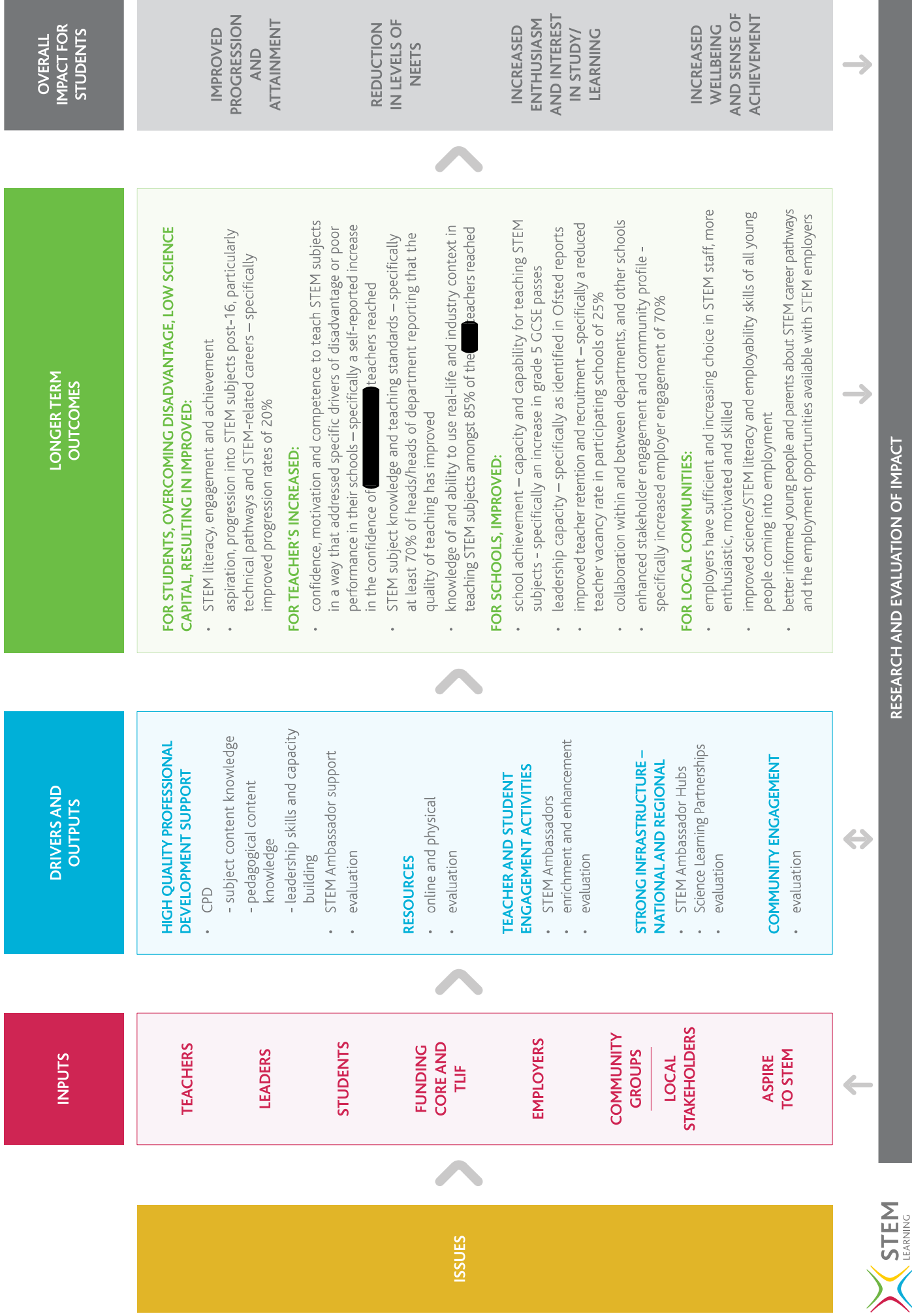




## STUDENT-CENTRED THEORY OF CHANGE

### ISSUES

- Students do not understand the importance of the subjects they study and how this affects their future careers (1,2)
- Students lack the key employability skills required from employers (3)
- Students lack confidence and aspiration, feeling that many employment opportunities are not for them (4,5)
- Students from the most disadvantaged backgrounds and social deprivation factors are known to impact student outcomes (6,7,8)
- Negative stereotypes impact students levels of confidence and aspiration (9)

### EVIDENCE RELATING TO STUDENTS (37,28)

#### ASPIRE TO STEM PROGRAMME DELIVERABLES (37)

- Improved STEM teaching leading to improved student learning and enjoyment.
- Teachers have the knowledge of STEM careers to convey to students how learning science is relevant to future STEM careers.
- Teachers implement student-level interventions to narrow the gap at each school.
- Teachers are trained and equipped to teach diverse groups of students, aware of the learning needs of different groups of students and any potential bias within their teaching, leading to better learning outcomes for disadvantaged students
- STEM Ambassadors and other enrichment activity provide critical role models and context to raise student aspirations, enthusiasm and understanding of careers. (37,1)
- Increased understanding and awareness of technical pathways and a variety of progression opportunities

#### SHORT TERM OUTCOMES (37,28)

- Increased engagement, interest, enjoyment and achievement in STEM subjects
- Development of employability and practical skills
- Increased student confidence in STEM subjects such that they feel they can obtain a career in STEM.
- Increased value of science by showing that science skills are useful for many different STEM careers.
- Impact on students' investigative skills, enthusiasm for extra-curricular STEM
- Increase on student progress and attainment.

## TEACHER-CENTRED THEORY OF CHANGE

### ISSUES

- Teachers of STEM subjects lack confident and competence in their subject knowledge (10,11,12,13,14,15,16)
- Poor retention of teachers in England (17,18,19)
- In England, key issues are teacher shortages and turnover (19,20)
- Poor leadership capacity of STEM subjects (20,21)
- Key STEM subjects are failing to recruit initial teachers into the profession (20,21,22,23,24,25,26,27)

### EVIDENCE RELATING TO TEACHERS (37,16,32,33,34,35,36)

**ASPIRE TO STEM PROGRAMME DRIVERS**  
Developing great STEM teaching and school leadership through CPD (funded by TLIF) scaffolded by enhancement & enrichment (free to TLIF)

#### ASPIRE TO STEM PROGRAMME DELIVERABLES (37,16,32,33,34,35,36)

- Teachers are more enthused about their teaching, and reignite their love for their subject, leading to more engaged students.
- Improved STEM teaching leading to improved student learning and enjoyment.
- Teachers have the knowledge of STEM careers to convey to students how learning science is relevant to future STEM careers.
- Teachers implement student-level interventions to narrow the gap at each school.
- Teachers are trained and equipped to teach diverse groups of students, aware of the learning needs of different groups of students and any potential bias within their teaching, leading to better learning outcomes for disadvantaged students
- STEM Ambassadors and other enrichment activity provide critical role models and context to support teachers to understand the breadth of careers opportunities available to students.
- Increased understanding and awareness of technical pathways and a variety of progression opportunities
- Teachers embrace a passion to drive their own professional and personal development, creating long term demand
- Teachers collaborate with a wider network of schools leading to a self-sustaining community of practice.

#### SHORT TERM OUTCOMES (37,16,32,33,34,35,36)

- Increase in teach and engagement of teachers accessing CPD and support
- Increase in aspirations and confidence of teachers of STEM subjects
- Increased number of STEM teachers willing and able to include careers into curriculum
- Improved quality STEM teachers' subject content knowledge and pedagogical knowledge
- Increased teacher confidence, motivation and enthusiasm for STEM subjects
- Understanding how to contextualise the curriculum with cutting edge STEM knowledge, employability skills and STEM – related careers information
- Greater levels of retention and career progression within their STEM teaching roles

#### LONGER TERM OUTCOMES, FOR TEACHER'S INCREASED (37,16,32,33,34,35,36)

- Confidence, motivation and competence to teach STEM subjects in a way that addresses specific drivers of disadvantage or poor performance in their schools – specifically a self-reported increase in the confidence of 85% of the 880 teachers reached
- STEM subject knowledge and teaching standards – specifically at least 70% of heads/heads of department reporting that the quality of teaching has improved
- Knowledge of and ability to use real-life and industry context in teaching STEM subjects amongst 85% of the 880 teachers reached

#### LONGER TERM IMPACT FOR STUDENTS

- Increased progression and attainment
- Reduction in levels of NEETs

#### EVIDENCE RELATING TO STUDENTS (37,28,29,31)



#### EVIDENCE RELATING TO TEACHERS (37,16,32,33,34,35,36)

Numbered references can be found in the evidence log

## SCHOOL-CENTRED THEORY OF CHANGE

### ISSUES

- Schools fail to recruit and retain high quality teachers and leaders (17, 18, 29, 20, 23, 34, 36)
- Schools fail to offer job satisfaction and teacher professional and personal development (18, 21)
- Schools fail to provide subject specific CPD leading to high turnover of staff (22,24,25,27)
- Schools lack the budget to provide teacher CPD (32)
- Schools are not providing sufficient support for disadvantaged students and diverse groups of students. (6, 7, 8, 9)
- School leadership is poor – across multiple aspects of STEM teaching and leadership: content knowledge, pedagogy, research (especially action research), and leadership capabilities of teachers (35, 36, 21)
- Schools may have poor reputation or standing within the community which impacts their ability to recruit within the locality
- Schools do not understand what outstanding/good STEM teaching looks like, hence lack the ability to challenge effectively (35, 36)
- Schools are unable to engage in existing national programmes due to lack of capacity (17, 18)

### EVIDENCE RELATING TO SCHOOLS

(37, 6, 7, 8, 9, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36)

### SCHOOL FACING DELIVERABLES (37, 16, 32, 33, 34, 35, 36)

- Improved STEM teaching leading to improved student learning and enjoyment.
- Teachers have the knowledge of STEM careers to convey to students how learning science is relevant to future STEM careers.
- Teachers implement student-level interventions to narrow the gap at each school.
- Teachers are trained and equipped to teach diverse groups of students, aware of the learning needs of different groups of students and any potential bias within their teaching, leading to better learning outcomes for disadvantaged students.
- Teachers embrace the initial needs assessment process, leading to a transformational approach to school improvement

### SHORT TERM OUTCOMES (37, 16, 32, 33, 34, 35, 36)

- Increased teacher STEM subject and pedagogical understanding
- Increased teacher confidence, motivation and enthusiasm for STEM subjects
- Competence and quality of leading, teaching or supporting STEM subjects
- Understanding how to contextualise the curriculum with cutting edge STEM knowledge, employability skills and STEM –related careers information
- Greater levels of retention and career progression within their STEM teaching roles
- Increased understanding of how to make better use of local resources/environment/community, leading to a self-sustaining community of best practice.

### LONGER TERM OUTCOMES, FOR SCHOOLS INCREASED (37, 16, 32, 33, 34, 35, 36)

- School achievement – capacity and capability for teaching STEM subjects – specifically an increase in the number of grade 5 GCSE passes of at least 50% in supported schools in comparison to similar schools nationally
- Leadership capacity – specifically as identified in Ofsted reports
- Improved teacher retention and recruitment – specifically a reduced teacher vacancy rate in participating schools of 25%
- Collaboration within and between departments, and other schools
- Enhanced stakeholder engagement and community profile – specifically increased employer engagement of 70%

### LONGER TERM IMPACT FOR STUDENTS

- Increased progression and attainment
- Reduction in levels of NEETs

- Increased enthusiasm and interest in study/learning
- Increased wellbeing and sense of purpose

## COMMUNITY-CENTRED THEORY OF CHANGE

### ISSUES

- Lack of community and employer collaboration with schools impacts upon social mobility, particularly in areas of deprivation. (27, 28, 29, 30)
- Employers cite problems with drawing from the local labour pool with relevant STEM skills (30, 31)
- Low levels of employer engagement with local community projects (29, 30, 33)

### ASPIRE TO STEM PROGRAMME DRIVERS

Developing great STEM teaching and school leadership through CPD (funded by TLIF) scaffolded by enhancement & enrichment (free to TLIF)

### EVIDENCE RELATING TO COMMUNITIES

(27, 28, 29, 30, 31, 32, 33, 37)

### COMMUNITY FACING DELIVERABLES (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 30, 31, 33, 37)

- School delivers improved STEM teaching leading to improved student learning and enjoyment.
- Schools, in partnership with their local community, work collaboratively to improve student engagement in education and employment.
- Schools adopt a more student-based approach in STEM subjects to narrow the gap.
- Teachers are trained and equipped to teach diverse groups of students, aware of the learning needs of different groups of students and any potential bias within their teaching, leading to better learning outcomes for disadvantaged students

### SHORT TERM OUTCOMES (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 30, 31, 33, 37)

- Improved science capital and community engagement with school STEM based activities. Specifically - 2 community or family events per school per year
- Improved employer(s) profile in the community as a result of more effective engagement with local schools
- Increased wider community involvement – grandparents and wider family members – providing clearer mechanisms to engage
- Improved community wellbeing and sense of purpose.

### LONGER TERM OUTCOMES, FOR LOCAL COMMUNITIES (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 30, 31, 33, 37)

- Employers have sufficient and increasing choice in STEM staff: more enthusiastic, motivated and skilled
- Improved science/STEM literacy and employability skills of all young people coming into employment
- Better informed young people and parents about STEM career pathways and the employment opportunities available with STEM employers