

# Engineering and Design:

## Testing and Improving Designs

In this lesson, students will discover the significance of SpaceX's Starship test flights for enhancing designs in future projects.

Grades: 3-5		Subject: ELA & Science
Focus Standard(s)	RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. ETS1.B: Developing Possible Solutions Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.	
Learning Objective	Students will understand the significance of SpaceX's Starship test flights and the concept of testing and improving designs. Students will be able to identify text evidence to support the claim that the exploding rocket, Starship, mission was a success.	
Materials/Resources	<a href="#">Starship Test Flight Reaches Space</a> (Level 2) <a href="#">Starship Test Flight Reaches Space</a> (Level 3) Accompanying questions; pencil; highlighter	
Vocabulary	Reliability: the act of performing well consistently; initial: first; altitude: height above a planet's surface; analyze: study something closely to gain information from it	
Essential Questions(s)	What makes someone or something successful? Would something that fails be considered a success? How do engineers improve their designs for solving real-world problems?	
Anticipatory Set	Ask students: "What do you think makes an event or a mission successful?" Then ask students: "If a space rocket exploded in the air, would it still be considered a successful mission? Why or Why not?"	
Mini-lesson/Guided Practice	<ul style="list-style-type: none"><li>• Distribute copies of the text to students or have them use their personal devices.</li><li>• Allow students time to silently read the article to get a general understanding of its content.</li><li>• After students have skimmed the article, have them work in pairs, underlining or highlighting phrases that provide evidence supporting the claim that the mission was a success.</li></ul>	
Independent Practice	Option A: Students can answer the questions below. Option B: For individual account users, create an assignment and include the provided customized questions for students to answer.	
Assessment (closure)	Ask students to reflect upon a time where they may have failed at something, but still felt successful in the end.	
Differentiation	Adjust lexile® levels as needed; answer questions as a whole group; use accessibility features or read-to-me feature as needed; print copies of article	

Name: \_\_\_\_\_

Article: Starship Test Flight Reaches Space

Directions: Answer the following questions in complete sentences. Use evidence from the text to support your answer.

1. What evidence from the text can you quote to support the statement that SpaceX officials considered the test flight a success despite the rocket explosion?
2. Based on the text, what inference can you make about the purpose of SpaceX's Starship test flights?
3. Provide a direct quote from the text that illustrates how SpaceX plans to use the data from the test flights to improve the Starship rocket design.

## Answer Key

### Article: Starship Test Flight Reaches Space

Directions: Answer the following questions in complete sentences. Use evidence from the text to support your answer.

1. What evidence from the text can you quote to support the statement that SpaceX officials considered the test flight a success despite the rocket explosion?

Despite the explosion, SpaceX officials are saying that the mission was a success.

“With a test like this, success comes from what we learn,” said SpaceX in a statement after the explosion. “And today’s test will help us improve Starship’s reliability.”

She called the explosion of the rocket “a rapid, unscheduled disassembly.” Yet she added, “We got so much data, and that will all help us improve for the next flight.”

2. Based on the text, what inference can you make about the purpose of SpaceX's Starship test flights?

The engineers are endeavoring to enhance the design of the rocketship. To achieve this, they conduct tests throughout the process, collect and analyze data, and implement new solutions. The purpose of SpaceX's Starship test flights is to develop a safe and reliable rocketship capable of sending humans to space.

3. Provide a direct quote from the text that illustrates how SpaceX plans to use the data from the test flights to improve the Starship rocket design.

“Then they constructed explanations and designed solutions for the next test flight.”

“Now workers will again study the results from a test launch. And once again, they will work to improve the process so the *next* launch will be even better.”