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

- My parents/carers think it is important for me to learn science
  - Yes 70%
  - Don’t know 18%
  - No 12%
  n=978

- My parents/carers think science is interesting
  - Yes 62%
  - Don’t know 24%
  - No 14%
  n=978

- My parents/carers will be happy if I become a scientist
  - Yes 56%
  - Don’t know 32%
  - No 12%
  n=976

- My parents/carers will be happy if I become an engineer
  - Yes 54%
  - Don’t know 31%
  - No 15%
  n=973

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.

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: +10%
- Industry makes things we need: +4%
- Industry is useful: +4%

CCI evaluation 2021-2022
- Our lives would be worse without industry: +14%
- Industry makes things we need: +9%
- Industry is useful: +7%

Greater awareness among children about who works in industry

CCI evaluation 2020-2021
- Young people work in industry: +20%
- Many scientists work in industry: +9%
- Engineers have important jobs in industry: +2%
- There are women scientists and engineers: +15%

CCI evaluation 2021-2022
- Young people work in industry: +13%
- Many scientists work in industry: +8%
- Engineers have important jobs in industry: +5%
- There are women scientists and engineers: +15%

* 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

I could work in industry in the future

I’d like to be a scientist

Pre-questionnaire changes %

Post-questionnaire changes %

Increase %

CCI evaluation 2021-2022

I could work in industry in the future

I’d like to be a scientist

Raised aspirations of girls and boys in CCI 21-22

Girls’ increase %

Boys’ increase %

I could work in industry in the future

I’d like to be a scientist

8

10

3

3

‘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 would like to be a scientist!’ (Girl, Year 6)

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

‘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 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

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of votes per category (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical science activities</td>
<td>37</td>
</tr>
<tr>
<td>Expert knowledge of science</td>
<td>35</td>
</tr>
<tr>
<td>Children’s investigative skills</td>
<td>35</td>
</tr>
<tr>
<td>Industrial context</td>
<td>34</td>
</tr>
<tr>
<td>Expert knowledge of industry</td>
<td>33</td>
</tr>
<tr>
<td>Equipment provision</td>
<td>30</td>
</tr>
<tr>
<td>Group work</td>
<td>30</td>
</tr>
<tr>
<td>Visitor in classroom</td>
<td>29</td>
</tr>
<tr>
<td>Career aspirations</td>
<td>26</td>
</tr>
<tr>
<td>National Curriculum coverage</td>
<td>21</td>
</tr>
<tr>
<td>Opportunity to observe and/or assess children</td>
<td>16</td>
</tr>
</tbody>
</table>

[CCI] is very effective as it created huge enthusiasm and interest in science/industry (children and staff).

[CCI] provided clear explanations and encouraged us as staff to reflect upon Science capital in the lives of the children.

The whole programme is superb and always exceeds our expectations.

CCI 2021-2022
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**
- Strongly agree: 60%
- Partly agree: 33%
- Neither agree or disagree: 7%

**My confidence to teach science has improved**
- Strongly agree: 44%
- Partly agree: 37%
- Neither agree or disagree: 20%

**I would now be confident to arrange visits to or from industry**
- Strongly agree: 48%
- Partly agree: 33%
- Neither agree or disagree: 20%

I am now more comfortable with teaching and learning from STEM.

I now feel more confident teaching about STEM particularly careers and the practical work ideas.

I feel more confident following the CCI sessions to teach children about industry and STEM careers.

I now feel more confident to make connections with local industries. I am more comfortable to link the learning with the profession so that the children can make connections.

I do feel I can make more links with industry as a whole and will be more aware of doing this more regularly within science lessons.

I feel that I am more confident teaching STEM now as I see the children engaging in activities in a wide range of roles.

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

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:

Visit our website: www.ciec.org.uk
Call us on 01904 322523
Email: ciec@york.ac.uk
Centre for Industry Education Collaboration
University of York, Heslington, York, YO10 5DD

CCI inspired teachers to make changes in their practice

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.

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

Believed other classes benefit from CCI.

85%

Enthused a colleague about CCI.

68%

Shared their CCI experiences with colleagues.

69%

85%