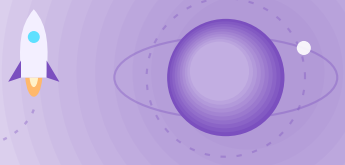
LESSON T1-04 · TIER 1 · ANATOMY, FORCE & STABILITY

Fuel Moves the Balance

GRADES 6-12



Name _____ Date _____ Class / Period _____

A balance that moves

A rocket burns fuel, so it gets lighter, and the balance point moves as the heavy fuel goes. That can make a steady rocket wobbly, or the other way round. Change one thing at a time to see what really matters.

Mission goal: find out how the order of burning the fuel changes the balance.

1 LOOK

OBSERVE BEFORE YOU TOUCH A CONTROL

Step 1 · Burn the bottom tank first

- This rocket carries _____ kg of fuel in tanks stacked one above the other. Its balance number at the start is _____ calibres.
- Above zero means steady, below zero means wobbly. A calibre is one rocket-width.

Step 2 · Burn the top tank first

- This time the heavy bottom tank stays full while the top tank empties first.
- It starts with the same balance number as before, _____ calibres.

Write the numbers shown in the sim in the blanks above, then record what you notice:

2 PREDICT

COMMIT TO A HYPOTHESIS FIRST

Prediction 1. Imagine the engine burns the bottom tank first. As the fuel drains, does the rocket's balance flip between steady and wobbly?

Hint: The balance number is positive when the rocket is steady and negative when it is wobbly. Fuel is heavy, so burning it moves the balance point.

□ Yes, the balance flips

□ No, the balance never flips

Because...

Prediction 2. Now imagine the engine burns the top tank first instead. Does the balance flip this time?
Hint: Same rocket, same fuel, only the order is different. Think about where the heavy fuel stays.

□ No, the balance never flips

□ Yes, the balance flips

Because...

3 EXPERIMENT

CHANGE ONE VARIABLE AT A TIME

Step 1. Press **[Space]** to light the engine and **[Z]** for full throttle. Press **[T]** to turn on the steering assist so the rocket stays pointing up. Keep burning until the bottom tank runs dry.

Step 2. Read the numbers, then press Got it. If the engine is still on, press **[X]** to cut it.

Trial	What I changed	What I measured / saw	Matched my prediction?
1			Yes · No · Partly
2			Yes · No · Partly
3			Yes · No · Partly

4 EXPLAIN

CLAIM · EVIDENCE · REASONING

Claim — What did you find out? (answer the mission goal in one sentence)

Evidence — Which numbers or observations from the sim support your claim?

Reasoning — Which science idea connects your evidence to your claim?

Self-check: □ I made a prediction before experimenting □ I used numbers from the sim □ I explained *why*, not just *what*