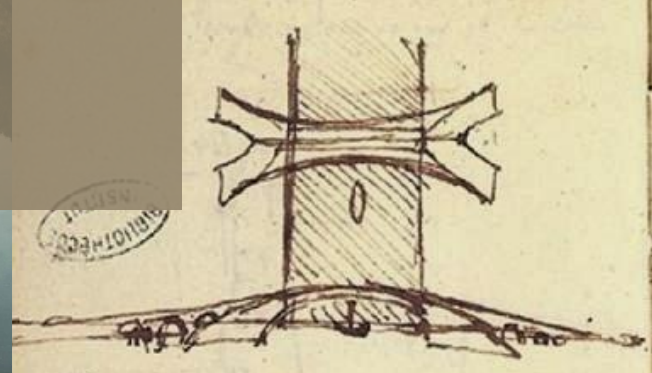


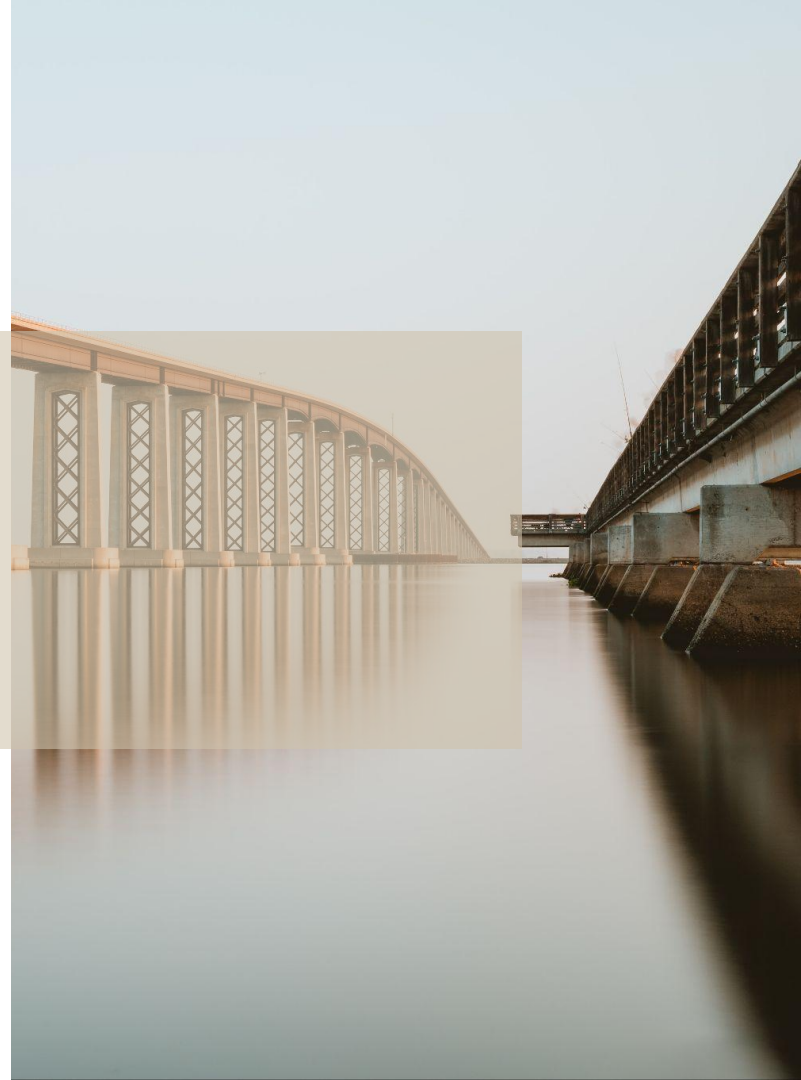
DAVINCI BRIDGE WORKSHOP

MYO Fall 2021



INTRODUCTIONS

- Name
 - Year & Major
- Why STEM/engineering?



DaVinci

- Born 1452
- Italian engineer, scientist, & artist
- Lengthy resume, many designs & projects



BACKGROUND

A Challenge

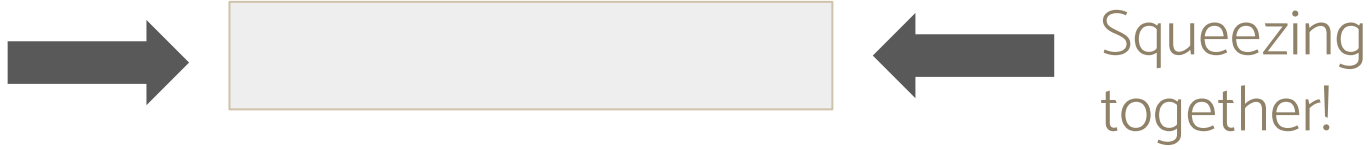
- Sultan Bayezid II of the Ottoman Empire
- Constantinople to Galata over Golden Horn estuary

The Bridge

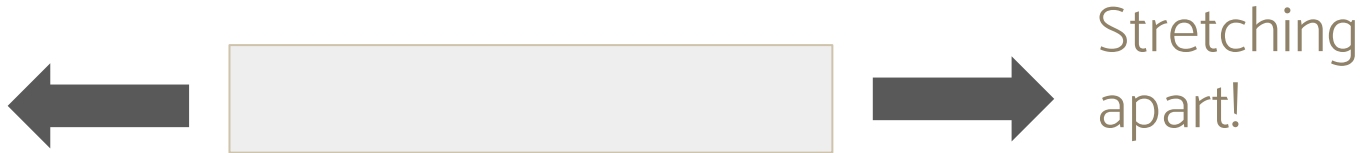
- Rejected for unorthodox design
- No fasteners
- Would have been longest at the time

THEORY

Compression



Tension



- this type of bridge held together by compression
- added weight strengthens to an extent
- unbound joints allowed to move less

Force

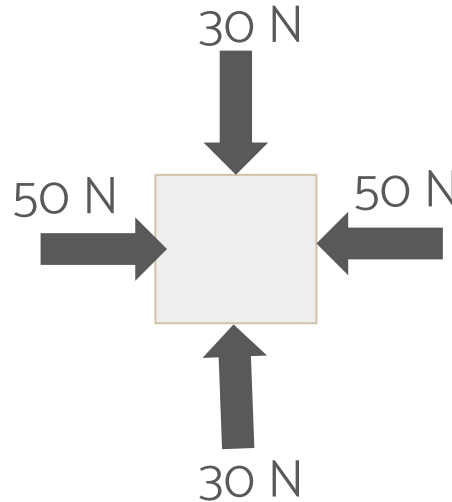
- push or pull of an object
- Magnitude & direction
- Usually measured in Newtons

Equilibrium

- all forces are balanced
- cancel each other out
- sum to zero

Types of Forces

Can anyone name a few different types of forces?

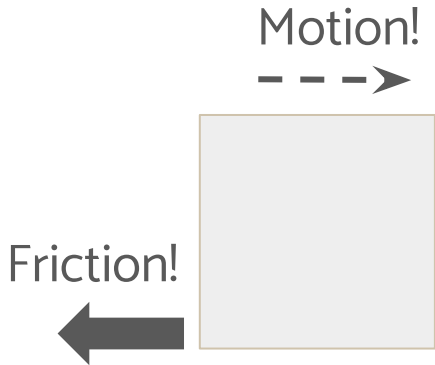


TYPES OF FORCES



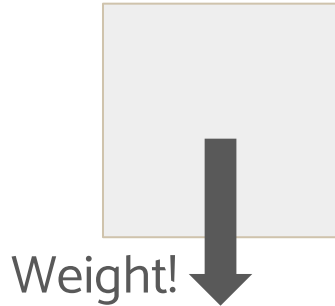
Frictional

due to
friction



Gravitational

due to
gravity



Normal

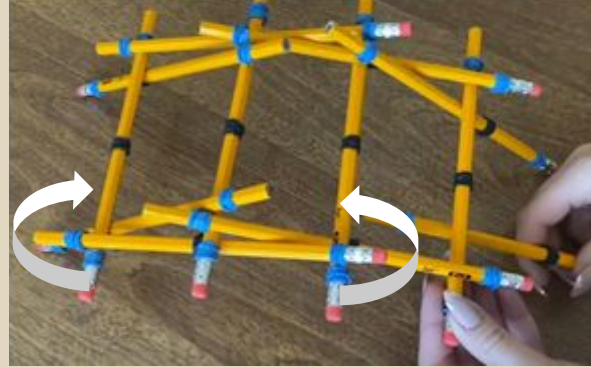
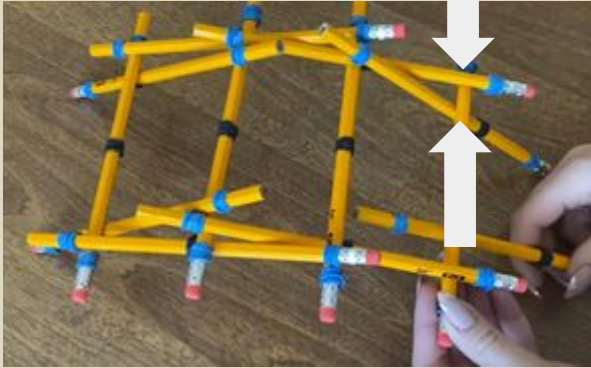
due to
contact



SMALL SCALE MODEL

- act perpendicular to an object
- pushed in different directions
- upward forces & downward forces act in same line

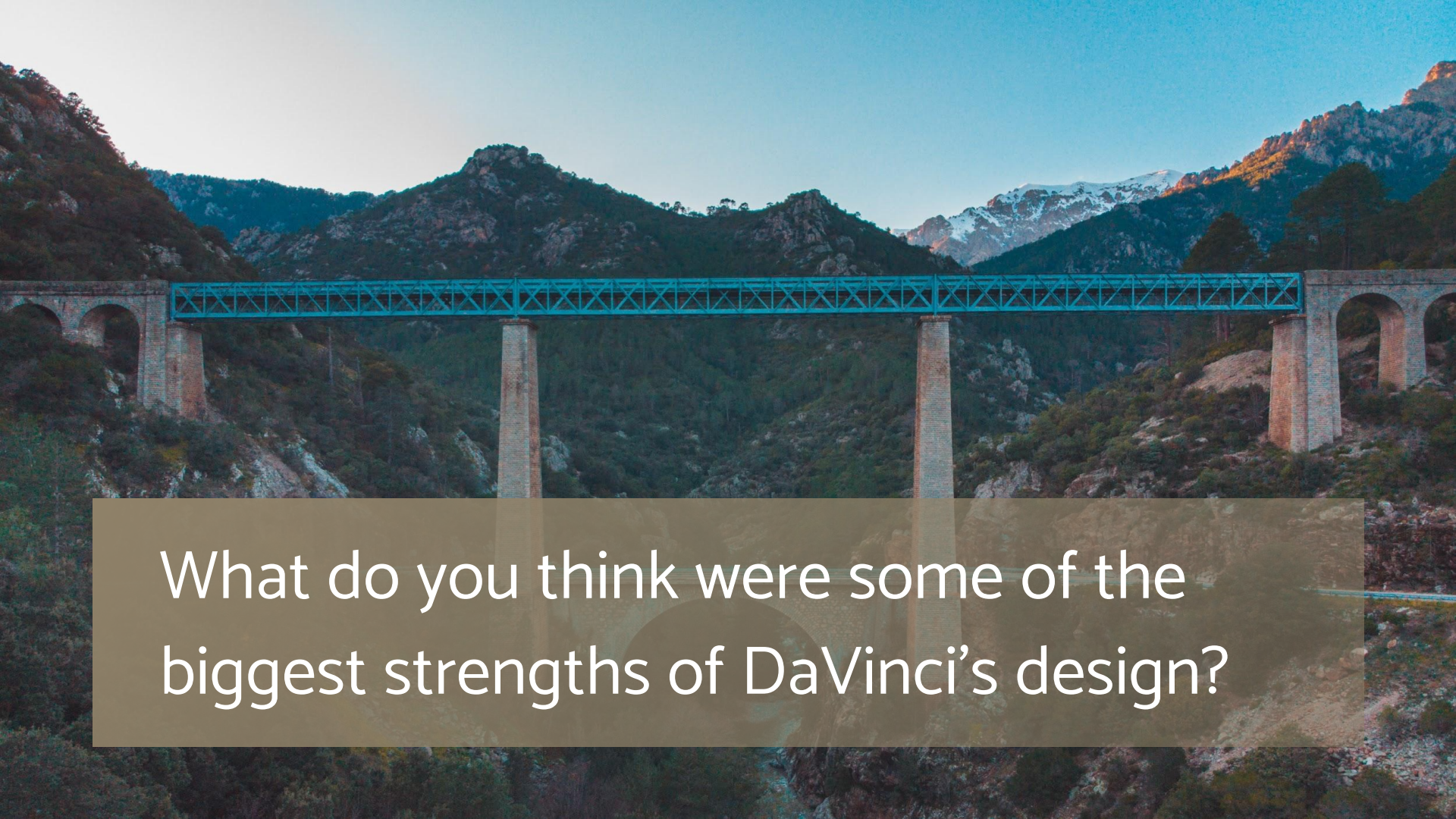
Shearing



Bending



- results in deformation, usually in concave/convex manner
- upward & downward forces not in line, are certain distance apart



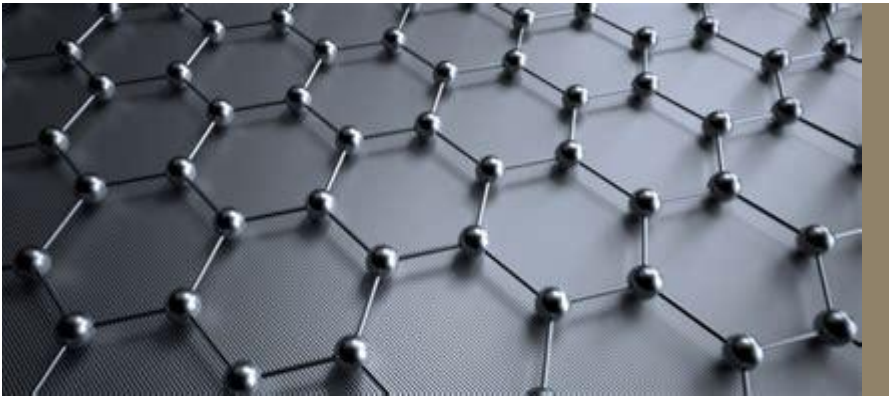
What do you think were some of the biggest strengths of DaVinci's design?

ENGINEERING



Civil

- Physics
- Infrastructure
- Cities
- Things you can see and touch



Materials Science

- Chemistry & physics
- Materials for different fields
- Novel properties
- Industrial processes

GETTING STARTED



Groups

- Enough supplies to work individually
- Highly encourage random groups of 2 or 3 by teacher

Materials

- **12** pencils
- **32** loom rubber bands

Preparation

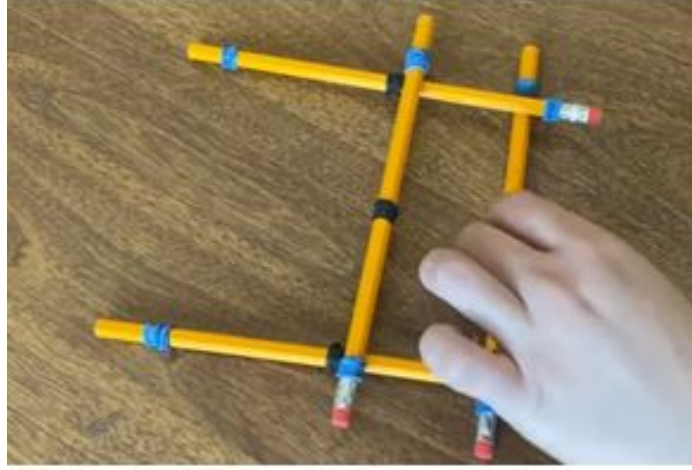
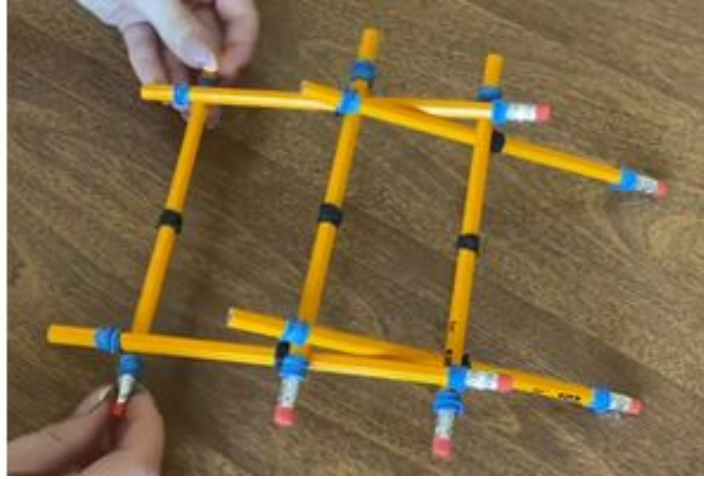
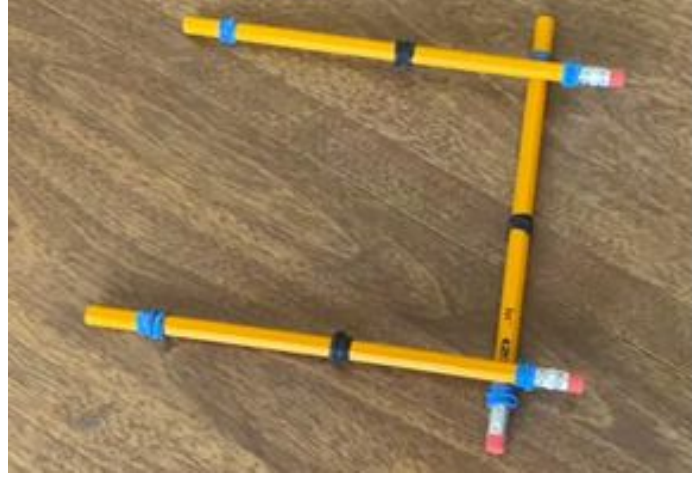
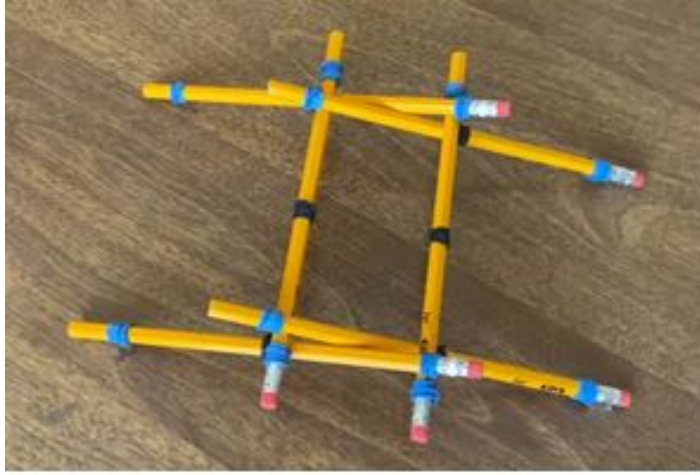
- **8** pencils w/ **3** rubber bands
- **4** pencils w/ **2** rubber bands, NO middle band!

THE FINAL PROJECT

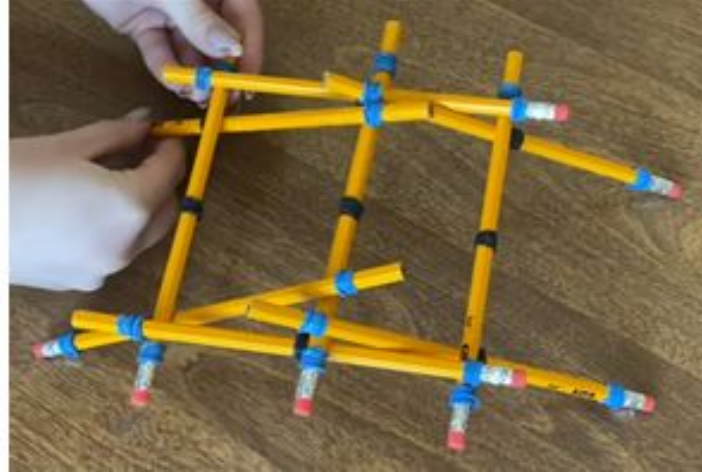
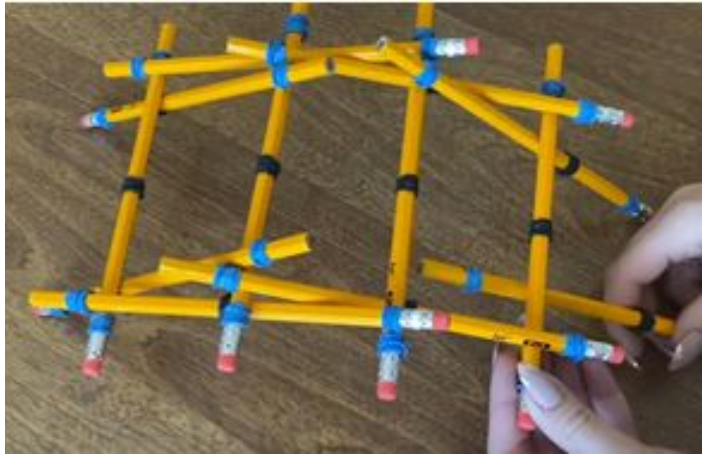


- More efficient construction?
- Longer?
- Additional weight?

STEP BY STEP



STEP BY STEP II



THANK YOU!

- You did great!
- Take home & try again with a parent/sibling
- Keep asking questions & exploring!

