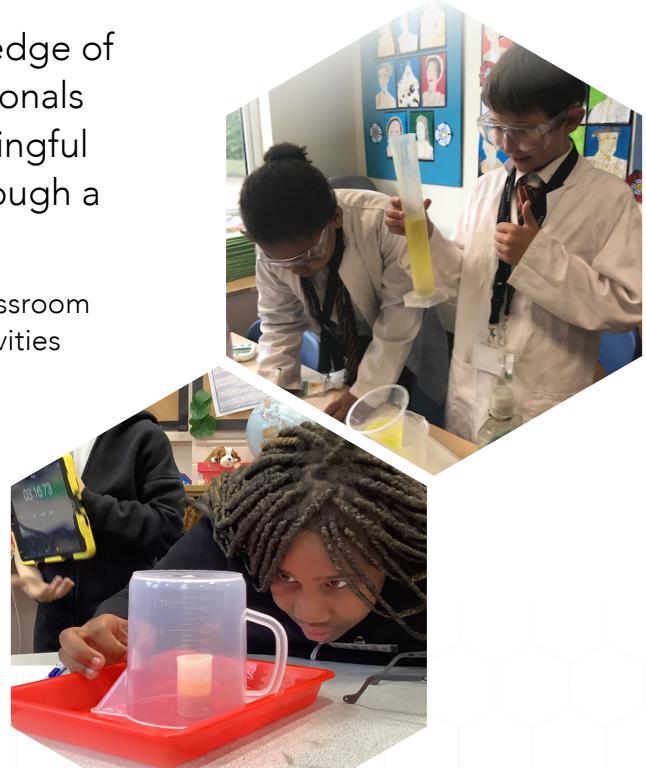


Children Challenging Industry (CCI)

Summary of Evaluation Report 2021-2022

Since 1996, CCI has combined the expert knowledge of primary education specialists and STEM professionals (CCI ambassadors) in an effort to promote meaningful engagement with science and STEM careers through a professional development programme.

The CCI advisory teachers, the CCI ambassadors, and the classroom teachers collaborate to deliver practical problem-solving activities inspired by industry stories. Children meet scientists and engineers in their workplaces, learn about their roles in industry, and present the results from their investigations to them. So far, CCI has engaged **60,000** primary school children and **15,000** teachers across England, stimulating the STEM career aspirations of many.



Participation in 2021-2022

51 continuous professional development (CPD) sessions for 725 teachers



37 primary schools, 51 classes with 1,555 children, and most classes (77%) had live and remote CCI ambassador sessions

The 2021-2022 CCI team of advisory teachers



How is CCI's impact evaluated? Children and teachers respond to separate surveys before and after participating in CCI, sharing their views of science and industry. Full details available from: <https://www.york.ac.uk/ciec/research/>

Focus on children

51% of children said they talk to others about their mainstream science lessons once a week and 96% do it with an average of **two** family members.

77% of children spoke about science with others after CCI: More children talked about the CCI lessons with an average of three people in their close social circles.

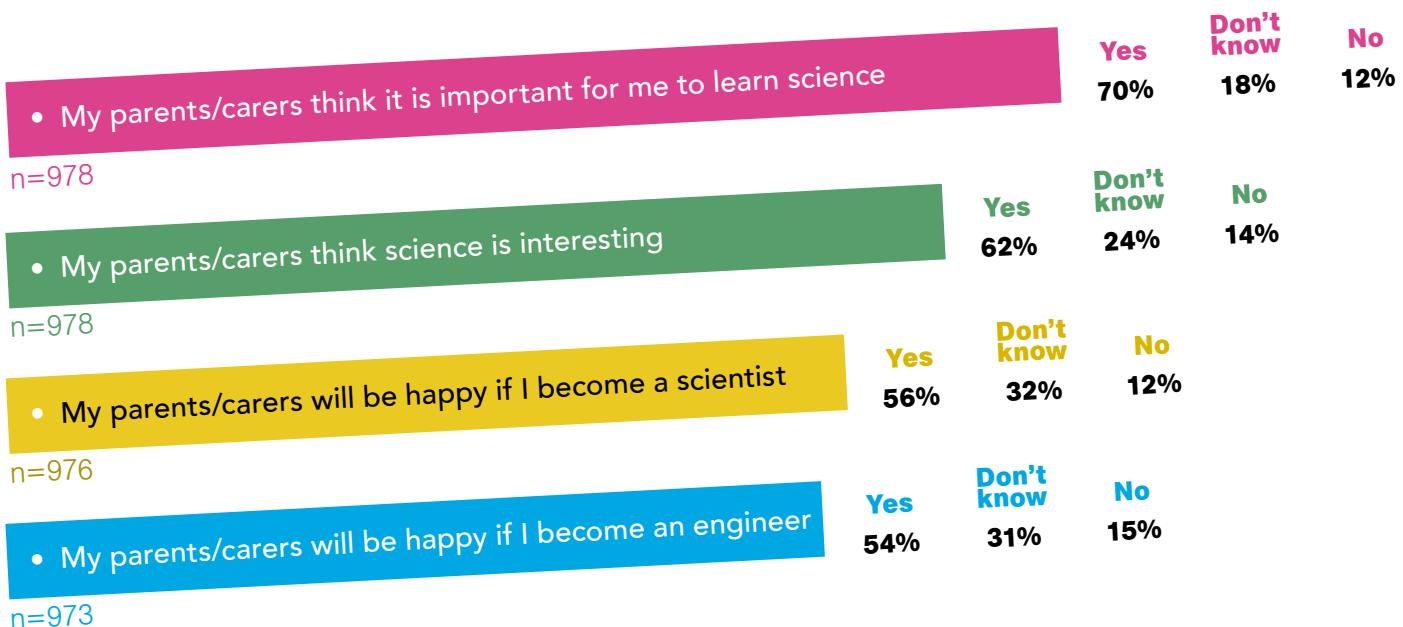
'I talked to [my family] about the [CCI] ambassadors and about how fun it was to actually speak to an actual engineer and transporter, and I also said that I would like to do more science in school.' (Girl, Year 6)

'I would tell [mum and grandparent] what I had learnt...They would have a chat saying about say like evaporation and then they would try and find experiments around the house.' (Boy, Year 6)

'I told [family and peers] different activities we did and new things I learnt... They also found out new things they didn't know.' (Girl, Year 5)

*'Talking about science at home is a form of scientific cultural capital that can advantage students at school.' (Archer et al., 2015, p.931)**

How children perceived their parents would appreciate a future career in science or engineering



Among the children whose parents would **not** be happy if they became a scientist or an engineer (n=185):

After CCI, 11% stated '*I could work in industry*' and 6% stated '*I'd like to be an engineer*', shifting their initially negative views.

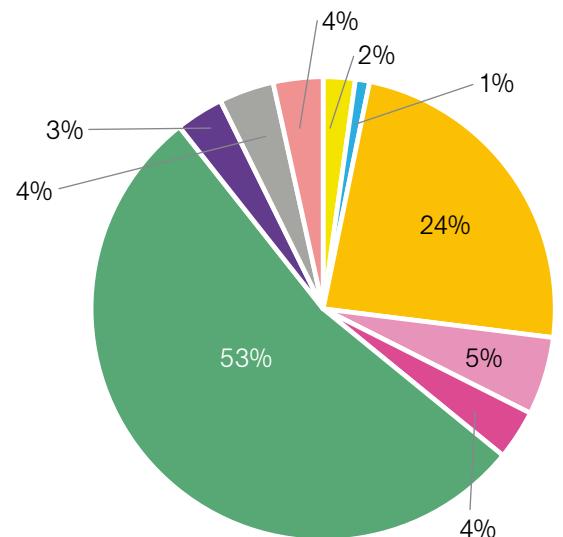
* **Reference:** Archer, L., Dawson, E., DeWitt, J., Seakins, A. and Wong, B. (2015), "Science capital": A conceptual, methodological, and empirical argument for extending Bourdieusian notions of capital beyond the arts. *J Res Sci Teach*, 52: 922-948. <https://doi.org/10.1002/tea.21227>

What children enjoyed about participating in CCI

82% of the children enjoyed the CCI practical activities.

Why children enjoyed the CCI practical activities

- They were challenging or felt achievement
- Felt like scientist or like doing real science
- Learned something new, interesting, or surprising
- Enjoyed group work and/or roles
- Enjoyed the hands-on work in experiments
- Had fun, enjoyment, or excitement
- Enjoyed using materials for tests
- Did not know/answer
- Other reasons



I liked the CCI practical activities because...

'Because I get to actually do experiments and not just watch other people do them. I get to feel like a real scientist and have fun but also learn a lot from it!' (Girl, Year 5)

'I liked learning how much foam we needed and telling [the CCI ambassador] about it. She also really inspired me to be able to be a scientist.' (Girl, Year 5)

'It was very interesting to see the different types of mould grown on the bread. It was also very interesting to discover why mould can be used in medicines.' (Boy, Year 6)

'It was really fun because it made me like science a little bit more and made me understand it is fun'
(Boy, Year 5)



More favourable attitudes towards industry among children

CCI evaluation 2020-2021



Our lives would be worse without industry
Industry makes things we need
Industry is useful

Pre-questionnaire agreement changes %

Post-questionnaire agreement changes %

CCI evaluation 2021-2022

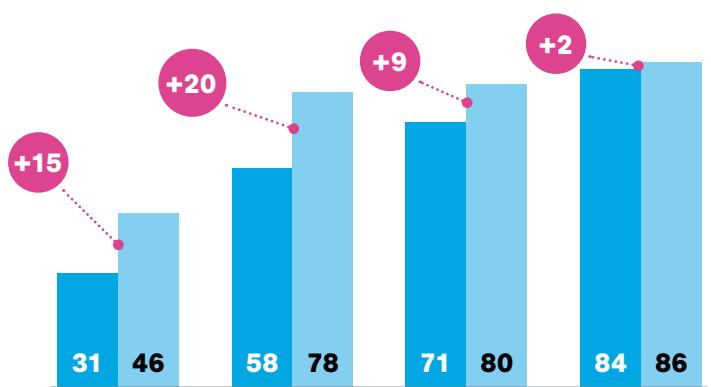


Our lives would be worse without industry
Industry makes things we need
Industry is useful

Increase %

Greater awareness among children about who works in industry

CCI evaluation 2020-2021

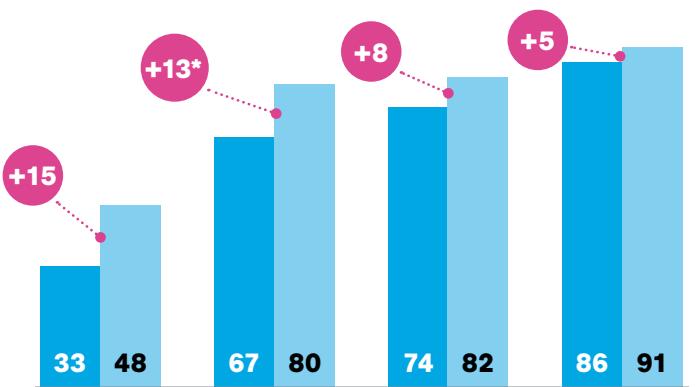


Young people work in industry
Many scientists work in industry
Engineers have important jobs in industry
There are women scientists and engineers

Pre-questionnaire agreement changes %

Post-questionnaire agreement changes %

CCI evaluation 2021-2022



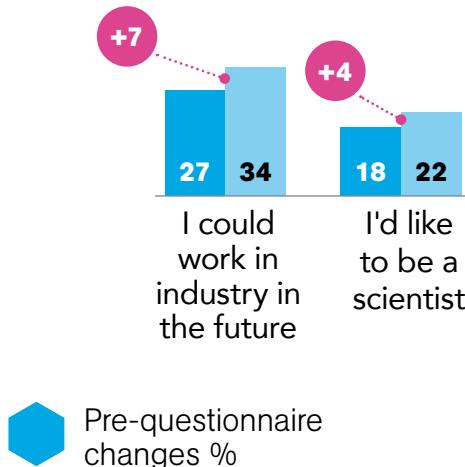
Young people work in industry
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Increase %

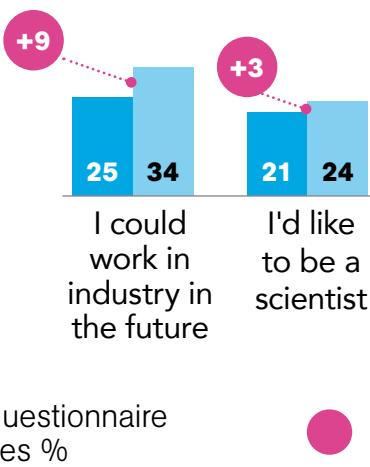
* Missing site visits meant that children did not observe as many scientists as they would normally do.

Children's career aspirations were raised after taking part in CCI

CCI evaluation 2020-2021



CCI evaluation 2021-2022



Raised aspirations of girls and boys in CCI 21-22



I could work in industry in the future

Boys' increase %

3 3

I'd like to be a scientist

Girls' increase %



'I want to be a engineer when I am older.' (Boy, Year 5)

'In industry I would like to be an engineer. (Boy, Year 5)

'Science is very cool and I want to be an engineer someday.' (Boy, Year 5)

'I want to be a scientist in the future.' (Boy, Year 5)

'[I want to] be a scientist that works in creating new cures for illnesses, also I would like to be an mechanical engineer.' (Girl, Year 6)

'I want to be a Cancer doctor.' (Girl, Year 6)

'I would like to be a scientist! (Girl, Year 6)

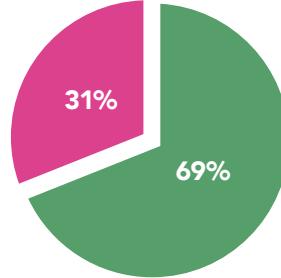
'I told [my family] that I wanted to be an engineer and about how much important science is to me... they agreed and said to follow my dreams.' (Girl, Year 5)

Focus on teachers

Teachers' opinions of the programme

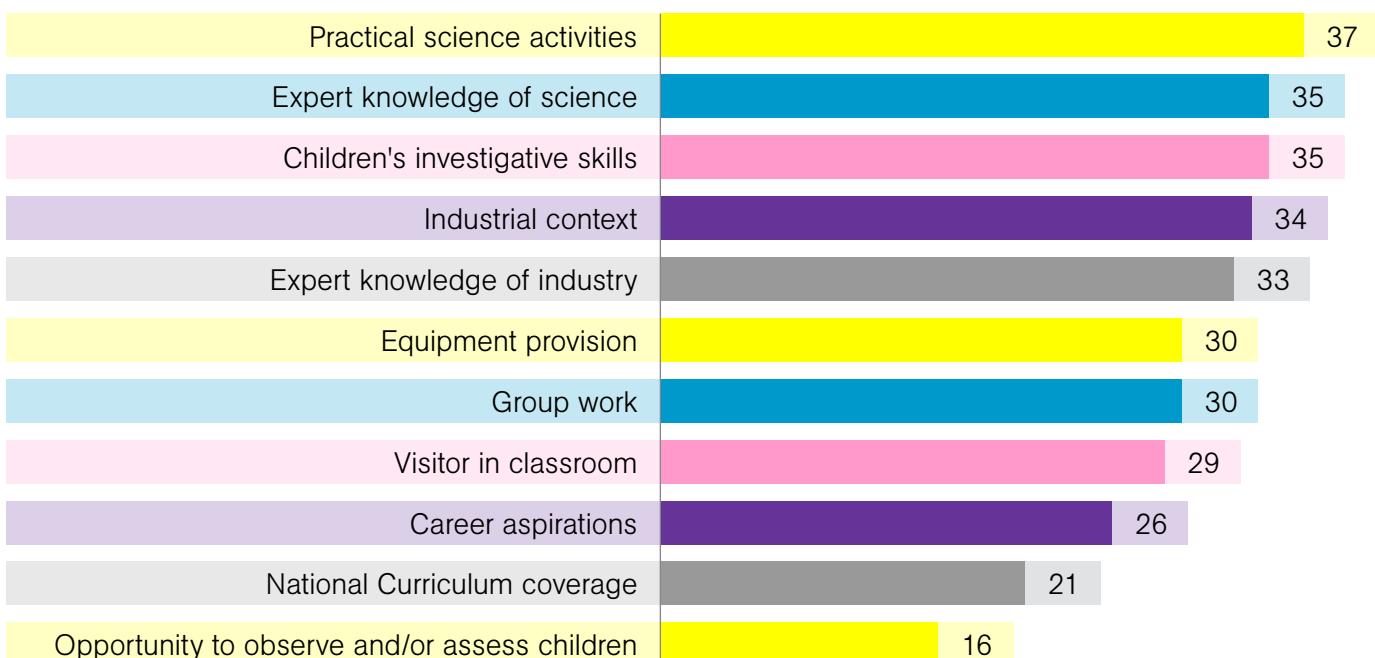
100% of the teachers (n=42) gave an overwhelmingly positive rating to the CCI programme.

- Excellent
- Good
- Satisfactory
- Poor
- Very poor



Strengths of the CCI programme according to the teachers

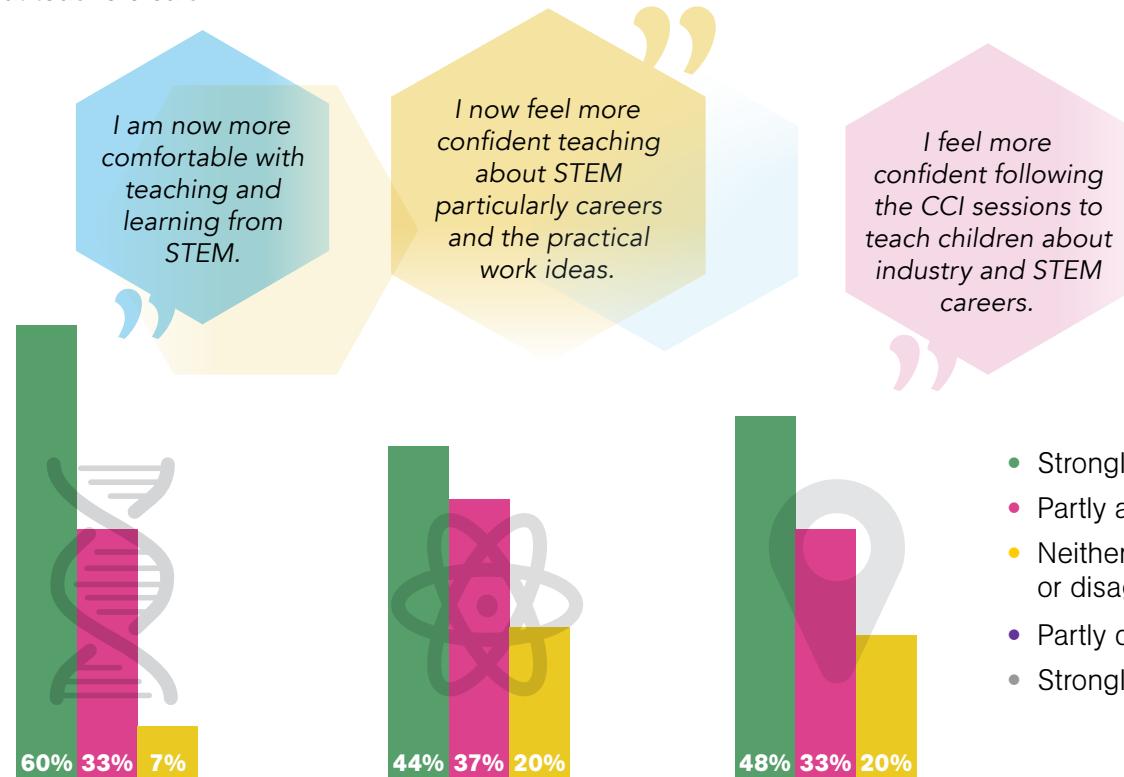
Number of votes per category (n=42)



Improved confidence for science teaching

The CCI science professional development sessions and the advisory teachers support helped teachers improve their confidence levels for science teaching and their knowledge of industry.

Here's what teachers said:

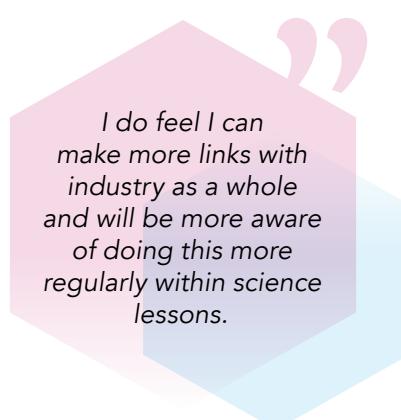


My knowledge of industry has improved

My confidence to teach science has improved

I would now be confident to arrange visits to or from industry

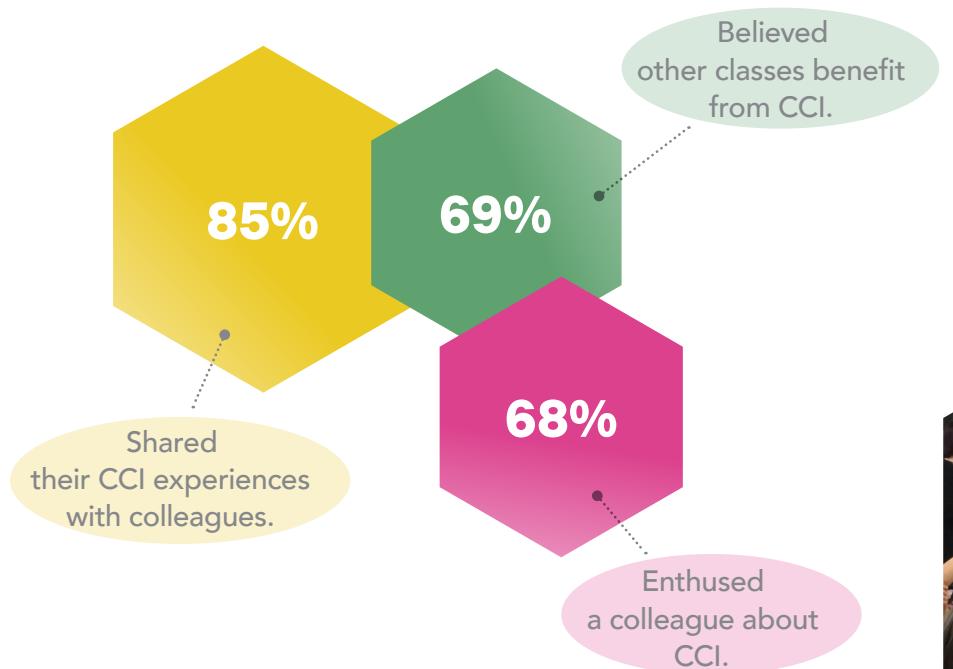
- Strongly agree
- Partly agree
- Neither agree or disagree
- Partly disagree
- Strongly disagree



CCI can strengthen children's perception of teachers as knowledgeable in science and industry topics.

After CCI, more children (51% >71%) stated that they could learn about industry from their teachers.

Extended impact of the CCI programme in schools



CCI inspired teachers to make changes in their practice

“
[CCI] inspired me to want to take the children out of school to go on a science trip.

I plan to do more practical activities where the children have more control over the investigation and more control in choosing how to record results.

As science lead, I will be holding a science week in school where we engage in practical hands on experiments and make contact with local scientists, engineers... to speak to the children about how science has helped them in their careers.

Results summary

The collaboration between the CCI advisory teachers, CCI ambassadors, and classroom teachers produced a positive and innovative learning experience for children. Children enjoyed the practical science activities, engaged in new learning opportunities and held more informed attitudes towards industry after participation. The direct experiences with real-life STEM professionals raised children's aspirations to work in industry or become scientists in the future.

The teachers also successfully engaged with CCI's professional development and had an overwhelmingly positive outlook on the programme. Their increased confidence levels in science teaching is a crucial finding that indicates the programme is meeting its goals. The plans and actions of teachers to reengage with or expand CCI indicate that the programme has the capacity to extend its influence beyond its initial phase and has the potential for significant expansion.

TO LEARN MORE OR FIND OUT HOW YOU CAN BECOME INVOLVED PLEASE:

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