WELCOME TO EPICS 151 GRAPHICS
Field Sketching

- **Please Sign In & Pick up a Sketchbook Rubric** (affix to inside cover of your sketchbook)
- We will not be using the computers. **Please do not log in** to minimize distraction
- **Feel free to move your chairs** around the room, so you can see and interact

Please Begin to Prepare Your Sketchbook:

- On Front Cover: <Full Name>, EPICS 151 SECTION <Studio/Project Letter>, <Graphics 'L' letter>, <Semester> <Year>
- Please Rotate Your Sketchbook Top Down and Turn Over (Back Cover Now Opens to Left Like Normal Book)
- TABLE OF CONTENTS (On First Page, Maintain Throughout Semester)
- In the Lower Outer Corners, Number Subsequent Pages in Your Sketchbook 1 through 40
- Original Sketches: Drawn on Right Hand Pages
- Notes: Written on Left Hand Pages

WELCOME TO EPICS 151 GRAPHICS/LAIS 100
Field Sketching (Melissa Smetana)

Instructor: MELISSA SMETANA

Office Hours:
By Appointment, Thursdays and Fridays from 12:00 pm-1:00 pm, CTLM 129

Please Contact Me Anytime by Email: smetana@mines.edu

In the subject line, please include:
“EPICS 151, Section <Letter>, <Topic>”

Emails Sent Friday Evening Through Sunday Night
Will be Responded to on Monday

TA Office Hours Beginning Week 2: 4-8 PM M-F
MTF CTLM 129; WR CTLM 152

WELCOME TO EPICS 151 GRAPHICS/LAIS 100
Field Sketching (Nancy Nguyen)

Instructor: Nancy Nguyen

Please Contact Me Anytime by Email: nancynguyen@mines.edu

In the subject line, please include:
“EPICS 151, Section <Letter>, <Topic>”

TA Office Hours Beginning Week 2: 4-8 PM M-F
MTF CTLM 129; WR CTLM 152

WELCOME TO EPICS 151 GRAPHICS
Field Sketching (Yosef Allam)

Yosef Allam's Schedule Fall 2016 (Also available by appointment; Mondays and Fridays are generally meetings and research)												
Time	**Tuesday (Project)**			**Time**	**Wednesday (Graphics)**			**Time**	**Thursday (Project)**		
	Event	**Instructor**	**Location**		**Event**	**Instructor**	**Location**		**Event**	**Instructor**	**Location**
9:30-10:45am	**151 M**	**Yosef Allam**	**Engineering Annex Upstairs**	8-9:50am	**151 LA**	**Yosef Allam**	**CTLM 129**	9:30-10:45am	**151 M**	**Yosef Allam**	**Engineering Annex Upstairs**
	151 N	Robin Bullock	Engineering Annex Downstairs						151 N	Robin Bullock	Engineering Annex Downstairs
11am-12:15pm	**151 O**	**Yosef Allam**	**Engineering Annex Upstairs**	10-11:50am	**151 LB**	**Yosef Allam**	**CTLM 129**	11am-12:15pm	**151 O**	**Yosef Allam**	**Engineering Annex Upstairs**
	151 P	Robin Steele	Engineering Annex Downstairs						151 P	Robin Steele	Engineering Annex Downstairs
12:15-1pm	LUNCH			11:50am-1pm	LUNCH			12:15-1pm	LUNCH		
1-2pm	**OFFICE HOURS**	**Yosef Allam**	**Engineering Annex 104**	1-2:50pm	**151 LC**	**Yosef Allam**	**CTLM 129**	1-2pm	**OFFICE HOURS**	**Yosef Allam**	**Engineering Annex 104**
2-3:15pm	**151 S**	**Yosef Allam**	**Engineering Annex Downstairs**					2-3:15pm	**151 S**	**Yosef Allam**	**Engineering Annex Downstairs**
	151 T	Alina Handorean	Engineering Annex Upstairs	3-4 pm	**OFFICE HOURS**	**Yosef Allam**	**Engineer Annex 104**		151 T	Alina Handorean	Engineering Annex Upstairs
3:15-5pm	**OFFICE HOURS**	**Yosef Allam**	**Engineering Annex 104**	4-5 pm	**TA TRAINING**	**Yosef Allam**	**CTLM 129**	3:15-5pm	**OFFICE HOURS**	**Yosef Allam**	**Engineering Annex 104**

Instructor: Dr. Yosef Allam

Email: yallam@mines.edu

In the subject line, please include:

“EPICS 151, Section <Letter>, <Topic>”

TA Office Hours Beginning Week2: 4-8 PM M-F

MTF CTLM 129; WR CTLM 152

TODAY

- Introductions
- Learning Objectives
- Course Deliverables
- Why do we sketch?
- Identify Your Work!
- Interrelationship: Sketching, CAD and the Design Process (illustrated)
- Systems Thinking
- Lettering
- Elements of Design
- Human Figure
- Sketching Techniques
- Landscapes - foreground, middle ground, background
- **Homework Summary**
- **Rubrics Summary**
- **Resources**

SEMESTER LEARNING OBJECTIVES FOR EPICS GRAPHICS

7 - Visually depict ideas to teammates, supervisors, and stakeholders through the use of field sketching for the purposes of communication as well as idea development and development through iteration.

8 - Model and communicate formalized design ideas through the use of standardized engineering graphics conventions as applied to engineering sketching and computer-aided design/solid modeling software.

FULL EPICS LEARNING OBJECTIVES: https://docs.google.com/spreadsheets/d/19XAVW_yVpUE_aav6DE7cKGfWpa08FwQgPujBFvb-mKo/edit#gid=356595662

LEARNING OBJECTIVES (Today)

7 - Visually depict ideas to teammates, supervisors, and stakeholders through the use of field sketching for the purposes of communication as well as idea development and development through iteration.

7.2 Sketch landscapes and backgrounds to provide context for ideas and designs.

7.3 Sketch the human figure to provide the context of human interaction for ideas and designs.

7.5 Sketch processes and procedures and sequences using nodes and links and universal symbols.

8 - Model and communicate formalized design ideas through the use of standardized engineering graphics conventions as applied to engineering sketching and computer-aided design/solid modeling software.

8.8 Apply the conventions of lettering, dimensioning, threads, hole, and other notations as necessary to annotate an engineering drawing.

FULL EPICS LEARNING OBJECTIVES:
https://docs.google.com/spreadsheets/d/19XAVW_yVpUE_aav6DE7cKGfWpa08FwQgPujBFvb-mKo/edit#gid=356595662

SKETCHING DELIVERABLES

→ **5% of Your Overall Course Grade (including checkpoints)**

→ **Both Hand Drawn and CAD Graphics Will Be Graded Elements of Your Written and Oral Deliverables for Your EPICS 151 Course Project**

1. Sketchbook (**25%** of Overall Field Sketching Grade)

Attach/Affix Rubrics to Inside of Cover

Sketch Every Day for 5-10 Minutes in Your Design Log Outside of the Classroom

- Sign, date and title each sketch; one page per sketch

Apply the Skills You Learn from Your Field Sketching Units:

- Sketch What You See, Sketch What You Think Up
- Perspective and Vanishing Points
- Various Views, Details, Sections, Dimensions, and Working Drawings

2. Attendance & Participation (**25%** of Overall Field Sketching Grade)

Please arrive to class, sign-in, and actively participate.

3. Homework (**25%** of Overall Field Sketching Grade)

Due at the Beginning of Class

Late Work Will Be Accepted Up To One Week Late AND Will Receive a 40% Deduction. All Work Will Need to be Completed to Support Your Final Exam and Sketchbook Submission Week 10 (September 1-3, during your registered section).

4. Final Exam (**25%** of Overall Field Sketching Grade)

EPICS COURSE SCHEDULE:

https://docs.google.com/spreadsheets/d/1RGl3qcnmKD56p_XRXogGySGA0dT0CS_UCRlccZyf13s/edit#gid=30775436

WHY DO WE SKETCH?

- **Convenience**
- **Speed**
- **Visualization**
- **Communication**
- **Ideation:** To form ideas or concepts (e.g., creating, imagining, brainstorming, planning, troubleshooting)
- **Design Development & Iteration Process**
- **Document Observations in the Field**
- **Create a Design Record**
- **Launchpad to Computer Aided Design (CAD)** (e.g., SolidWorks, AutoCAD, Sketchup)
  - Easy to want to jump in to 3-D modeling
  - Cheaper, quicker and more effective to sketch a concept first
  - Model after initial refinement of the concept

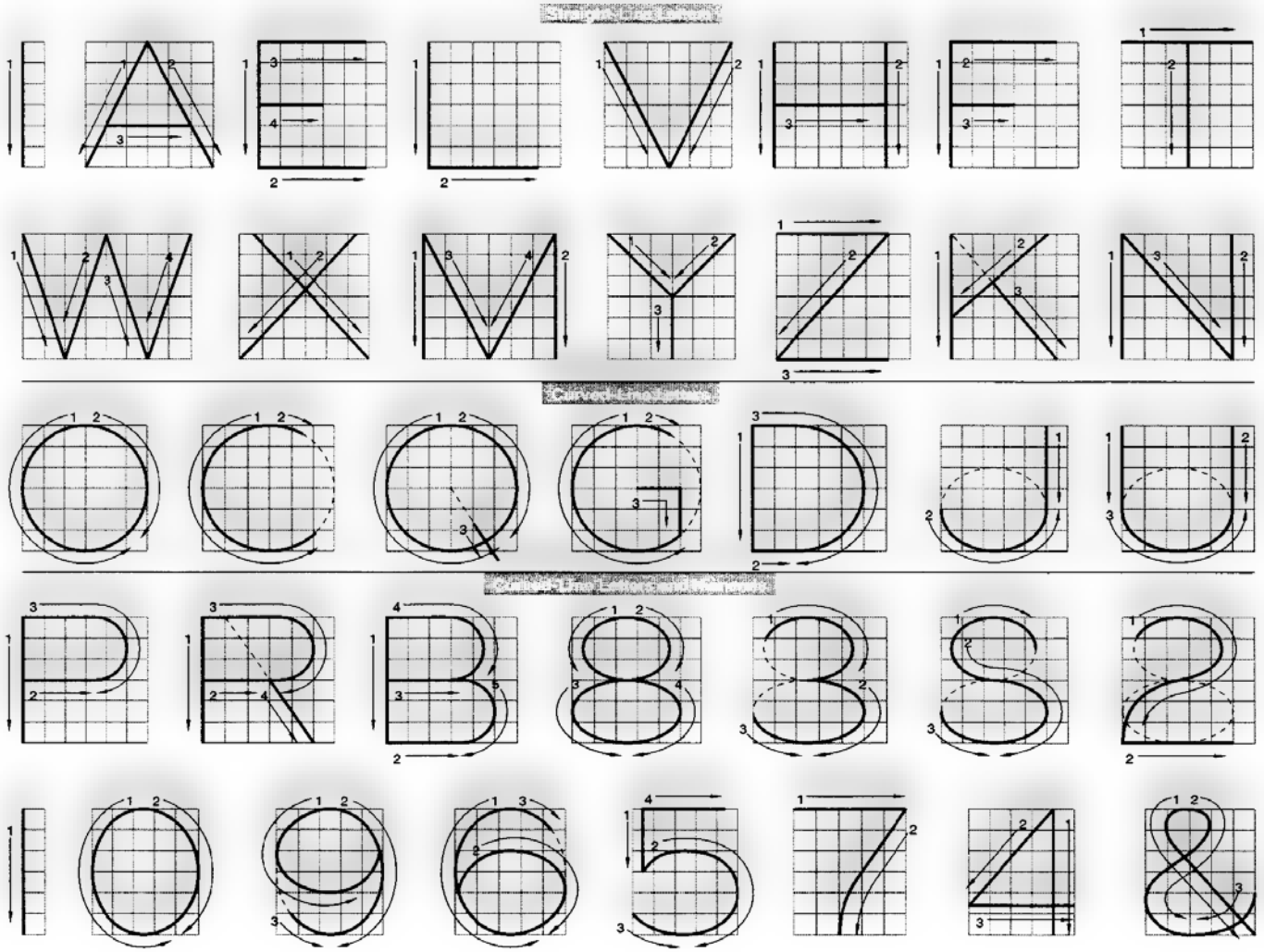
→ **Both hand drawn and CAD graphics will be graded elements of your written and oral deliverables**

IDENTIFY YOUR WORK!

- **Label: Name, Date and Title**

  On Each and Every Page (Sketches, Lettering, Notes, Etc.)
- **Team?**
  - On the sketch, identify everyone who participated
  - Sign the sketch medium
  - Take a photo/copy/scan to create a design record
- **Why is this important? Provides Clarity and Context**
  - Tells us whose work we're looking at
  - Helps protect intellectual property
  - Supports mental recall
  - Establishes a timeline
  - May help to resolve disputes
  - Reinforces decisions

LETTERING GUIDELINE



Notice the Proportion of Width vs. Height

LETTERING GUIDELINES

- Treat each letter as an individual drawing constructed of crisp lines.
- Should be indistinguishable from other classmates.
- Hold your pencil at approximately a 60 degree angle to the paper
- Practice following the stroke guide using a **pulling motion**

NOTE: For a left-handed person, the direction of the vertical strokes and curvilinear strokes remains the same; however, the direction of horizontal strokes reverses

- Letters need to be uniform in style, height, verticality, thickness of stroke

Master technique and consistency of uniformity
before stylizing. Stylizing will occur naturally with practice.

IN CLASS ACTIVITY: Lettering

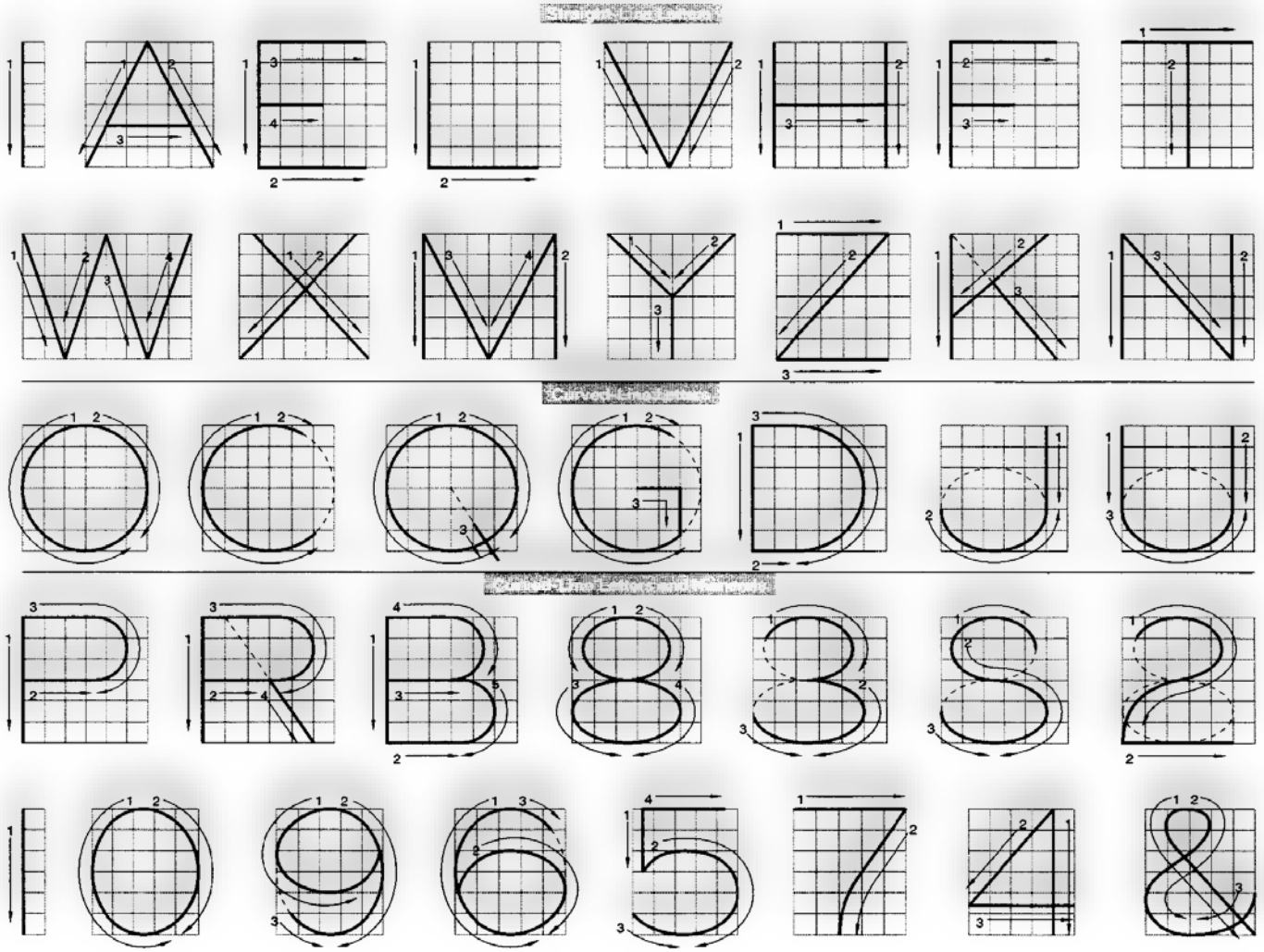
Please, 2 volunteers at each of the dry-erase boards

Volunteers - In Your Sketchbook Write

In Class Activity: Lettering Volunteer, your name, and today's date

5 minutes

LETTERING GUIDELINE



Notice the Proportion of Width vs. Height

COLORADOSCHOOLOFMINES

LETTERING HOMEWORK

Lettering Guide Replication

Draw each letter, number, and the ampersand symbol at 1/4” and 1/2” scale (in your sketchbook)

THE DESIGN PROCESS

Hardest Part & Most Critical

Ideation

Development of Documentation and Prototyping

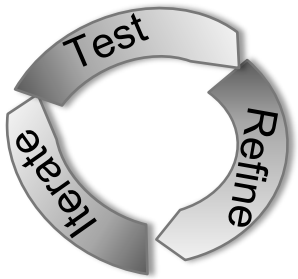
Built and/or Implemented

Problem Definition → Exploration/Conceptualization → Analysis → Execution/Implementation

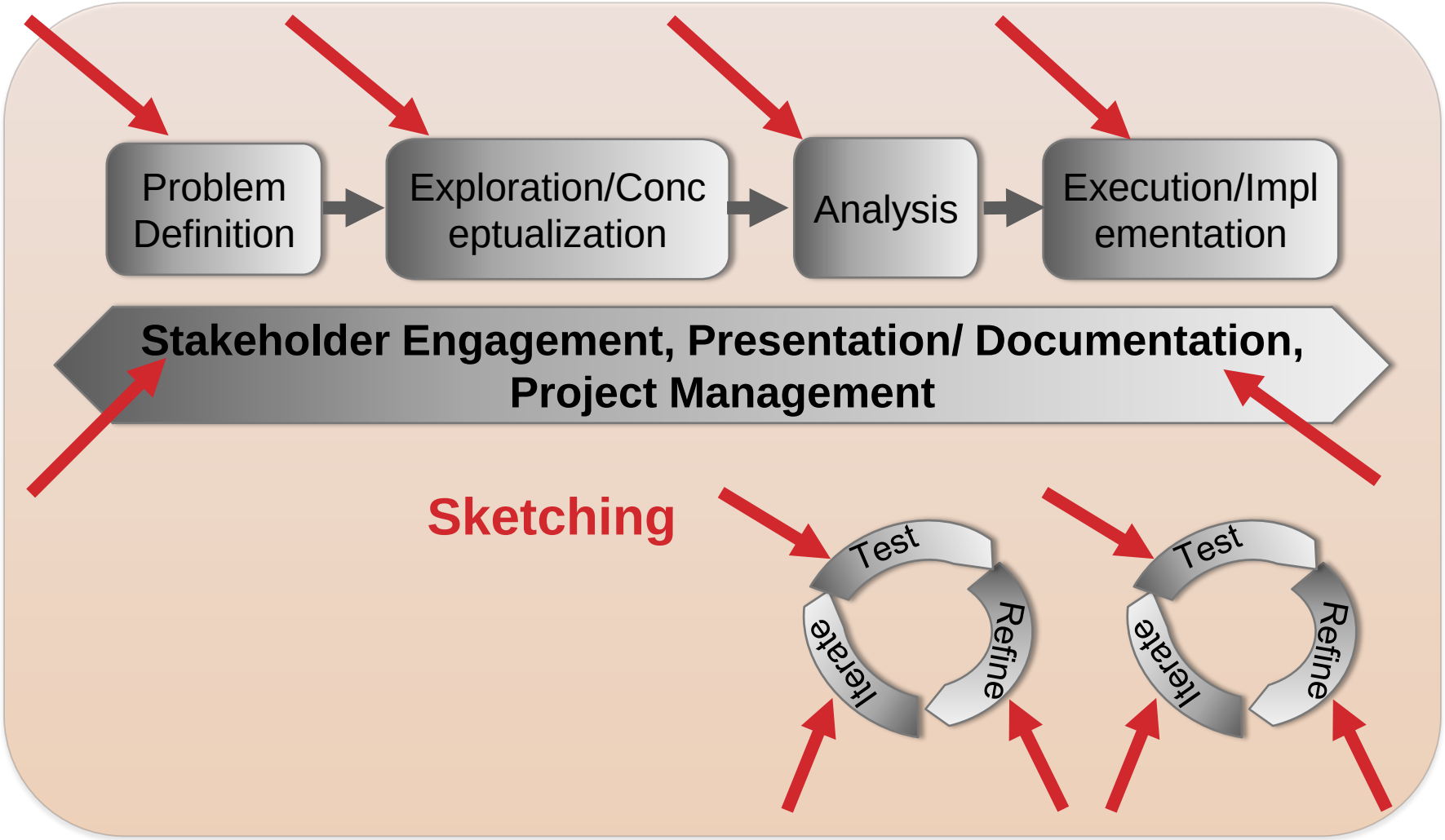
Stakeholder Engagement, Presentation/ Documentation, Project Management

Collaboration

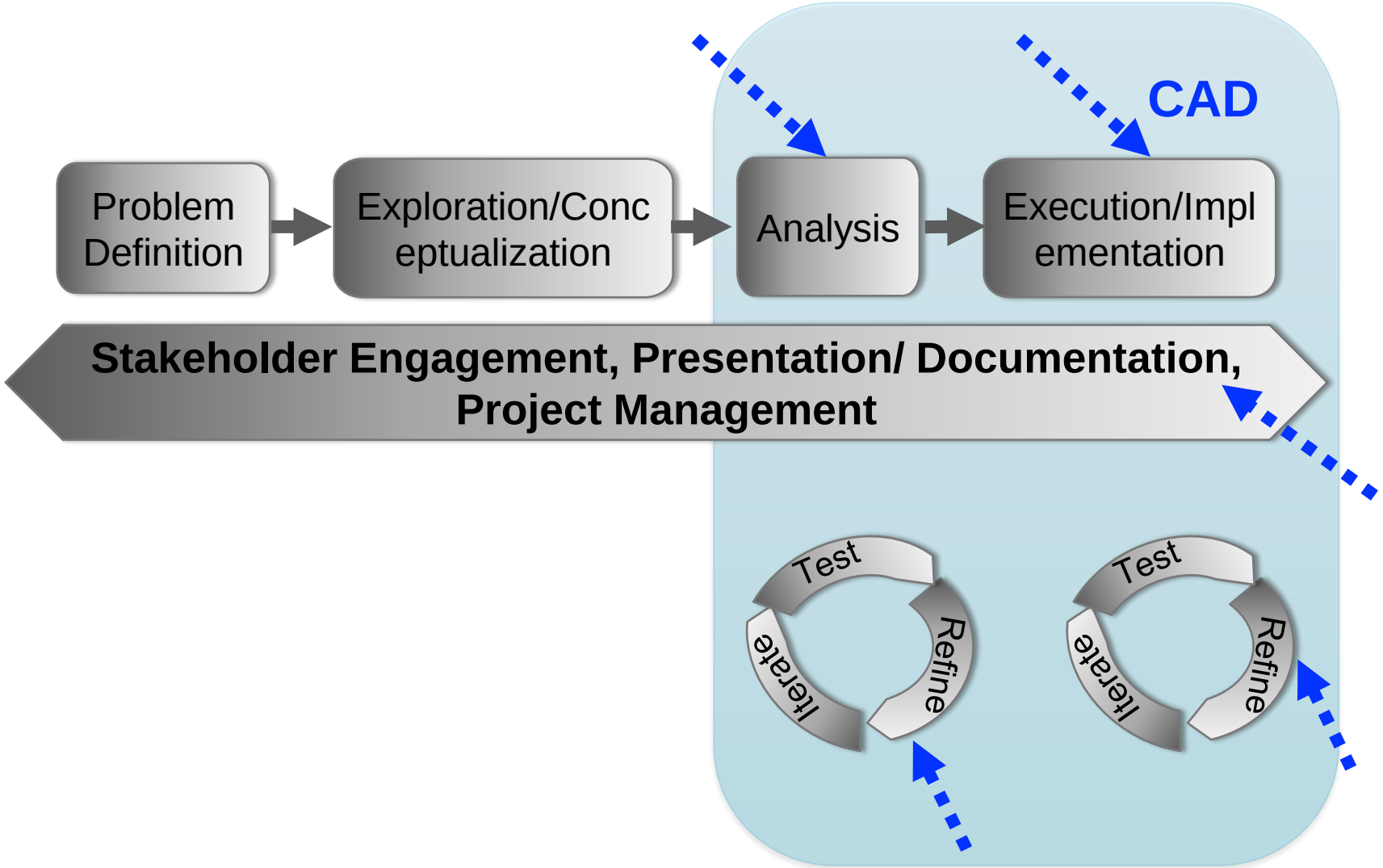
"Play Nice With Others"



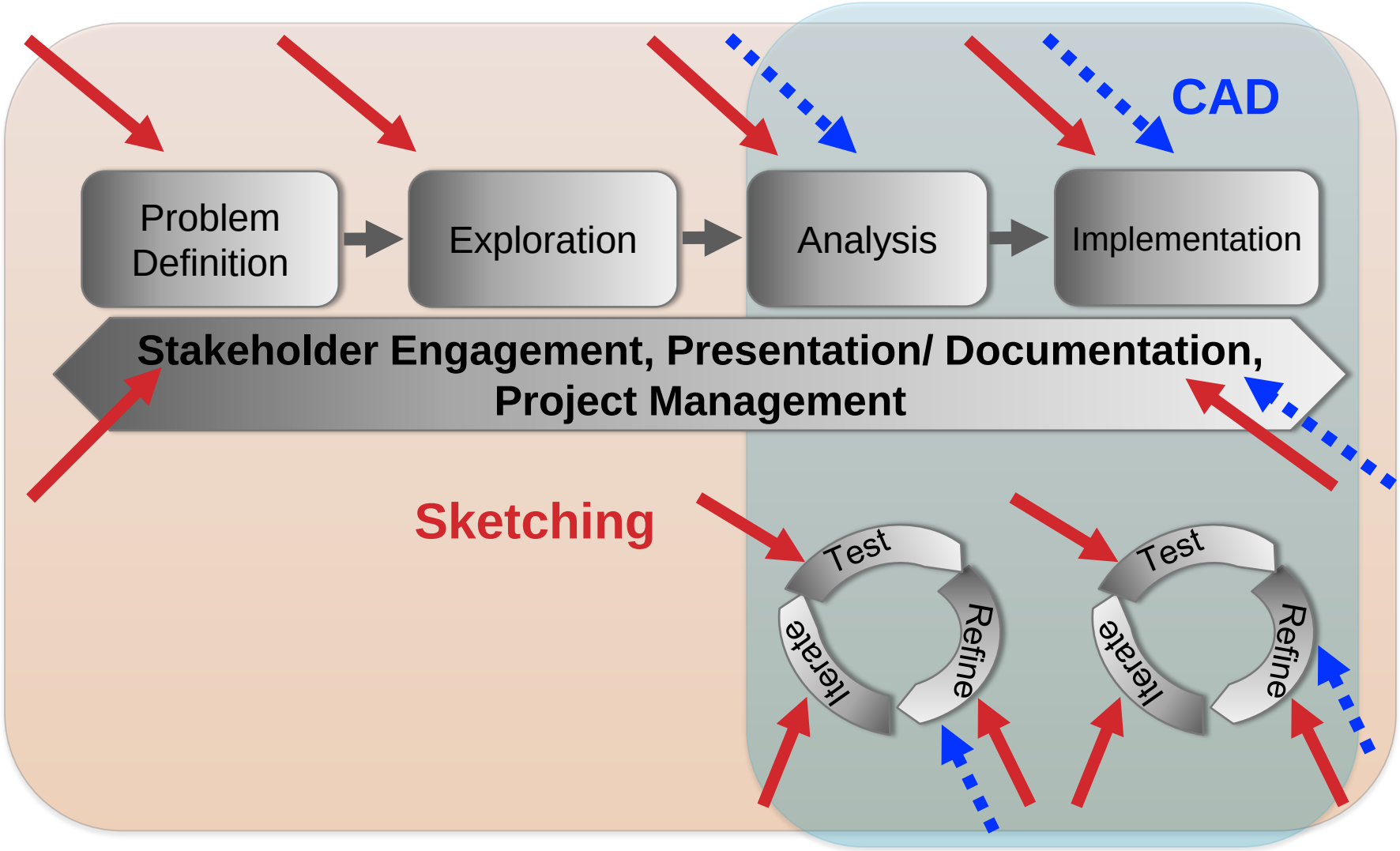
INTERRELATIONSHIP
Sketching and the Design Process



INTERRELATIONSHIP
CAD and the Design Process



INTERRELATIONSHIP
Sketching, CAD and the Design Process



IN CLASS ACTIVITY:
How to Make Toast

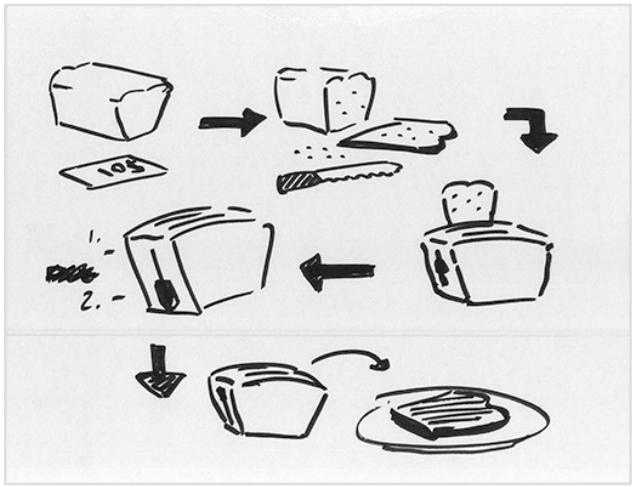
Please, 2 volunteers at each of the dry-erase boards

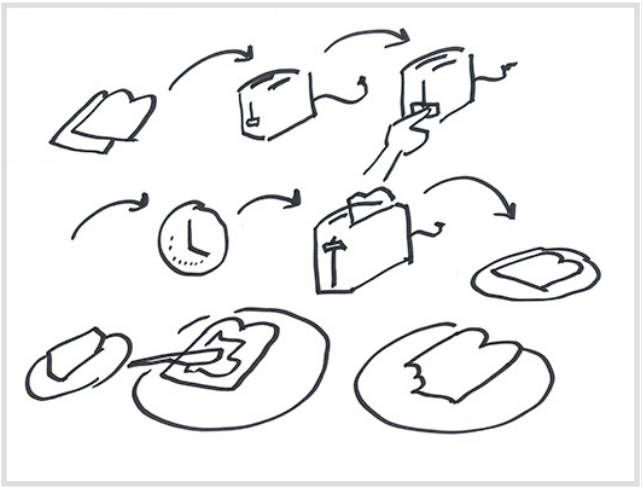
Volunteers - In Your Sketchbook Write

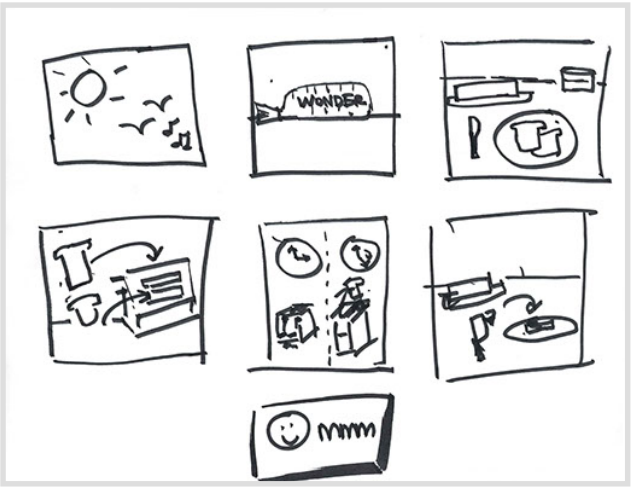
In Class Activity: How to Make Toast Volunteer, your name, and today's date

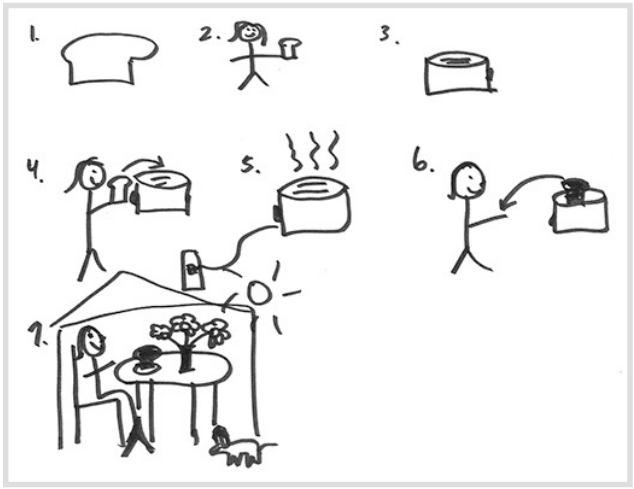
2 Minutes

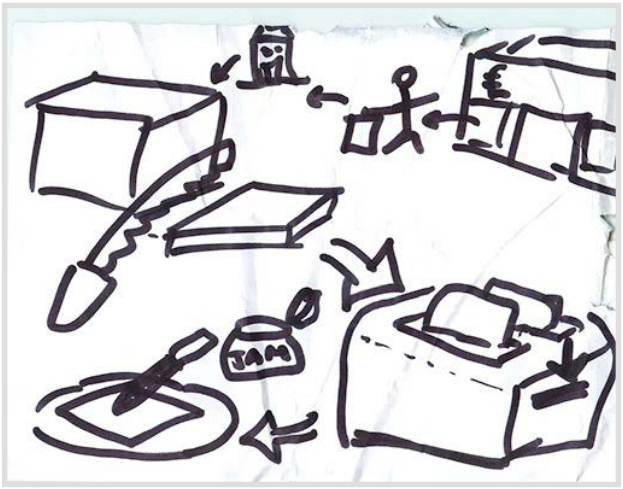
IN CLASS ACTIVITY: How to Make Toast











For more examples: http://www.drawtoast.com/gallery.html#.V21cV1evVFI

IN CLASS ACTIVITY: Process Depiction

1. Watch the Video “Draw How to Make Toast: A Simple and Fun Introduction to Systems Thinking” (http://www.drawtoast.com/index.html#.V0TPlVevXFI)
2. It is recommended that you take notes while watching the video.
3. On a new, blank sheet in your sketchbook, identify the process “How to Assemble a Flashlight. Please label your work!
   (Option: This activity may be done independently with reconfigurable Post-It! Notes, then combined and reconfigured in student teams, to be recorded in sketchbooks after the final process has been iterated and finalized and photographed by teammates.)

   Title: **How to Assemble a Flashlight; Name(s): J. Doe; Date: MM/DD/YY**
4. Think about and identify the systems and sub-systems (Hint: Start to ID Parts)

5 Minutes

IN CLASS ACTIVITY: Process Depiction

5. As an individual, **in your individual sketchbook and with words, outline/map 6-8 steps/actions** necessary to assemble the flashlight.

Verify Parts → Asm. A/B → Asm. A/B to C → Oil Parts D&E → Insert D into E → Insert D/E to A/B/C → Asm. A/B/C/D/E to F

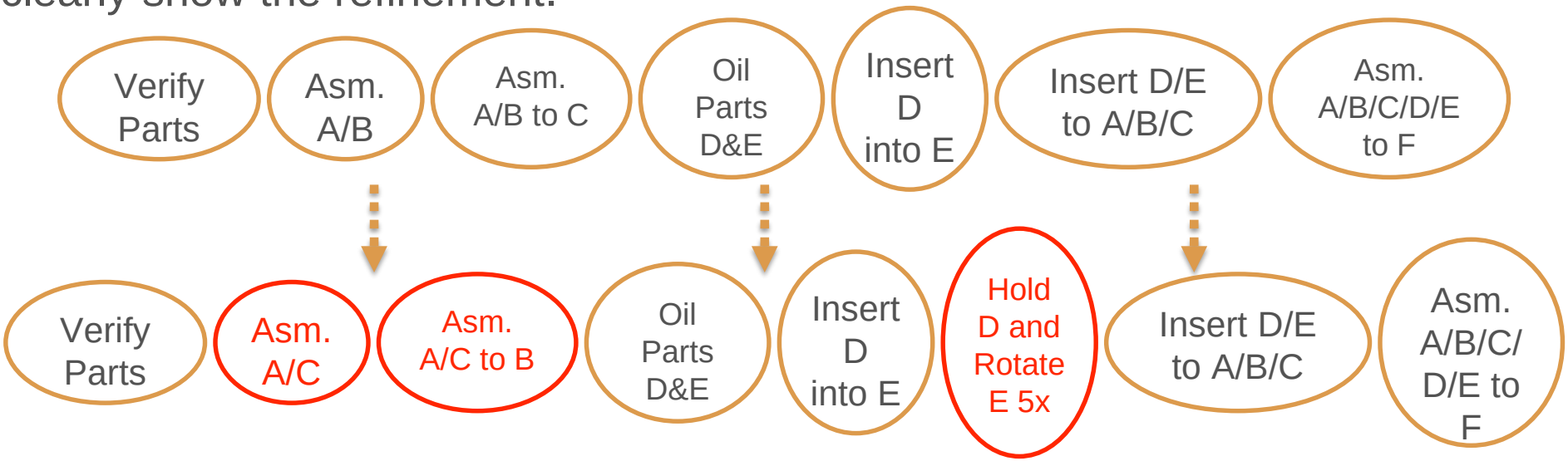
5 Minutes

IN CLASS ACTIVITY: Process Depiction

Please, join in teams of 5 or so to collaborate

6. Share your ideas as a team.

7. As a team, iterate, refine, and outline/map 6-8 steps/actions necessary to complete assembly of the flashlight. Document the team's refined map below your initial map in your sketch book and on your submitted homework to clearly show the refinement.



8. As a team, write instructions to support the assembly illustrations.

10 Minutes

HOMEWORK (cont'd)

Process Depiction *Continuation of In-Class Activity*

9. **As an individual**, sketch the refined steps/actions (only) as an illustrated diagram **in your sketchbook.**
10. Incorporate universal symbols (e.g., power symbol, directional arrows)

Process Depiction Instructions

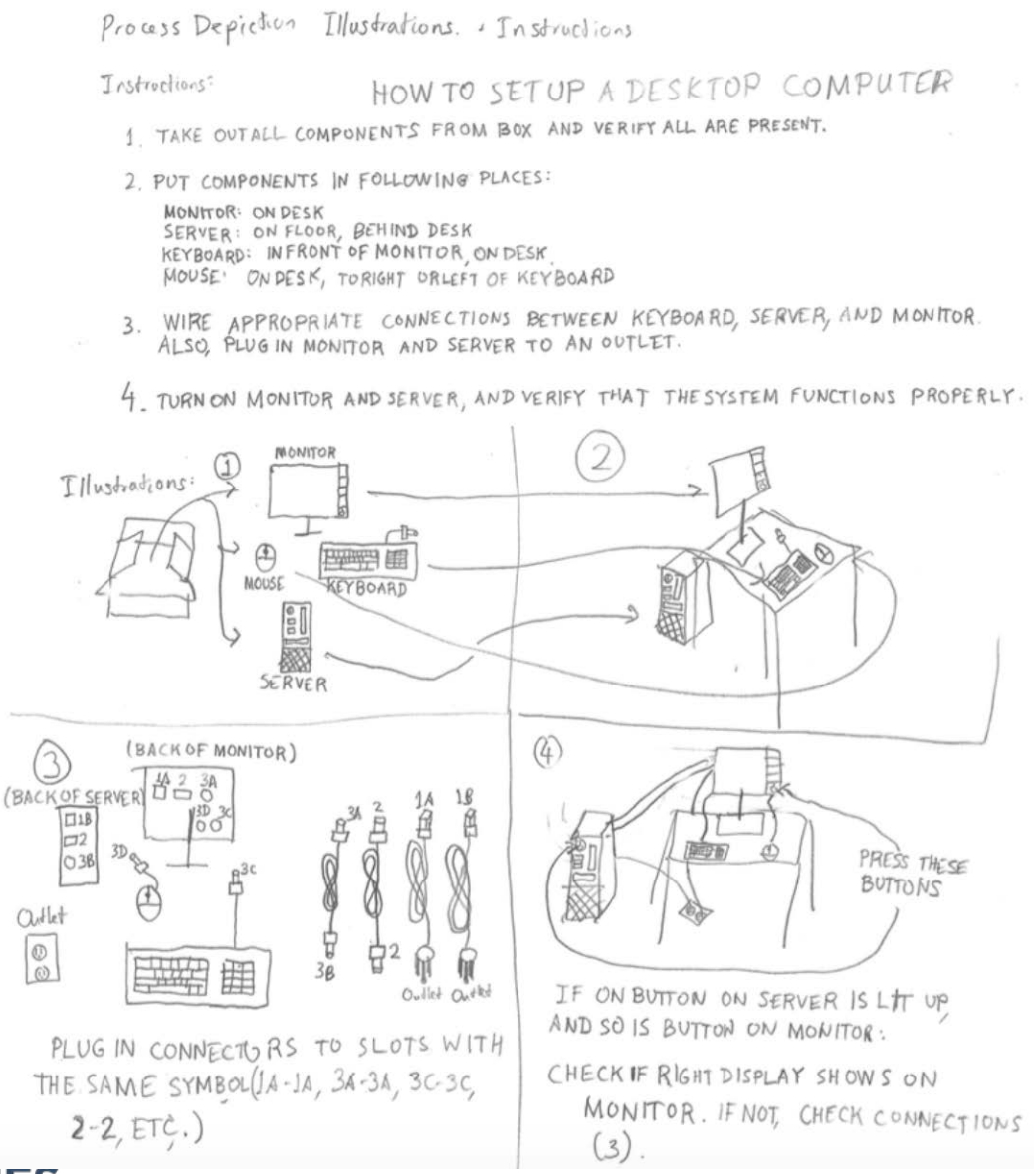
As an individual, use the lettering technique to write instructions for each illustration/step involved in your team's Process Depiction

- Develop the instructions as a team
- Letter them as an individual
- You may either include them on the same sheet in your sketchbook near or below or alongside your process depiction illustrations OR write them on a separate sketchbook page.

Please come to class prepared to share and discuss!

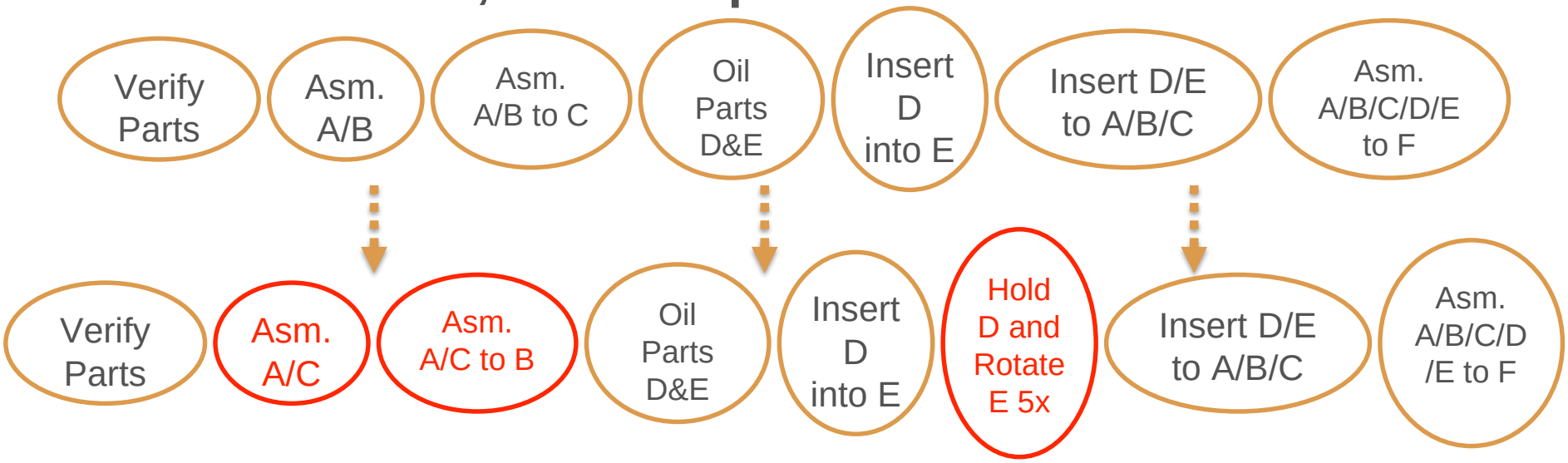
STUDENT HOMEWORK EXAMPLE

NOTE: This example does not include the mapping. Your initial map needs to be documented <u>in your sketch book and on your submitted homework</u> to clearly show the refinement.



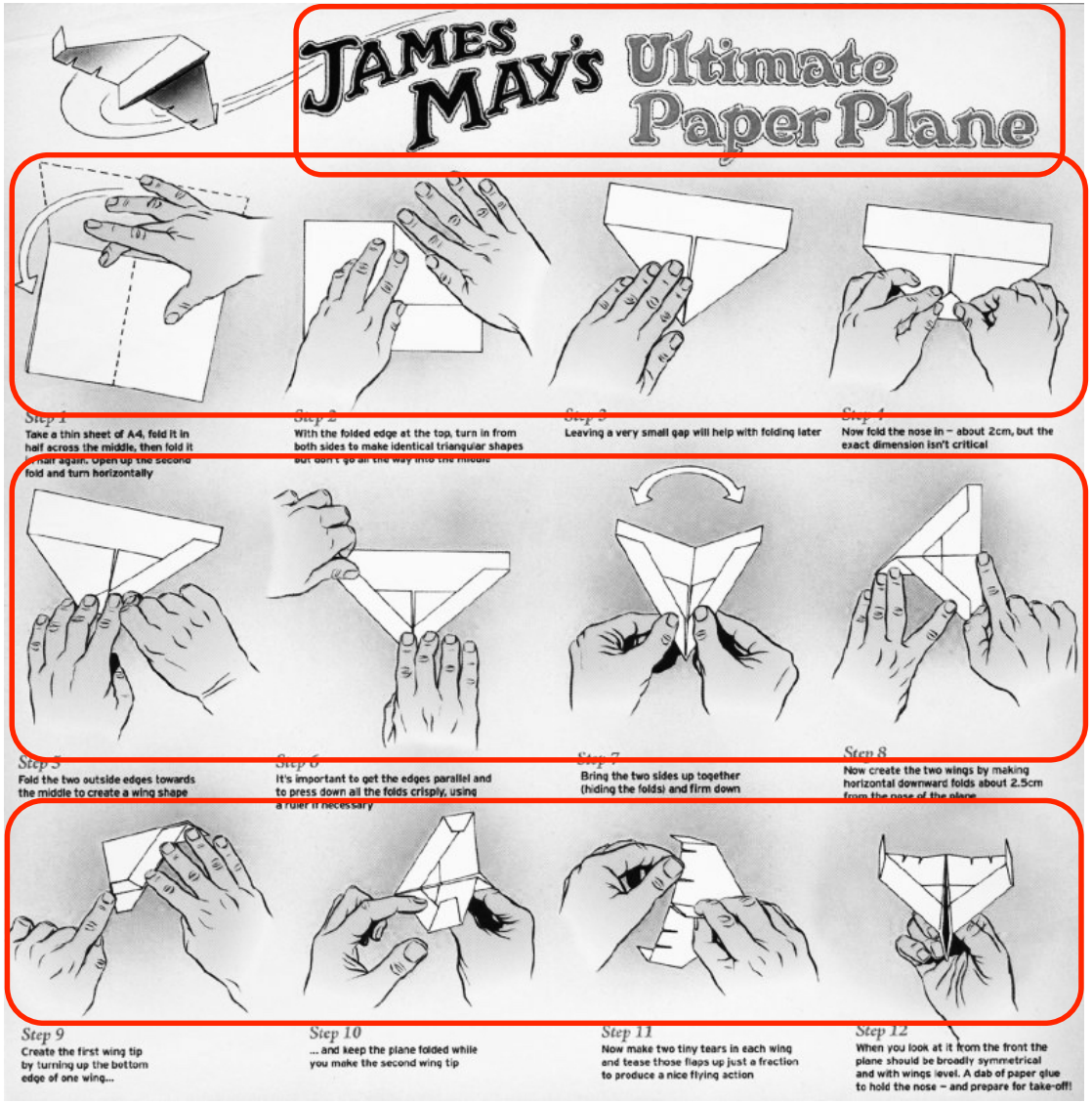
STUDENT HOMEWORK OUTLINE

- **Section, Title, Name and Date Clearly Lettered Following the Lettering Guideline Criteria**
- **Your Personal, Initial Map**

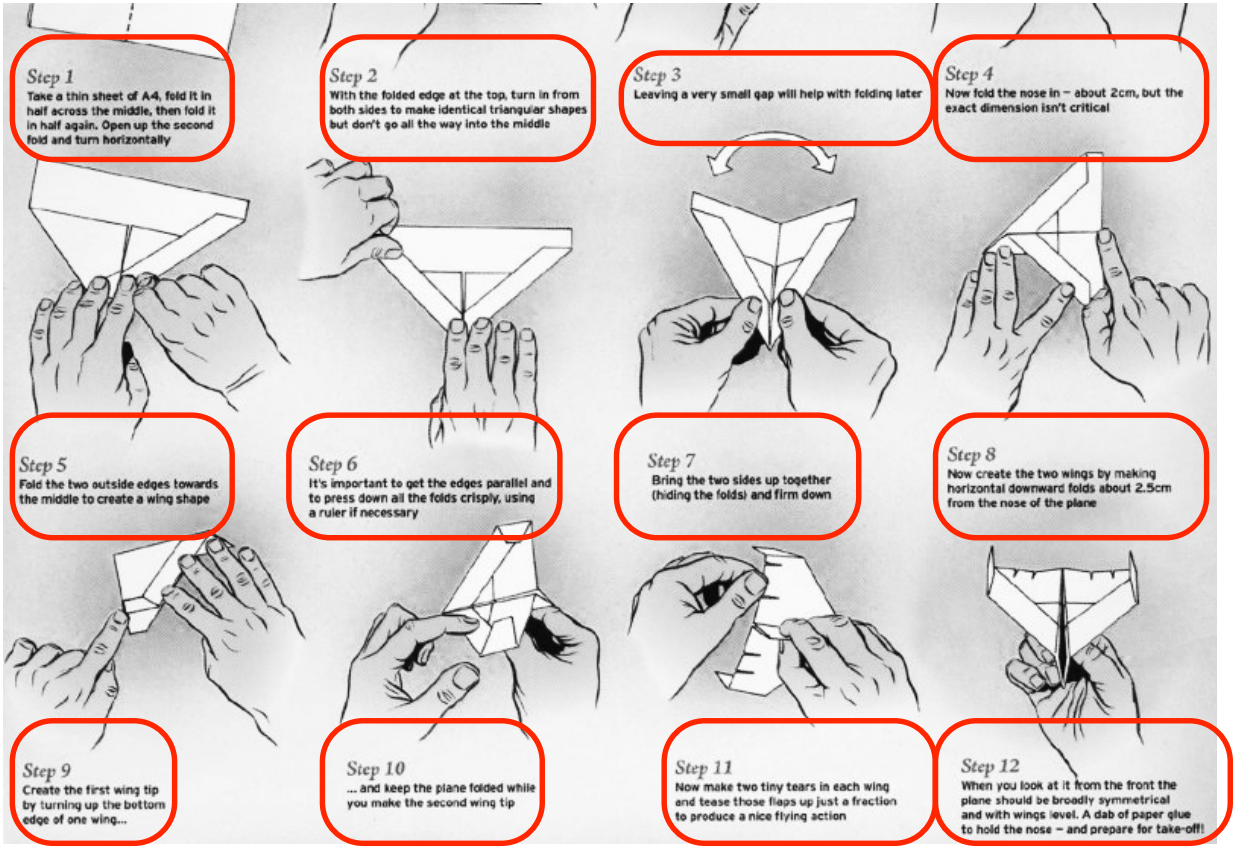


- **Your Teams Final, Refined Map**
- **Illustrations Below**
- **Instructions Either With Illustrations OR On Another Sketchbook Page Following the Lettering Guidelines**

HOMEWORK EXAMPLE



HOMEWORK EXAMPLE



This is to serve as an example; however, all text must be hand lettered following the lettering guideline and must be legible from a distance.

Please come to class prepared to share and discuss!

7 ELEMENTS OF DESIGN

LINE

SHAPE

FORM

TEXTURE

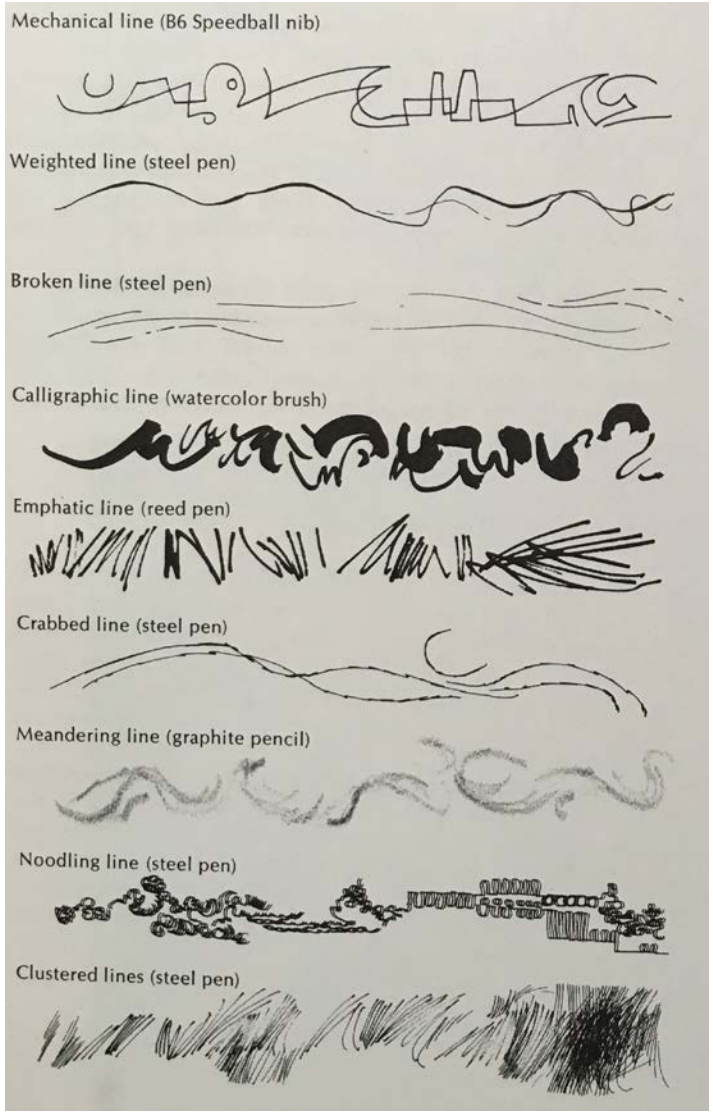
VALUE

COLOR

SPACE

ELEMENTS OF DESIGN

1. **LINE - A Point Extended**
   - **Types of Lines:** Actual & Implied, Curved & Straight
   - **Line Direction:** Horizontal, Vertical, Diagonal, Curved
   - **Use of Line:** Leading (create depth), Network (create value & volume)



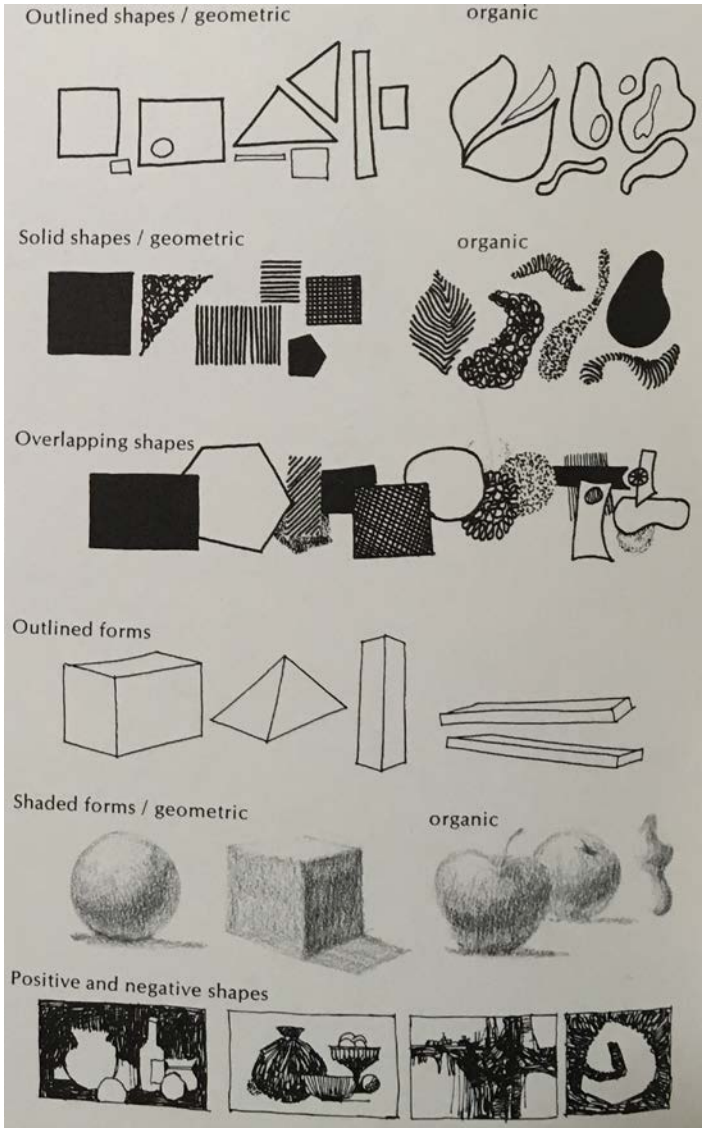
ELEMENTS OF DESIGN

2. SHAPE

- **2-D:** Height x Width, Enclosed
- **Shape Types:** Rectilinear (geometric), Curvilinear (organic)

3. FORM

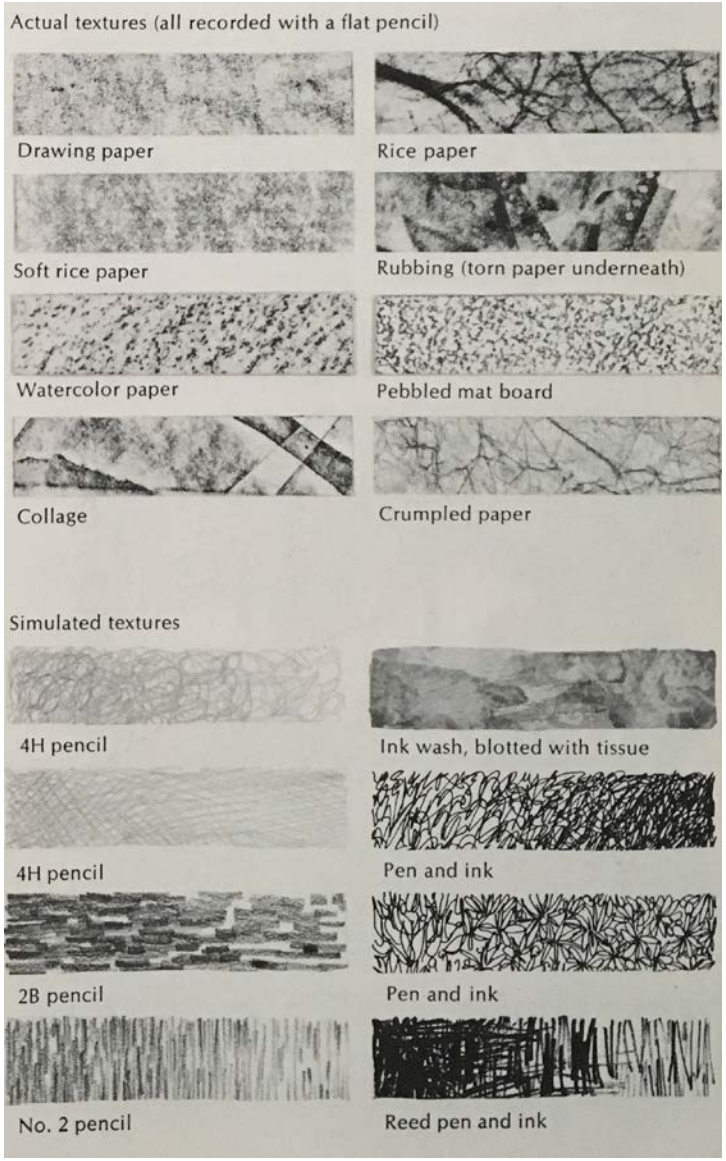
- **3-D:** Height x Width x Depth
- **Plane**: Advancing, Receding, Projecting, Vertical, Horizontal Slanting
- **Volume**: Use of Value



ELEMENTS OF DESIGN

4. TEXTURE

- Tactile
- Visual
- Illusory



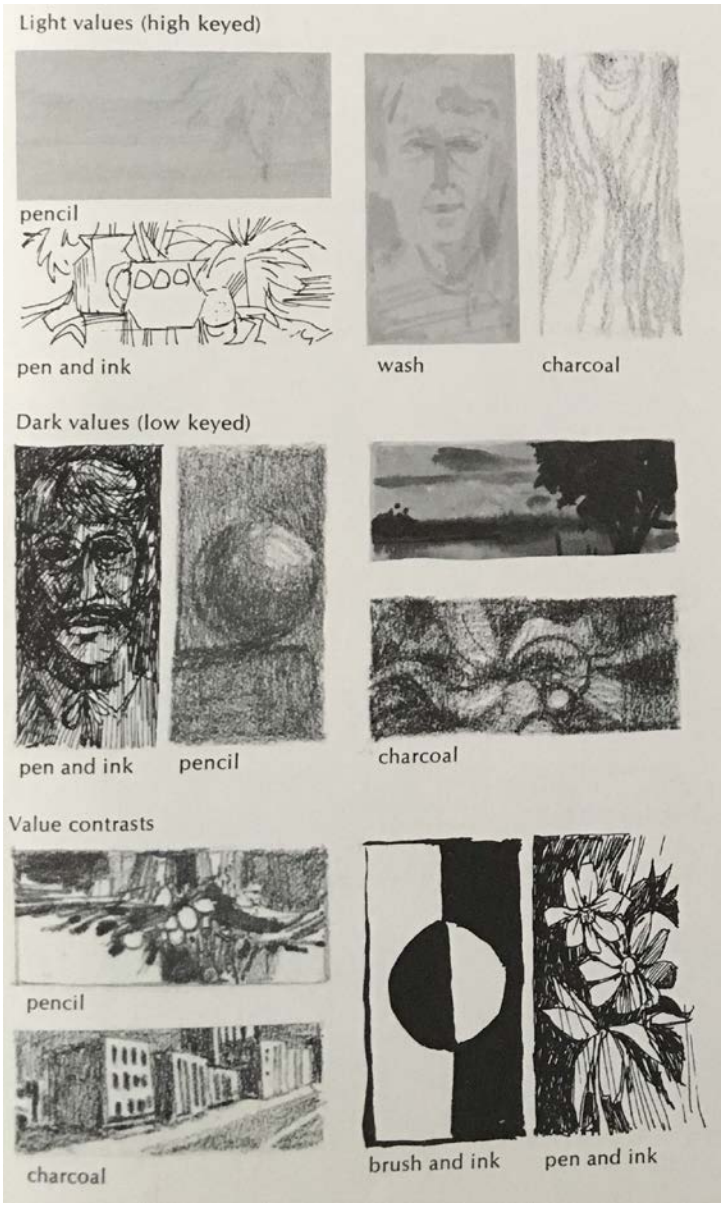
ELEMENTS OF DESIGN

Tactile vs. Visual vs. Illusory

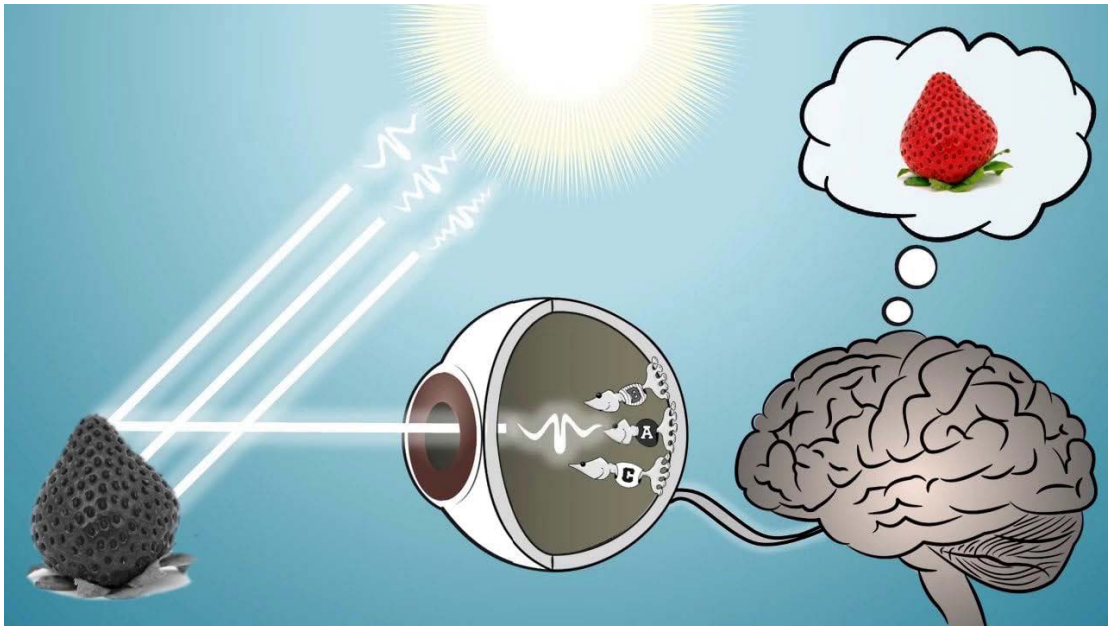
ELEMENTS OF DESIGN

5. VALUE

- **Relative Lightness and Darkness**
- **Contrast**
- **Shadow**
- **Helps to Create Perspective**



ELEMENTS OF DESIGN



6. COLOR

- What we see due to reflected light spectrum
- Will not study color in this course

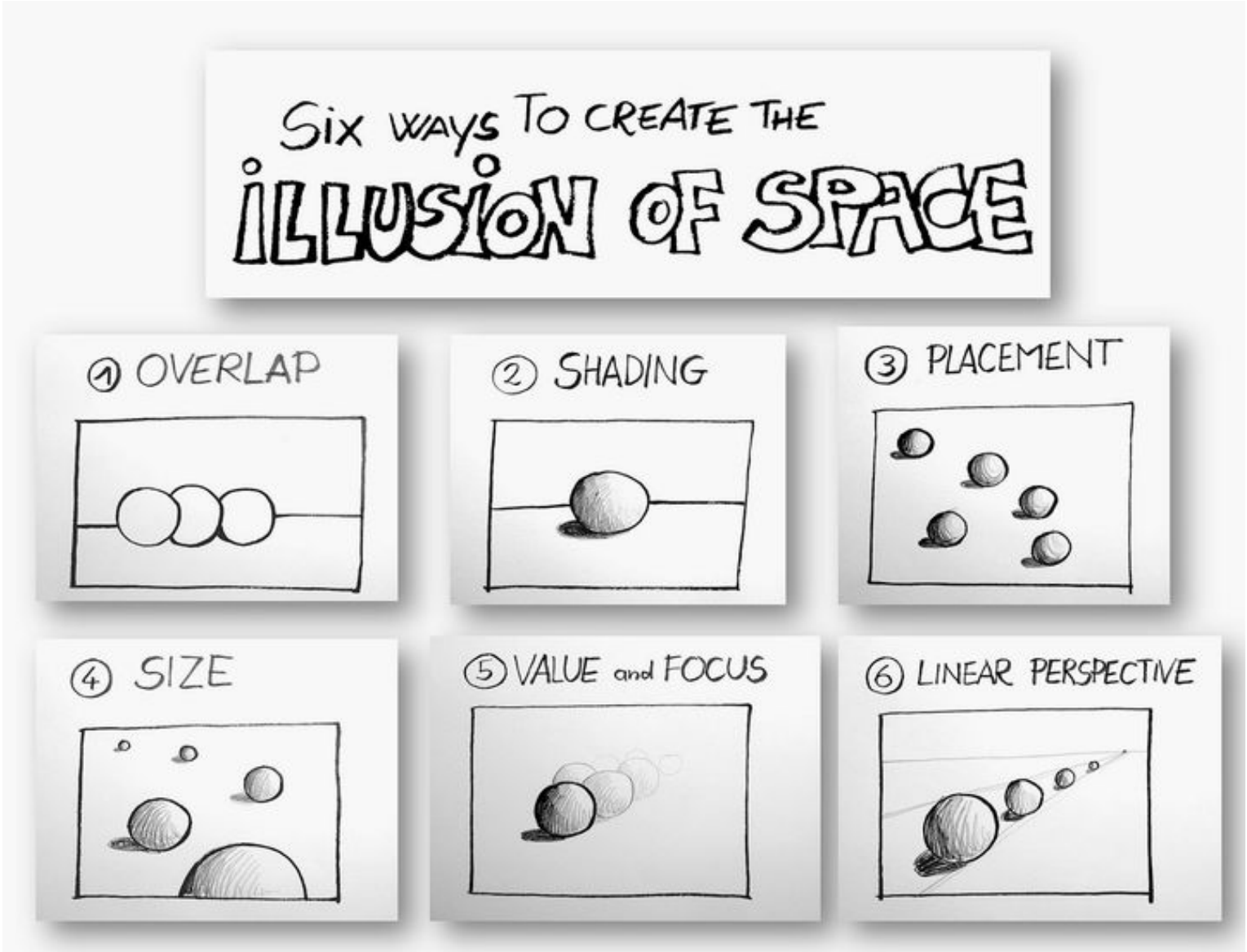
ELEMENTS OF DESIGN

7. SPACE

- **Material substance, yet inherently formless and diffuse**
- **Only once an element is placed in its field is a relationship established**
  i.e., 8 1/2”x11” piece of paper - until something is placed on it - space is not defined
- **As the elements are introduced, multiple relationships are established**

  Space → Elements → Elements
- **Positive (figure), Negative (ground), Representational, Nonobjective, Abstract**
- **Illusions of Depth and Perspective**

ELEMENTS OF DESIGN



EXAMPLE ANALYSIS: Line, Shape, Form, Texture, Value, Color, Space

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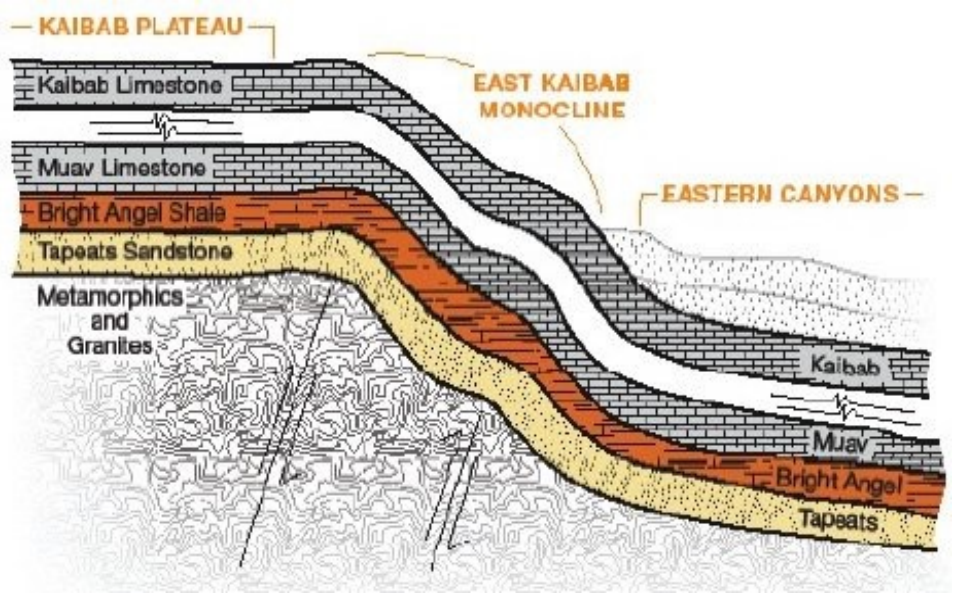

EXAMPLE ANALYSIS: Line, Shape, Form, Texture, Value, Color, Space

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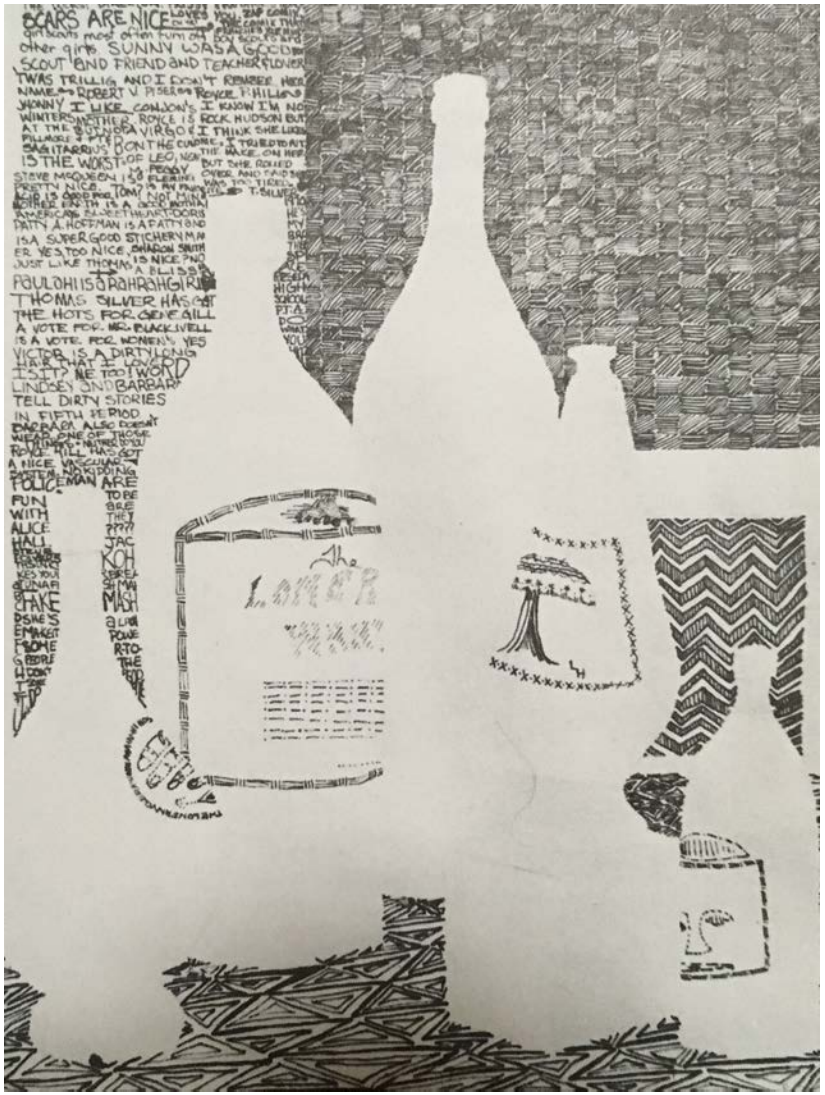


IN CLASS ACTIVITY:
Graphics Interpretation Using the Elements

Please, 2 volunteers at each of the dry-erase boards

Volunteers - In your sketchbook write

In Class Activity: Graphics Interpretation Volunteer, your name, and today's date

5 Minutes

IN CLASS ACTIVITY:
Graphics Interpretation Using the Elements

Create six (6) sketches as interpretations of the object

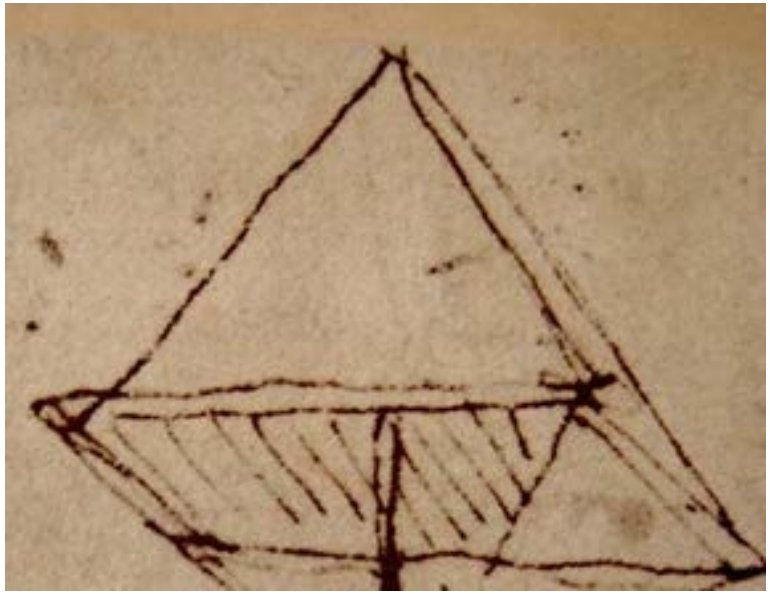
1. Use only lines
2. Use lines and points
3. Use shapes, lines and points
4. Use light and dark values
5. Using texture
6. Emphasize negative shape or the area around the figure

HUMAN FIGURE

Why is the human figure important for our sketches?

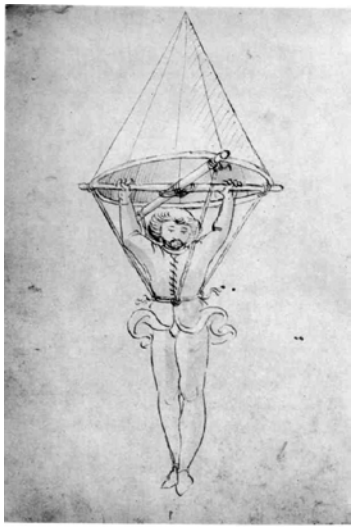
The Human Figure Tells a Story

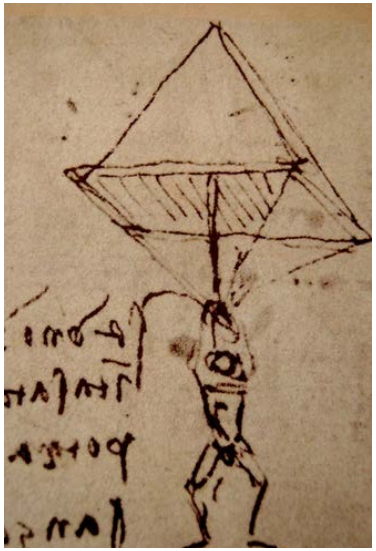
- Proportion
- Scale
- Functionality
- Interaction
- Understand What We're Looking At

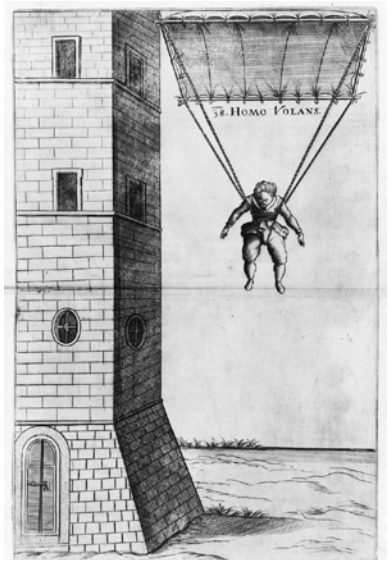


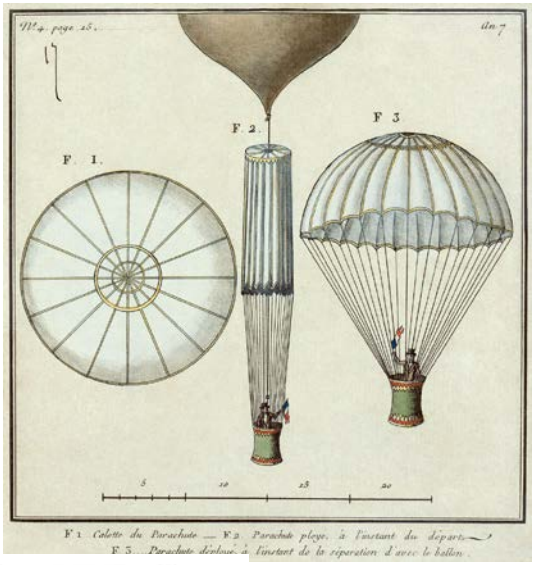
What is this?

HUMAN FIGURE





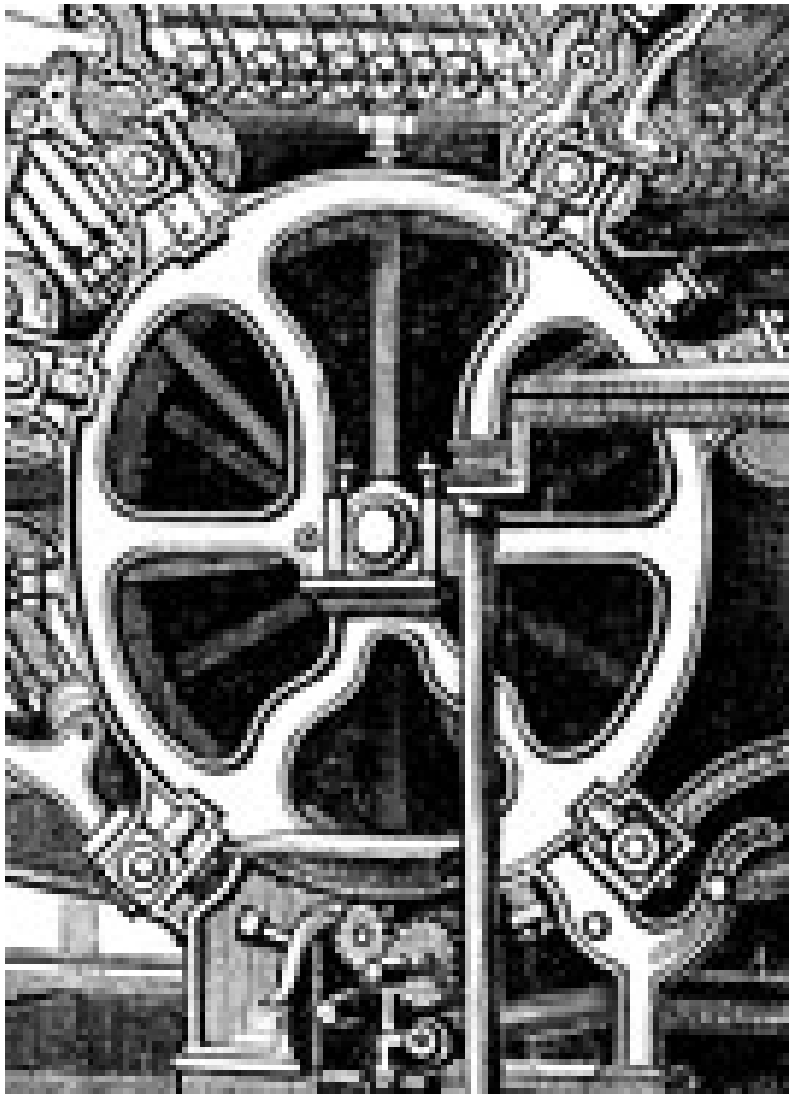




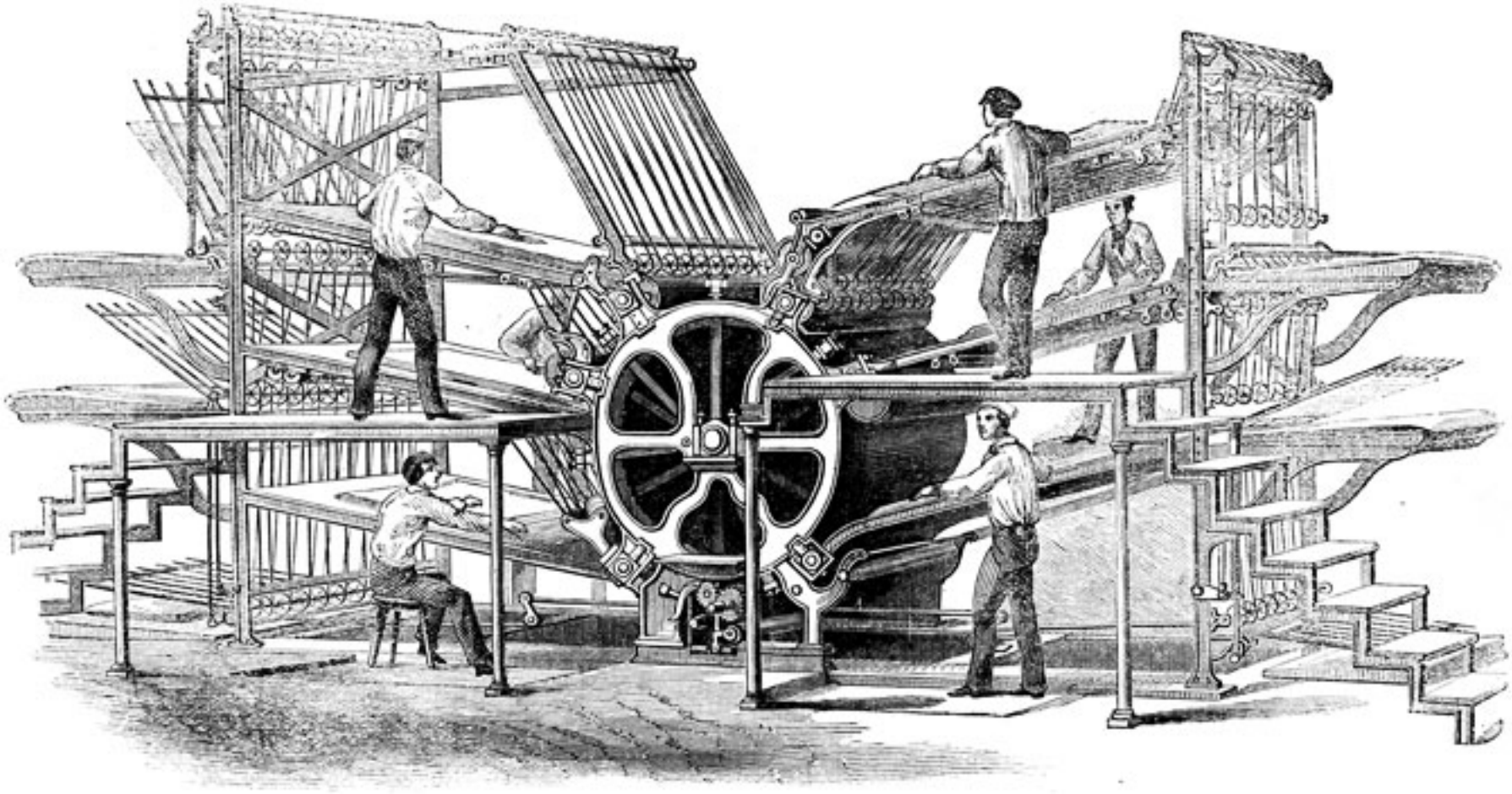
Problem Definition → Exploration/ Conceptualization → Analysis → Execution/ Implementation

Stakeholder Engagement, Presentation/ Documentation, Project Management

HUMAN FIGURE



HUMAN FIGURE



HUMAN FIGURE

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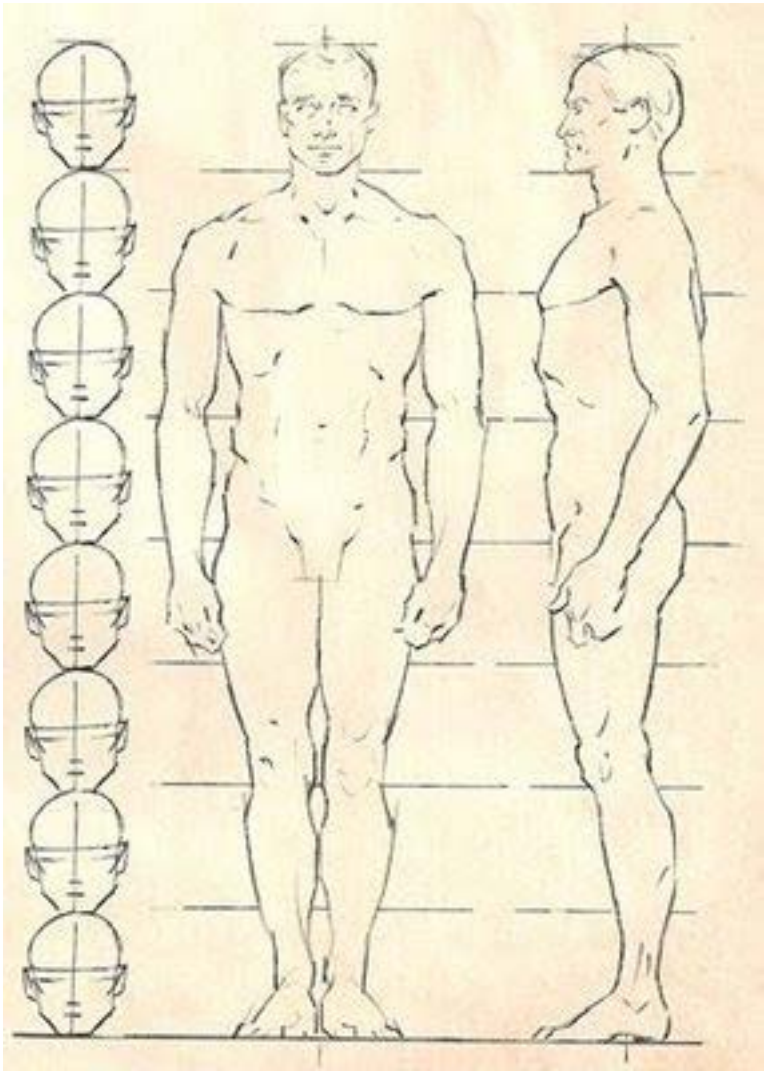
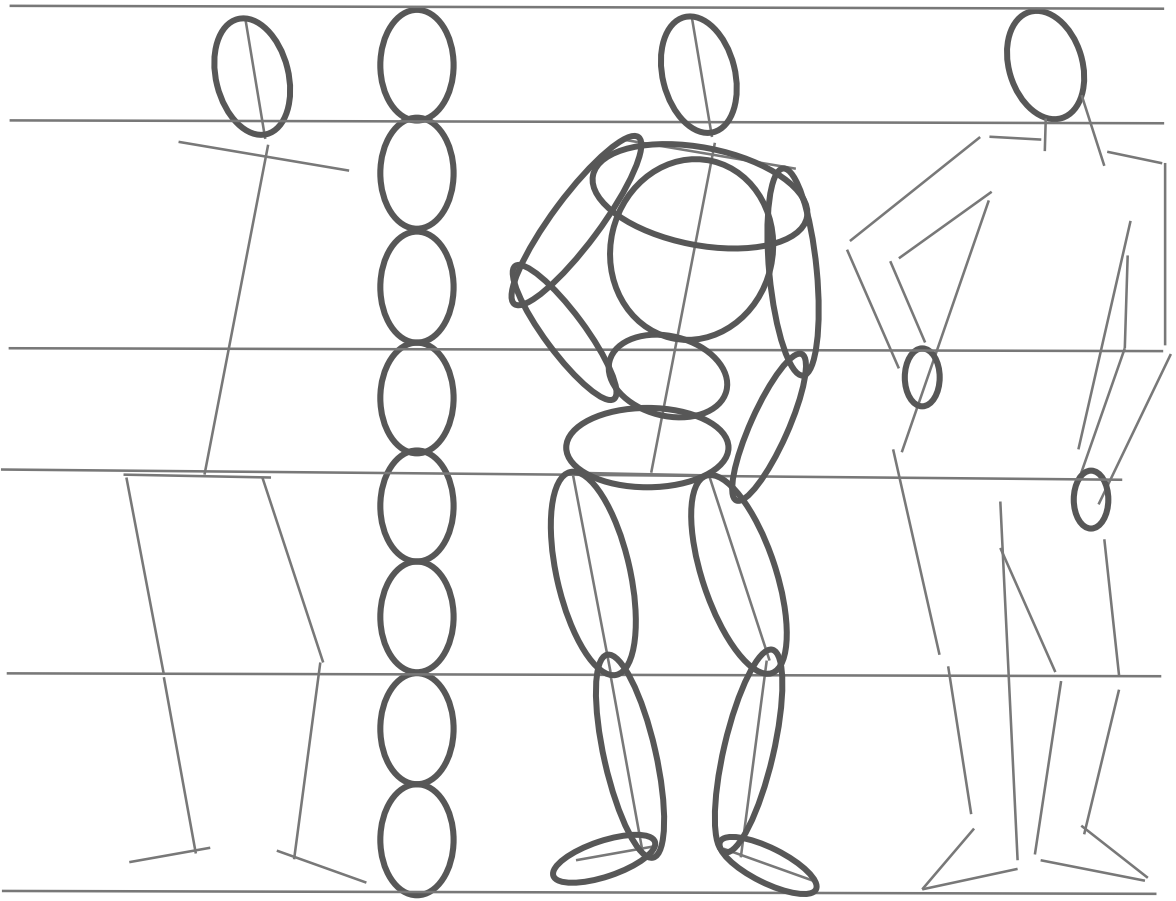


- 7-8 Heads Tall
- Size of head establishes relationship of proportions to trunk and legs
- Shoulders are approximately 2 horizontal heads wide
- Hips are approximately 2 vertical heads wide
- Female shoulder and hip proportions are typically opposite
- Observe bendlines
- Ratio establishes balance of parts to compose the whole
- Symmetry

IN CLASS ACTIVITY: Human Figure



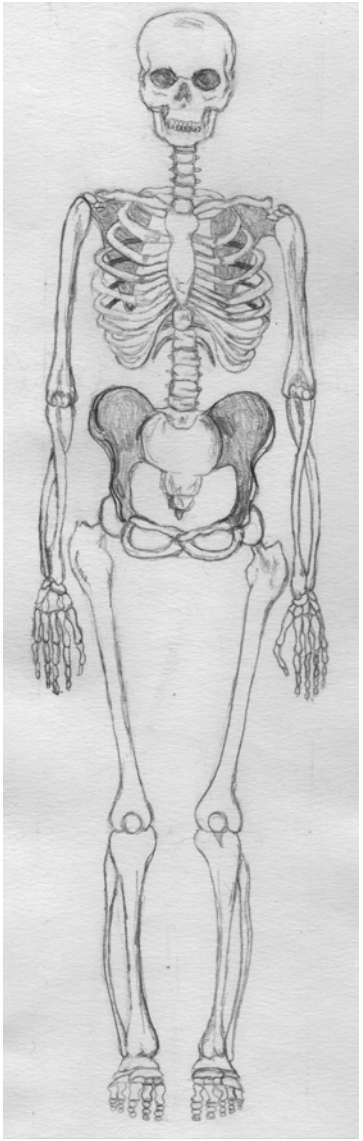
- Start by defining the size of the head
- Use guidelines
- Can use lines and nodes, “sticks”, circles, ovals, sketchy lines, etc. to form after framing

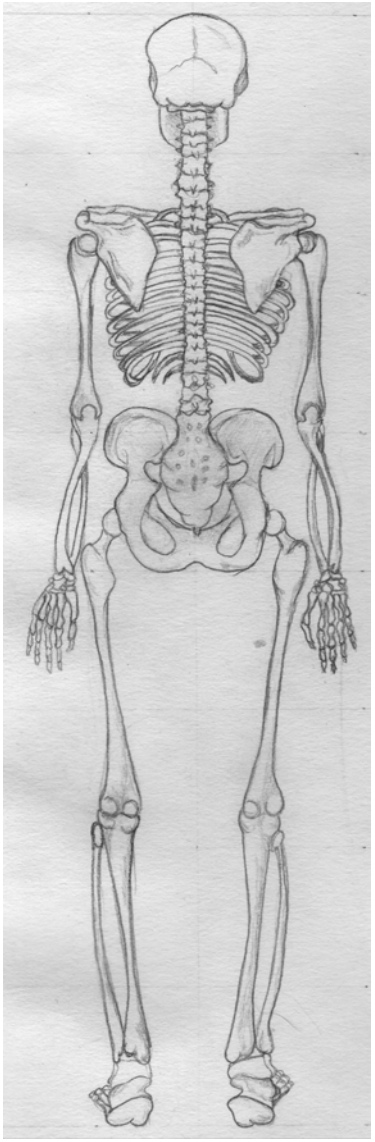
In your sketch book write

In Class Activity: Human Figure, your name, and today’s date

5 Minutes

DETAILED EXAMPLE OF HUMAN FIGURE





You are not expected to draw to this level of detail. These examples help you gain an understanding from the skeletal view.

Please notice

- initial establishment of the size of the head
- subsequent guidelines are very light and not erased
- framing
- added detail to form

SKETCHING TECHNIQUES

- Does not need to be artistic, but needs to communicate major features.
- **Goal:** Get something on paper; and use the whole sheet rather than as a postage stamp
- **Remember:** What's the difference between shape and form? How do we create form?
- Look for general shapes, then proportion, and lastly detail to give the shape form
- Don't worry about mistakes
- Don't get caught up in the details. You can refine later.
- **Sketch quickly:** Clearer, better quality, overcome inhibition

Have fun!

Practice! Practice! Practice!

LANDSCAPES

- Impossible to write down everything
- Search for something that interests you and start there, then draw other things in relation
- Consider the Elements of Design

  (Line, Shape, Form, Texture, Value, Color, Space)
- Establish fore-, middle- and background
- Use squiggly, thin lines

  (No bold, straight lines in the natural world)
- Show distance with detail/fidelity and size

  How does the eye capture detail? Close-up=More Detail; Far Away=Less Detail
- Not fully detailed, but enough to differentiate features
- Provide context (as necessary) for true subject of the sketch

LANDSCAPES

1. **LINE**
   - **Types of Lines, Line Direction, Use of Line**
2. **SHAPE**
   - **Enclosed 2-D Shape Types**
3. **FORM**
   - **3-D, Plane, Volume**
4. **TEXTURE**
   - Tactile vs. Visual vs. Illusory
5. **VALUE**
6. **COLOR**
7. **SPACE**
   - Positive (figure), Negative (ground), Illusions of Depth and Perspective

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IN CLASS ACTIVITY: Landscape

1. **LINE**
   - **Types of Lines, Line Direction, Use of Line**
2. **SHAPE**
   - **Enclosed 2-D Shape Types**
3. **FORM**
   - **3-D, Plane, Volume**
4. **TEXTURE**
   - Tactile vs. Visual vs. Illusory
5. **VALUE**
   - Lightness and Darkness
6. **COLOR**
7. **SPACE**
   - Positive (figure), Negative (ground), Illusions of Depth and Perspective

5 Minutes

HUMAN FIGURE & LANDSCAPE HOMEWORK

Human Figure & Landscape Sketches (Three (3) Total):

1. A Human Figure (in your sketchbook)

2. A Landscape (in your sketchbook)

- At Least Four (4) Natural Elements (e.g., greenery, trees, mountains, rocks, water, clouds)
- At Least Two (2) Man-made Elements (e.g., building, bench, dock, bicycle, street, books, lamps)

3. A Landscape + Human Figure(s) (on a new sketchbook page to be shared in the next class)

Include:

- At Least Four (4) Natural Elements (e.g., greenery, trees, mountains, rocks, water, clouds)
- At Least Two (2) Man-made Elements (e.g., building, bench, dock, bicycle, street, books, lamps)
- At least one (1) Human Figure in the Foreground

OR

- You May Re-draw the image from the In Class Activity on Loose Paper. Add at Least Two (2) Man-made Elements (e.g., cooler, climbing ropes, backpack) and include at least one (1) human figure

Find photos on the internet, go for a walk, etc.

Please Do Not Draw From Other Sketches/Drawings

Label Your Work!

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STUDENT HOMEWORK EXAMPLE

Field Sketching
Homework 1 cont. (Landscape with Human Figure)

HOMEWORK SUMMARY

- **LETTERING GUIDE REPLICATION:** Replicate guide at 1/4” and 1/2” scale **(in your sketchbook)**
- **PROCESS DEPICTION INSTRUCTIONS:** Use the lettering technique to draw instructions your group created for the Process Depiction ***If you didn’t finish in class, develop/iterate/refine instructions as the **same group you worked with in class.** **Letter the refined instructions only.** Each member of the group should be presenting the **same information, but as your own creation in your Sketchbook.*** *You will need to display your individual work at the beginning of the next class session.*
- **PROCESS DEPICTION ILLUSTRATIONS *If you didn’t finish in class, continue to develop/iterate/refine as the **same group you worked with in class.** Illustrate the refined process only. Each member of the group should be presenting the **same information as your own creation in your Sketchbook*** *You will need to display your individual work at the beginning of the next class session.*
- **HUMAN FIGURE & LANDSCAPE SKETCHES (3 Total):** 1) A human figure **(in your sketchbook)**, 2) A landscape **(in your sketchbook)**, 3) A landscape + human figure(s) **(in your sketchbook)**
- **Please come to the next Field Sketching session prepared to share and discuss**

Homework shall be completed in your sketchbook. Please don’t forget to identify your work.*

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RUBRICS SUMMARY

- **EPICS 151 Sketchbook Rubrics**
  - Please print and affix to the inside of the Field Sketching sketchbook cover
- **EPICS 151 In Class Volunteer and Participation Rubrics**
  - Please review expectations for how your grade will be assessed on the last day of Field Sketching
- **EPICS 151 Week 1 Homework Rubrics**
  - Please **print** and **staple to** the **backside of your homework** to be turned in. Please be sure to **clearly letter** the **section, date, and name information at the top of the rubrics**, so it can be returned to you even if it becomes detached from your assignment.

Rubrics for each deliverable will be available on the Blackboard

PRE-WORK FOR WEEK 2

- **Review EPICS 151 Graphics, Week 2 Presentation Slides**
- **Week 2 Plan**
  - Share Your Homework
  - Planar Projections Overview
  - What is a perspective drawing?
  - 1-Point & 2-Point Perspective Drawings
  - Oblique Views
  - Isometric Views
  - Homework Summary
  - Rubrics Summary
  - Pre-Work for Next Field Sketching Session
  - Resources

RESOURCES

- **Tom Wujec's Ted Talks Website**, "Draw How to Make Toast: A Simple and Fun Introduction to Systems Thinking" (http://www.drawtoast.com/index.html#.V0TPlVevXFI)
- http://thenounproject.com - Symbols
- http://www.mcescher.com
- http://facweb.cs.depaul.edu/sgrais/texture.htm
- A helpful resource is the book Design Drawing written by Francis D.K. Ching with Steven P. Juroszek