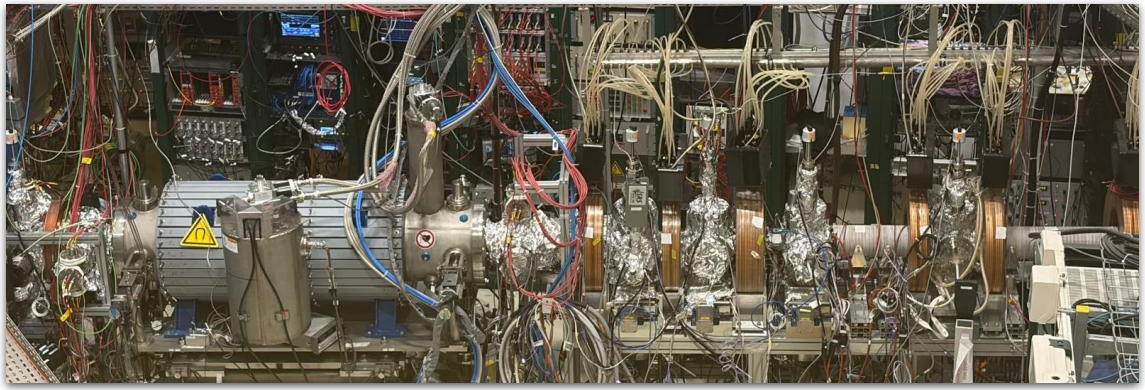
ENGINEERING AT CERN

HST2026 Study Group 5

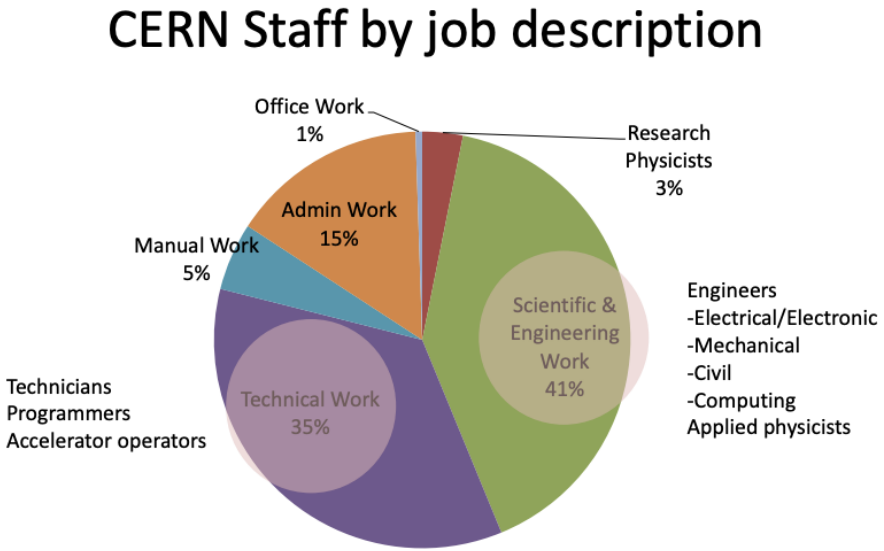


A

Key Ideas

R

- Groundbreaking science requires groundbreaking engineering.
  - Building the LHC
- All types of engineers work at cern, which makes up the majority of the workforce.
- All engineering is driven by constraints and trade offs.
- Engineering at CERN is about making the impossible possible.
  - We’d like a beam to exist in a vacuum surrounded by a vacuum



Ray Veness (CERN)

Curriculum & Classroom Connections

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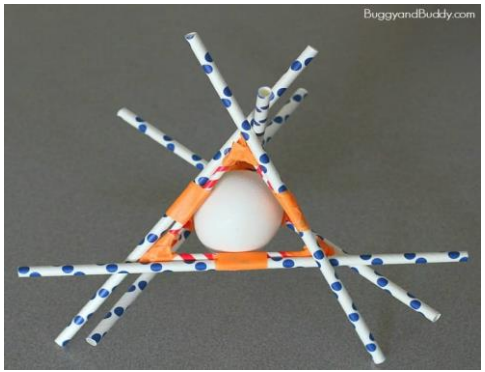
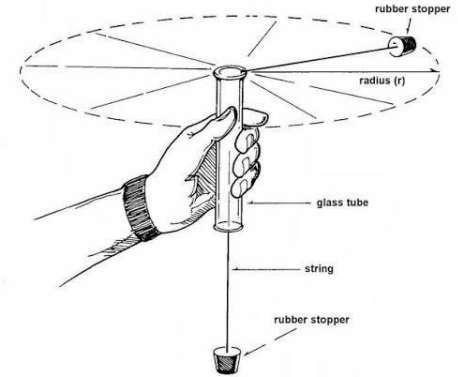
- For many of us, there is no engineering course for students to take. There is only physics.
- We can connect many physics concepts into engineering projects to both challenge and engage students.

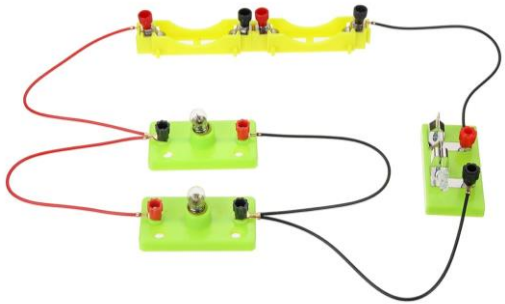
Momentum/Impulse



Circular Motion



Electricity/Magnetism



Potential Students' Conceptions & Challenges

M

Potential Misconceptions:

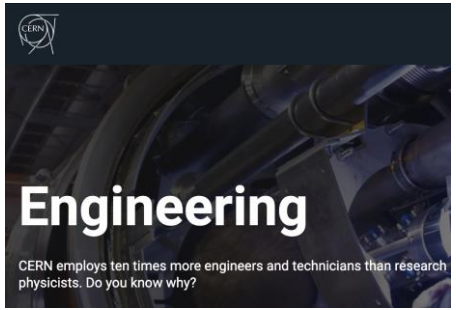
- Engineering is only for physicists/people good at math.
- Engineering is about big structures/machines.
- Engineering is boring / too theoretical.
- Engineering requires too many skills / it's too hard to become one.

Challenges:

- Even when students are successful they doubt their own ability.
- Teachers must combat student frustration. Students can give up quickly when faced with difficult challenges.

Useful Material & Resources

Engineering at CERN



A

[Website]

Build Your Own Particle Accelerator!

R

[Instructions]

Discover Engineering

DISCOVER ENGINEERING

Z

[Website]

Electrical Engineering at CERN

M

[Video]

Best Practice Example

HST2026 Study Group 5

Maria (Spain), Alex (Cameroon), Zohar (Israel), Russ (USA),

One way in which our thinking has changed…

M: Particle collisions result in smaller particles.

A: Good teaching involves many strategies.

R: Scientists love when models fail.

Z: We should strive to connect to modern ongoing physics.

Highlights, snapshots, farewell messages…

Thank you to all of CERN for welcoming us, especially to Anja & Milena!