DataSnap™

Impact Student Engineering Workbook

Name: _____

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Lesson 1:

Distance and Time

Instructions: Complete the following questions as you follow the Lesson 1 slide presentation. Look for the workbook icon in the bottom-left corner of a slide—this means there is a question to answer.

Introduce and Define

1. What is motion?

2. Which ball will roll into the wall first? Why do you think this?

3. Define:

Term	Definition
Distance	
Time	

4. How would the distance and time **change** when you make a round trip?

Lesson 3:

Acceleration and Gravity

Instructions: Complete the following questions as you follow the Lesson 3 slide presentation. Look for the workbook icon in the bottom-left corner of a slide—this means there is a question to answer.

Introduce and Define

1. What is acceleration?

2. Why does acceleration happen?

3. What is gravity?

4. What does Earth's gravity do to objects in freefall?

Explore: Gravitational Freefall

5. Record the data from the app after each trial.

Drop Height	Drop Distance (meters)	Drop Time (seconds)	Maximum Velocity (m/s)
Example	0.50 m	0.32 s	3.1 m/s
0.5 m			
0.75 m			
1.0 m			

4. Imagine This: Hold the Impact Ship 2 meters above the floor and let go.
    a. How will the impact from a 2-meter-high drop be different from the 1-meter drop?

    b. How does the concept of inertia explain this phenomenon?

5. What is impact force?

6. Explore the relationship between drop height and impact force. Record data in this table:

Drop Height	Measured Drop Distance (meters)	Maximum Velocity (m/s)	Impact Force (N)
Example	**0.52 m**	**3.1 m/s down**	**107 N**
0.5 m			
1.25 m			
2.0 m			

7. Test and Evaluate:
    a. **Conclude:** What is the relationship between drop height and impact force? Support your answer using the data gathered.

    b. **Make a Prediction:** What would the impact force be if dropped from twice the maximum height?

    c. **Ideate:** What are three ways your team could modify the Impact Ship to reduce the impact force?

Lesson 5:

Protect the Astronaut

Instructions: As you follow the Lesson 5 slide presentation, complete the following questions.

NASA Video Questions

1. After watching the video, what are five ways that engineers reduce the potential harm that might happen to humans in a crash?

2. What is the goal of gathering data with the crash test dummies?

Engineering Design Process

3. What does it mean to be an iterative process?

4. Build your understanding of each step of the Engineering Design Process by filling in the table below:

Step	Name of Step	Description of Step
1		
2		
3		
4		
5		