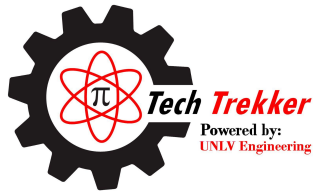


Can you fix this plane?

Step-by-Step Instructions

Presented by UNLV STEM Ambassadors



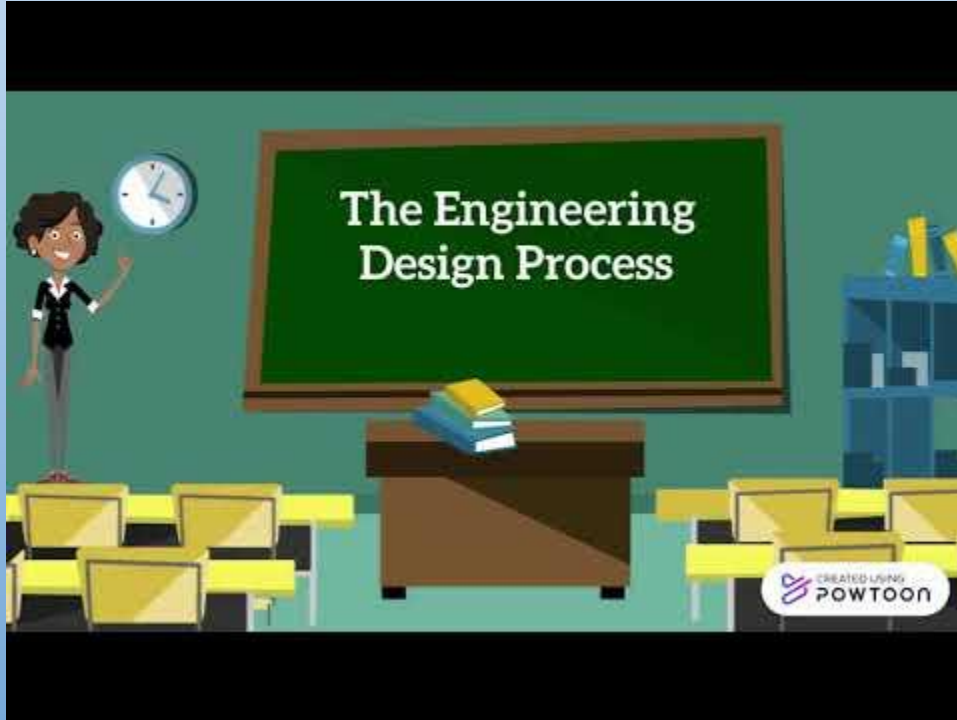
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Engineering Design Process

Engineering Design Process



1

Identify the Problem

2

Brainstorm



3

Design

4

Build
Redesign ← Test & Evaluate

5

Share Solution



Materials Needed



*Click the orange circular audio button for additional instructions.

- 3 Bad Airplanes (templates provided)
- Tape Measure/Rulers/Colored Tape
- Markers/Crayons/Glitter/Stickers
- Activity Pamphlet





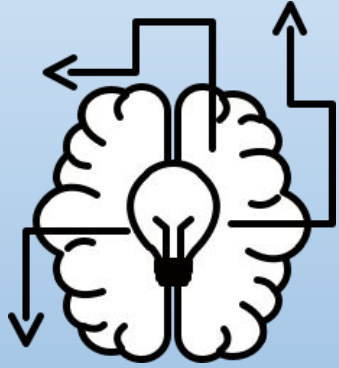
You have to travel from McCarran Airport in Las Vegas to Sydney Airport in Australia (about 8,000 miles apart), and you cannot deviate from your flight path. Your current plane is damaged, and it does not fly straight. You need to fix your plane to allow it to get to its destination without going too far, sinking into the ocean, or deviating from its path.



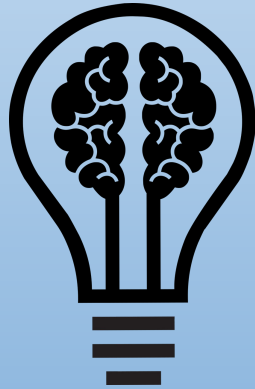
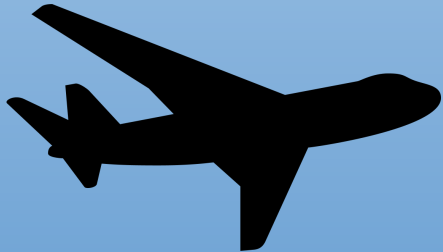
**Step 1: Identify
the Problem**



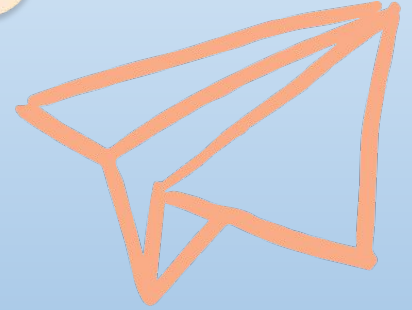
Step 2: Brainstorm



What makes a plane fly straight?



Why do you think your plane doesn't work?



Step 3: Limitations and Constraints



1

Flight Plan

8 feet / Straight line / Marked finish line



2

Shape

Plane-like / No balls or clumps



3

Time Limit

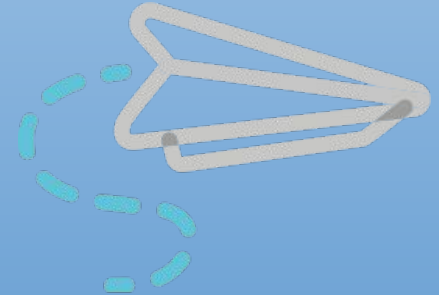
5 minutes of practice / Perfect your throw



4

Final Test

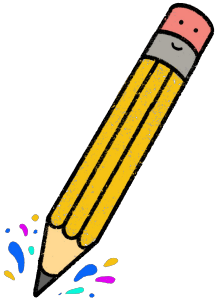
1 final throw



Step 4: Design



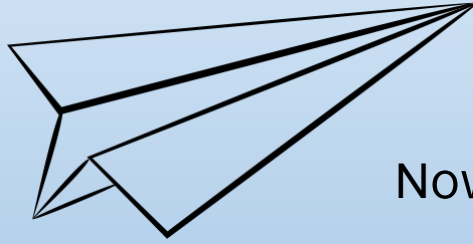
Design A:



Design B:

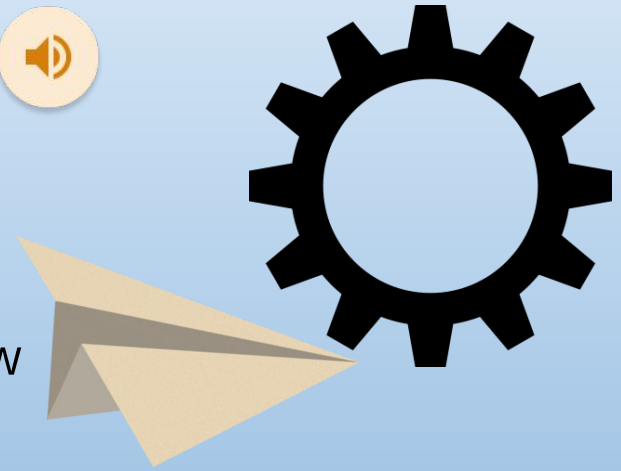
Design C:

Step 5: Build

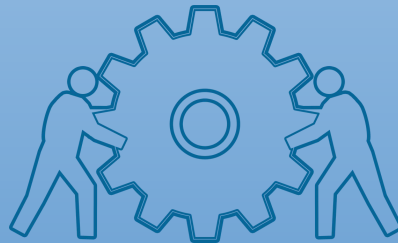


Now it's time to build!

Use the blueprints to build your new and improved planes.



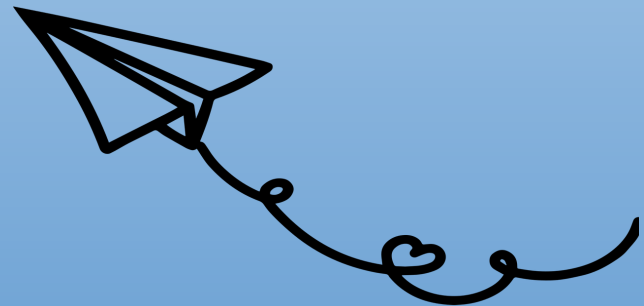
Don't forget the limitations and constraints!



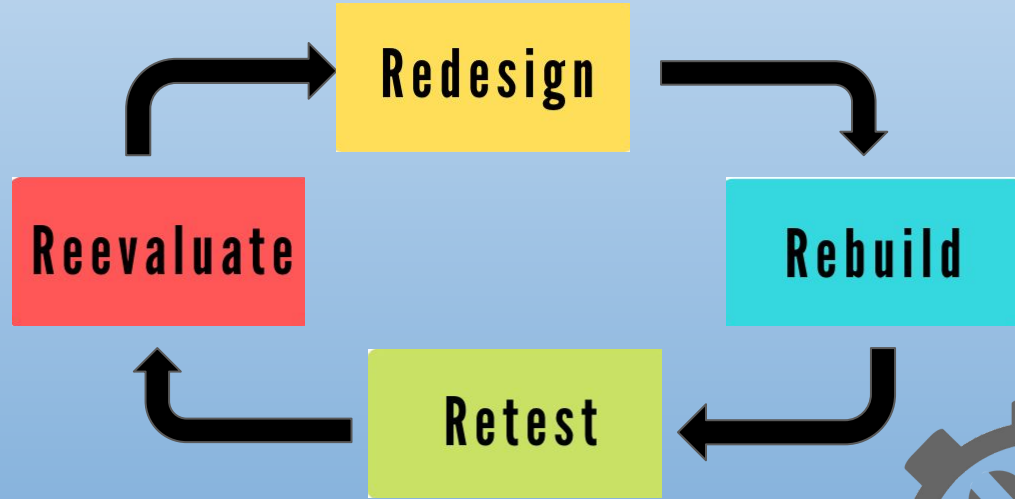
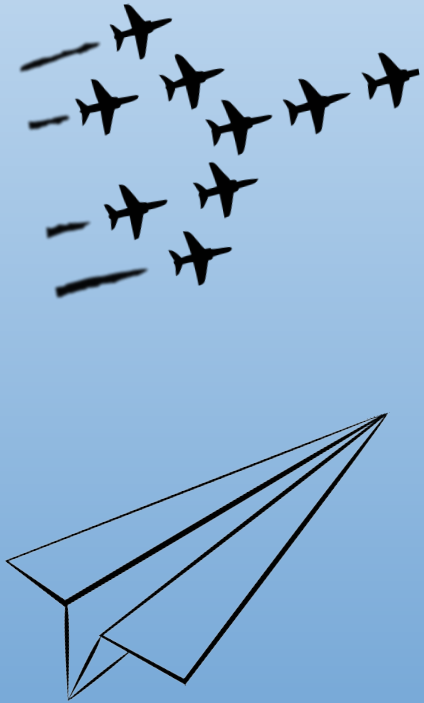
Step 6: Test and Evaluate



- Now that you have fixed your plane, take 5 minutes to perfect your throwing technique.
- After practicing your throwing technique, make your final throw and record how far it landed.
- Once tested, answer the remaining question in the Test and Evaluate section of your pamphlet.



Step 7: Redesign, Rebuild, Retest, and Reevaluate



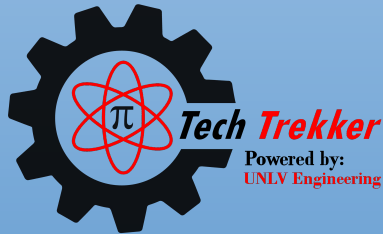
*Click on the buttons above to take you back to the directions for each step.

Step 8: Share Solution

Why do you think your own design flew further than other designs?

If your plane couldn't fly the 8-foot distance, what was the issue?

How can you make your design better?



Describe your experience—your successes and your failures—to your family and friends.

WARNING!!!

The next slide will provide the explanation (solution) on what makes the best plane for this experiment. Make sure you have completed the previous steps before moving on.



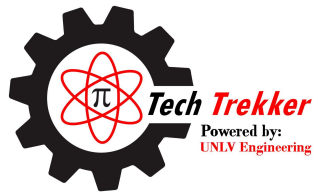
Explanation



- Engineers design planes that can do loops and tricks, but the first planes created had to fly straight.
- Airplanes are subjected to 4 different forces: lift, thrust, drag, and gravity.



Thank You!



On the move... Bringing technology into classrooms

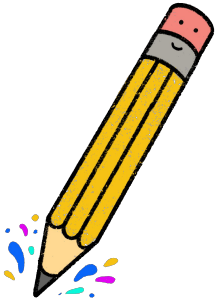


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Redesign



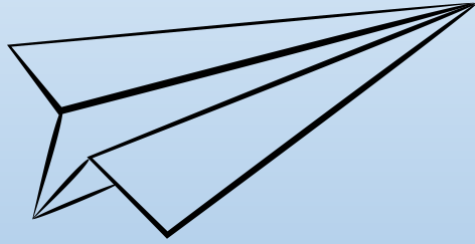
Improved Design A:



Improved Design B:

Improved Design C:

[Return](#)



Rebuild

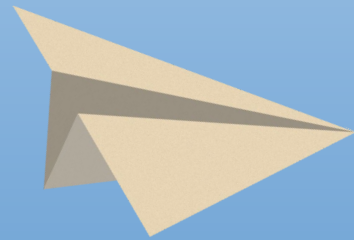


Based on your revised design, it's time to build your new and improved plane.

Remember your plane needs to fly 8 feet in a straight line. You have only 5 minutes to practice the perfect throw. You cannot make your plane in a paper ball shape, and you have just 1 final throw to test your design.



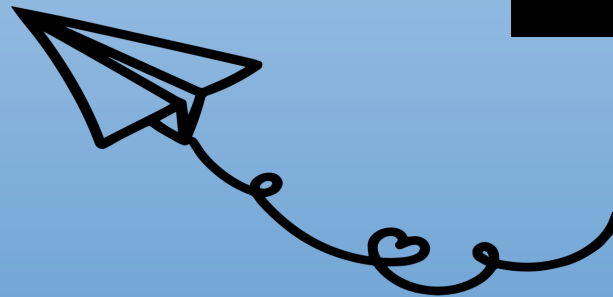
Return



Retest

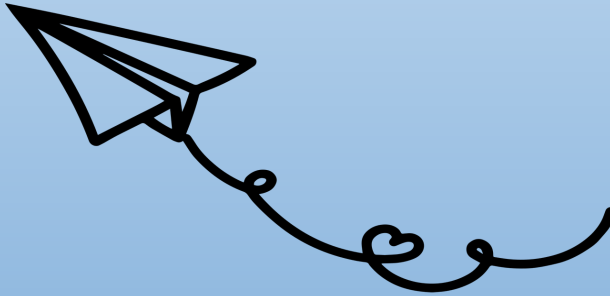


Using the same steps as before, test your new plane to see how far it can fly. Then answer the questions provided in the Retest and Reevaluate section of your pamphlet.



[Return](#)

Reevaluate



Did it fly straight?

Did it travel as far as your goal?

Write down all your observations and results in your pamphlet.

Return