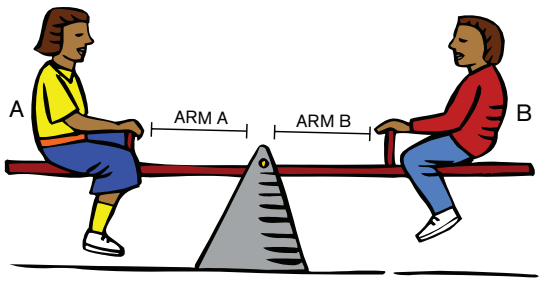
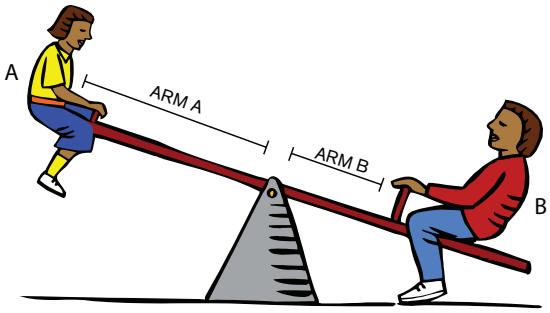
ACTIVITY: Weight and Balance

Name: _____

/ 15

AS ON A TEETER-TOTTER, ALL WEIGHTS IN AN AIRPLANE (OCCUPANTS, FUEL, CARGO) MUST BE BALANCED.





On a teeter-totter, the point where the weight of each child is balanced is called the **fulcrum**. Balancing the teeter-totter is determined by the product of: 1. the weight of each child 2. the distance of each child from the fulcrum.

(weight of Child A x Arm A = weight of Child B x Arm B)

On an airplane, the fulcrum is called the **center of gravity (CG)**. It reflects the sum of a number of weights along the length of the plane (like having several children on one side of the teeter-totter, not just one!) Some of these weights include:

1. the pilot and front seat passenger
2. the back seat passengers
3. cargo/baggage behind the back seat
4. the weight of fuel in the wings
5. the weight of the plane itself

Because the engine (in front) is the heaviest part of a plane, most of these varying weights are on or behind the plane's center of gravity (at the wing).

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CIRCLE ONE OR FILL IN THE BLANKS:

1. The point where a teeter-totter rests is called a fulcrum. **TRUE / FALSE**

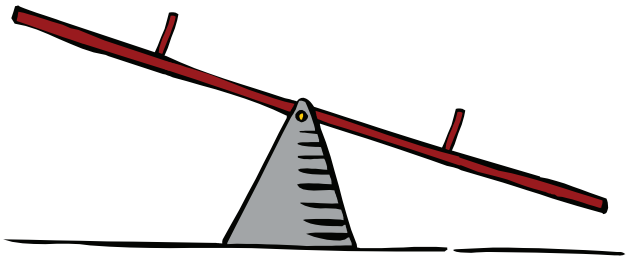
2. Kathryn and Kim each weigh 85 pounds they are sitting equally far from the center of the teeter-totter, they will B __ __ __ __ __ __ each other.

3. Jeffrey weighs 95 pounds and Jennifer weighs 72 pounds. Jennifer will have to sit **CLOSER / FARTHER AWAY** from the center than Jeffrey to counter-balance Jeffrey's weight.

4. The distance from the center of balance (fulcrum) to the weight of each child is call the A __ __.

5. Two factors determine if each child will be in balance:
A. the child's W __ __ __ __ __ and
B. the distance to the center of balance (__ __ M)

6. The one point on a beam (like our teeter-totter) where all weights and distances balance is called the fulcrum. In an airplane, it is called the center of G __ __ __ __ __ __.



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CIRCLE ONE OR FILL IN THE BLANKS:

1. In the air, the weight of the plane, its equipment and all the people, cargo and fuel in it have one __ E __ __ __ __ of __ __ __ __ I __ __.

2. In the air, the center of gravity is somewhere along the W __ __ __, where the center of lift also is located.

3. The engine in the very front of the plane is one of the heaviest parts of the plane. No wonder the distance from the engine to the wing is **SHORTER / LONGER** than the distance from the wing to the tail.

4. The plane's front seats and fuel in the wings are very close to the center of gravity and the center of lift.

A. Carrying a heavier pilot and passenger in the front seats will likely have **A LARGE / A SMALL** effect on the balance of the airplane.

B. Carrying more fuel will add weight, but will have **A LARGE / ALMOST NO** effect on the balance of the airplane.

5. The passenger seats are in the rear of the plane, and the cargo bin is even further back (behind the rear seats and well behind the wing).

A. Carrying passengers in the rear seats will likely have an effect on the plane's balance. **TRUE / FALSE**

B. Carrying a little cargo in the cargo bin will have no effect on the plane's balance. **TRUE / FALSE**

6. The safe flight of an airplane depends on both __ __ __ G __ __ and __ __ L __ __ __ __ .