

Look & Wonder:

Force cause moving: oarsمجاديف, enginesمحركات, wind. **Force cause slow:** Water currentsتيارات مائية

Essential question: By using vehicles which use thrust lift and buoyancy to overcome gravity, drag and friction. .

The Lesson

How do rockets fly into space? كيف يطير الصاروخ للفضاء

Rockets صاروخ use a special force called thrust. الدفع **Thrust** is the force that moves an object forward. It can be a pushing or a pulling force.

The rocket's thrust must be stronger than gravity.

Two forces against **rocket's thrust:** Gravity & Drag. قوتان تعاكسان قوة دفع الصاروخ: الجاذبية والسحب

Drag السحب Force works against the motion of an object moving through a liquid or a gas.

✓ **1- Quick Check:** 1-Thrust and drag both forces acting on the rocket, put on opposite directions.

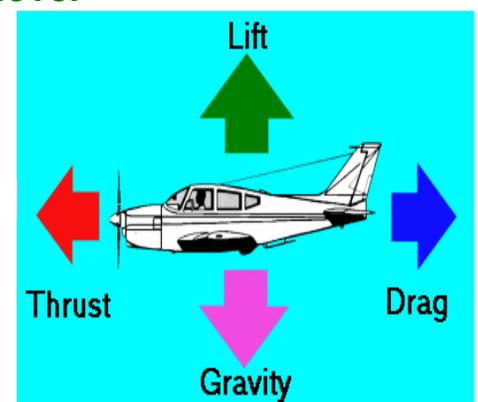
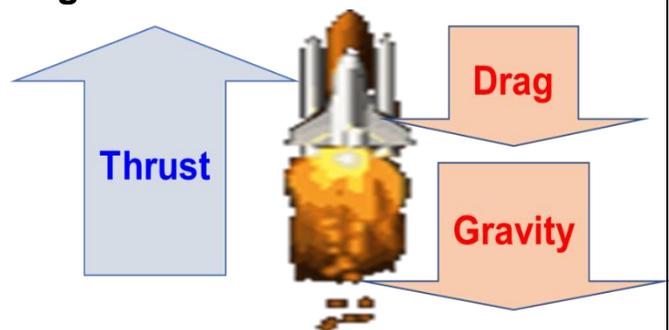
✓ **2- Quick Check:** The rocket will require less force to move.

How do airplanes fly?

the airplane uses **Lift** الرفع : is the force holds an object in the air, keeps it from falling.

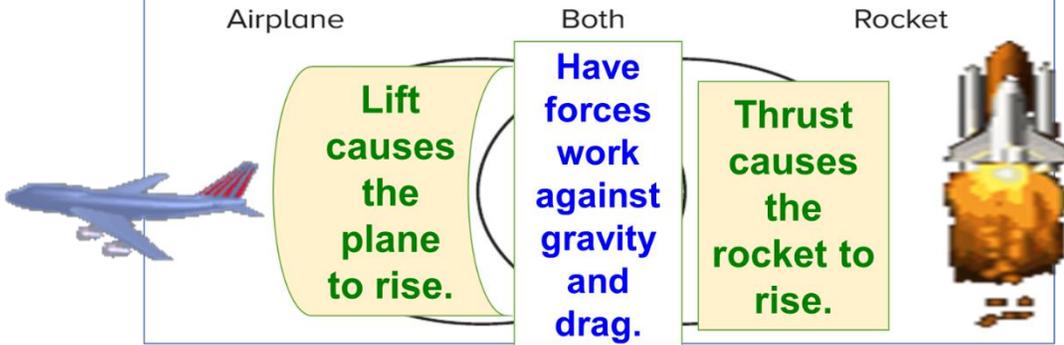
How can airplane lift? First, by thrust. Second, the moving air must push against the bottom of the wing. The shape of the plane's wings helps create lift.

Tow forces slow airplane: Gravity & Drag. And flat surfaces of the plane hit the air and slow the plane's motion.



✓ **Quick Check**

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



✓ **4- Quick Check**

4-Lift causes the plane to rise.

How do we use friction to stop and go? What makes bicycle or car stop?

By Friction قوة الاحتكاك is a force that works against motion. Friction is caused when two objects are in contact with each other.

يحدث الاحتكاك عندما يكون هناك جسمان على اتصال مع بعضهما البعض

On your bicycle, these objects are the wheel العجلة, the axle محور العجلة and the tire اطار العجلة, and the surface السطح

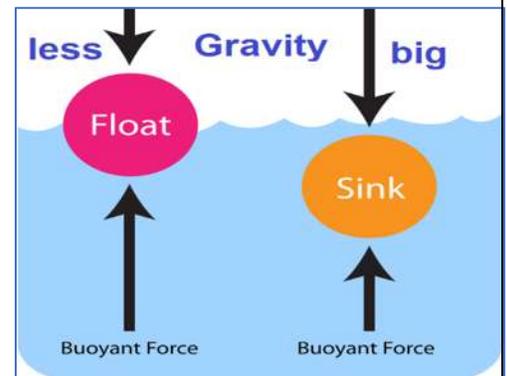
Friction is needed for motion. Without friction the train would never be able to move. The friction between the wheels and the rails القضبان moves the train. This type of friction is called traction احتكاك الجر او السحب الذي يحدث بين عجلات القطار وقضبان السكة الحديدية

✓ **5- Quick Check:** 5-Friction give opposing force need for motion to start. It also give opposing force need to slow and stopping.

How do boats float?

Boats float because a force is pushing them up, this force is **buoyancy** الطفو. Gravity is the force that works against buoyancy.

Boat with more cargo will sink because gravity more greater than buoyancy. السفن او القوارب ذات الحمولة الكبيرة جدا سوف تغرق بسبب ازدياد قوة الجاذبية على قوة الطفو مسبباً غرق السفن والقوارب.



Read A Photo: Both are forces that work against gravity force.

How do planes, boats, and cars control their motion?

1- **In airplane:** To increase the lift of an airplane, a pilot increases the thrust, adjusts the flaps on the wing, if lowering the thrust can cause the airplane to lose altitude. تفقد الطائرة ارتفاعها اذا قلل الطيار من قوة الدفع.

2- **In Boat:** A boat's provides thrust to move it forward. The rudder steers the boat. It does this by changing the direction of the thrust.

يوجه الدفة القارب. ويفعل ذلك عن طريق تغيير اتجاه الدفع.

3- **In Car:** When the driver of a car turns the steering wheel to the left, the wheels point to the left. Traction with the road turns the car in that direction. الجر مع الطريق يحول السيارة في هذا الاتجاه.

With all vehicles, the forces that cause motion also control it.