

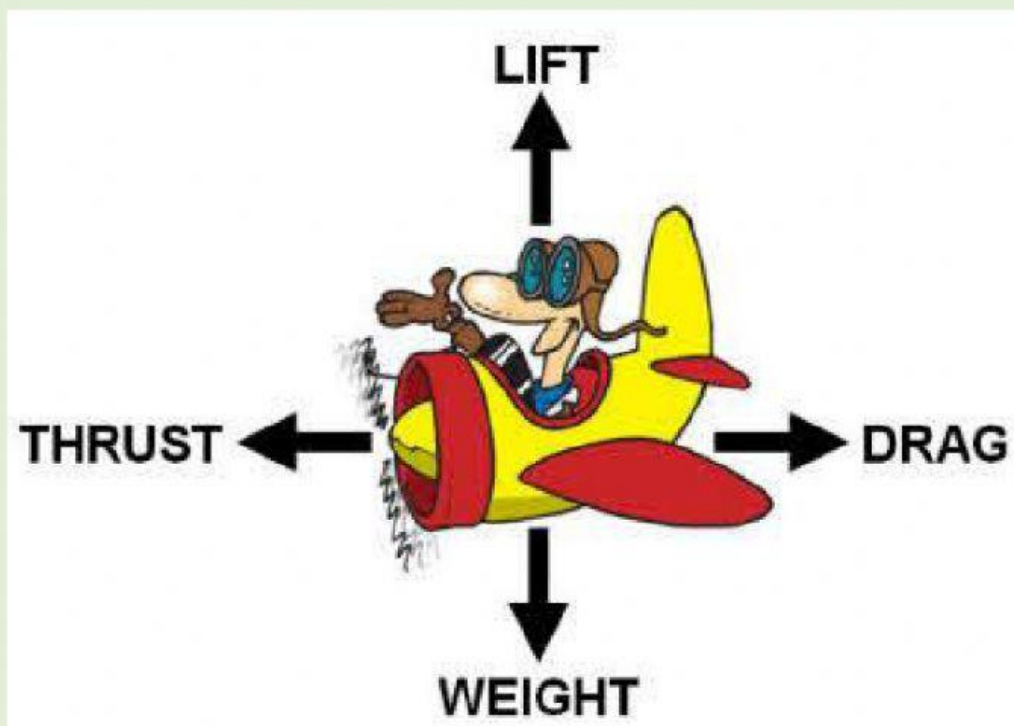


## SCIENCE

### CHAPTER 8-MOTION, FORCES AND DESIGN PROCESS

#### LESSON 2- FORCES AND TRANSPORTATION

#### PART 1



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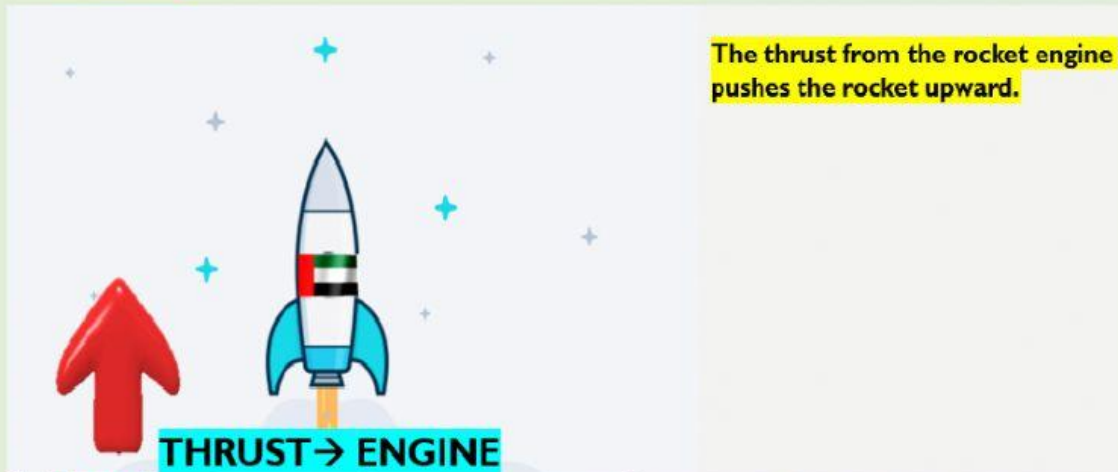
# HOW DO ROCKET FLY IN SPACE?

❖ There are 2 type of forces acting on the rocket→

-THRUST

-DRAG

❖ **THRUST** is a force that moves an object forward



❖ **DRAG** is a force that moves against motion of an object- slows it down.

**DRAG → AIR**

**PG NO 381 IN YOUR BOOK**

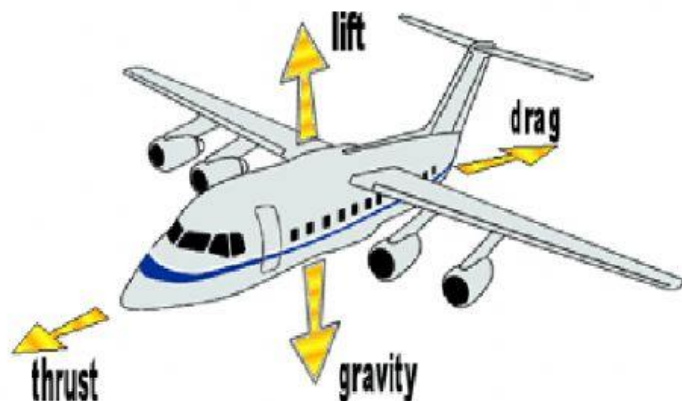


## WATCH EXPERIMENT ABOUT FORCES ACTING ON A ROCKET

## HOW DO AIRPLANE FLY IN SKY?

### Four forces of flight

**Lift** - upward  
**Drag** - backward  
**Weight** - downward  
**Thrust** - forward



- ❖ Airplanes use the force of LIFT to fly
- ❖ LIFT is the force that holds objects in air
- ❖ **Two things are needed for an airplane to have lift →**

1. Plane must be moving forward

2. Moving air must push against the bottom of the wing

- ❖ Gravity slows the takeoff of the plane.
- ❖ Drag also affects the plane's motion.

### **FOUR FORCES OF FLIGHT**

### **FOUR FORCES OF FLIGHT SONG**

## PRACTICE QUESTIONS:

- 1.** How are thrust and drag alike?  
How are they different?

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- 2.** There is no air in space, and little gravity. How will this affect the motion of a rocket?

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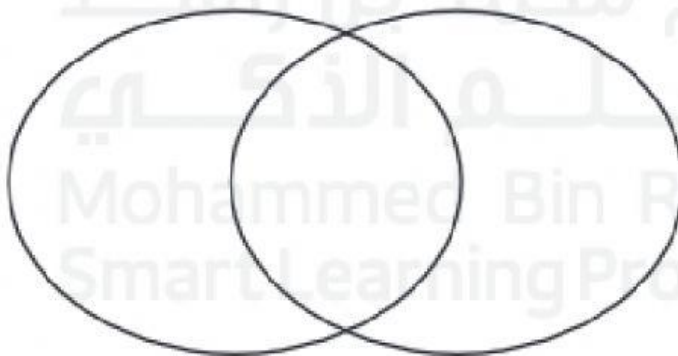
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- 3.** How does the motion of an airplane compare to the motion of a rocket?

Airplane

Both

Rocket



- 4.** Why is an engine needed to make an airplane fly?

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TYPE YOUR ANSWER

5. **Test Prep** What slows down the movement of a plane?

- A thrust
- B drag
- C buoyancy
- D lift

6. Which two forces slow an airplane's motion as it rises into the air?

- A thrust and lift
- B thrust and drag
- C drag and lift
- D drag and gravity

7. Students have each created their own designs for cargo boats. Which would work best to test their designs?

- A Put the boats in water to see which float and which sink.
- B Put the boats in water and add weights to see which can hold the most weight before sinking.
- C Weigh and measure each boat and then place them in water to see which sink and which float.
- D Have students vote on the best design.

8. The table below shows the weights of different drone prototypes. On which object is the pull of gravity strongest?

| Object  | Weight (N) |
|---------|------------|
| Drone A | 12.5       |
| Drone B | 10.2       |
| Drone C | 12.3       |
| Drone D | 7.6        |

- A Drone A
- B Drone B
- C Drone C
- D Drone D

9. The table below shows direction of the forces acting on a rocket that is moving forward. Engineers need to increase the forward velocity of the rocket.

| Force   | Weight (N) |
|---------|------------|
| gravity | down       |
| drag    | backward   |
| thrust  | forward    |

Which change should engineers make?

- A increase drag
- B increase thrust
- C decrease thrust
- D increase gravity

## **LAB BASED QUESTIONS**



**CLICK ON**  
**YELLOW ICON**  
**TO OPEN**  
**VIRTUAL LAB**  
**ABOUT THRUST**  
**AND DRAG**

### **PRACTICE QUESTIONS:**

1. Air drag slows down the rocket sled.
  - a. YES
  - b. NO
2. Thrust \_\_\_\_\_ the speed of the rocket sled.
  - a. INCREASE
  - b. DECREASE
3. Friction slows down the rocket sled.
  - a. YES
  - b. NO