DEFINING PROBLEMS, AND INCLUDING STAKEHOLDERS

WEEK 2, STUDIO DAY 1

AWARENESS TRAINING

There are many going afar to marvel at the heights of mountains, the mighty waves of the sea, the long courses of great rivers, the vastness of the ocean, the movements of the stars, yet they leave themselves unnoticed!

– SAINT AUGUSTINE

You, yourself,

as much as anybody in the entire universe,

deserve your love and affection.

-Buddha

Until you value yourself, you won't value your time.

Until you value your time, you won't do anything with it.

-M. Scott Peck

The place to improve the world is first in one's own heart and head and hands.

-Robert M. Pirsig

TODAY'S OBJECTIVE

1- Identify, breakdown, and define open-ended problem(s).

→ 1.2. Verbalize, review and refine the problem statement to reflect the design intent and project direction

2- Research the context and background of problems and solutions.

→ 2.4. Identify stakeholders and analyze their relevance to the problem.

→ 2.5. Analyze the problem from a user's and stakeholders' perspective.

INFORMAL PRESENTATIONS

4 minutes maximum each

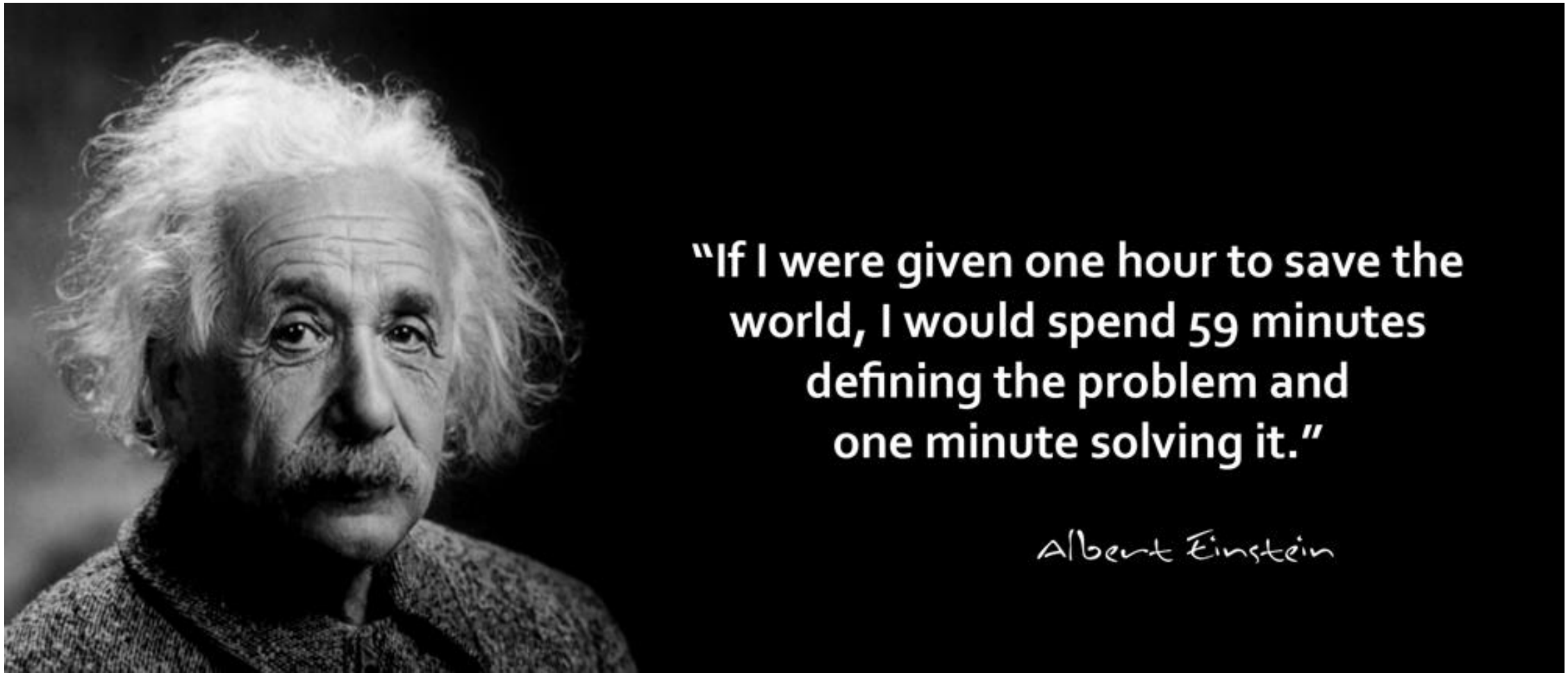
Define your problem

- Have one team member write it on the whiteboard
- Also write each team member's name and last initial

Present your 3 solutions (include hand sketches)

20 minutes

DEFINING THE PROBLEM



DEFINE THE PROBLEM

Problem definitions are constrained by the definer's:

- ***Understanding of the problem***
- ***Understanding of the stakeholders***
- ***Imagination***
- ***Available time/resources***
- ***Intentionality in approach***

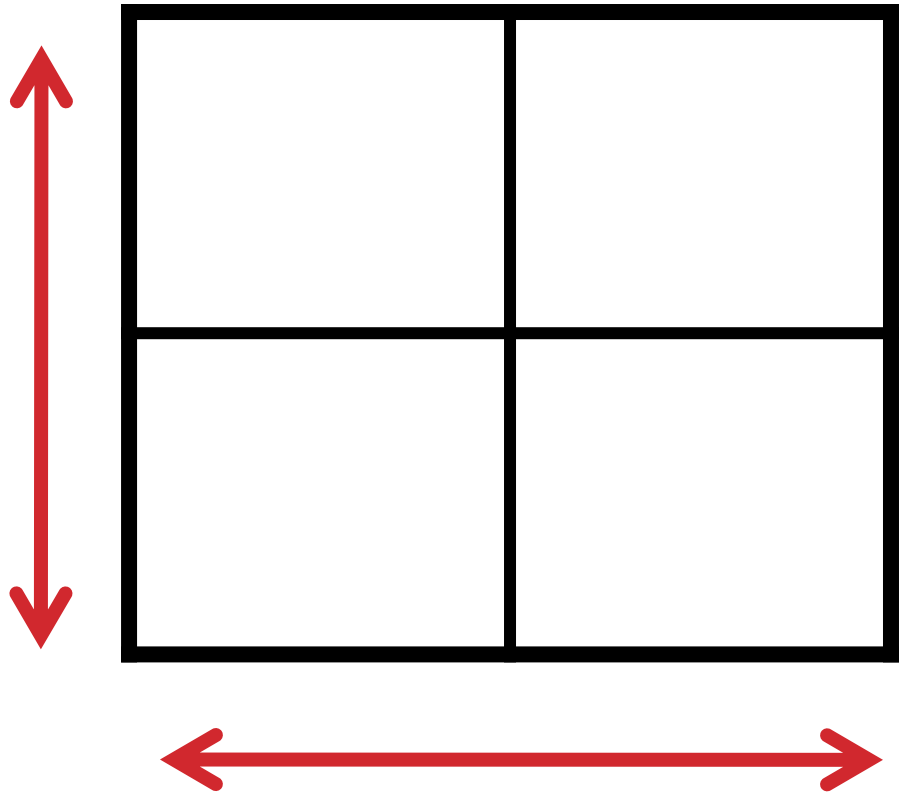
USEFUL TOOLS TO DEFINE THE PROBLEM

- **Be intentional**
- **Initially, go as broad as you can**
  - Substitute more general words
  - Consider the root causes of the problem
- **Narrow it down intentionally, based on constraints**
  - Which part of the larger problem can *you* help address?
  - What do you think are the most important parts of the problem?
- **State the problem statement as a question**
  - How might we…?
  - In what ways…?
  - OR state it as a difference between what *is* and *what might* or *should be…*
- **Come at it from the stakeholders' perspectives**
  - How might this look to the _____ ?
  - Interview users and stakeholders to understand their perspective

DEFINING THE PROBLEM

Definitions can be:

- **Narrower or Broader**
- **More technical or Less technical**



FINDING AND INVOLVING THOSE CLOSEST TO THE PROBLEM

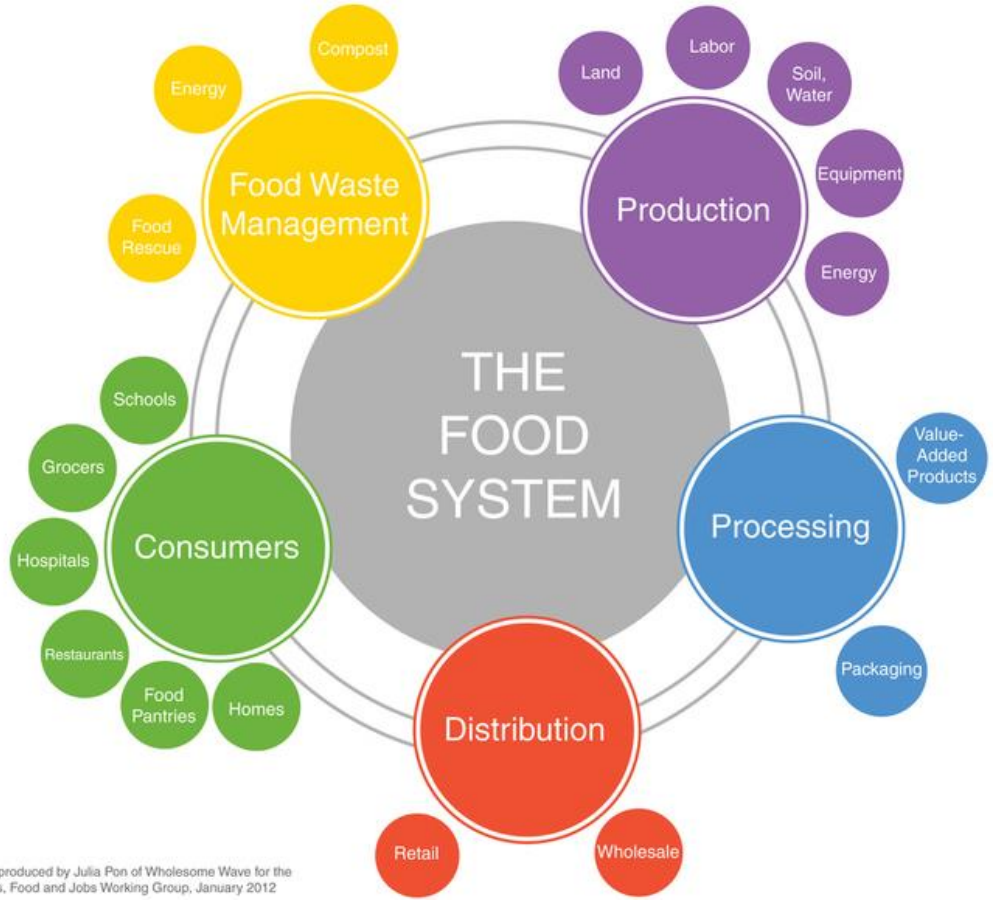
DEFINING/UNDERSTANDING STAKEHOLDERS

Who are the "stakeholders" of a challenge?

- Might also be referred to as "end users," "actors," "affectees"…

Let's walk through an example.

- Take your identified FOOD problem
- List out all the "stakeholders," or those affected by the problem



DEFINING/UNDERSTANDING USERS

Once you've thought of 8-12 stakeholders, what do you do next?

Analyze them to determine who should participate as you solve your problem.

→ Look for diverse perspectives.

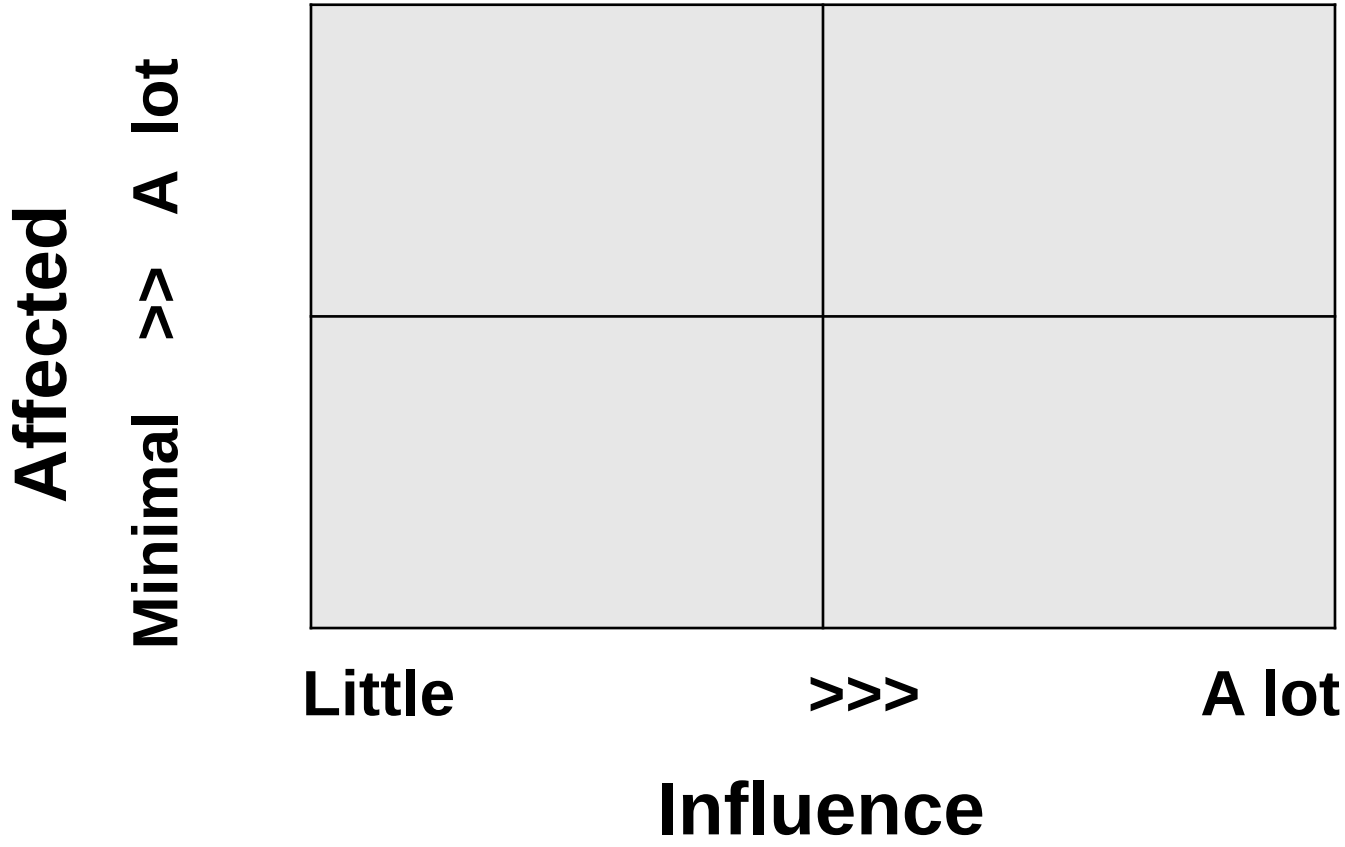
→ Intentionally involve non-engineers and scientists participation.

→ Move beyond 3rd party experiences to first hand experience

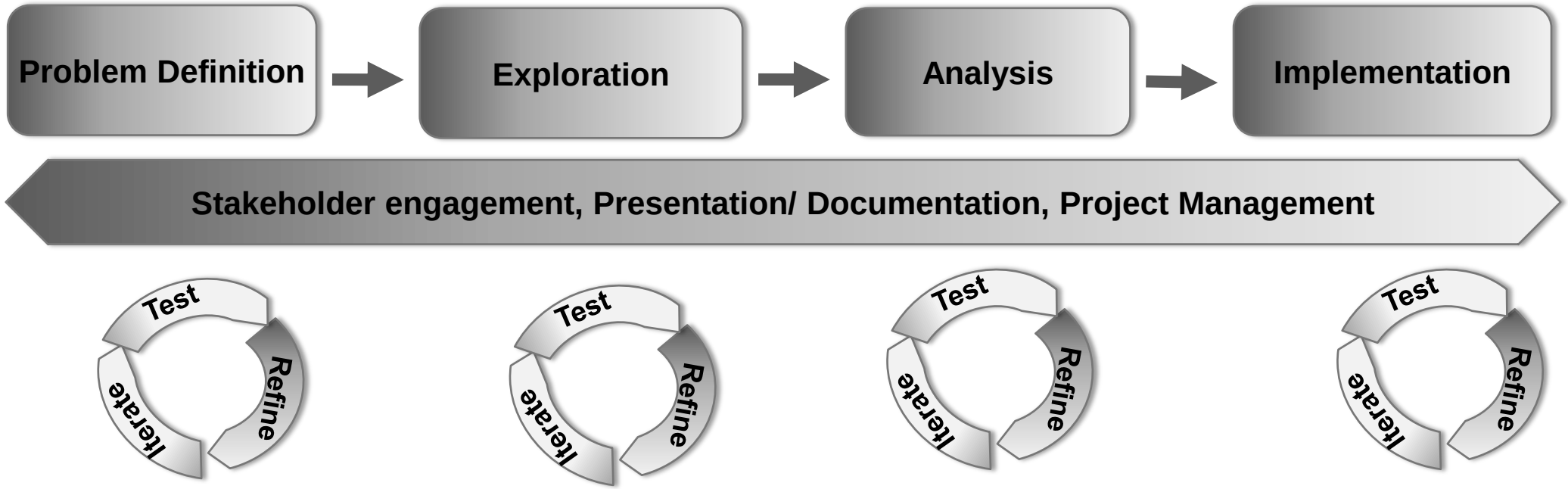
MAPPING STAKEHOLDERS – FOOD PROBLEM

- **One way to categorize users:**
  - **How affected are they by the problem?**
  - **How much influence do they have over the situation/ problem/ solution?**

5 minutes



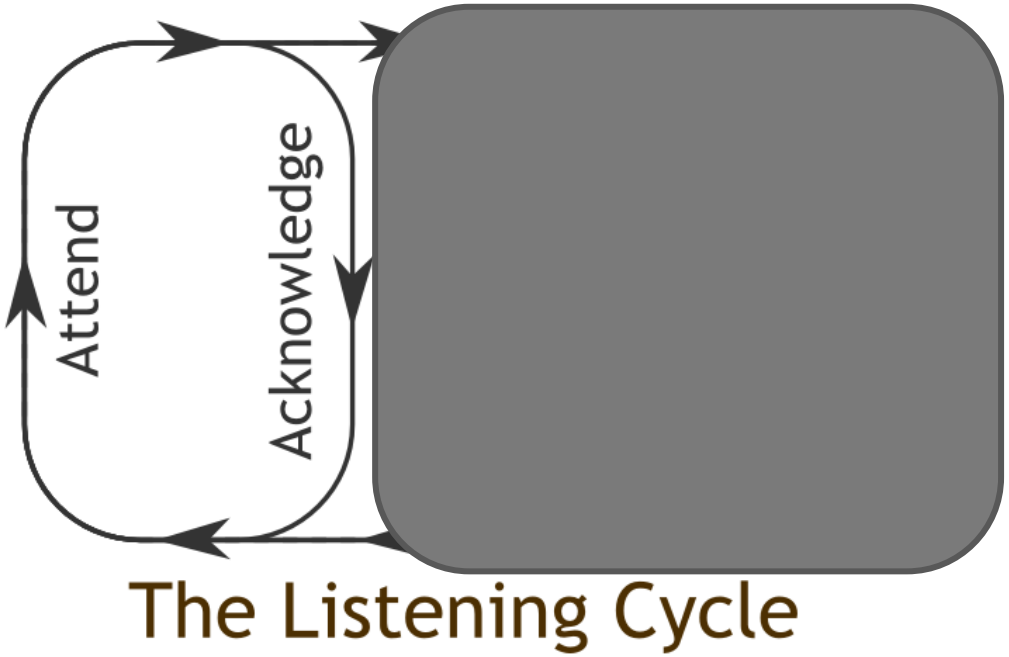
INVOLVING STAKEHOLDERS



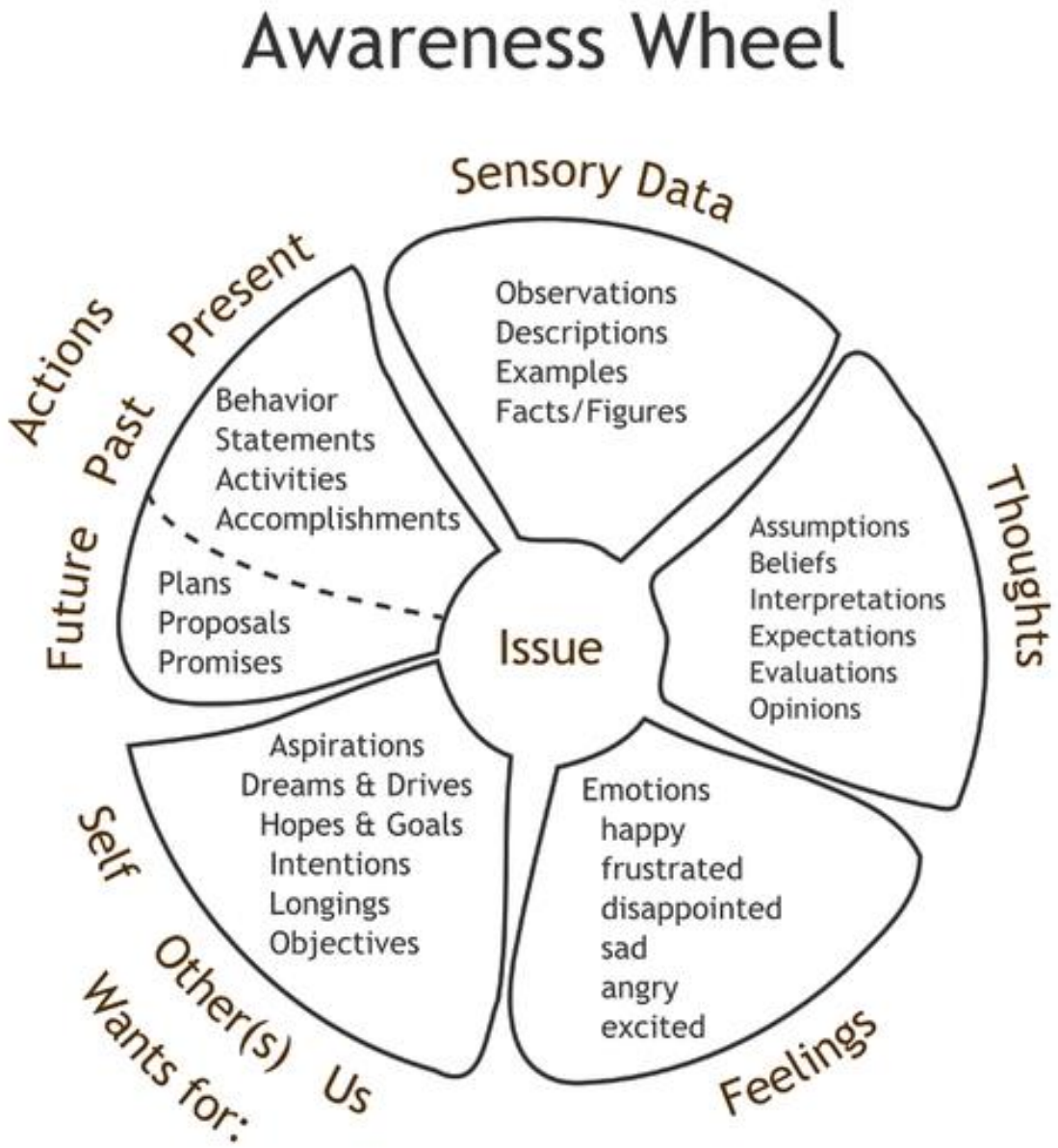
Be intentional about when to involve each one!
Interviewing will allow you to fill in gaps!

INTERVIEWING SKILLS

- **Be prepared**
- **Uninterrupted Attendance**
- **Awareness**



The Listening Cycle



PREPARING TO INTERVIEW

- Respect their time!
  - Do your research
  - Plan your interview
  - Prepare good questions
- Awareness of the ‘baggage’ you each bring in with you
  - They will be forming perceptions of you
  - They are the expert!
- Bring a notebook and take good notes, or a recording device (with permission)

- Be prepared to LISTEN INTENTLY…

EXTREME LISTENING

- Pair up
- Ask your question (…on next slide)
- DON'T SAY ANYTHING: acknowledge and attend
  - don't interrupt
  - be comfortable with the pauses in their answers
  - You can nod and smile…
  - For 2 minutes
- Swap! New question

EXTREME LISTENING – QUESTION 1

"Tell me about your favorite place and what you like about it"

2 minutes

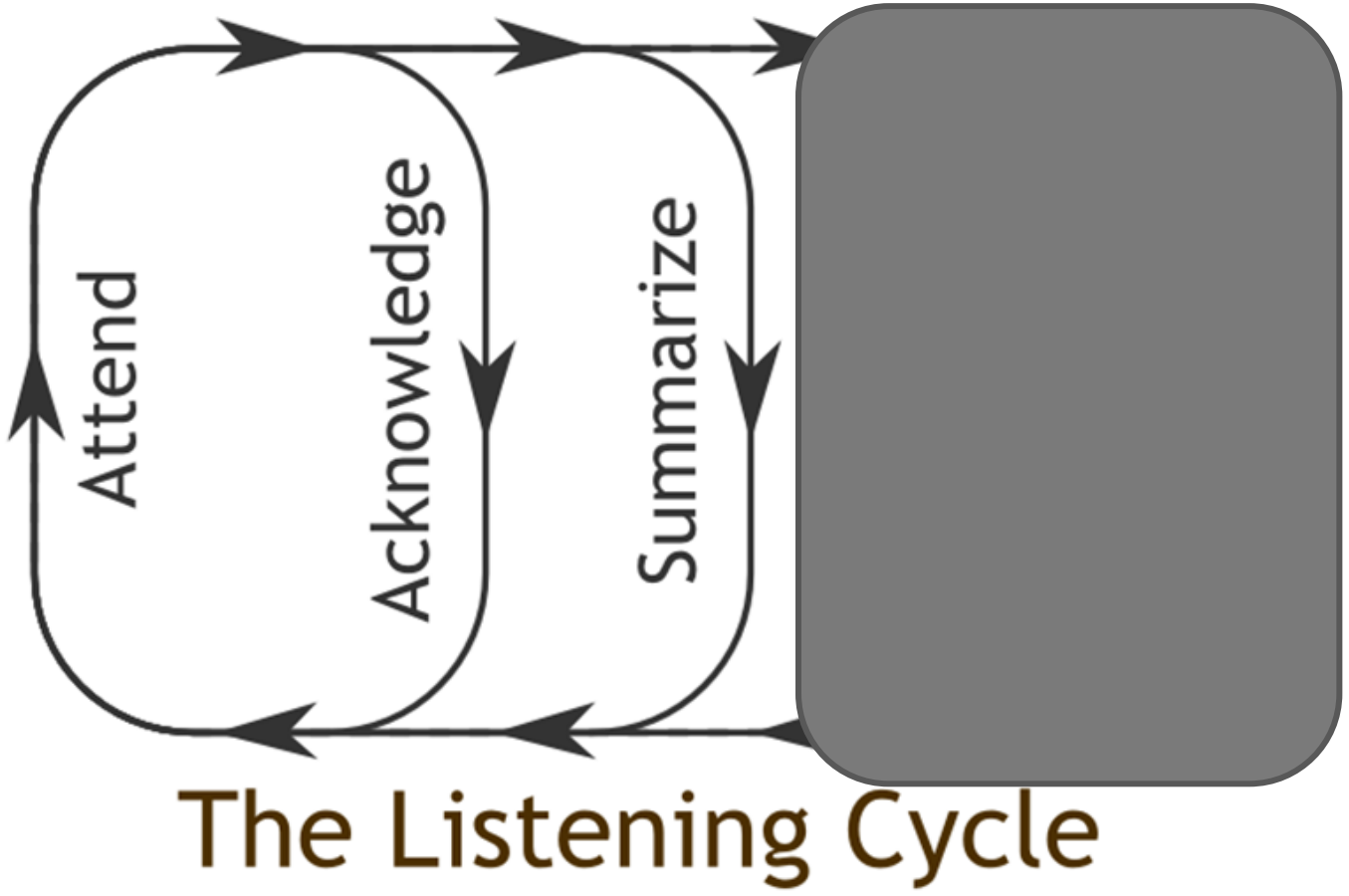
EXTREME LISTENING – QUESTION 2: SWAP

"Tell me about your least favorite place and what you don't like about it"

2 minutes

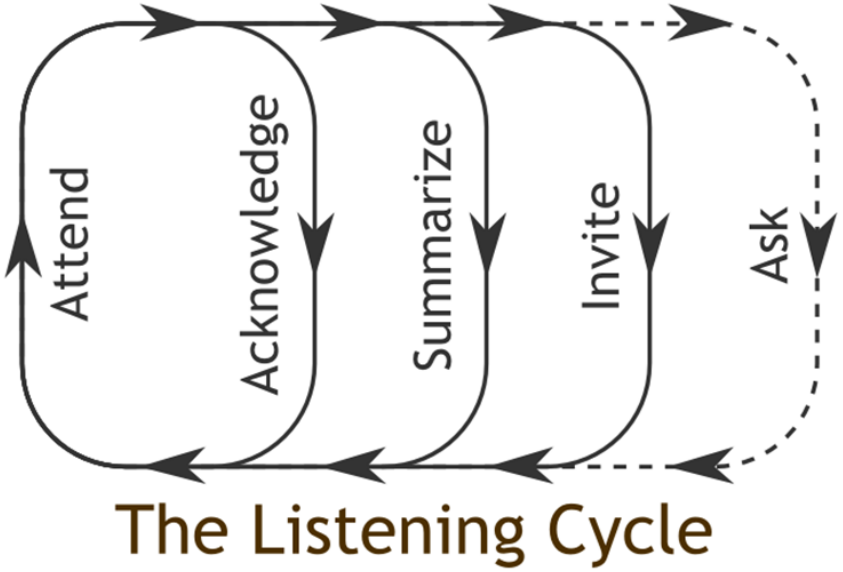
TAKING THE NEXT STEPS IN THE LISTENING CYCLE

Summarize what you heard.



The Listening Cycle

BE AN EXPERT INTERVIEWER
FINAL STEPS IN THE LISTENING CYCLE



The Listening Cycle

Hone your observation (awareness) skills

- Many times people say one thing, but do another
- Awareness of all forms of communication
  - Body language, tone, pace, volume

Invite them to share

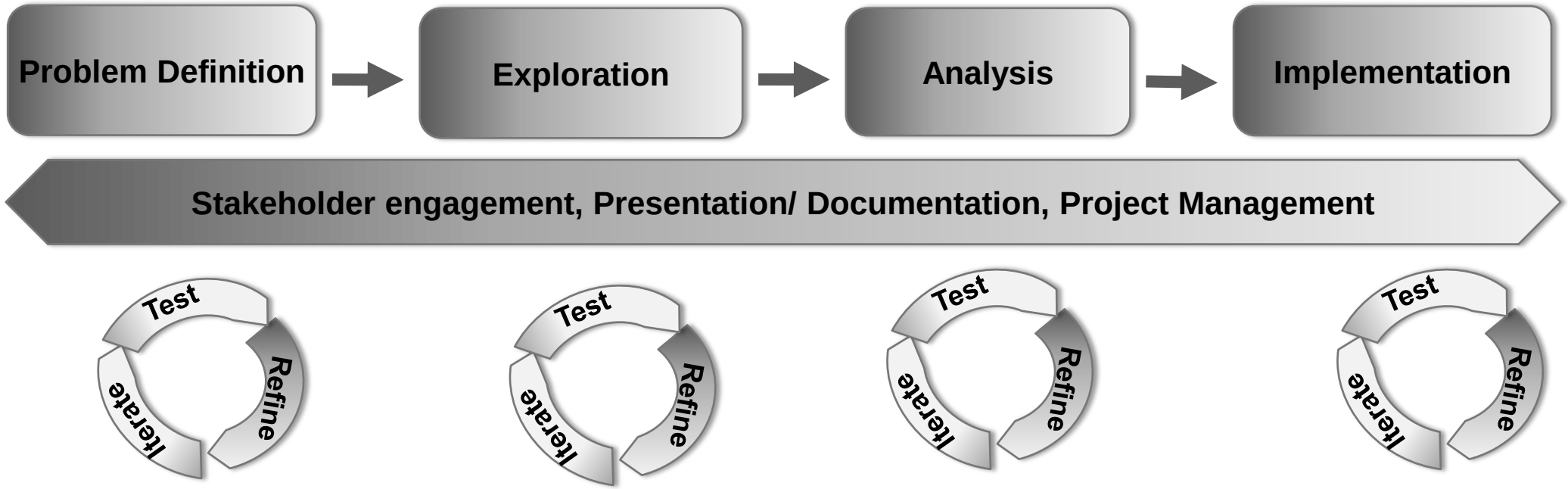
- Ask them to Show you or DRAW for your, or
- Bring props (rough and refined prototypes, sketches, etc.)
- Ask them for examples or stories

When enough time has passed for a follow-up,

- Ask open-ended questions, not many that have yes/no answers
  - **“Tell me more about…”**
  - **“Can you clarify….”**

DOCUMENT (in your design log)

INVOLVING STAKEHOLDERS



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EPICS 151 AND COURSE DELIVERABLES

Design EPICS I Weekly Schedule Fall 2016 V1 *(subject to change, check back)*

Date (Mon)	Week	Project Studio 1 (Monday or Tuesday, Engineering Annex)					Project Studio 2 (Wednesday or Thursday, Engineering Annex)					Graphics (Wed, Thu, or Fri, CT129)			
		Due	Pre-Class	Topic	Assigned	Learning Objective	Due	Pre-Class	Topic	Assigned	Learning Objective	Due (SW HW due Tue 11:59 PM on BB)	Topic	Assigned	Learning Objective
Aug 22	1		Welcome Email	Introduce course, instructor, design log, marshmallow challenge in mini-teams.	IDEO video	3.1		Buy Comp. Notebook IDEO Video Syllabus & Course Map	Where do problems come from? Bug lists; "Fix the classroom" exercise.	Buglist, problem definition, and solution, on food.	1.1		Field & Engineering Sketching: Why hand sketching? Design, lettering, Human Figure, Landscape	Sketchbook (I); Process with Lettered Instructions; Landscape with Human Figure (I)	7.2, 7.3, 7.5, 8.8
Aug 29	2		Food solutions; mini-teams with informal presentations	Part 1: Problem Definition Part 2: Stakeholders		1.2, 2.4, 2.5		5 Dysfunction Pre-reading	Team work part 1 (5 dysfunctions), Team Assignments	Videos, User Empathy Reflection (I)	4.1, 4.2	In-class: Process w/ Lettered Instructions; Landscape w/ Human Figure (I)	Field & Engineering Sketching: 1-Point & 2-Point Perspective, Isometric Pictorials	Perspective & Isometric Drawings (I)	7.1, 8.5
							Release Call For Proposals								
Sept 5	3	**Labor Day : NO EPICS 151 CLASS Mon 5th or Tues 6th** ***(note: you may have other classes in session Tuesday)***					Design Log Food Desert Reflection & Notes	Read Call for Proposals; empathy articles	Part 1: Project questions. Observing and Interviewing stakeholders. Part 2: System breakdowns	Problem Definition	1.3, 2.4, 2.5	In-class: Perspective & Isometric Drawings (I)	Field & Engg Sketching: Obliques, 3rd Angle Ortho Multiview Projections, Ellipses, Dimensioning	Dimensioning Packet (I)	7.1, 8.4, 8.8
Sept 12	4		Draft Problem Definition	Scholarly and Authoritative sources, and guided research. (Meet @ Arthur Lakes Library) Problem Definition Checkpoint	Attend 1-2 SME talks	2.1, 2.2	User Empathy Reflection (I)	Problem Definition	Part 1: Finalize Problem Definitions. Project questions. Part 2:Team contract.	Team Contract (T); Refined Problem Definition	1.1-3, 2.3, 4.1, 4.5		Intro to SolidWorks: setting up, interface, intro to CAD sketching, reading orthographic drawing	SolidWorks HW 1 (I)	8.1
Sept 19	5	Team Contract (T)	Refined Problem Definition;	Part 1: Idea generation. Part 2: Rapid prototyping - how and why. Workshop safety and tour.	Idea log peer feedback; Looks-like Prototype (I)	5.3, 3.2			Focusing and decision-making tools.	Project Proposal (T)	5.4	Blackboard: SolidWorks HW 1 (I)	SW: Basic part modeling; design intent, sketching tools, contours.	SW HW 2 (I)	8.9, 8.10
Sept 26	6		360 Review Reading	Part 1: Teamwork part 2, peer reviews, 360 reviews. Part 2: Presentation skills, and overview of Proposal		4.1-5, 6.1			Part 1: Project Planning Part 2: Why Sketching?	Project Plan (T)	5.1,5.2, 7.1?	BB: SW HW2 (I)	SW: Features and applied features.	SW HW 3 (I)	8.9, 8.10
Oct 3	7	Looks-Like Prototype (I); Project Proposal (T)		Team Presentations: Design Proposal; 4-5 "Looks-like" prototypes; pitch & justify best idea.		6.1, 3.2,		Teammate Evaluation	Part 1: conduct 360 review Part 2: confirm chosen design direction		4.1-5, 3.4	BB: SW HW3 (I)	SW: working with planes, multiple bodies, modeling (equation, variables, Boolean)	SW HW 4 (I)	8.9, 8.10
Oct 10	8			Part 1: Breaking down a big project: Subsystems and interfaces. Part 2: Works-like prototype: why / how, design of prototype tests.	Works-like prototype (T)	1.3, 2.3, 3.3, 3.5		Industry research, Design Log notes	Part 1: Subsystems approval and direction. Part 2: Risk assessment	Testing protocols and safety plan	1.3, 3.6	In-class: Dimensioning Packet (I), Sketchbook (I)	Field & Eng Sketching: Auxiliary Views, Section Views, Detail Views, More Dimensioning	Auxiliary, Section Views Packet (I)	8.6, 8.7, 8.8
17-Oct	9	**FALL BREAK – No class Mon 17th or Tue 18th**					Project Plan (T); Testing Protocol w/ Safety Plan		Part 1: Team time - subsystems, testing, prototypes. Part 2: Overview of susbystems report.	Subsystems Report (I)	3.4	BB: SW HW4 (I)	SW: sweep, shell, split, revolve, dome, patterns, ribs, holes.	SW HW 5 (I)	8.9, 8.10
Oct 24	10	Subsystem functionality testing (T)	*interview an engineer or scientist*	Part 1: Subsystems Testing Part 2: Technical writing		3.3, 3.4, 3.5, 6.3			Stakeholder feedback on works-like prototype. Coaching of design iterations.	Stakeholder Feedback	2.5, 3.1, 3.4	BB: SW HW5 (I)	SW: Assemblies and exploded views; smart fasteners.	SW HW 6 (I)	8.9, 8.10
Oct 31	11	Iterations based on feedback (T)		Subsystem testing.		3.3-5	Subsystems Report (I)		TBD Part 1 Embedding graphics, tables.Part 2- validating claims		6.2, 6.3	In-class: Packet Corrections (I); Auxiliary, Section Views Packet (I)	Field & Engg Sketching: Working Drawings; Field and Engg Sketching Mini-Exam		7.1-7.5, 8.1-8.9, 8.12
Nov 7	12	Interface testing iterations (T)		Prototype testing.		3.3-5			Overview of final report, tradeshow presentations.	Final Design Report (T); Trade Show Presentation (T)	5.6, 6.2, 6.3	BB: SW HW6 (I)	SW: Drawing sheet, dimensioning, Bill of Materials, design intent.	SW HW 7 (I)	8.6, 8.7, 8.8, 8.11, 8.12
Nov 14	13	Works-Like system testing (T)		Prototype testing.		3.3-5	Works-Like Prototype Testing Progress (T)		Part1: Wrap up prototype tests. Part 2: Materials list and cost estimation.		3.3-5, 5.5	BB: SW HW7 (I)	SW: Exam review, tips & tricks		8.9, 8.10
Nov 21	14	Works-Like system testing (T)		Part 1: Prototype testing (for teams not cleared yet) Part 2: Other catch-up		3.3-5	**THANKSGIVING – No class Wed 23rd, Thu 24th or Fri 25th**					**No GRAPHICS**			
Nov 28	15	Final Teammate Evaluation (I)		Part 1: Trade fair presentations and artifacts. Part 2: Supervised feedback: peer and team.		6.2, 4.4			Course evals. Supervised team time.		4.4	In-class: Design Log (I)	SolidWorks Exam. 180-minute CSWA exam is mandatory.		8.9, 8.10
Dec 5	16	Final Design Report (T); Trade Show Presentation (T)		Exhibit final solution; judging		6.2, 6.3			*EPICS 151 Final Competition 5-7:30 pm Wednesday, Location TBD*		6.2	**No GRAPHICS**			
Dec 19-Jan 10		**Exams & Winter Break**													

PRE-READING FOR WEEK 2, DAY 2:

FIVE DYSFUNCTIONS OF A TEAM

ASSIGNMENT:

Read this content.

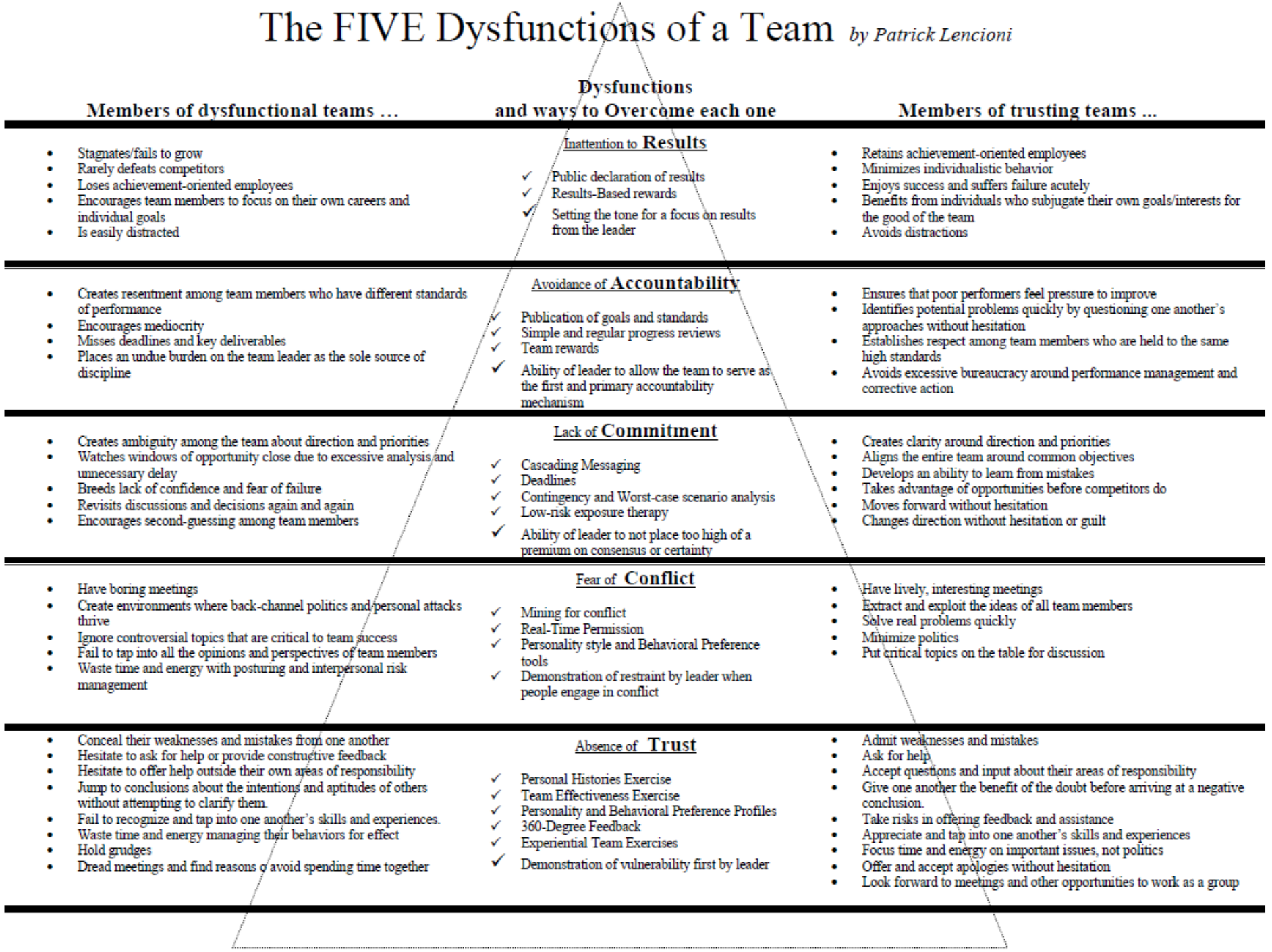
Think about and jot down experiences you have had in each dysfunction area (design log).

Match it to your Bug List of things you've experienced in a team that you don't like.

Link to hi-res copy:

https://drive.google.com/file/d/0BzQzzYuRx3ezNjlYbEl3M2RBb2c/view?usp=sharing

The FIVE Dysfunctions of a Team *by Patrick Lencioni*



Members of dysfunctional teams …	Dysfunctions and ways to Overcome each one	Members of trusting teams …
• Stagnates/fails to grow • Rarely defeats competitors • Loses achievement-oriented employees • Encourages team members to focus on their own careers and individual goals • Is easily distracted	Inattention to **Results** ✓ Public declaration of results ✓ Results-Based rewards ✓ Setting the tone for a focus on results from the leader	• Retains achievement-oriented employees • Minimizes individualistic behavior • Enjoys success and suffers failure acutely • Benefits from individuals who subjugate their own goals/interests for the good of the team • Avoids distractions
• Creates resentment among team members who have different standards of performance • Encourages mediocrity • Misses deadlines and key deliverables • Places an undue burden on the team leader as the sole source of discipline	Avoidance of **Accountability** ✓ Publication of goals and standards ✓ Simple and regular progress reviews ✓ Team rewards ✓ Ability of leader to allow the team to serve as the first and primary accountability mechanism	• Ensures that poor performers feel pressure to improve • Identifies potential problems quickly by questioning one another's approaches without hesitation • Establishes respect among team members who are held to the same high standards • Avoids excessive bureaucracy around performance management and corrective action
• Creates ambiguity among the team about direction and priorities • Watches windows of opportunity close due to excessive analysis and unnecessary delay • Breeds lack of confidence and fear of failure • Revisits discussions and decisions again and again • Encourages second-guessing among team members	Lack of **Commitment** ✓ Cascading Messaging ✓ Deadlines ✓ Contingency and Worst-case scenario analysis ✓ Low-risk exposure therapy ✓ Ability of leader to not place too high of a premium on consensus or certainty	• Creates clarity around direction and priorities • Aligns the entire team around common objectives • Develops an ability to learn from mistakes • Takes advantage of opportunities before competitors do • Moves forward without hesitation • Changes direction without hesitation or guilt
• Have boring meetings • Create environments where back-channel politics and personal attacks thrive • Ignore controversial topics that are critical to team success • Fail to tap into all the opinions and perspectives of team members • Waste time and energy with posturing and interpersonal risk management	Fear of **Conflict** ✓ Mining for conflict ✓ Real-Time Permission ✓ Personality style and Behavioral Preference tools ✓ Demonstration of restraint by leader when people engage in conflict	• Have lively, interesting meetings • Extract and exploit the ideas of all team members • Solve real problems quickly • Minimize politics • Put critical topics on the table for discussion
• Conceal their weaknesses and mistakes from one another • Hesitate to ask for help or provide constructive feedback • Hesitate to offer help outside their own areas of responsibility • Jump to conclusions about the intentions and aptitudes of others without attempting to clarify them. • Fail to recognize and tap into one another's skills and experiences. • Waste time and energy managing their behaviors for effect • Hold grudges • Dread meetings and find reasons o avoid spending time together	Absence of **Trust** ✓ Personal Histories Exercise ✓ Team Effectiveness Exercise ✓ Personality and Behavioral Preference Profiles ✓ 360-Degree Feedback ✓ Experiential Team Exercises ✓ Demonstration of vulnerability first by leader	• Admit weaknesses and mistakes • Ask for help • Accept questions and input about their areas of responsibility • Give one another the benefit of the doubt before arriving at a negative conclusion. • Take risks in offering feedback and assistance • Appreciate and tap into one another's skills and experiences • Focus time and energy on important issues, not politics • Offer and accept apologies without hesitation • Look forward to meetings and other opportunities to work as a group

PRE-READING CONT.

Q: Why are so many teams dysfunctional?

A: Because they are made up of human beings with varied interests and frailties. When you put them together and leave them to their own devices, even the most well-intentioned people will usually deviate toward dysfunctional, unproductive behavior. And because most leaders and managers are not schooled in the art of building teams, small problems are left untreated and spiral further and further into ugliness and politics.

Q: What is the worst behavior you've ever seen on a dysfunctional team?

A: Choosing just one is difficult. But if I had to select one, I would say it was a company where the CEO was unable to confront his direct reports about basic behaviors such as their blatant refusal to attend staff meetings and honor reporting structures. Ultimately, this led to the stifling of conflict around key issues, resulting in massive financial losses and scandal.

Author Q & A Pat Lencioni - *The Five Dysfunctions of a Team*

Q: What exactly are the five dysfunctions of a team?

A: Lack of trust. Team members are uncomfortable being vulnerable with one another, unwilling to admit their weaknesses, mistakes, or needs for help.
Fear of conflict. Team members are unwilling to engage in passionate, unfiltered debate around important issues.
Inability to commit. Team members fail to achieve buy-in around clear decisions and courses of action.
Unwillingness to hold one another accountable. Team members fail to confront one another around behaviors and deliverables that do not conform to agreed decisions.
Inattention to results. Team members put their individual needs for career development and recognition before the collective goals of the team.

Q: Why do you convey your messages through fables?

A: I believe that readers learn more through fables because they can relate to the characters and more easily internalize the messages. In addition, they are more apt to finish a book if they find it intriguing and fun to read. Finally, because I've had some experience writing screenplays, I enjoy the process of bringing my theories to life through interesting dialogue and character development.

Q: What advice do you have for someone struggling with a dysfunctional team?

A: If you're the leader of a team, go back and start by ensuring team members trust one another an are comfortable engaging in open conflict around issues. There is no substitute for trustÃƒÂ¢Ã¢â€šÂ¬Ã¢â‚¬Â• it begins with the willingness of team members to open themselves up one another and admit their weaknesses and mistakes.

In addition, any individual, whether an executive or a line employee, can impact a team in either a positive or negative way. Without holding one another accountable, even the best-intentioned team members can create dysfunctions within a team.

If you're not the leader of the team, find a way to get your leader committed to addressing the five dysfunctions. Or be prepared to take risks calling people on unproductive behaviors. If neither of these options are possibilities, think about finding another team.

COMING UP NEXT!

Team assignments!

Group skills – read posted material and write in design log ahead of class

Project announcement and user empathy experience assignment.