

NASA Is With You When You Fly

Understanding the Science of Flight



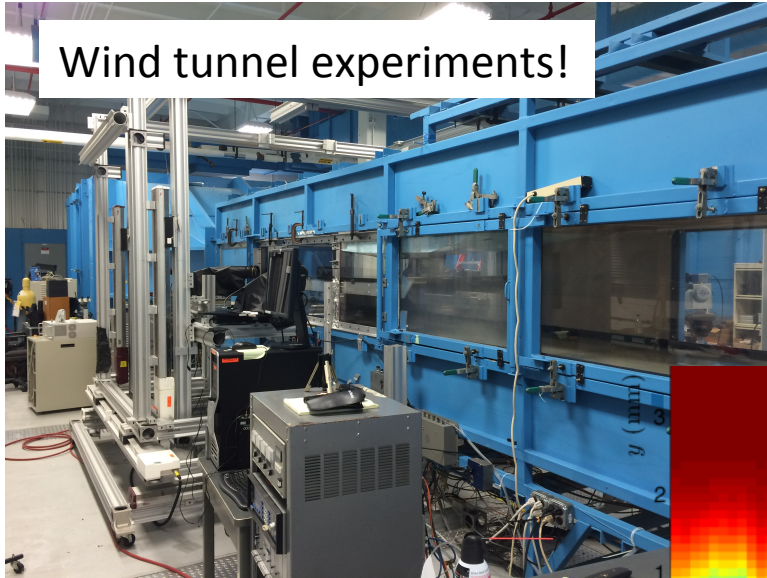
Jenna Eppink

A little bit about me...

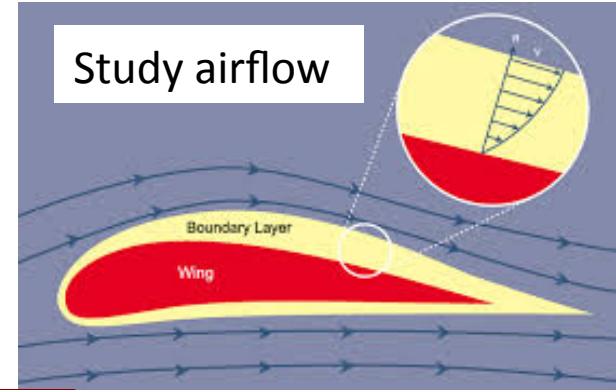


What I get paid to do...

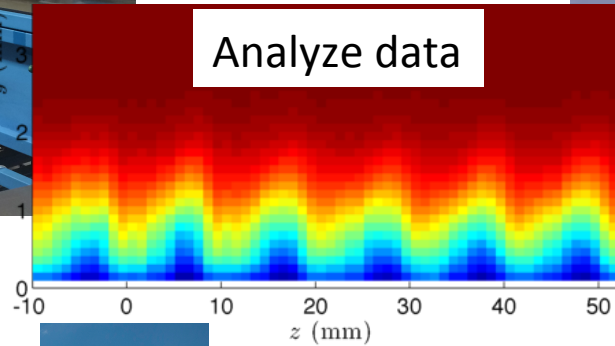
Wind tunnel experiments!



Study airflow



Analyze data



Count bugs! Seriously...

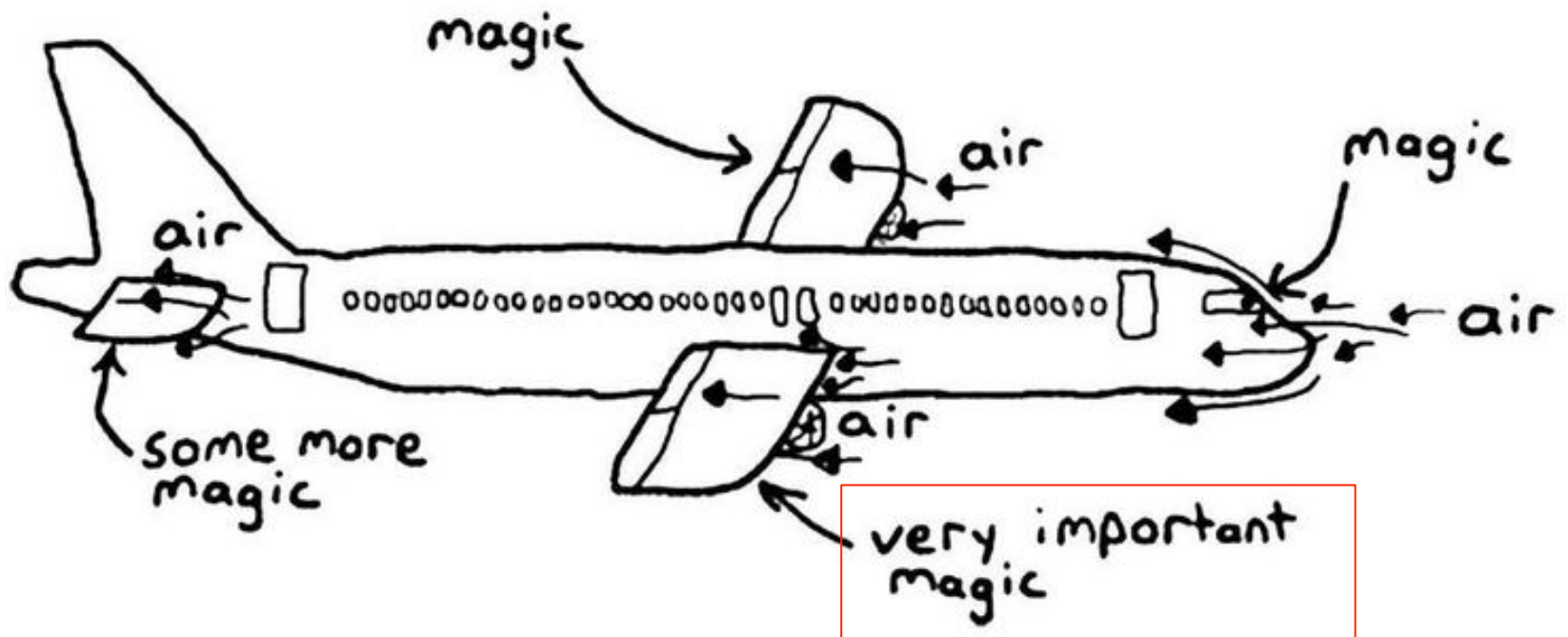


Play with lasers (I mean, take data)



How Do Airplanes Fly?

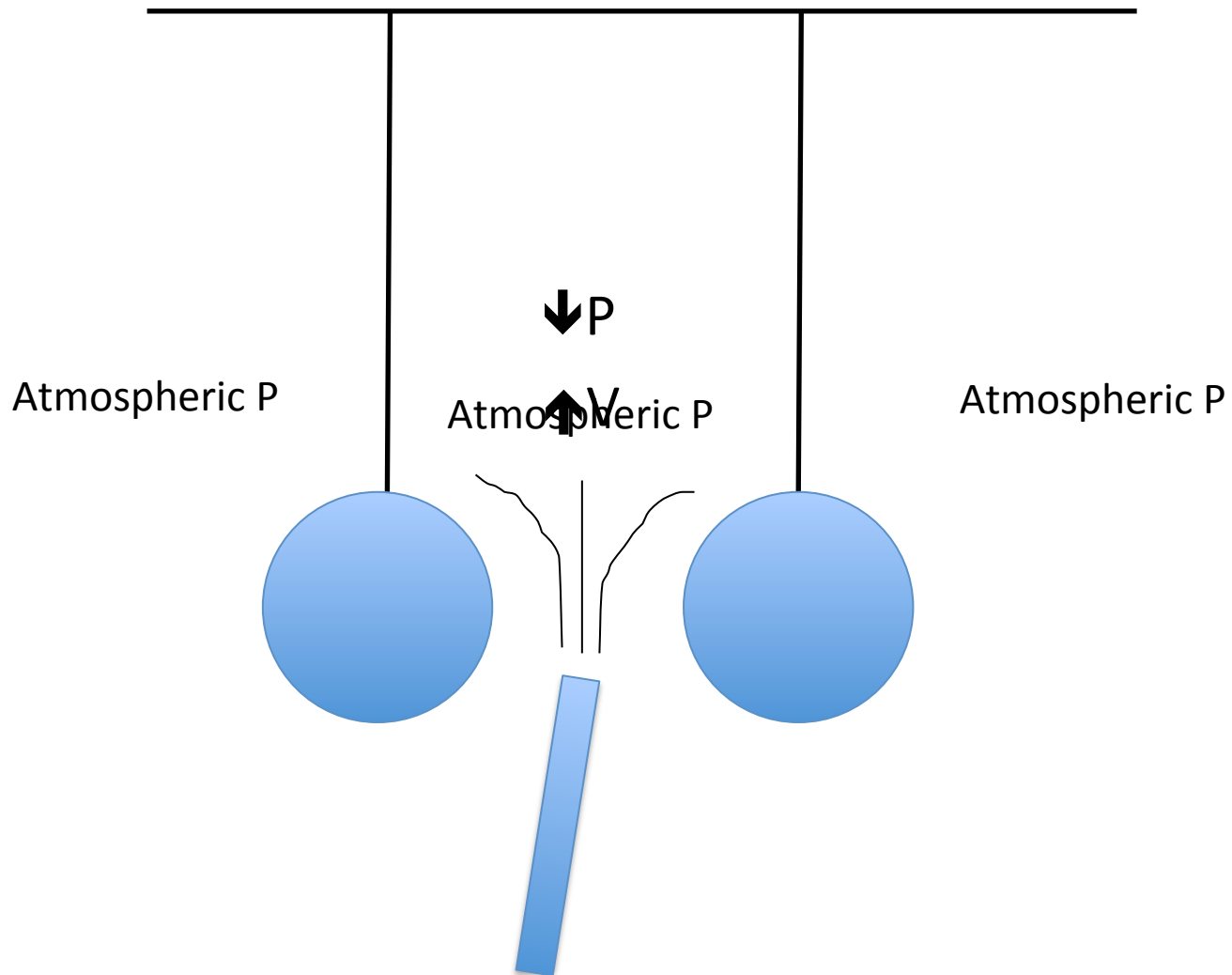
how planes fly



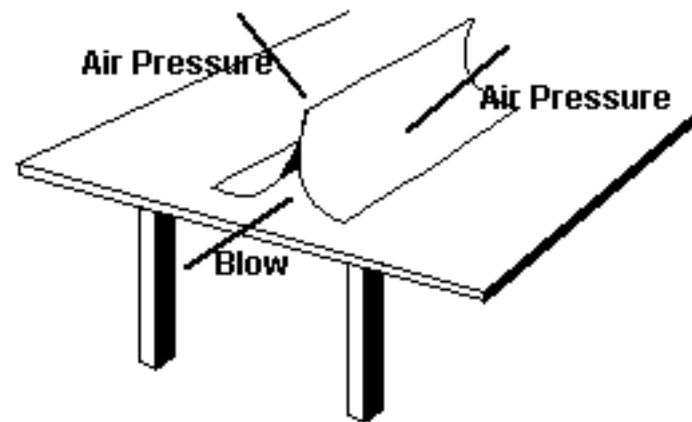
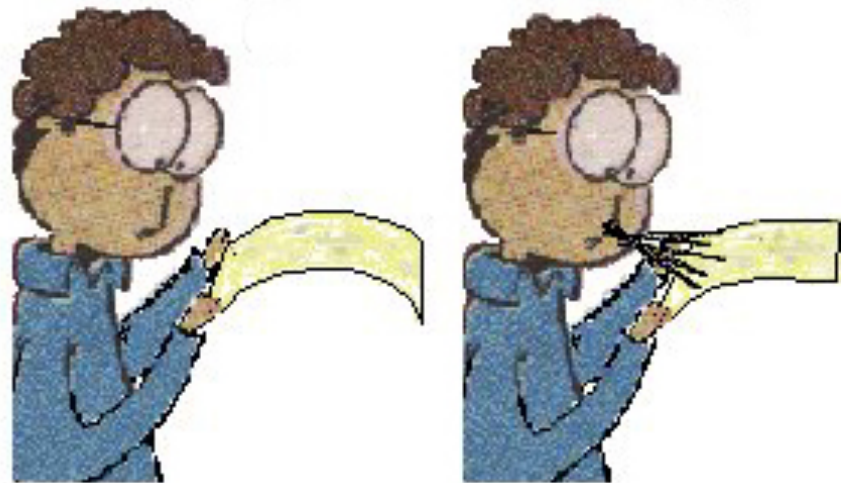
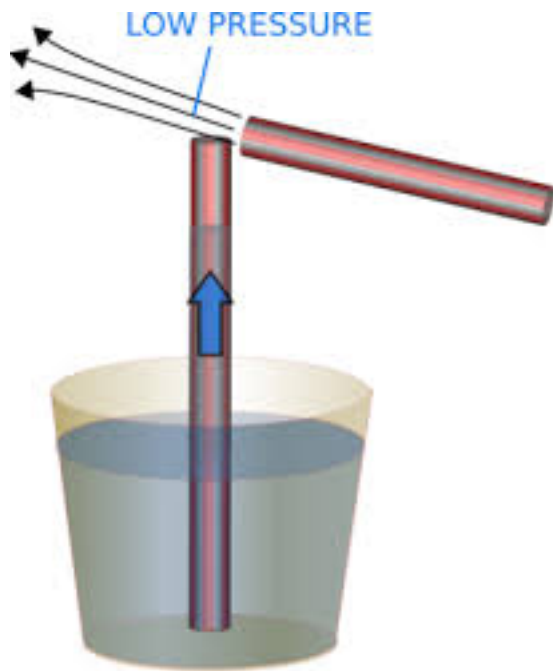
How Do Airplanes Fly?

- Bernoulli's principle:
 ↑ air speed (velocity, V) results in ↓ pressure (P)
- Let's do an experiment!

What happened?

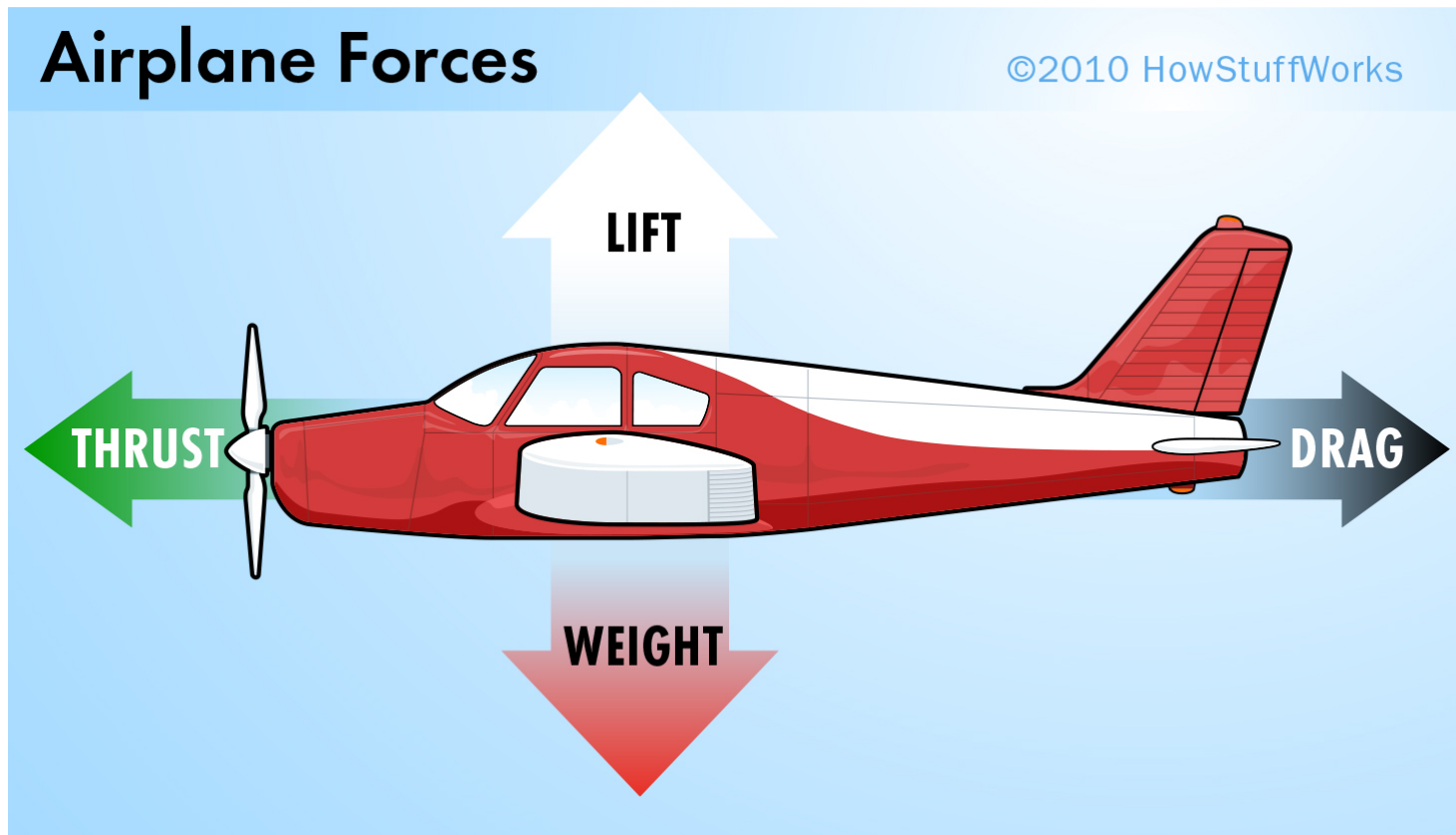


Other experiments you can try at home



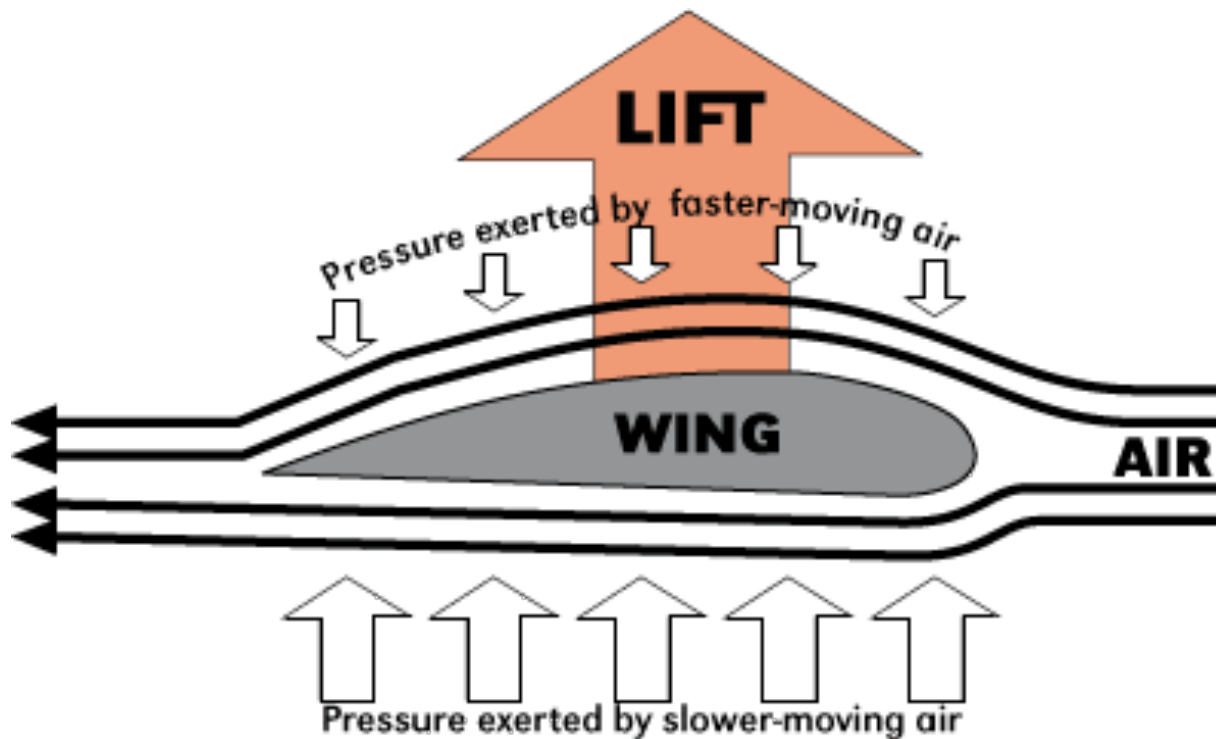
Lift

- Lift is what keeps the airplane in the air!

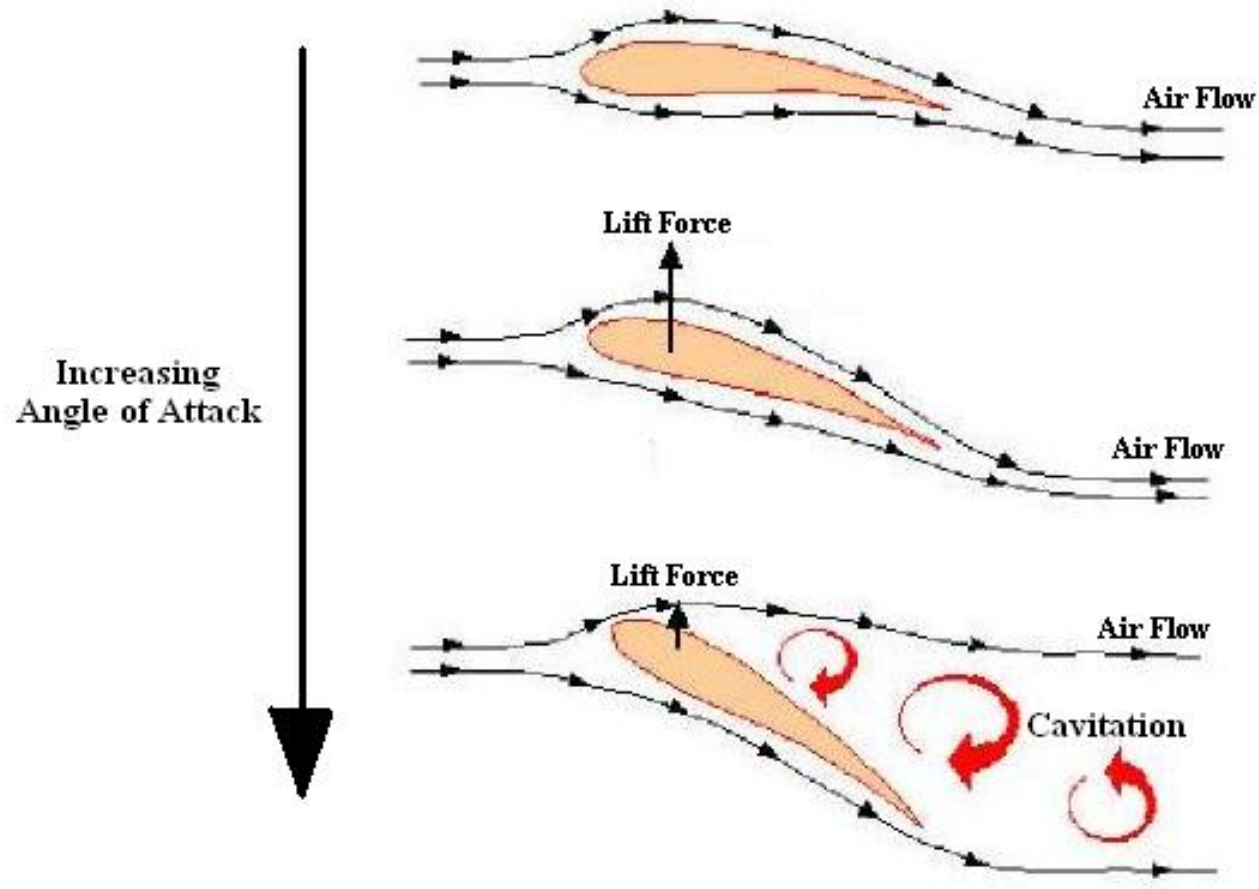


How wings produce lift

- The wing is shaped in such a way that the air moves faster over the top

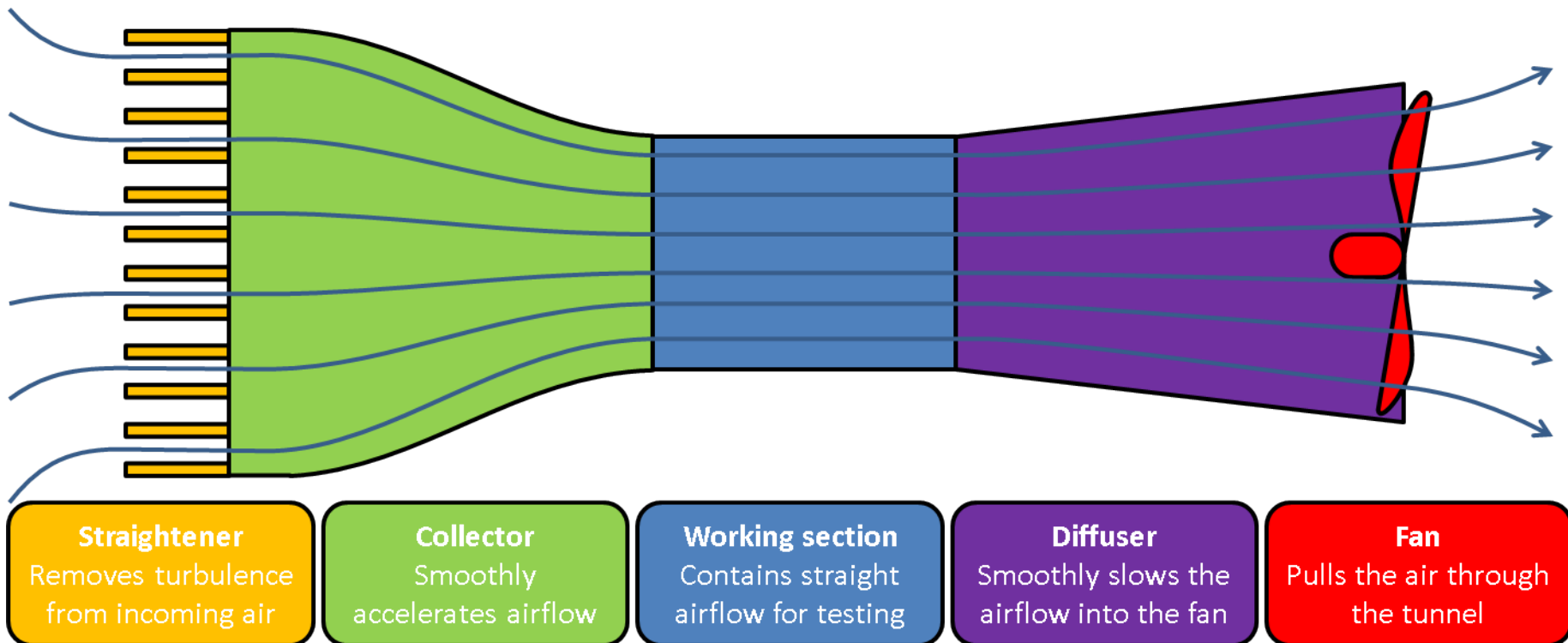


Angle of Attack and Lift



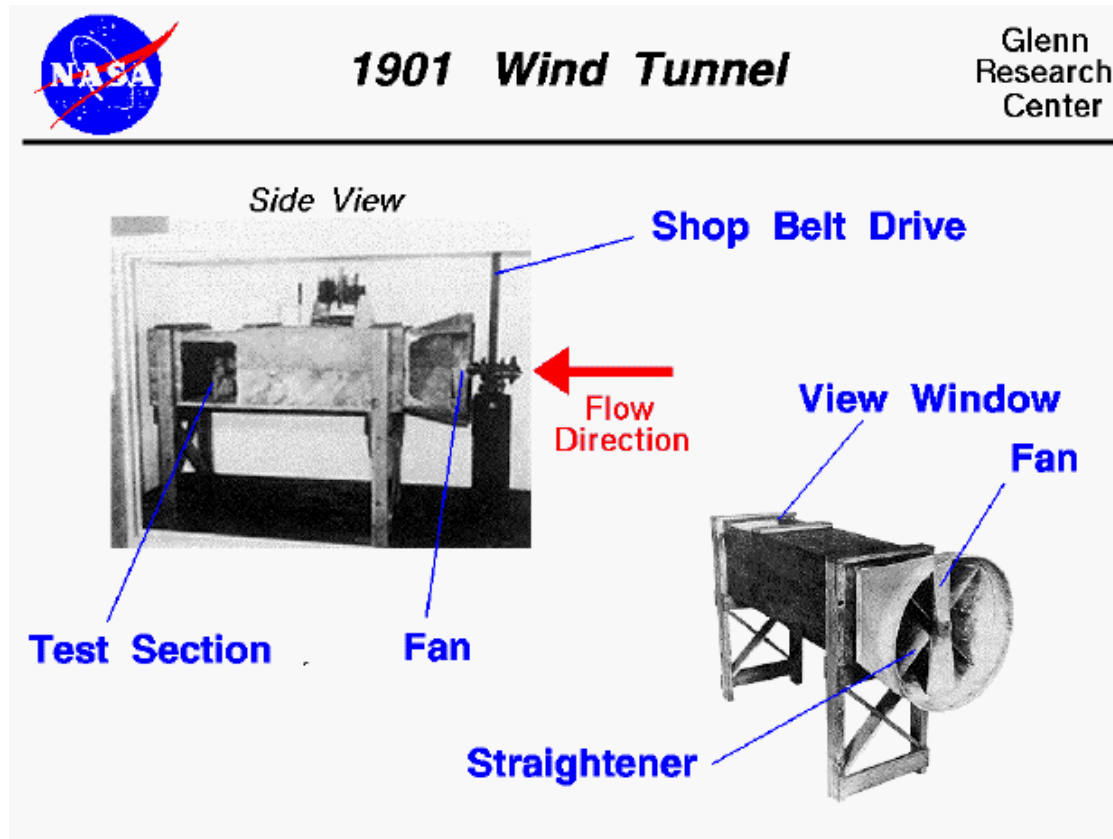
Wind Tunnel

- Wind tunnels help us study aerodynamics without doing expensive and complicated flight tests



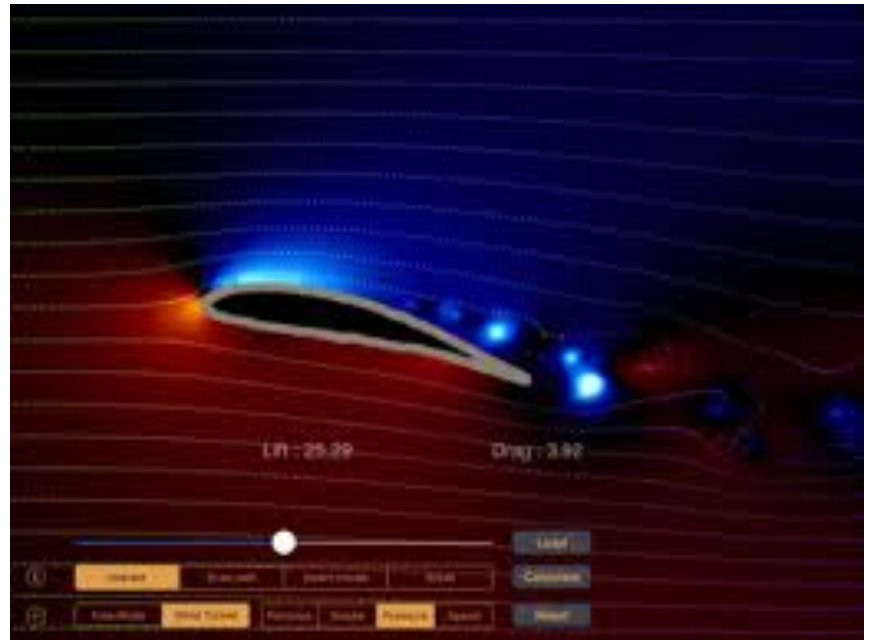
A little history...

- The Wright Brothers built a wind tunnel to measure lift and drag of different airfoil shapes after becoming frustrated with their flight testing results.



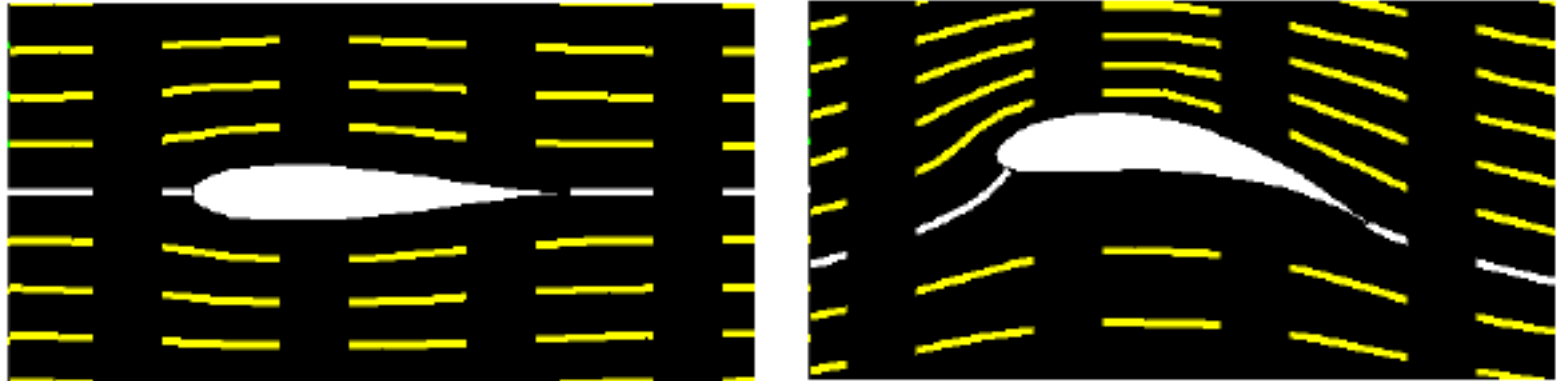
Your task

- Design and build an airfoil that produces lift (at $\sim$ zero degree angle of attack).
- If you have a smart phone, you can download the wind tunnel app (it's free!) to help with your design
 - Or you can take turns using mine



A few tips

- Flow turning is important



Flow turning at trailing edge is very important.

Higher Turning = Greater Lift

Wrap-up

- What did you observe?
- Which airfoils performed best. Why?
- What happened when we went to a high angle of attack?

