

Design Process and Notebook/Deadlines Class

By Jennifer Guevara

SESSION/CLASS 1:

Minutes 0-70

- Design Process/Notebook Presentation
- Discussion of Time Management/Deadlines
- Design Process Puzzle (If enough time left) *optional*

Materials for Class:

- Slideshow on design process, notebook, and deadlines
https://docs.google.com/presentation/d/1kcmp-JOfV7OAW3MJHIIN2TL_I_t_y-HDahMk-kxdmgl/edit?usp=sharing
- Class board (to write on)
- Cards for design process puzzle (One set for each group)

Class Times:

- Minutes 0-25:** Design Process/Notebook presentation
- Minutes 25-45:** Time management discussion (using white-board); [students] will discuss reasonable schedule for strategy, designing/prototyping, building, testing; will also discuss how to manage robotics and school time
- Minutes 45-50:** Explanation of group activity
- Minutes 50-65:** Design puzzle activity in [4] groups
- Minutes 65-70:** Questions

Activity (Design Process Puzzle) Explained:

-Each group of students will be given a set/bag of cards. The cards contain steps/decisions made by a team throughout a design process. The cards are out of order! Using the design process (which was taught earlier in the session), each group will organize their cards. (The cards will **clearly** locate under a certain category: Strategy, Design/Ideas, Prototyping, Building, Testing Results)

Activity Times (45-65):

- Minutes 45-50:** Explanation of activity; Group selections
- Minutes 50-52:** Pass out 1 set (bag) of cards to each group.
- Minutes 52-62:** Each group works to organize order of cards using design process.
- Minutes 62-65:** Winners determined (Closest or completely organized set of cards)

SESSION/CLASS 2:

Minutes 0-70:

-Student Activity → Catapult/Trajectory Competition

Game Objectives:

- Build manipulator out of KNEX and rubber bands that excels in trajectory of a golf ball
- Run through design process and write notebooks while designing and building.

Students:

-4 groups

Materials for game and field setup:

- 4 bags of KNEX and rubber bands
- Paper & pencils for notebooks

Activity Times (0-60):

- Minutes 0-10:** Explain game, its relevance to lesson (using design process and writing notebook), and notebook requirement.
- Minutes 10-30-:** Groups design and build manipulators while writing their notebooks and going through design process.
- Minutes 30-55:** Competitions. Teams write down failures and accomplishments in notebooks. Winners determined and notebooks given in.
- Minutes 55-70:** Clean-up manipulators, bags, and field; Questions

Game Matches -Times (30-55)

- Minutes 30-32:** Field/Team Setup
- Minutes 32-36:** Match 1 (2 v 2) AB vs CD**
- Minutes 36-38:** Field/Team Reset
- Minutes 38-42:** Match 2 (Same alliances: 2 v 2) **
- Minutes 42-44:** Field/Team Reset
- Minutes 44-48:** Match 3 (Winning alliance Face-off: 1 v 1) **
- Minutes 48-53:** Polish notebooks

**One match will actually be 2 minutes 30 seconds, but extra time is mentioned above in case of technical difficulties or match delays

SESSION/CLASS 3:

Minutes 0-70

- Catapult/Trajectory Competition: Manipulators' remakes **without** detailed notebooks
- Comparison of Session 2 manipulators with Session 3 remakes
- Catapult/Trajectory: Manipulators' remakes **with** Session 2's BEST notebook. **
- Comparison of Session 2's bot with best notebook with Session 3 remakes **

** :If enough time left after Part I

Materials for activity:

- 4 bags of KNEX and rubber bands
- 4 analyzed notebooks from Session 2
- Paper and pencils for new "last minute" notebooks

Remake Activity Explained:

PART I:

-This activity follows the progress of Session 2.
-Each team (Team A, B, C, and D) will be asked to remake **another** team's manipulator. (They will remake the manipulator of their opponent, NOT their alliance, from session 2. So A will remake C, and B will remake D -vice versa.) HOWEVER, they will NOT be given that team's written notebook from session 2. Each team will have 3-5 minutes to re-create a guide (LAST MINUTE NOTEBOOK) trying to detail their previous session's manipulator. The team remaking their manipulator will use that last minute notebook. After all 4 manipulators are remade, comparisons (using pictures) will be made comparing the remade manipulators to the originals from session 2, showing the effects/consequences of not having a notebook while building.

PART II: (If enough time left)

-In Part II of this activity, each group will be given a copy of the BEST notebook from session 2. (This actually excludes the notebook's authors. THAT group will be given the SECOND BEST notebook from session 2.) Using the detailed notebooks that were written during the design and build of the original manipulators, each group will recreate the manipulator described in their given notebook. (So 3 groups will remake the manipulator that won BEST notebook, while 1 group will recreate the SECOND BEST notebook's manipulator.) After each group is finished recreating the manipulators, comparisons will be made between the remakes [made using detailed notebooks] and

the original manipulators, as well as with the remakes from Part I of this activity, which were made from last minute notebooks.

-Students will see the importance of a notebook, and a timely written one at that.

Activity Times:

-Minutes 0-7: Explanation of activity -part I

-Minutes 7-12: Last-minute notebook remakes

-Minutes 12-27: Building remakes of manipulators with last minute notebooks

-Minutes 27-32: Comparison of remakes with originals

-Minutes 32-39: Explanation of activity -part II

-Minutes 39-54: Building of remakes using BEST [detailed] notebooks from session 2.

-Minutes 54-60: Comparison of new remakes vs [unguided] remakes vs originals

-Minutes 60-70: Clean-up; talk lesson learned (notebook relevance); thoughts; questions