



Air Racer Student Engineering Workbook

Name: _____



www.crexo.com



www.realityworks.com

Lesson 1:

Building the Racer

Instructions: As you follow the Lesson 1 slide presentation, complete the following questions.

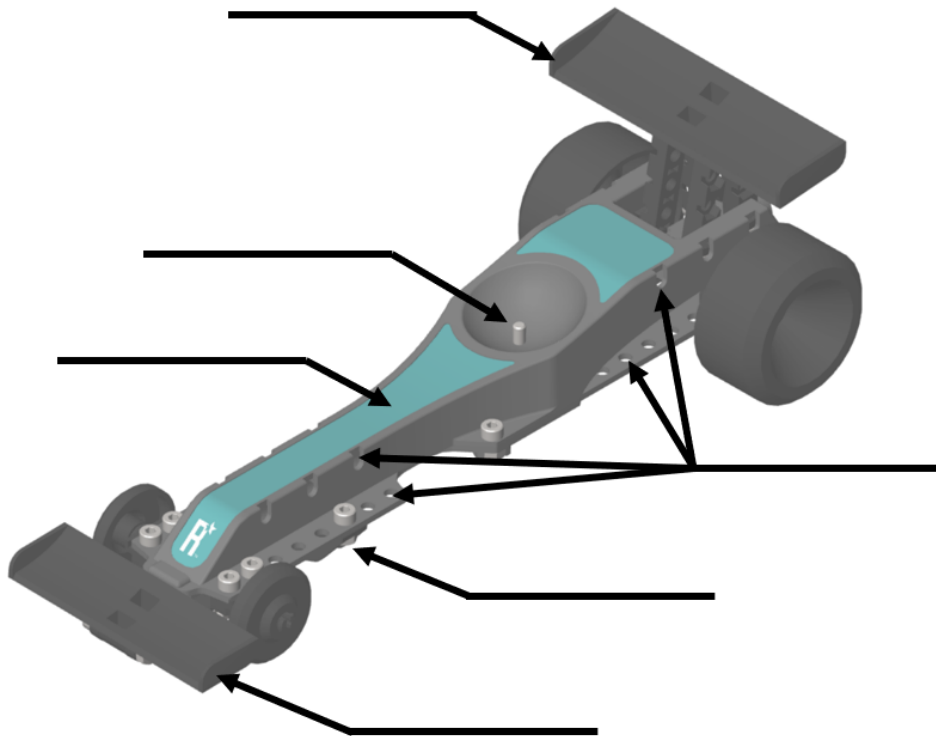
Introduce and Define

Introduction to Drag Racing

1. How far do drag racing cars typically race?
2. What is the purpose of the Christmas Tree?
3. If drag races are only $\frac{1}{4}$ of a mile, why does the drag strip have an additional $\frac{3}{4}$ of a mile of road after the finish line?

Top Fuel Dragsters

4. Label each component on the diagram:



Lesson 2:

Collecting Race Data

Instructions: As you follow the Lesson 2 slide presentation, complete the following questions.

Introduce and Define

1. What is velocity?
2. What is the difference between the Trial and Race modes on the launcher?
 - Trial:
 - Race:
3. Go to <https://datasnap.crexo.com/learn> to pair the DataSnap Motion Sensor.
4. When conducting a data-collection trial with the DataSnap Motion Sensor, what are the triggers that the sensor must recognize?
 - 1.
 - 2.
 - 3.
5. **Collect Race Data:** Complete 2 successful races with your Air Racer using the Race System and collect velocity and time data from the DataSnap Motion Sensor. Set the launch pressure to 70 psi.

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

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

Lesson 3:

Mass and Inertia

Instructions: As you follow the Lesson 3 slide presentation, complete the following questions.

Introduce and Define

1. Fill in the table as you learn about these concepts:

Term	Definition	Sketch/Note
Inertia		
Mass		
Newton's 1 st Law		

Explore

Activity 1: Mass and Inertia

Set the launch pressure to 70 psi. Complete 3 runs, each with a different number of washers added to increase the Air Racer's mass. Weigh your Air Racer to complete the chart.

Run Number	Number of Added Washers	Total Mass of Racer (grams)	Race Time (s)	Maximum Velocity (m/s)	Launch Acceleration (G)
1	0				
2	40 20 on each side				
3	80 40 on each side				

2. Which mass produced the greatest launch acceleration? Use data from the table to support your answer.

Lesson 8:

Engineering Design Challenges

Instructions: As you follow the Lesson 8 slide presentation, complete the following questions.

Introduce and Define

1. Fill in the blanks of the Engineering Design Process Diagram.

