



LEAFS 2021: Civil

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Forces 101


- ◎ A force is a push or pull on an object
- ◎ For bridges, the distribution of forces are the most important:
 - Brainstorm the forces that might be applied on a bridge (i.e. weight of the cars)



Newton's Three Laws of Motion



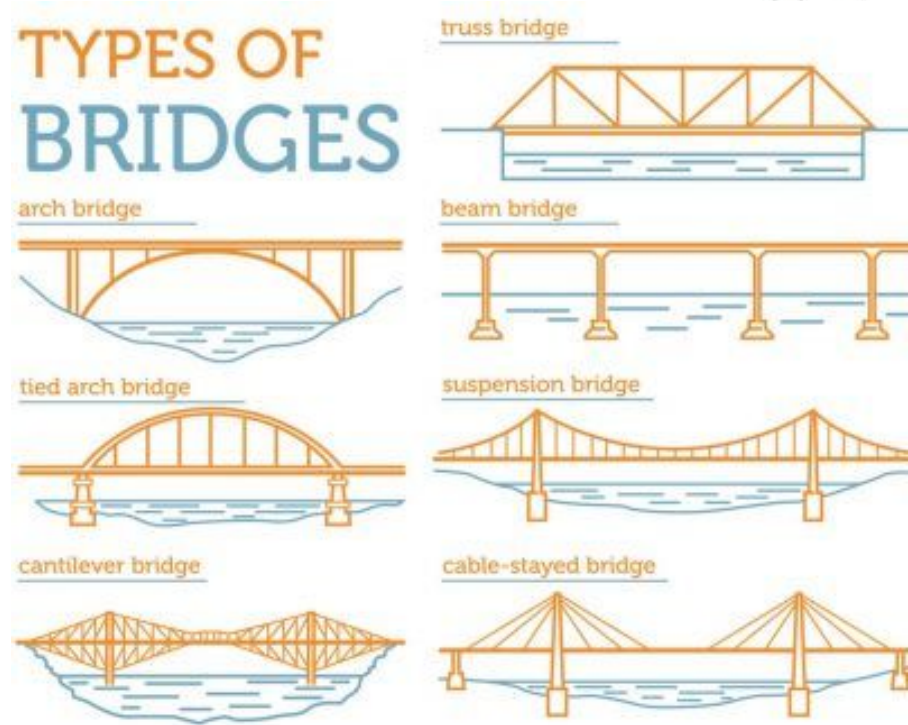
Newton's 3 laws of Motion

- 1st Law: Objects in motion stay in motion, and objects at rest stay at rest unless acted upon by an external force
 - 2nd Law: Acceleration of an object depends on two things, force and mass. (Does a bridge accelerate?)
 - 3rd: For every action, there is an equal and opposite reaction
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Shapes of Bridges

Factors that affect the shape of the bridge:

- Distance
- Terrain
- The object of transport (trains, cars, pedestrians, etc.)



Beam Bridges

- ◎ Rigid horizontal structure
- ◎ Requires support (pillars) between distances
- ◎ Great for short distances



Arch Bridges

- ◎ Great for crossing distances where it is difficult to build midway supports
- ◎ The shape balances the weight of loads throughout the arch
- ◎ Has a finite span length



Truss Bridge

- ◎ A lightweight structure
- ◎ Very good at bearing loads
- ◎ Can cover long and short distances well



Truss Bridges Activities

