

CERN Science Gateway Education Labs & Science Shows

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"I used to wish to become a princess when I grew up. But recently, I've changed my mind. I've seen how interesting sciences and flying to space are. As a princess, I'd have to marry a prince, stay at home, and take care of the children. So, I've decided that instead of becoming a princess, I'd rather be an astronaut."

4-year-old girl talking to guide after an open workshop



Science Gateway Education Activities

Labs

(Re-) Discover your inner scientist



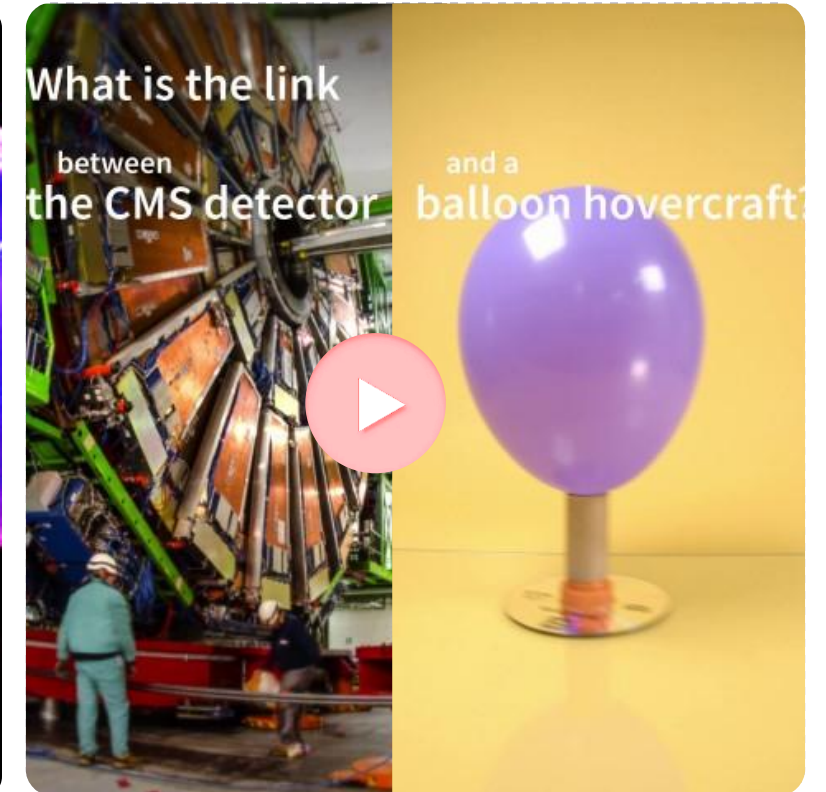
Science Shows

Explore the stories of discoveries



Online Learning

Engage online to find out more



Science Shows

5 different shows, 30-45 min, 200-400p

- Journey Through a Detector
- Proton Express
- Mysteries of Matter
- Seize the Data
- Science of Magical Parties

2-3 shows per day

First 9 months: 200 shows, 18k visitors
(240k visitors in total at Science Gateway)



Audience feedback shows

Net Promoter Score: 77

Shows: Proton Express & Journey Through a Detector

N = 98; 15 shows → <10%

11-level scale: 0 - not at all to 10 - very much, converted to %, ± 1 Standard Deviation

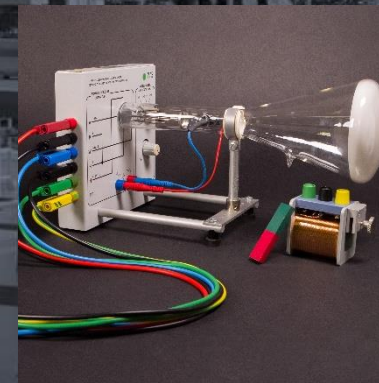
How much did you like today's show?	94% (±10%)
Are you curious to learn more about the show topic?	86% (±17%)
Did the workshop help you get a better understanding of we do at CERN?	90% (±19%)
Was the presenter engaging?	96% (±11%)
Would you recommend this science show to friends and family?	92% (±8%)



Creators of NPS (Bain & Company) suggest:

- Above 0 is good,
- Above 20 is favourable,
- Above 50 is excellent, and
- Above 80 is world class.

Lab Workshops



Lab workshops

10 different lab workshops, 45-90 min, 24p

First 9 months: 785 workshops, 17k visitors

Age group	% Visitors
5 to 7	4%
8 to 12	7%
13 to 15	5%
16 to 19	35%
20 to 29	1%
30+	5%
Open workshops	42%



Audience feedback workshops

Net Promoter Score: 87

Seeing the invisible, Open Workshop

N = 81 (43 FR, 38 EN)

11-level scale: 0 - not at all to 10 - very much, converted to %, ± 1 Standard Deviation

Did you enjoy the workshop?	94% ($\pm 12\%$)
Are you curious to learn more about the workshop topic?	89% ($\pm 18\%$)
Was the duration of the workshop appropriate?	91% ($\pm 16\%$)
Did the workshop help you get a better understanding of what scientists do?	92% ($\pm 12\%$)
Was the guide engaging?	95% ($\pm 10\%$)
Was the guide friendly?	97% ($\pm 7\%$)
Was it easy to understand the explanations of the guide?	94% ($\pm 11\%$)
Would you recommend this lab workshop to friends and family?	96% ($\pm 9\%$)

New database for educational resources at CERN

- Collection of educational resources produced by different education and outreach teams at CERN
- Includes scripts, design files and educational support material for workshops and shows that are easy to replicate
- visit.cern/resources
- If you have specific questions: please don't hesitate to contact us



Particle Detectives: A low-cost portable science show

Join us as 'particle detectives' to explore particles and their interactions, from molecules to CERN.

Age group: **13-15** **16+**



Scattering boxes - Seeing the invisible

Explore how balls interact with a hidden structure to develop a scientific model.

Author: **CERN PER team**

Age group: **5-12** **13-15** **16+**



Balloon Hovercraft - Power of Air

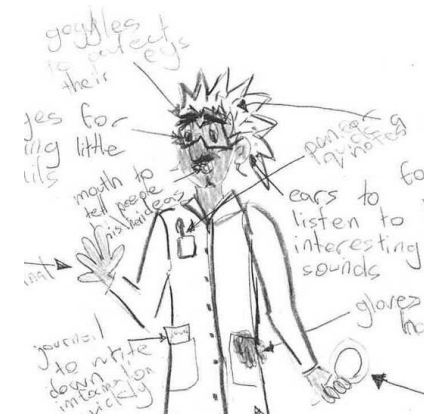
Explore how air is able to help us lift heavy things by reducing friction.

Author: **CERN PER team**

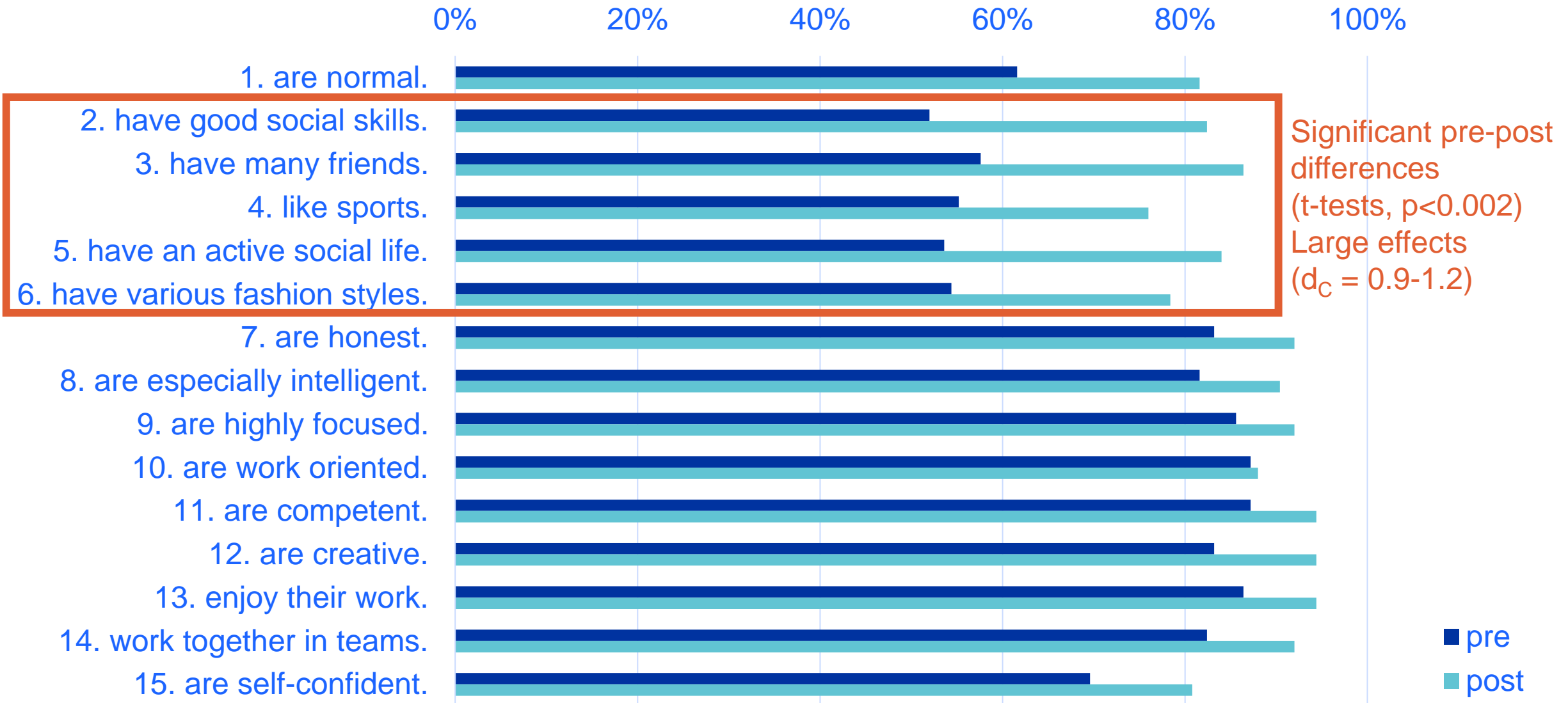
Age group: **5-12** **13-15**

Meet-a-scientist effect

- Talking to scientists can significantly increase students' STEM career aspirations (Fadigan & Hamrlich, 2004; Mills & Katzman, 2015) and it can change their perception of scientists (Houseal et al., 2014; Rennie & Howitt, 2015; Woods-Townsend et al., 2016)
- Students' perception of scientists as workshop facilitators is a strong predictor of many educational outcomes such as interest, curiosity, enjoyment, physics self-beliefs, perceived cognitive activation (basically all except conceptual understanding) (Woithe et al., 2020)
- Quantitative instruments to measure students' beliefs about scientists (e.g., Garriot et al., 2017; Wyer et al., 2010), e.g. statements about interpersonal & professional competencies
- **Example: Results from week-long high-school student camp at CERN (N=25)**
 - 6-level scale completely disagree (1) to completely agree (6), converted to % scale



Physicists working at research institutes:





Thank you for your attention.

Questions?

References

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Image of scientists and what they do

The regular everyday work of a physicist working at a research institute involves:

