Advanced DataSnap™

Air Racer Student Engineering Workbook

Name: _____

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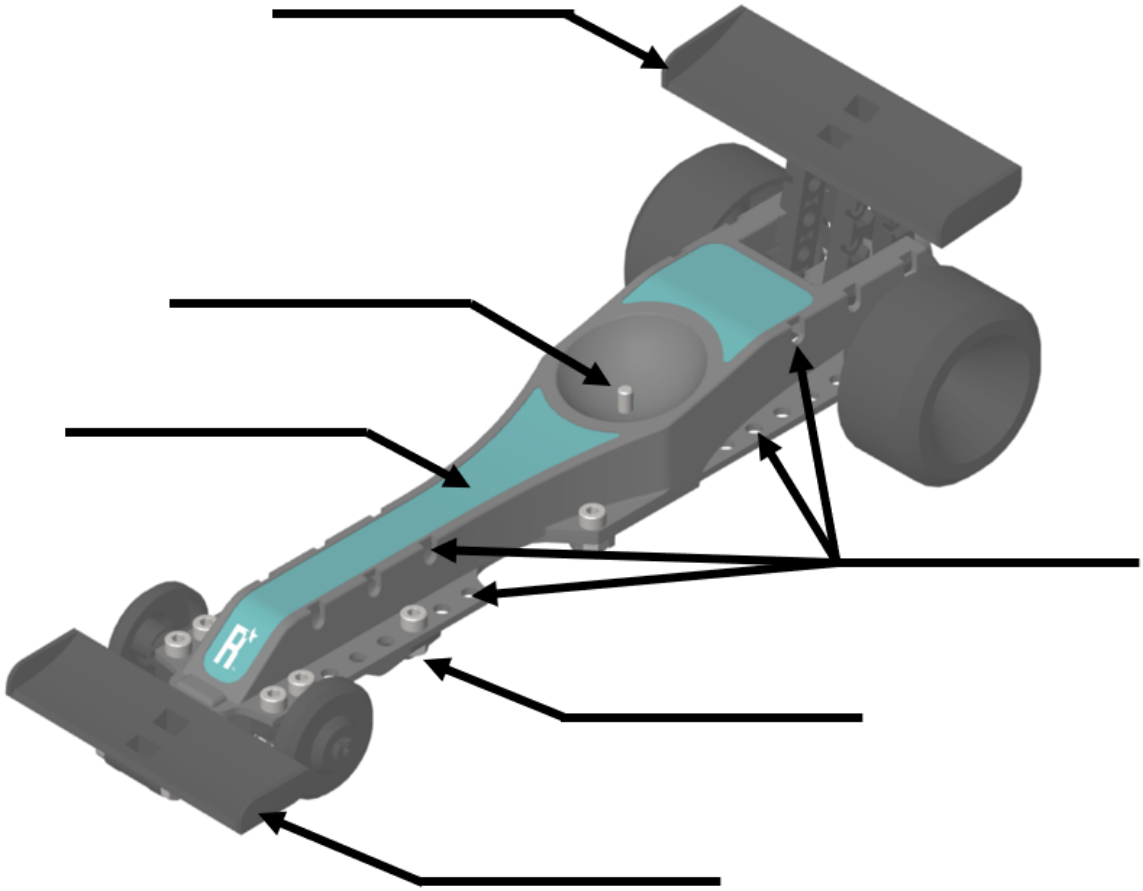
7. Label each component on the diagram:



8. Which components on a top fuel dragster do not exist on your Air Racer? What have they been replaced with?

9. What makes a system pneumatic?

12. **Plan Your Solution:** This is your team's first race, so focus your energy on making sure you understand how to use your Air Racer, Race System, and app that connects to the DatSnap Motion Sensor.

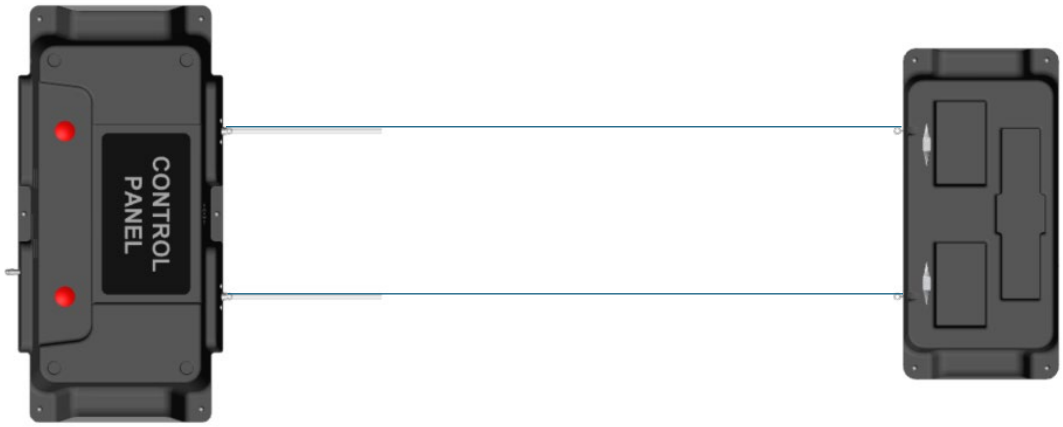
13. **Prototype It:** Have you double-checked that your Air Racer is rolling smoothly and the DataSnap Motion Sensor is sending data to your device?

14. **Test and Evaluate:** Complete 2 successful races with your Air Racer using the Race System and collect velocity and time data from the DataSnap Motion Sensor.

Trial	Average Velocity (m/s)	Maximum Velocity (m/s)	Race Time (sec)
1			
2			

15. Examining your data, what is the relationship between maximum velocity and race time? Writing in complete sentences, use your racer's data to support your answer.

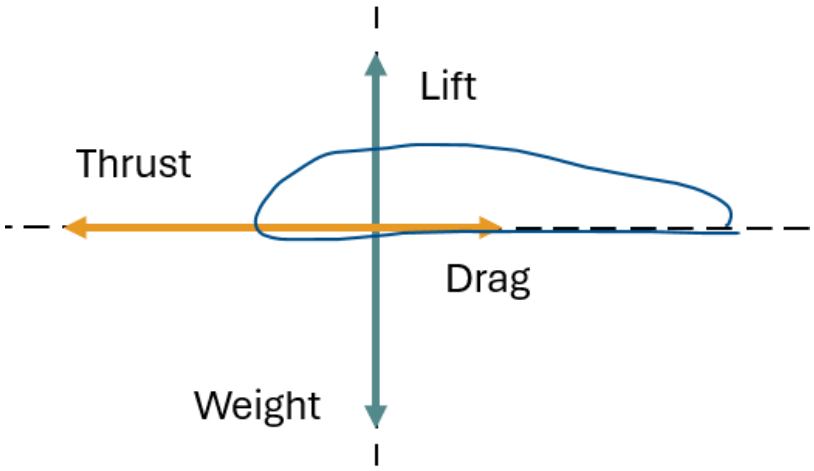
16. During a race, where on the track does the racer experience its maximum velocity? Label on this sketch where the racer achieves its maximum velocity.



17. Why do you think it happens there?

2. How does rolling friction help us explain why our cars slow down over time after being launched from the compressor?

3. On the airfoil drawing below, show where the lift and drag forces would act.



4. How might the wider tires on a top fuel drag racer affect the drag acting against the car?

5. What are the benefits of lift for a race car? What are the negatives?

6. What other aspects of a car's design can affect the lift and drag forces it experiences?

7. How can we manipulate the race car wings to change the downforce the car experiences?

Step 3

Plan Your Solution: In the space below, **sketch** the design for your solution. Annotate (add words, labels, arrows, short sentences) to help your sketch explain the reasoning behind your decisions.