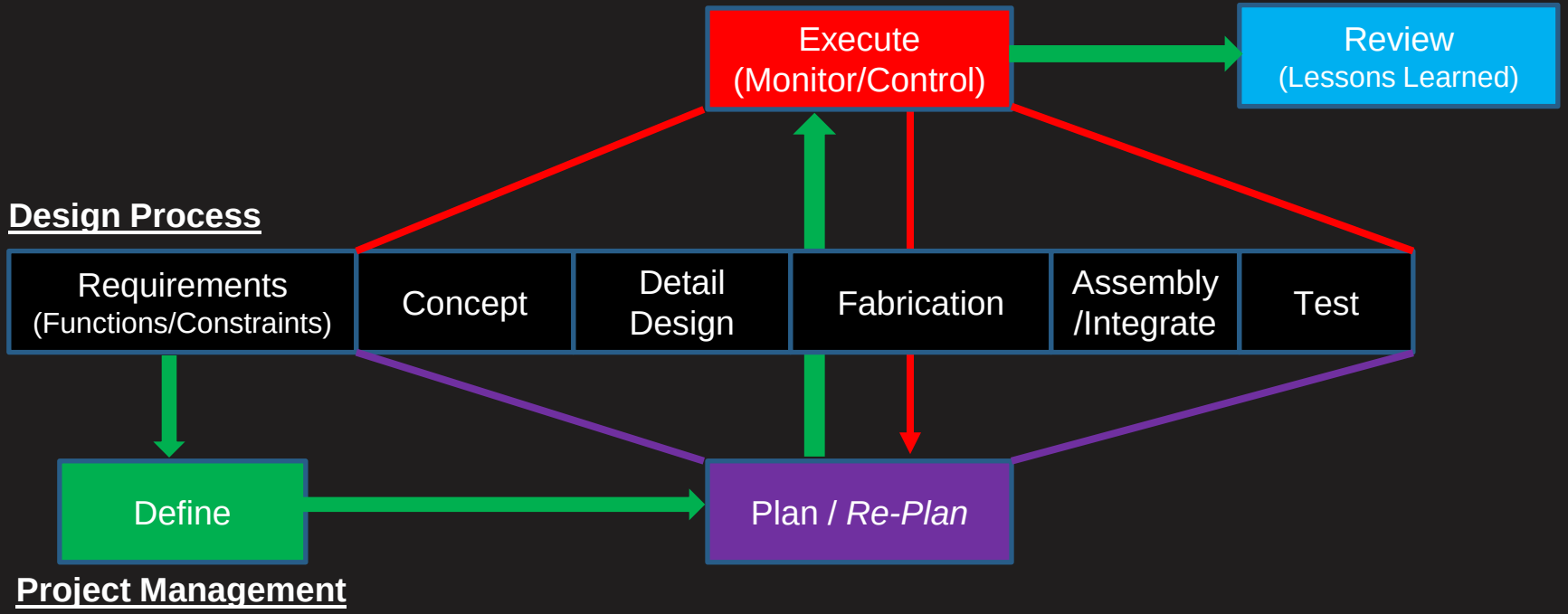
1. **(Define) the project**
   - ❑ Define project objectives, constraints

2. **(Plan) the project**
   - ❑ **Define Major steps** (milestones) to accomplish project
   - ❑ **Develop tasks** (work break down structure) within milestones
   - ❑ **Estimate time** to complete tasks
   - ❑ **Determine resources:** material, assign team members

3. **Execute(Do)-Control(Verify) the project**
   - ❑ **Direct work to plan:** Accomplish deliverables to team standards
   - ❑ **Control:** Report progress to plan

4. **(Review) the project**
   - ❑ Do a lessons learned and update handbooks with best practices

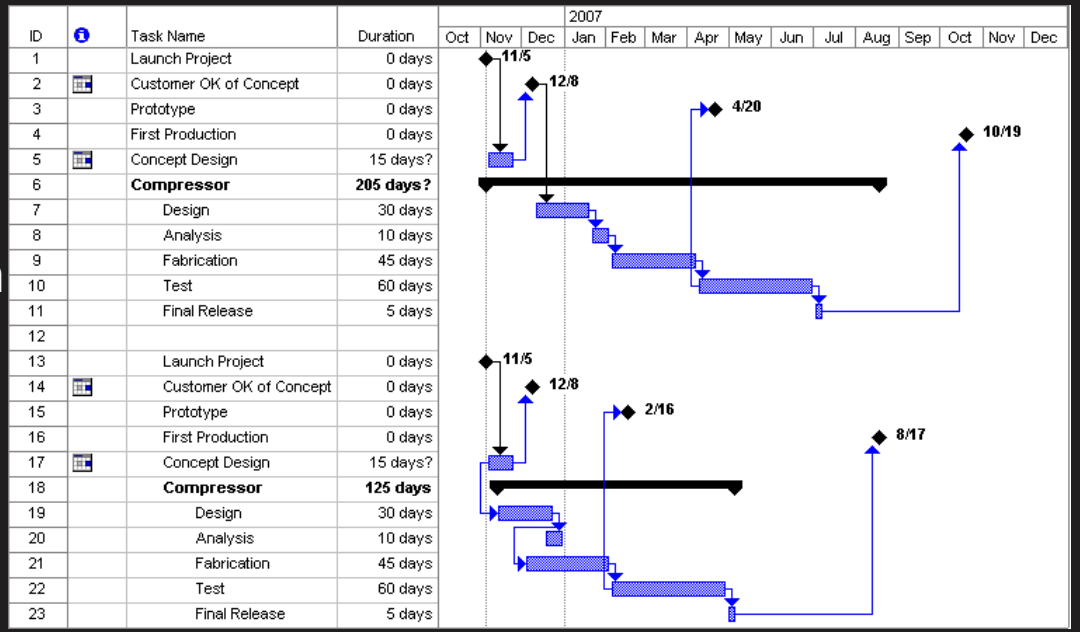
Project Management Process and the Design Process



Gantt Chart

GANTT Chart Creation:

- ❑List all milestones and events in a time line
- ❑ Estimate the time required for each task
- ❑ Represent the information in a bar chart



ID	Task Name	Duration
1	Launch Project	0 days
2	Customer OK of Concept	0 days
3	Prototype	0 days
4	First Production	0 days
5	Concept Design	15 days?
6	**Compressor**	**205 days?**
7	Design	30 days
8	Analysis	10 days
9	Fabrication	45 days
10	Test	60 days
11	Final Release	5 days
12		
13	Launch Project	0 days
14	Customer OK of Concept	0 days
15	Prototype	0 days
16	First Production	0 days
17	Concept Design	15 days?
18	**Compressor**	**125 days**
19	Design	30 days
20	Analysis	10 days
21	Fabrication	45 days
22	Test	60 days
23	Final Release	5 days

Software tools: Microsoft Project, Open source: ProjectLibre, OpenProject(web)

Project Management Demon - Time

“The difference between a dream and a goal is a deadline”

attributed to Napoleon Hill

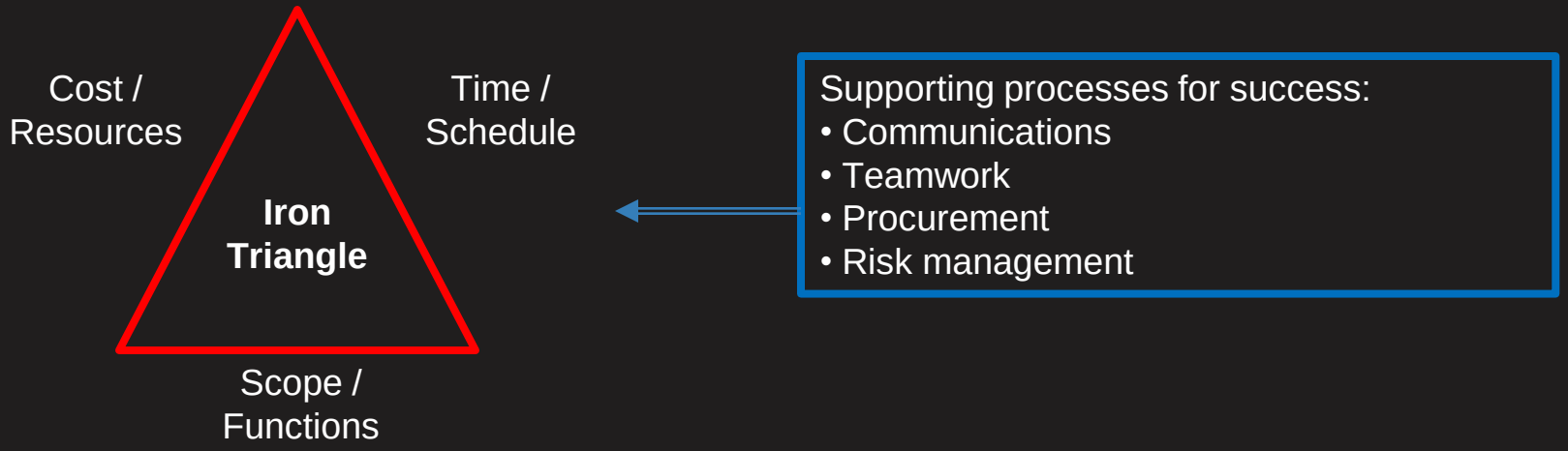
In any project what is the one thing you cannot change?

Time

Execution-Control: The “Iron Triangle”

For every project, independent of size, has only 3 parameters that can be changed

- ❑ Cost/Resources – labor cost, team members(skills) and hardware
- ❑ Time/Schedule – calendar time
- ❑ Scope/Functions – work to be done and deliverables to be provided



Changing one side effects the other sides

FRC Milestone Plan

Kickoff weekend: Learn game, analyze scoring, develop game play strategy, develop functions robot has to do

Week 1: (Define) Define modules from functions, develop module concepts, controls and software architecture, – Saturday: build chassis, start prototype builds

Week 2: (Concept-Prelim Design) Complete prototypes, Choose Robot Concept, Start prelim design, complete drive train software

Week 3: (Detail Design) Start Detailed Design, develop BOM, Start fabrication of parts, driver training starts

Week 4: (Assembly) Start assembly, complete detailed design, electrical sub panel and software programming

Week 5: (Integration) Complete robot Integration (electrical, software) and functional testing

Week 6: (Robot Testing-Evaluation) Complete operational Testing, Tweak, Improve, & Practice

FRC Milestone – WBS by Sub-Team

Process Step	Description	Mechanical	CAD	Electrical	Software
1) Requirements Capture	-Kickoff game video -Game/Robot Manuals -Development of "WHAT"	Support robot strategy/functional spec	Support robot strategy/functional spec	Support robot strategy/functional spec	Support robot stategy/functional spec
-Design Review	Review/Release to develop robot concept	Robot functional spec per decision process detailed in "Requirements Instructions"			
2) Robot Concept	Development of "HOW"	Develop robot mechanisms prototypes	Develop mobility module CAD; start robot module CAD	-Support prototypes -Define sensors, actuators	-Support prototypes
3) Preliminary Design	Engineering calculations	Perform engineering calculations	Complete mobility module CAD	Develop electrical architecture	-Develop software architecture -Develop mobility module software
-Design Review	Review/Release to design robot	Final Robot concept per decision process detailed in "Concept Instructions"			
4) Detailed Design	Engineering Documentation of "HOW"	-Build mobility module -Start fabrication where possible	Complete CAD/ Fab part dwgs	Complete Electronic docs: Schematics; I/O definition; fuse map; panel layouts	Complete module logic description
-Design Review	Review/Release of fab parts/electrical assemblies	Design "Walk Through" for mechanical, electrical and software designs("Mistake Proofing")			
5) Fabrication	Material machining	Build modules	Update CAD to fab part changes	Build electrical panels	Test drive station and mobility module
6) Integration	Mechanism integration	Assembly robot modules	Update CAD to assembly changes	Assembly electrical panels to robot	Test I/O functionality
7) Test / Evaluation	Robot module testing, performance testing	Support mechanical mechanisms	Update CAD to changes	Support robot electrical	Lead module testing /performance eval
9) Lessons Learned	Design/Build/Competition review	Review/Update handbooks	Review/Update handbooks	Review/Update handbooks	Review/Update handbooks

Milestones

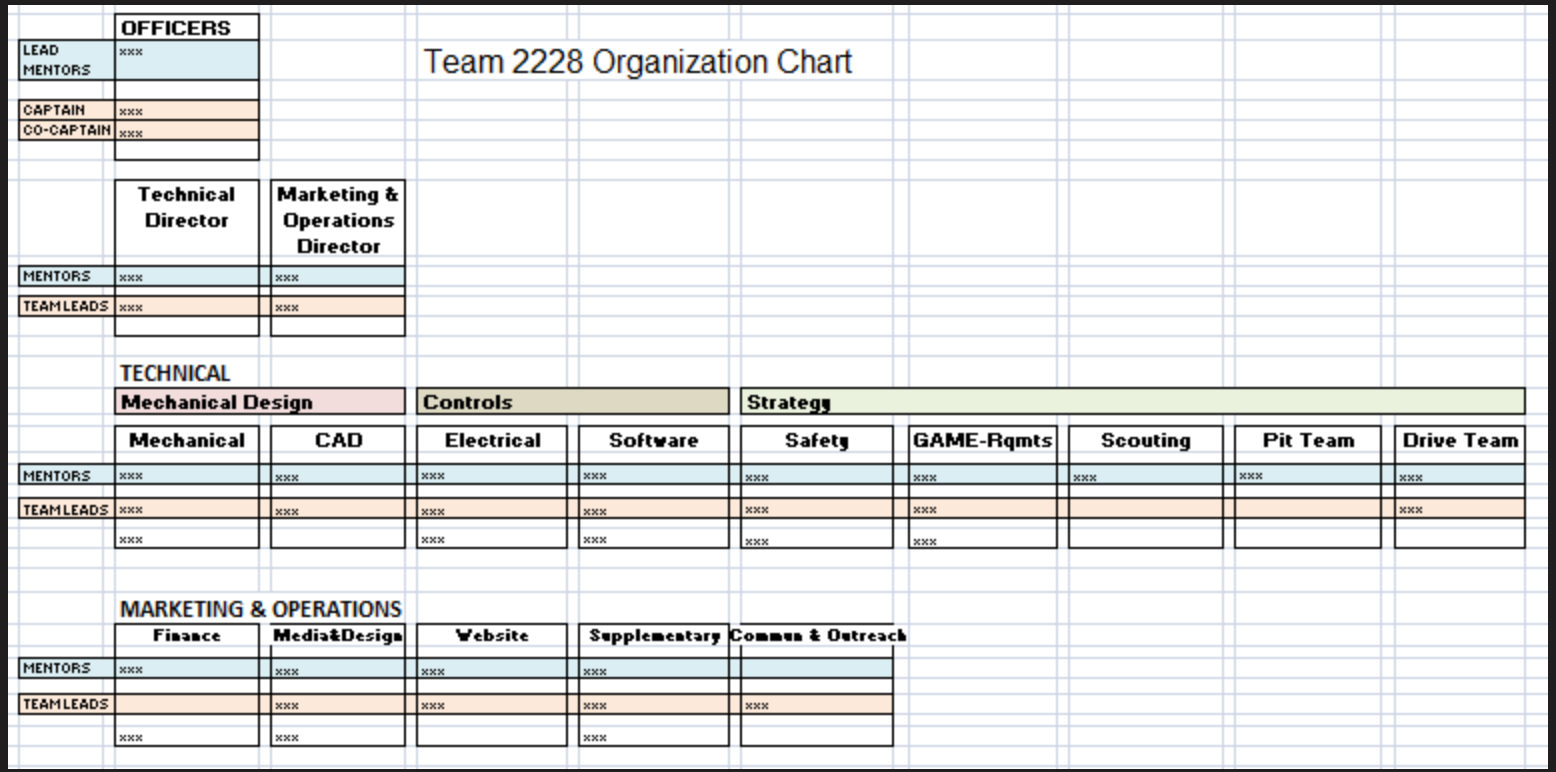
Sub-Teams

Tasks

See: Design Process Handbook

(Tribus – Diagram)

Team Resources-Organization Chart



Team 2228 Organization Chart

	OFFICERS
LEAD MENTORS	xxx
CAPTAIN	xxx
CO-CAPTAIN	xxx

	Technical Director	Marketing & Operations Director
MENTORS	xxx	xxx
TEAMLEADS	xxx	xxx

TECHNICAL

	Mechanical Design		Controls		Strategy				
	Mechanical	CAD	Electrical	Software	Safety	GAME-Rqmts	Scouting	Pit Team	Drive Team
MENTORS	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
TEAMLEADS	xxx	xxx	xxx	xxx	xxx	xxx			xxx
	xxx		xxx	xxx	xxx	xxx			

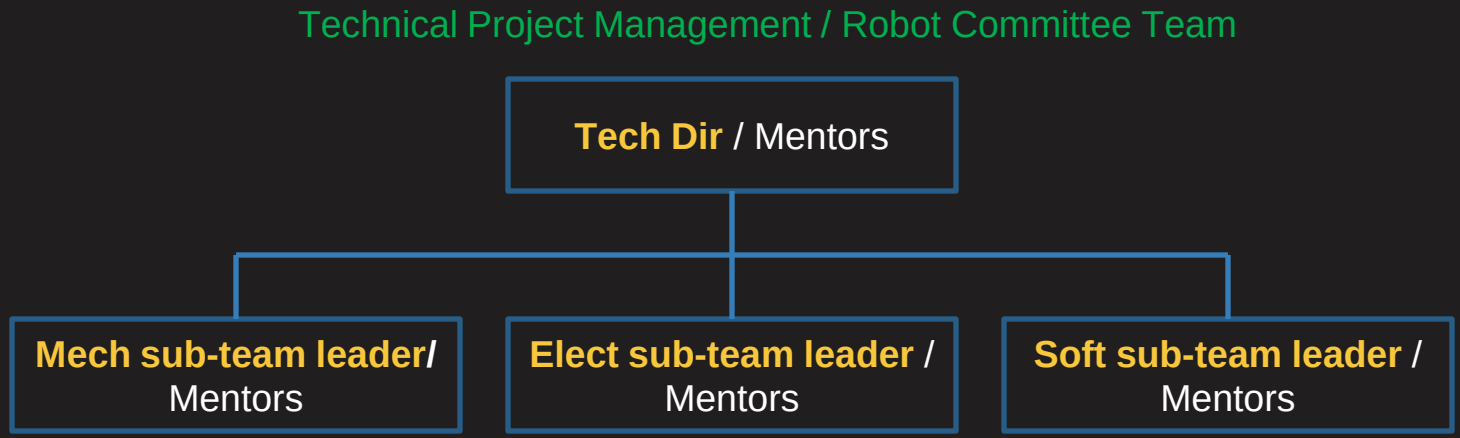
MARKETING & OPERATIONS

	Finance	Media&Design	Website	Supplementary	Commun & Outreach
MENTORS	xxx	xxx	xxx	xxx	
TEAMLEADS		xxx	xxx	xxx	xxx
	xxx	xxx		xxx	

Execution-Control: Management Team

Project Management Team

1. Monitors the design process progress against the project plan
2. Is responsible for detecting variances from the plan
3. Makes corrective action to put the project on schedule.



Execution-Control: Team Leader Meeting

Key roles of the Team Leader meeting:

- ❑ Managing the **scope** (what is going to be done)
- ❑ Managing the **schedule** (is work getting done when needed)
- ❑ Managing **risk** (what to do if things did not work as expected)

Responsibilities:

- ❑ The Technical Director is responsible for running this meeting.
- ❑ Team leaders provide status on sub-team members assigned tasks and work progress.

Results of the team meeting:

- ❑ **Clearly communicate** the goals that need to be achieved that day
- ❑ Provides a **common understanding** of progress and issues
- ❑ Forum to prevent scope creep.

Knowledge Challenge

1 What is the phrase used at the beginning of every meeting?

2 What are the four process steps of project management?

3 What are the three sides of the Execution “Iron-Triangle”?

4 What is Execution Control?

5 What are Resources?

Project Management Exercise

Develop FRC Plan for building our robot

Spacer

Part II

Team 2228 Leadership

Some Leadership Principles

“The only **things that distinguish every leader** from non-leaders are **motivation and action!**” ~Leadership – Getting it Done

“A **leader is** someone **who can get things done** through other people” ~Warren Buffet

“One of the most effective methods of leadership is "empowering" people to accomplish a desired goal” . ~Leadership – Getting it Done

Leadership is doing - Managing is making sure that things are done to plan correctly. A sub-team leader is responsible for both leadership and managing.

Sub-Team Leader - Project Management Skills

Planning:

- ❑ Setting Goals (Have the END in mind)
- ❑ Developing milestones (Start at the end and work backwards)
- ❑ Developing a work break down structure
- ❑ Time management – Task/Sub-Task time estimation

Execution:

- ❑ Sub-Team control (coordinate),
- ❑ Project controls(status reporting)

Risk management – problem solving

- ❑ Re-planning to work around project obstacles

Sub-Team Leader - Personal Skills

Responsibility:

- ❑ Responsible for both the **successes and failures** of sub-team
- ❑ Responsible for **producing project deliverables** per sub-team standards listed in handbooks (drawings, schematics, BOM, Software)

Commitment:

- ❑ It is important you follow through with what you agreed to do.
- ❑ **You need to lead by example: dress, behavior, work ethic, SAFETY**

Trustworthy:

- ❑ Sub-team members will only **trust you if you are open and honest**. You should also encourage the same from sub-team members

Sub-Team Leader - Interpersonal Skills

Delegation:

- Delegate work with **accurate instructions** – convey task deliverable expectations
- Empower sub-team members

REMEMBER: There is more than one way to approach a task or problem!

Motivation:

- Provide **Clear goals** - Conveying expectations for performance
- Provide tools, resources, training
- **Seek sub-team member's opinions** and let them be part of decisions
- You will be more effective at directing the team toward your goal if you pull **(lead by example-but don't do all the work)** rather than push
- **Providing feedback** regarding progress
- Have a **positive attitude** in solving problems that limit sub-team success

Sub-Team Leader - Interpersonal Skills

Sub-team Feedback:

- **Positive:**
  - Always look for positive actions
  - Give feedback right away
  - Make a big deal about it
  - Do it often
- **Negative:**
  - Find a private place –

    NEVER Provide Negative Feedback In Front Of Other Team Members
  - Be calm – be specific
  - Focus on actions not individual
  - Define positive steps
  - Listen to individual
  - If situation cannot be resolved – raise to mentor level

http://management.about.com/cs/peoplemanagement/ht/negativefb.htm
http://management.about.com/cs/peoplemanagement/ht/positivefb.htm

Listening Skills – Being a Good Listener

Tips on being a good listener:

- ❑ **Good Eye contact**
- ❑ **Good body language** – don't cross arms, sit properly
- ❑ **Minimize distractions** (looking out the window, fidgeting, side conversations)
- ❑ **HEAR** what **the other person** is saying, Put yourself in their shoes
- ❑ **Only speak to note that you are hearing them**
- ❑ **Only ask questions for clarification** - avoid yes/no questions
- ❑ **Summarize and restate** in different words
  - ➢ What I think I hear you saying is…"
  - ➢ "In other words, you think that…"
  - ➢ "I hear you saying…Is that right?"

Listening Skills – Blocks & Filters

Listening Blocks

- ❑ I must defend my position
- ❑ I'm looking for an entrance into the conversation
- ❑ I don't have time to listen to you
- ❑ I already know what you have to say
- ❑ I know what you should do

Listening Filters

- ❑ We are brought up not to listen
- ❑ Research has shown in general:
  - ➢ Women interested in reasons and feelings
  - ➢ Men interested in facts and results(solve problems)

Listening Skills - Response

Tips on Listening Response:

- ❑ Start in a friendly way
- ❑ Try to honestly see things from the other person's point of view
- ❑ Show Respect for the other person's opinions – only they can change their opinion
- ❑ Never say "You're Wrong."
- ❑ If you are wrong, admit it quickly and emphatically
- ❑ Be sympathetic with the other person's ideas and desires
- ❑ Do not give advice unless asked for
- ❑ Appeal to the Nobler motives (team standards, team expectations)

Presentation Skills

Presentation Content:

- ❑ Know your audience
- ❑ Information should be presented in a logical flow
- ❑ Use Graphics

Delivery:

- ❑ **NEVER Apologize** - Be confident in your presentation
- ❑ **Project your voice** at the audience not at the screen
- ❑ Avoid pause words (e.g. “Ah”) – silence is ok
- ❑ Avoid starting each idea with the same phrase – (e.g. “You Know”, “Like”)
- ❑ Use Eye Contact & Gestures
- ❑ Appropriate Q&A
  - ➢ **All questions are good questions**
  - ➢ Treat all questions as being important
  - ➢ If a question is not relevant put it on a parking lot list to address later

Knowledge Challenge

1 What are some tips on being a good listener?

2 How do you respond to questions?

3 What should you do if you are interrupted by someone else?

4 What should your presentation content contain?

5 What two things you should do in a presentation?

6 Finish: “All questions are …….”

Spacer

Project Management Example:

We will build a house:

1. Step One (Define) - Develop the scope:
   - The house will be a 2 story colonial with a basement and a garage

2. Step two (Plan) - Develop a milestone plan:
   - List the major steps in building a colonial house

3. Step two (Plan) - Develop a work break down structure
   - What are the tasks within each milestone?

4. Step two (Plan) - Estimate the time, and resources
   - How long will it take for each task
   - List what materials you need
   - **How many people are needed to do the tasks**

Project Management Example:

5. Step 3 (Do) - Execute
   - How do you execute?

6. Step 3 (Do) - Control
   - How do you know you are on schedule?
   - What do you do if you are not on schedule?

7. Step 4 (Review) – Close out project
   - How do you close out the project?

8. Step 4 (Review) - Lessons Learned
   - How do you do a lessons learned?

Planning Tools

There are two common graphical tools for project Planning:

- **Gantt Chart** (Developed in early 1900's by Gantt)
- **PERT Chart** (Program Evaluation and Review Technique)

A Gantt chart (Most Common):.

- **Tasks are individually listed** and tracked by percent complete
- **Easy to see the steps** required to complete a project
- This allows project to see and track tasks separately
- For a large project the chart can become difficult to read
- Works well for Milestone charting, large task charting

FRC Planning Guideline

This is nice, however, the best practices from other teams and FIRST have established much of this for us.

PLAN

- ❑ ***We have the game*** *rules, constraints, and a time limit*
- ❑ ***We have the design process*** *steps and design standards for deliverables*
- ❑ ***We have sub-Team Handbooks***

EXECUTE

- ❑ ***We have the best practices*** *from other teams for milestones*
- ❑ ***We have the robot structure*** *model for requirements / constraints organization*
- ❑ ***FIRST has provided a Robot structure for electrical and software design***

Revisions

V170716 – RJV, added knowledge challenge
V160811 – RJV; updated from 2015 lessons learned
V151110 – RJV; Original