TE HONONGA AKORANGA
COMET

# Eastern Bay of Plenty STEMM Action Plan

Prepared by Te Hononga Akoranga COMET | April 2024

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# STEMM Action Plan Executive Summary

## Purpose

This report presents the case for change (why collaborative action is needed) and a roadmap & recommendations for Trust Horizon to fund a "STEMM Action Plan" to grow science, technology, engineering, mathematics, mātauranga Māori (STEMM) capacity and capabilities in the Eastern Bay of Plenty.

## Vision

We see all Eastern Bay of Plenty learners equipped to innovate, solve challenges, take hold of opportunities and thrive.

Communities champion STEMM learning, unique to them, which broadens our rangatahi's choices for their future.

## Mission

We will work alongside learners, teachers and communities to build STEMM capabilities through relevant and accessible workshops, activations, networking, resources and PLD training.

We accelerate change by scaling what we know works, strengthening cross-sector connections, and responding to communities' needs and aspirations.

## Key steps for collective impact

### Set targets

Understand who is working with whom, and how they currently operate.

Set aspirational outcome targets for students, teachers, iwi/hapū, Māori & rural communities and businesses.

### Build a collective

Funders and funded STEM providers make up the "STEMM Collective",

The group is to be guided by collective principles and a shared outcome framework, and coordinated by a backbone organisation.

### Prioritise funding

Adopt a clear assessment criteria to direct funding to:

1. Invest in programmes for young people (years 5-10).

2. Invest in locally-relevant programmes & indigenous STEMM.

## Funder recommendations:

| Timeframe | Summary of Key Actions |
|---|---|
| Short | - Scale what's working (eg. House of Science & Ministry of Inspiration).<br>- Scope out "backbone organisation" role. |
| Medium | - Re-release RFP to invite more providers on board to join the STEMM Collective.<br>- Fund 1-2 STEMM pilots.<br>- Fund additional planning & networking hui around the region.<br>- Fund "local navigator" role(s). |
| Long | - Fund joint community STEMM events.<br>- Establish regular reviews of funded programmes.<br>- Grow investment for STEMM Action Plan with other funders.<br>- Scope out a "community response" fund for the development of community-led STEM projects and programmes. |

## STEMM Collective recommendations:

| Timeframe | Summary of Key Actions |
|---|---|
| Short | - Start regular planning hui.<br>- Create a shared directory.<br>- Create joint online presence. |
| Medium | - Develop shared targets and outcome measurement framework.<br>- Scope out a "local navigator" role.<br>- Scope out shared sub-regional "resource libraries".<br>- Scope out an indigenous STEMM roadshow alongside iwi/hapū.<br>- Establish connections with local businesses. |
| Long | - Create regular joint communications.<br>- Deepen relationships with iwi/hapū and identify "value-add" opportunities.<br>- Seek out future funding sources .<br>- Grow business/industry-level partnerships for STEMM programmes. |

# 1 Introduction

Trust Horizon (the Trust) is a charitable trust committed to investing in projects that bring transformational change to the Eastern Bay of Plenty. Driving the region forward and bringing prosperity and pride to its people.

For over 20 years, the Trust has been supporting STEM (Science, Technology, Engineering and Mathematics) education and employment pathways, particularly with a focus on growing local talent for careers in the energy sector. The Trust has recognised that a traditional model of short-term grant giving is piecemeal and makes it difficult to ascertain whether its investments are achieving the STEM outcomes it seeks to support and building longer-term capabilities within the Eastern Bay of Plenty region. The Trust is seeking to take a more proactive approach to investing in STEM programmes, working alongside education providers and teachers.

Bay Trust is a charitable trust operating in the wider Bay of Plenty region, whose purpose is to accelerate bold meaningful change to assist communities and the environment to flourish.

Te Hononga Akoranga COMET has been contracted by Trust Horizon, supported by Bay Trust, to facilitate the development of a STEMM Action Plan to inform the Trust's investment and collaboration activities over a 3-year horizon.

## 1.1 Goals

Trust Horizon is looking to achieve the following goals through this project:

1. Map out the Eastern Bay of Plenty's current STEM outreach and education ecosystem,
2. Work with 6 previously-identified STEM education provider partners to identify opportunities to coordinate delivery, deepen impact and effectively measure outcomes to build STEM capability and engagement in the region, and
3. Develop a collaborative action plan with STEM providers, for a 3-year initial investment period, with a view to supporting providers to develop self-sustainability in the longer term.

## 1.2 Scope

The scope of Te Hononga Akoranga COMET's work in developing this report included:

Phase 1: Scoping, initial research and project management

- Conduct introductory meetings with up to six (6) identified STEM providers and general background research into STEM education in EBOP.
- Plan a two-day workshop with STEM providers, Trust Horizon team and invited teachers and community stakeholders.

Phase 2: Workshop and co-design with STEM partners

- Facilitate a two-day workshop, using the Outcomes Mapping (OM) framework to collectively sketch out a vision, mission and desired outcomes for the STEMM Action Plan.
- Ideate and develop options for possible shared approaches or next steps to fill gaps and remove barriers towards achieving our identified outcomes.
- Work towards a collective approach to outcomes measuring and reporting.
- Build whānaungatanga within the group through sharing and collaborative thinking.

Phase 3: Development of strategic action plan report

- Produce a report outlining the "STEMM Action Plan" for the Trust, bringing together the learnings and outcomes from the workshop alongside COMET's research and expertise in the development and implementation of STEM outreach and engagement initiatives.

## 1.3 Purpose

The purpose of this report is to outline the strategic actions that COMET believes will support the Trust's goals of investing in collaborative action for long-term STEM capacity and capability building in the Eastern Bay of Plenty region.

The report sets out:

**Section 2:** COMET's understanding of the current STEM outreach and education system in the Eastern Bay of Plenty.

**Sections 3-4:** The case for change. Our justification for adopting a collaborative approach and why a "STEMM Action Plan" for coordinating funding and delivery of STEM services is needed.

**Section 5:** The key components of the "STEMM Action Plan" including recommendations for a shared vision, mission and outcomes.

**Section 6:** The key components required for a "STEMM collective" group to implement the plan, including recommendations for the collective structure, roles, guiding principles and outcomes measurement.

**Sections 7-9:** Priority funding areas and funding considerations for Trust Horizon, through which the Trust can target its STEM-related investment and encourage collaborative action among multiple providers.

**Section 10-11:** Priority actions and recommendations for funders and the STEMM collective partners (once funded) to better coordinate delivery and work collaboratively towards the plan's vision, mission and desired outcomes.

## 1.4 Contributors

This report has been developed following a two-day workshop in Whakatāne on 19–20 February 2024 with representatives from:

- **Funders:** Trust Horizon and Bay Trust
- **Economic development and community organisations:** Toi EDA (the regional agency for the Eastern Bay of Plenty) and Toi Kai Rawa Trust (Māori-led business with a specific focus on igniting Māori economies across the Bay of Plenty)
- **Schools:** teachers from Trident High School, Whakatāne High School and Te Kura o te Pāroa.
- **STEM providers:**
  - Brain Play (Auckland-based STEAM programme with plans to expand nationally)
  - Ministry of Inspiration (Nationwide facilitator of the Aquabots Competition and STEAM programme/PLD provider)
  - Eastbay REAP (local distributor of House of Science kits)

Input has also been received from the following: STEAM-Ed, STEM-Wana and Kia Kotahi Ako.

Throughout the report, we use the term "stakeholders" for the people who have contributed to the ideation and development of this plan. We wish to acknowledge all their valued contributions. We

also reference specific discussions from the workshop to highlight the importance of listening to "community voice" in the development of any community-directed investment plan.

We use the acronym "STEMM" (science, technology, engineering, mathematics and mātauranga Māori) in reference to the Action Plan and collective group that will implement the plan. This was a collective decision by the workshop attendees to highlight the importance of mātauranga or "indigenous STEM" to the region. In all other instances, we refer to STEM for simplicity as a 'catch all' for the different terms that funders, providers and communities commonly use.

While there is debate around the inclusion of other letters, for example A for Art, we believe that the intention of the plan and Trust Horizon's goals are the same, no matter the acronym – which is to foster increased engagement and long-term capabilities in "STEM" skills to drive more young people into highly valued employment and support prosperous and thriving communities.

## 1.5 Limitations

This plan has been developed based on the input and feedback from many different perspectives, including funders, STEM providers, teachers and community stakeholders. However, we acknowledge that the stakeholders were limited in number and there may be community voices that have not been heard. Our recommendations have been developed based on the best information that is currently available to COMET. Further wānanga with interested communities should be undertaken throughout the development and implementation of the STEMM Action Plan to ensure the plan and the Trust's investments are 'fit-for-purpose' for the communities it seeks to support.

The 'Eastern Bay of Plenty' region described in this report is based on the Trust Horizon's defined area of operation which covers Whakatāne District, Ōpōtiki District, Kawerau and Kaingaroa. Regional councils, other funders and regional or community stakeholders may have differing boundaries for the EBOP region (as no clear regional boundary exists); however, we expect funding distributed through the STEMM Action Plan will be limited to schools and communities within the Trust's boundaries. There may be potential to expand the reach of the STEMM Action Plan's investments in the future as additional funding partners come on board and 'out-of-zone' communities with STEM education needs are identified.

# 2 STEM in the Eastern Bay of Plenty

## 2.1 Education and economic landscape

The Eastern Bay of Plenty is a large region with 52 registered schools and nearly 10,000 enrolled students (1). The region's main town centres include Kawerau, Ōpōtiki and Whakatāne, but there is a wide geographical spread with more than half the schools in the region classified as "relatively isolated" by the Ministry of Education.

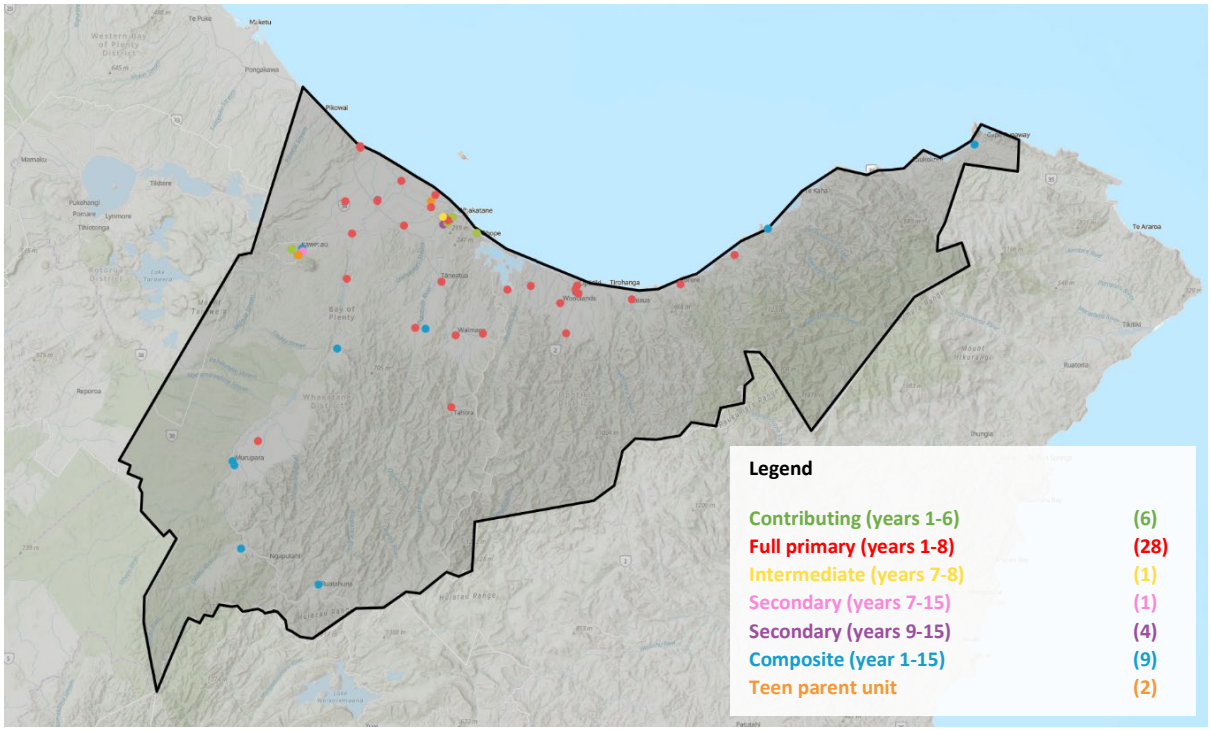



*Figure 1: Map of Eastern Bay of Plenty schools*

The percentage of school leavers with NCEA levels 1–3 or above in the Eastern Bay of Plenty region is below the national average, as is the percentage of school leavers with a vocational pathway or entering tertiary studies within one year of leaving school (1). The reasons for this are complex and vary across communities, with resource inputs (e.g. government investment in education, the quality and availability of teachers) and socio-economic factors (e.g. poverty, isolation, employment opportunities) all playing a part.

STEM career pathways typically require some form of post-secondary education (e.g. a bachelor's degree or vocational training). The STEMM Action Plan alone cannot lift educational outcomes for the whole region. However, the data does indicate that there is significant potential to grow local talent as many students are not currently able to see or access STEM careers (if they cannot enter post-secondary education or training).

Investing in young people's education early on and providing teachers, students and whānau with the resources and support to see themselves in STEM may well contribute to a lifting of student engagement and achievement over time.

| Description | Whakatāne District | Ōpōtiki District | Kawerau District | Bay of Plenty | NZ |
|---|---|---|---|---|---|
| Number of students (2023) | 6,882 | 1,639 | 1,005 | 57,199 | 831,038 |
| Number of schools (2023) | 33 | 13 | 5 | 163 | 2,538 |
| Number of teachers in state schools (2022) | 707 | 170 | 116 | 5,139 | 72,950 |
| Percentage of school leavers with NCEA Level 1+ (2022) | 83.5% | 76.2% | 70.7% | 85.2% | 84.8% |
| Percentage of school leavers with NCEA Level 2+ (2022) | 70.7% | 65.5% | 54.7% | 73.6% | 75.0% |
| Percentage of school leavers with NCEA Level 3+ (2022) | 42.8% | 34.5% | 32.0% | 47.3% | 51.8% |
| Percentage of school leavers with a Vocational Pathway award (2022) | 10.9% | 7.1% | 1.3% | 12.7% | 11.6% |
| Percentage of school leavers enrolled in tertiary within one year of leaving (2021) | 45.5% | 28.9% | 27.4% | 54.7% | 59.3% |

*Table 1: School data and student achievement in Eastern Bay of Plenty, Education Counts, 2024*

Opportunities for Māori in STEM:

The wider Bay of Plenty region has 35 iwi groups, 260 hapū and 224 marae, making it one of the largest Māori populations in the country (2).

The main industries in the region include timber, forestry, kiwifruit, dairy, engineering and manufacturing. Key economic indicators for the region are presented in Figure 2 (3).

According to Ministry of Education, more than 69% of students in the Eastern Bay of Plenty whakapapa Māori.

By 2050, it is predicted that:

- Over 40,000 new jobs will be created in the Bay of Plenty region, mainly in high-skilled areas (4).
- Māori, Pasifika and Asian peoples will make up around 50% of the working-age population (4).

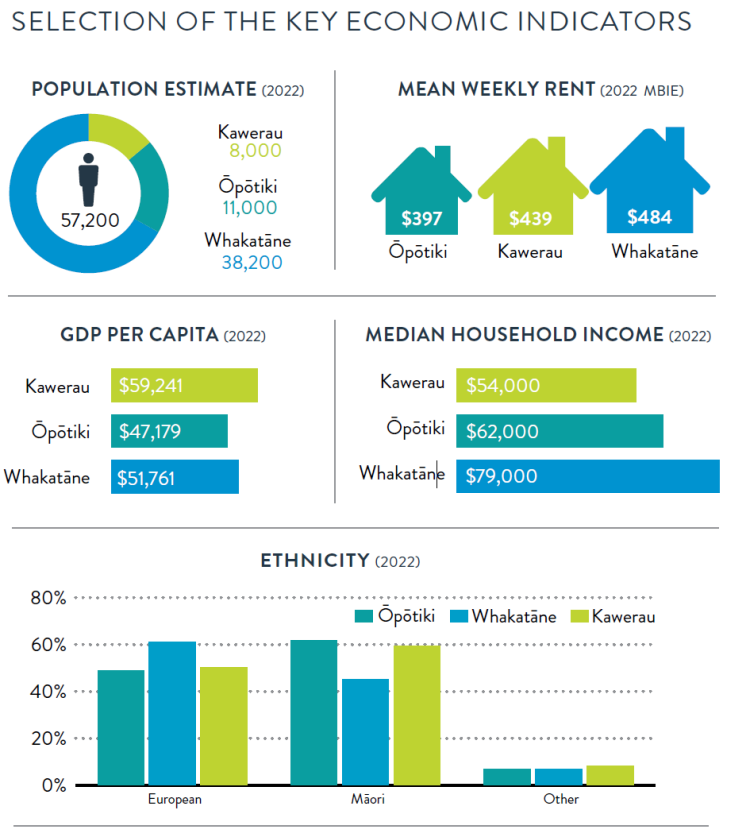



*Figure 2: Eastern Bay of Plenty economic indicators, Toi EDA, 2023.*

These forecasts suggest there is significant potential for today's tamariki Māori to become a highly skilled STEM workforce contributing to growing their local rohe and economy in the future, while staying connected to their land and iwi, hapū and whānau. Supporting this opportunity and investing in Māori students (as the largest student cohort) is a key theme in the STEMM Action Plan.

## 2.2 STEM outreach and education providers

COMET's research and discussions with stakeholders in the region have identified at least 30 STEM outreach and engagement (or 'Learning and Education Outside the Classroom [LEOTC]') providers with an existing or possible presence in the Eastern Bay of Plenty region. A non-exhaustive list of providers and STEM-related extra-curricular activities is provided in Appendix 1.

Our understanding is that the reach of individual organisations tends to be relatively small and localised in the regional centres of Whakatāne, Ōpōtiki and Kawerau. Some providers have had sporadic engagements in the region (dependent on funding) rather than an established presence, and fewer service providers are operating in rural or more isolated communities. STEM providers are often unable (or incentivised) to develop long-term relationships because of the nature of competitive, short-term and sporadic funding which makes long-term planning difficult.

In addition to these 'STEM provider' programmes, we know there are many iwi-, hapū- and community-based initiatives happening across the region. These include māra kai, conservation and environmental projects. It is impossible to map out where these projects are or the level of STEM engagement being achieved. However, we recognise that aligning with community-led interests and projects presents a significant opportunity for existing or new providers to create impactful programmes that are readily adopted by students and teachers and are 'fit-for-purpose' for that community.

# The case for change

# 3 Barriers and opportunities in the Eastern Bay of Plenty

## 3.1 Barriers to change

Many reports and hui, including the Trust Horizon two-day workshop (5), have identified the many barriers slowing or impeding change in the STEM outreach/education sector.

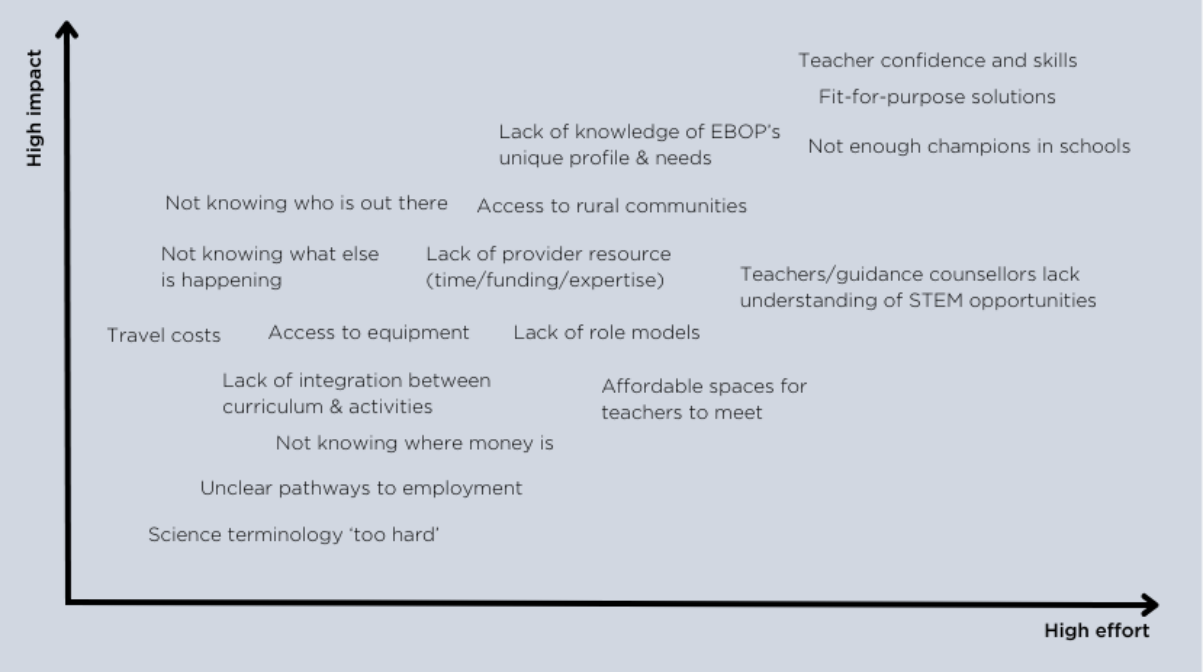



*Figure 3: Barriers to increasing STEM capabilities in EBOP, Trust Horizon STEM Action hui*

Not all barriers can be addressed at once. The actions recommended in this report aim to focus on removing barriers that will have the greatest impact for the least collective effort (i.e. could be achieved within a three-year horizon). These include:

- Not knowing who is out there
- Not knowing what else is happening
- Lack of provider resource
- Lack of knowledge of EBOP's unique profile and needs
- Access to rural communities
- Access to equipment

As barriers are progressively reduced or removed, collective efforts can eventually shift towards addressing other barriers or challenges.

## 3.2 Opportunities

The two-day workshop identified several opportunities of which a collective approach to STEM delivery may be well positioned to take advantage. These include:

- Recognition that many communities, iwi and hapū are already working on STEM initiatives. STEM providers could partner with existing community interests and initiatives to strengthen what is happening on the ground, rather than duplicating or creating something new.
- Recognition that isolation need not be a barrier. Several stakeholders challenged the common perception that rural and isolated communities were more difficult to reach and work with.

Rather, what is critical to successful engagement is ensuring these rural communities feel empowered to seek out and take advantage of STEM opportunities and to have local champions that can support sustained learning.

- Recognition that there are several organisations working on improving digital accessibility. There may be an opportunity to work alongside these organisations to increase digital literacy and STEM skills at the same time as giving out devices.
- Similarly, we understand there are businesses in the region that may be looking to invest in STEM education in the future, for example, as part of large-scale solar energy and infrastructure projects. These may offer alternative funding and partnership opportunities for STEM providers.
- Recognition that many organisations working in the STEM space share the same values and aspirations, and there is a strong demand for more connectivity and communication. This validates the potential value of bringing together the currently fragmented ecosystem under a 'collective' vision and mission.

# 4 The value of collective action

Working alone can only achieve so much. Particularly as there is no one-size-fits-all approach for STEM outreach and engagement that is effective for every student and community, and no one provider can do everything. Each provider or programme covers a different area of STEM, operates in different ways and provides varying levels of expertise and support. By connecting EBOP's diverse STEM providers and encouraging a collective approach to outreach and education, we can seek to bridge geographical and relational divides and foster a more cohesive ecosystem.

Collective action refers to the coordinated efforts of multiple stakeholders, including individuals, organisations, communities and institutions, working towards a common goal. It takes a strengths-based approach by identifying where certain resources, expertise and influence lie within different stakeholders and pooling these together to tackle challenges that are too large or complex for any one actor to address alone.

*Nā tō rourou, nā taku rourou ka ora ai te iwi*

*With your food basket and my food basket, the people will thrive.*

## 4.1 Collective contributions sustain long-term change

The 'Theory of Change' methodology can be used to illustrate how and why you'd expect a desired change to happen. It outlines the various inputs, influencers (partners) and actions that contribute towards an outcome and how various short-, medium- and long-term outcomes then contribute towards a common goal. Figure 4 demonstrates this in a STEM education context.

As the diagram highlights, different providers may contribute towards the same aspirations in different ways, working at different levels and influencing different parts of the complex ecosystem.

Individually, it is extremely difficult for providers to validate that their intervention is correlated with any direct impact on any one student (i.e. they cannot say that it was their programme that led to a young person choosing a STEM career pathway because multiple complex factors contribute to that decision making). However, when multiple providers work collectively towards the same outcomes, they start to build on each other's contributions rather than compete.

With that collaboration and a consistent outcomes measurement framework, providers (and funders) can say with greater certainty that their contributions and investments have helped to create greater impacts and longer-term changes.

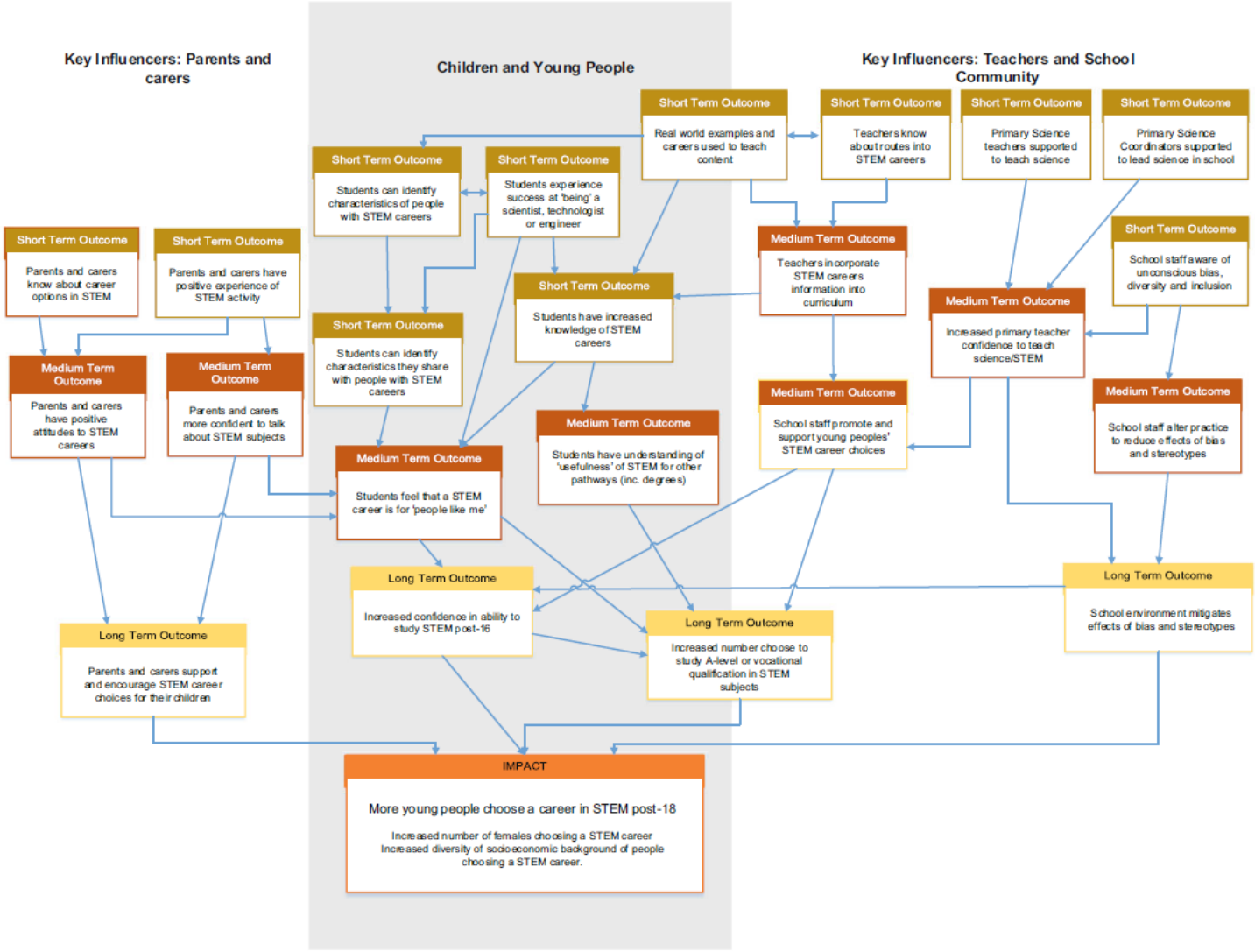



*Figure 4: Theory of Change diagram showing short-, medium- and long-term outcomes linked to increasing diversity in STEM. Davenport et al, 2020.*

## 4.2 Benefits to stakeholders

For schools and communities, collective action reduces overwhelm and makes it easier to participate by making all opportunities clear and accessible. Appendix 1 lists the many STEM education providers that are operating in and around the EBOP region. For new schools looking to engage, it can be difficult to know which group to connect with and what each provider offers. Anecdotally, we've also heard that opportunities and activities are only accessed via "who you know", making it difficult for new teachers to understand what is available in the region.

A collective approach enables providers to share knowledge about their programmes and the schools and stakeholders they work with. This can ultimately lead to better and more cohesive learning outcomes for students. For example, one provider could reinforce key messages or foundational skills built by a previous provider, thereby building on students' prior knowledge and strengthening their learning.

**CASE STUDY: TAUPŌ ENVIRONMENTAL EDUCATION COLLABORATIVE**

The Taupō EEC is a self-governing, self-funded collective of 13 environmental education providers in the Taupō region. Members meet several times a year to share knowledge and plan collective actions with a goal of making education more accessible and empowering students, teachers and communities to take action for their environment.

**Key collective actions:**

- Joint events calendar and PLD sessions.
- Shared marketing, website, contact database and profile building.
- Regular meetings and knowledge sharing.
- Data sharing for outputs/outcomes measures.

**Reported benefits:**

- Teachers access multiple providers in one go.
- Better linking of student learning experiences.
- Providers and schools clearly understand each group's strengths and offerings.
- More efficient planning and bigger reach by leveraging networks and 'sharing the load'.

## 4.3 Benefits to STEM providers

When the uncertainty and burden of competing for the same funding sources are removed or eased, providers are more likely to work positively together and take a longer-term view of their programmes and relationships. Providers could see a range of benefits from working in a coordinated manner to share knowledge, contacts and resources, including:

- Gaining greater awareness of what the other providers are doing, which in turn helps them define their 'point of difference' as a provider,
- Understanding what gaps need to be filled, so they can focus their efforts and avoid overlaps and duplications,
- Expanding their reach and visibility in communities,
- Leveraging existing, collective knowledge to adapt and refine their programmes to be more responsive to community needs, and
- Using shared outcomes data, which can minimise data collection and reporting efforts for future funding applications.

Longer-term or untagged funding allows STEM providers to plan their programmes, services and resources (include staff capability development) with greater certainty, and this can support the development of more self-sustainable organisations.

In more established relationships, providers may even see opportunities to build on each other's strengths to create joint programmes or initiatives. These may be more readily funded and scalable, leading to better growth opportunities for the providers.

## 4.4 Benefit to funders

For funding organisations wanting to maximise the impact of their investments, encouraging a collective action approach can provide better value than piece-meal investments in individual providers. This is because of the value that collective thinking and action bring in terms of improving provider/programme efficiency, reducing duplications and building stronger networks and relationships, which ultimately will reach and upskill more people and increase the impact of the investments within communities.

Collective action is not limited to STEM providers and community stakeholders, either. There is significant potential for multiple funding organisations to pool their resources together to support the implementation of this collective STEMM Action Plan. By pooling resources with others, a funder can leverage their funding to support larger-scale or longer-term initiatives that would be beyond their capacity. This is particularly important in the current environment where demand for funding is high but the amount available for philanthropic funders to distribute remains stagnant or in decline.

Additionally, collective funding promotes knowledge sharing, learning and innovation within the philanthropic community. This enables funders to benefit from diverse perspectives and expertise that can lead to better funding decisions and better outcomes. For example, if funders can adopt more consistent funding approaches, more providers may be able to access funds and therefore increase the reach, scale and sustainability of their programmes.

Ultimately, investing in collective actions that foster longer-term, sustainable impact will reduce the 'co-dependency' that some programmes have on funders and enable genuine systemic changes in the communities that funders seek to serve.

# STEMM Action Plan

# 5 STEMM Action Plan

## 5.1 Vision and mission

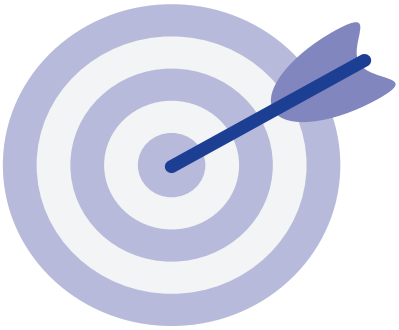
In building a collective action plan with multiple partners and stakeholders, it is vital to start with a common understanding of who the stakeholders are and what each organisation's vision, mission and objectives are. By understanding each organisation's unique perspectives, we can recognise the strengths and values that each brings to the collective thinking and identify the commonalities that will underpin successful, long-lasting collective action.

Based on this collective understanding, stakeholders have co-designed a shared vision and mission for the STEMM Action Plan.

**Vision:** We see all Eastern Bay of Plenty learners equipped to innovate, solve challenges, take hold of opportunities and thrive. Communities champion STEMM learning, unique to them, which broadens our rangatahi's choices for their future.

**Mission:** We will work alongside learners, teachers and communities to build STEMM capabilities through relevant and accessible workshops, activations, networking, resources and PLD training.

We accelerate change by scaling what we know works, strengthening cross-sector connections and responding to communities' needs and aspirations.



## 5.2 Aspirations for the Eastern Bay of Plenty

Building on the collective vision and mission, it is important to set clear, aspirational targets for the groups and communities that the STEMM Action Plan seeks to work with and influence. This sets out what "success" would look like for each group:

- **Students** are highly engaged, active learners who can see themselves in STEM. They have the self-belief and knowledge to tackle challenges, innovate and pursue their aspirations.
- **Teachers** have embedded a culture of learning in schools and are equipped with the knowledge, resources and connections to go 'above and beyond' for students to support their pursuit of STEM learning.
- **Iwi/hapū and Māori communities** are drivers of their own STEM education, working in a cohesive and coordinated manner with teachers, whānau and STEM education providers to determine and achieve success for their communities.

- **Rural communities** are active STEM hubs with strong whānau engagement and student-led, community-based learning. Their location is no barrier to accessing STEM opportunities.
- **Businesses and industry** are local champions of STEM that actively contribute time, money and resources to growing and sustaining STEM opportunities for EBOP communities.

We recommend that, as the STEMM Action plan is further developed, more specific and quantifiable targets for each group should be defined to drive ambitious and measurable action. Examples of outcome measures and data that could be collected are presented in Section 6.4.

# 6 STEMM Collective

## 6.1 STEMM Collective structure

The nature of collective action means that successful outcomes depend on several different parties coming together with specific actions or responsibilities that contribute towards the collective goals. The parties within the "Sphere of Control" have been defined as the "STEMM Collective", and the way they operate with the target groups is depicted in Figure 5. This section provides an outline of the collective members' roles and what the Collective would need to do to support the implementation of the STEMM Action Plan.

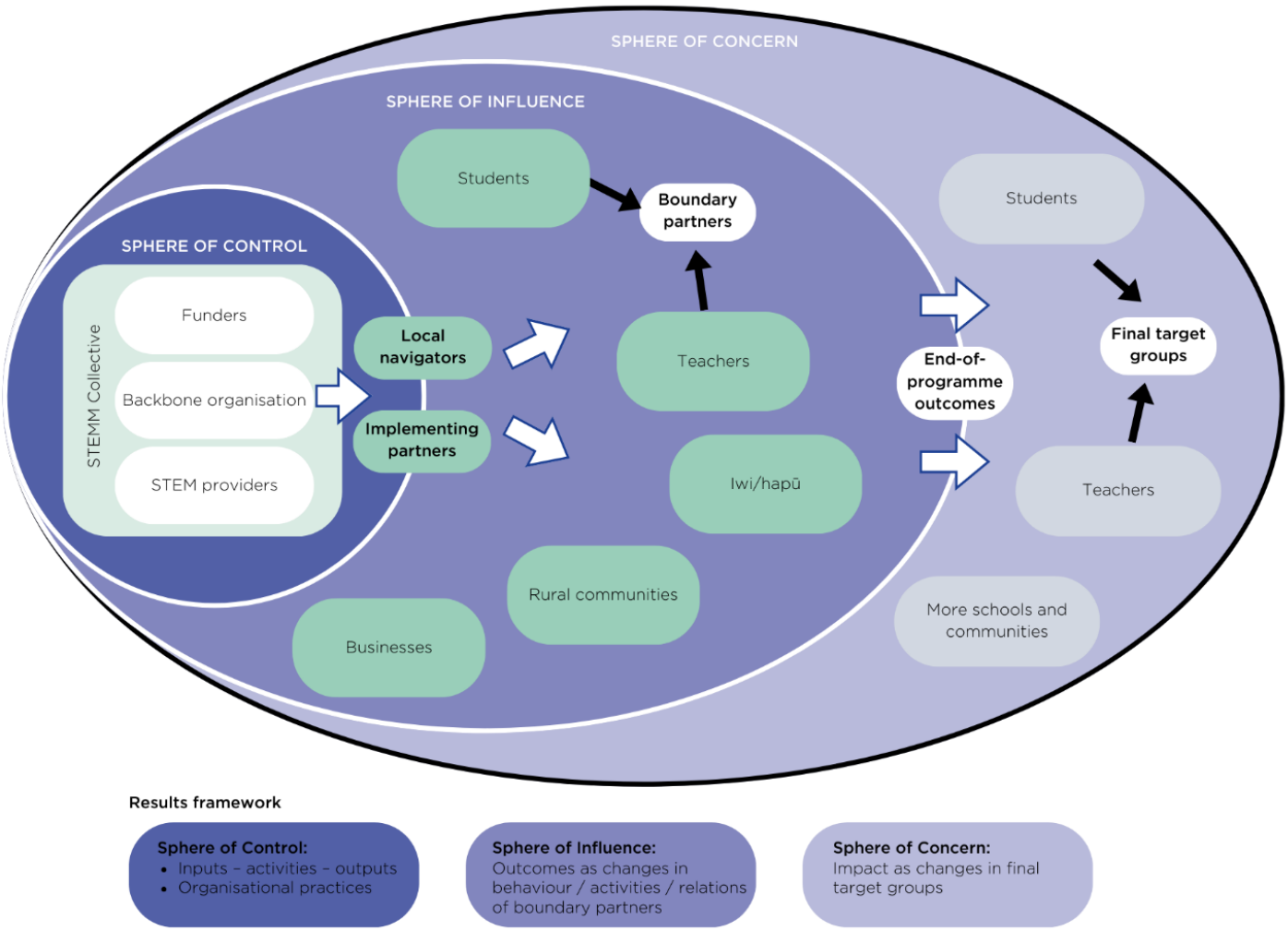



*Figure 5: STEMM Collective spheres of influence*

The "green" groups that sit within the sphere of influence are the people that STEM providers will work with directly (in outcomes mapping, these are called the "boundary partners").

The "grey" groups in the sphere of concern are others that the STEM provider does not directly work with, but whom we expect will also benefit from the STEM programme or intervention. Outcomes mapping suggests that to maximise outcomes for the final target groups, providers can (and must) focus on how they influence the people they directly work with.

**An example of boundary partners in action**

A "House of Science" subscription involves a direct relationship between a STEM provider and a teacher. To increase long-term effectiveness, the STEM provider can seek to bolster that relationship by providing more training, making new connections for the teacher, or improving the kits in response to teacher feedback. The provider does not, however, have any direct control or influence over *how* the teacher uses the kits for their students (who, in this case, sit in the sphere of concern). But by empowering the teacher to use the kits consistently and effectively, that is likely to have a positive effect on the students as well.

### 6.1.1 STEMM Collective members (Sphere of Control)

**Funding partners**

Funding to 'kickstart' the STEMM Action Plan is required to increase the capacity of STEM providers and regional community organisations to implement the collective actions that have been identified.

The funding partners' role will be to decide which organisations are funded through the STEMM Action Plan and how much funding to allocate (and over what period). In this way, funders will have a significant degree of control over the plan's implementation, at least in the short term.

Recommendations for the funding priorities and considerations that could inform future investment decisions are provided in Sections 8 & 9.

**A well-connected 'backbone' organisation**

The coordination, communication and relationship management skills needed to facilitate whānaungatanga and build towards collective action are not to be underestimated (or under-resourced). A capable and well-connected backbone organisation would play a critical role in the STEMM Collective by managing coordination activities, such as:

- Setting and running meetings to bring STEM providers together,
- Maintaining shared databases/event calendars,
- Linking STEM providers with schools and communities as needed (this may also fall under a separate 'local navigator' role),
- Growing and maintaining the Collective's connections with community stakeholders and strategic partners as needed,
- 'Onboarding' new providers to the STEMM Collective (to ensure they understand the collective principles, agreed roles and processes, etc.),
- Supporting collective outcomes tracking and monitoring, and
- Maintaining general oversight of what is happening in the EBOP's STEM ecosystem to ensure the Collective's actions remain responsive and relevant.

Additional functions that the backbone organisation may have include:

- Providing 'snapshots' or general updates to funders periodically to keep them informed of what they are seeing in terms of community and STEM provider needs, gaps and opportunities,
- Contract management, and
- Collective reporting to funders (if required).

Care needs to be taken, however, that the backbone organisation's role is clearly in service specifically to the STEMM Action Plan and does not conflict with the organisation's other STEM-related or educational activities.

Furthermore, while the backbone organisation may be able to provide funders with data about community needs and gaps, they should not be directly involved with assessing any funding applications or recommending STEM providers to support. That may create conflicts of interest and a power imbalance within the Collective and would not be conducive to collaborative efforts, with providers possibly feeling obliged to work with the backbone organisation rather than seeing the value of the role and its contributions to collective efforts. These considerations should be further discussed when a suitable backbone organisation is identified.

**STEM providers (implementing partners)**
STEM providers are the organisations who will be 'implementing' the plan — i.e. actively planning and contributing towards the collective action set out in the STEMM Action Plan as well as delivering their STEM programmes to the target groups. We envisage that providers will refer to the STEMM Action Plan to develop their funding applications, and they must be able to clearly show how their proposed programme relates to the plan's mission and objectives. Further, the providers must show a commitment to actively engaging in the STEMM Collective (i.e. an agreement to the Collective principles) and this may form one of the conditions of receiving funding.

Recommendations for actions on which the STEM providers and backbone organisation can work together (once the Collective is established) are outlined in Section 11.

### 6.1.2 External stakeholders (Sphere of Influence)

**Teachers, community stakeholders and other strategic partners**
We see teachers and other stakeholders as having a vital role in providing feedback on the Collective's plans and future direction, as well as being connectors and enablers of some collective actions. However, they may not necessarily actively contribute towards all of the Collective's outcomes. Therefore, they would not sit within the Collective directly but rather would be within the Collective's 'sphere of influence'. Clear and consistent communications and feedback loops must be established between stakeholders to achieve long-term impact and grow capability and sustainability.

## 6.2 STEMM Collective principles

The role and scope of Collective members will become more defined as the plan is further developed and implemented. For a starting point, we have identified a few core principles that could be adopted going forward, so future implementing partners (e.g. STEM providers) who wish to join this kaupapa can understand the key expectations for being involved.

These recommended principles include:

1. **Common ground:** Partners should agree on the STEMM Action Plan's shared vision, mission and goals. They should be able to demonstrate how their programme or initiatives align with the outcomes that the plan seeks to achieve.
2. **Active engagement:** Partners should commit to actively participating in regular planning meetings, joint events and communications and to the sharing of ideas, resources and opportunities as they arise.
3. **Honour Te Tiriti o Waitangi:** Partners should strive to act in partnership with Māori communities, to increase Māori participation in — and leadership of — STEM engagement activities. Partners should seek to actively champion and protect Māori knowledge, interests, values and other taonga as part of their work.
4. **Listen and learn:** Partners should support a collaborative ethos where they are open to two-way communication and learning from school and community stakeholders, willing to adapt to

meet changing needs and prepared to share successes and failures (i.e. lessons learnt) for the benefit of others in the Collective.

5. **Respect for autonomy:** Partners should respect the autonomy and expertise of each participating organisation or individual while recognising the value of collective action and shared accountability. This autonomy should enable partners to retain flexibility in their decision-making within the framework of collective goals (e.g. opting out of joint events or initiatives that are not relevant to their core business).
6. **Long-term sustainability:** Partners should commit to supporting collective impact over the long term, recognising that sustained, collaborative efforts will be required to achieve meaningful and lasting change. New initiatives and programmes should be developed with longevity or financial sustainability in mind from the outset.

## 6.3 Fostering long-term collaboration

There are many ways to foster collaborative relationships among 'competing' groups. The Trust's unique position of seeking to fund work through a collective action plan will necessitate that STEM providers work together and that funding should, at least initially, be ample motivation for collaboration.

Over time, however, funders should expect to see more organic and altruistic motivations for collaboration as collective members see the value of working together (beyond it being a prerequisite for future funding). Reinforcing the Collective's common objective and clear guiding principles will be important for building this long-term trust and collaborative effort.

## 6.4 Outcomes measurement and reporting

A simple and consistent process for data collection and analysis will be critical for tracking progress towards the STEMM Action Plan's goals. We would recommend a set of 'internal' measures (for the Collective members) as well as 'external' (for its boundary partners) to gauge progress and record outcomes. These measures — and related data collection and reporting processes — should be fleshed out in detail by the funders and STEM providers.

For a start, we have provided some recommended outcomes measures and processes below.

### 6.4.1 Internal measures

Since increasing collaboration between providers is key to the success of the STEMM Action Plan, measures to track how well the STEMM Collective itself is functioning over time will be a useful tool:

- Number of attendees (different organisations) at Collective planning hui.
- Number of stakeholders engaged through the Collective (e.g. people on mailing lists, attending public events, etc).
- Evidence of knowledge sharing and collaborative actions between STEMM collective partners.
- A record of 'lessons learnt' – i.e. constructive feedback and learnings gained through experiences that may be of benefit for other STEM providers.

### 6.4.2 External measures

These measures would track the outputs and outcomes of individual STEM providers consistently so that all data can be aggregated and analysed cohesively to determine the collective outcomes from the STEMM Action Plan's investments.

Outcome measures should relate to the target groups and aspirations, as described in Section 5.2. Understanding changes in the target group's behaviours, attitudes, relationships and policies (BARP) can be an effective way to track progress over time, as these changes can be tracked with evidence.

Examples of questions or data requirements might include:

**Students:**

- Student demographic data (e.g. numbers, age, ethnicity, location).
- Student experiences (e.g. Did students learn something new? Did they have fun?).
- Student attitudes (e.g. questions to gauge whether the programme or intervention changed a student's attitude towards STEM).
- Qualitative narratives (e.g. seeking out and recording the success stories and unexpected outcomes told by teachers and students).

**Teachers:**

- Teacher relationships ( e.g. do teachers feel more connected to provider offerings and/or other teachers? Do they feel better supported to teach STEM in the future?).
- Teacher attitudes ( e.g. questions to gauge whether the programme or intervention changed a teacher's confidence in STEM).

**Iwi/hapū, Māori and rural communities:**

- Community relationships (e.g. Did iwi/hapū partners feel heard and included? Were they able to contribute to the STEM providers' programme/event etc.?).
- Community experiences (e.g. Did community participants learn something new?).
- Community attitudes (e.g. Did the programme or intervention feel relevant and exciting? Did it change their perception of STEM?).
- Qualitative narratives (e.g. seeking out and recording the success stories and unexpected outcomes told by community members and iwi/hapū partners).

**Businesses and industry:**

- Number of businesses or professional role models attending community events or participating in a STEM programme.
- Number of businesses sponsoring or supporting local STEM initiatives.
- Role model experiences (e.g. Did professionals have a good time? Did they feel like their presence had a positive effect on students and teachers?).

# 7 Recommendations overview

The following sections contain our recommendations for:

- Priority funding areas for the Trust to direct the focus of future STEM provider programmes and interventions,
- Funding considerations for the Trust to assess future funding applications,
- Actions that the Trust (and other funders) can implement to establish the STEMM collective and support the implementation of the STEMM Action Plan, and
- Actions and ideas that the STEMM collective can implement to deliver on the STEMM Action Plan. These actions can only be progressed once the STEMM collective is established.

All recommendations in the STEMM Action Plan have been aligned with the mission's key strands: scaling what works, strengthening cross-sector connections, and responding to communities' needs and aspirations. This ensures that each action directly contributes to the collective mission. As the plan evolves, all future actions and priorities should be related back to the mission as well.

We recommend that all aspects of the mission be progressed cohesively for greatest long-term impact, because:

- There are many STEM providers already in the region (or looking to enter), but most have limited visibility and reach. Provider programmes must be easily accessible for schools and communities to engage with them. Short-term wins can be gained by scaling up existing initiatives (by building on existing relationships) that align with the collective's desired outcomes.
- New pilot programmes or providers should be supported to enter the region if they are able to build on what is already existing (in terms of relationships, resources or interests), fill identified gaps, and/or demonstrate a strong commitment to contributing towards the collective's vision and mission.
- Providers that respond to community needs and aspirations, utilising local STEM contexts, will have the greatest influence in increasing student and whānau engagement in STEM. However, STEM providers are often not 'close' enough to communities to understand these needs, so it is important that the links and feedback loops between providers and communities are strengthened. Cross-sector connectors can help to facilitate dialogue and drive this responsiveness.
- A coordinated approach between providers and teachers is also important for improving the efficiency of STEM outreach efforts by making initiatives easier for schools to participate in, removing clashes or duplications, identifying opportunities for collaboration and staying responsive to changes in the school or communities.

# 8 Recommended priority funding areas

Funders may wish to set priority focus areas to strategically direct collective efforts to where they are needed most (or where its likely to create the most sustained impact). Based on our understanding of the needs in the Eastern Bay of Plenty region and stakeholder inputs, we recommended funding be prioritised around two key themes.

## 8.1 Young people seeing themselves in STEM

Getting tamariki and rangatahi excited about STEM and seeing its practical applications in their lives and communities is the first step towards getting young people to consider possible STEM career pathways. If they see those pathways and opportunities for their future, they will be more likely to stay engaged in education and be active in the pursuit of their aspirations.

Research has found "the majority of students [in middle years of schooling] are highly undecided about science, at a time when they will be making permanent and critical decisions about their futures" (6).

The Trust has an opportunity to drive that early exposure to STEM by prioritising funding to providers that predominantly serve the year 5–10 age groups. This "late primary to early secondary" age group is one of the most influential stages in a students' education; if they do not have good experiences of STEM at this age, they are much less likely to choose related subjects at secondary school.

Furthermore, investing in STEM in primary school settings will better support long-term capability in the Eastern Bay of Plenty because many primary school teachers do not have specific STEM teaching capabilities or confidence (compared with secondary school specialist science teachers). Programmes that can work alongside primary and intermediate school teachers and support teacher development will enable more sustained educational outcomes for future students.

## 8.2 Thriving local communities through innovation

Recognising that the Eastern Bay of Plenty's young people and their whānau whakapapa to scientists, technologists, innovators and problem solvers, this theme supports the growth of knowledge already latent in the region and extending it with a future focus on technology and innovation.

The key employers in the Eastern Bay of Plenty are mainly primary industries, which are inherently science-based. Many of these industries, however, are undergoing rapid change (or will need to) to adapt to the changing climate and other environmental pressures. We see this as a significant opportunity for STEM providers to create programmes that are relevant and based on locally contextualised science while also showcasing the importance of innovation (e.g. through scientific research and leading-edge technologies).

In addition, workshop stakeholders expressed a strong desire for STEM providers to work alongside iwi/hapū and Māori communities, to tap into ancestral knowledge and show real-world applications (and job opportunities) to rangatahi (5). By showing rangatahi that there are STEMM applications in their rohe and that they can 'do STEMM' right here in the Eastern Bay of Plenty, this is likely to encourage more young people into careers that support the growth and prosperity of the local communities.

# 9 Recommended funding considerations

Alongside the priority funding areas, funders may wish to set clear assessment criteria to support the consistent assessment of funding applications. Determining the 'value' or 'potential impact' of different funding applications is extremely difficult. It requires an understanding of the programme's intended outcomes as well as what makes a programme effective and sustainable.

## 9.1 Understanding what STEM interventions can achieve

Local and international research and monitoring studies of student achievement has regularly shown a decline in science engagement in the middle years of schooling (years 5-10) (7). Evidence suggests this age group would benefit the most from STEM interventions because changing attitudes at this critical age will enable more students to 1) see themselves in STEM and 2) be encouraged to pursue STEM subjects in later years of schooling.

Different interventions will have different target audiences and intended outcomes and STEM outreach can span a wide range of activities and audiences. Generally, these link to a students' educational journey as depicted in Figure 6.

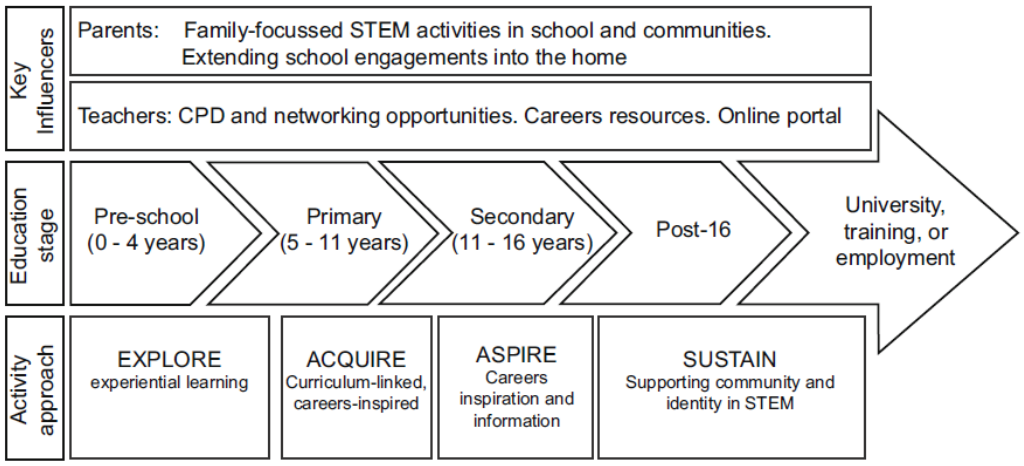



*Figure 6: A child's educational journey in STEM. From Davenport et al, 2020.*

For an intervention in ECE and primary school contexts, the provider will primarily be targeting attitudes towards STEM subjects through increasing awareness of STEM in the real world and creating enjoyment of the subject. It is unlikely that there will be a direct correlation between this intervention and the student pursuing a STEM career.

Students in the early years of secondary school will have begun to make decisions about their subject choices and how this relates to future careers. Interventions in this context will continue to target awareness of STEM in real life but should also begin to focus on careers and specifically subject choices and study or career pathways. There is also a need to cover STEM content in more detail to develop their understanding and lift achievement in these subjects.

Students in senior secondary school will likely be considering their future pathways and what studies or careers they wish to pursue. Interventions at this level may be more skills or career-related.

The return on investment (ROI) for interventions targeting late secondary students cannot be compared to one targeting primary school students, as providers will be working with students that have already decided to pursue a career in STEM (versus those that are just becoming familiar with STEM in the first place).

## 9.2 Determining potential for long-term impact

One key consideration that the Trust would like to consider, is the longevity or potential long-term sustainability of a proposed STEM programme. Research suggests that a STEM intervention or programme is more likely to create a sustained impact when the following points have been considered:

- **Reach:** Sometimes investing in a smaller group of students is more likely to create long-term outcomes than investing that same amount of money in a larger group. Investing in a smaller group allows for more targeted content and deeper connections, which creates more meaningful changes than working across a larger group. Limited resources spread thinly across a large group can only achieve surface level engagement.
- **Programme timeframe:** A provider that provides a series of workshops is more likely to create sustained changes than a provider that is only going into a classroom/school once, as the series gives students the opportunity to reinforce the learning over multiple sessions. Sustained engagement also enables student-role model relationships to develop.
- **Teacher training and resources**: A provider that works directly with the teachers can create programmes that continue when the provider is not present. This builds teacher capabilities and confidence, while giving them the opportunity to align learning to their school curriculum and continue to reinforce the learning. This is especially important as teachers will have a greater understanding of student needs, which allows a more tailored approach to how the content is taught.
- **Whānau involvement:** Students will need the support of their whānau if they wish to pursue any future career opportunities. A provider that recognises opportunities for students to involve whānau in their learning journey is more likely to create sustained change because the provider can also influence and change whānau attitudes towards STEM, either directly or through the student participants.
- **Connection with the community:** Students will feel a deeper sense of connection to STEM when they can relate it to issues that are important to them and their community. This helps to contextualise and highlight the application of STEM to the real world.
- **Role models:** Students cannot be what they cannot see. Exemplifying career pathways that are linked to classroom learning emphasises the real-world applications of STEM and opportunities that are available to the students and showcase pathways into those careers.

Other considerations that may help to determine whether a programme might be good 'value for money', scalable or sustainable over the longer-term include:

- **Co-funding:** Programmes with demonstrated additional support, whether via business sponsorships, co-funding, in-kind donations or community buy-in, may be more likely to continue in the longer term as it will not be solely reliant on the Trust's funding.
- **Ongoing support:** If a programme involves training teachers, understanding what level of on-going support is available (post-training or programme intervention) can be useful for determining whether it is likely that teachers can and will continue to utilise that programme in the future.
- **Alignment with the STEMM Action Plan and other implementing partners:** Reviewing the portfolio of investments as a whole can be a useful approach to ensure that each new funded programme has the potential to build upon or collaborate with others in line with the mission and objectives of the STEMM Action Plan.

# 10 Recommended funder actions

This section summarises recommended actions that Trust Horizon and Bay Trust (and potentially other funders) can implement in the short-, medium- and long-term to fund and encourage more collective action. Detailed commentary is provided in Appendix 2, which sets out further justification and discussions around each recommendation.

We recognise that much of the longer-term actions will depend significantly on which providers make up the STEMM Collective and how they choose to coordinate and prioritise this collaboration over time.

## 10.1 Short term

1. Continue to fund House of Science kits across the Eastern Bay of Plenty region, leveraging this platform to build connectivity and responsiveness in schools.
2. Scale up the Aquabots programme by funding its introduction into more schools and communities.
3. Scope out and fund the role of a "backbone organisation" to coordinate collective partners and support the implementation of this plan.
4. Investigate the potential to fund or support regional kahui ako leads to do a stocktake of existing resources and capabilities (i.e. teacher surveys, science and tech stock in schools).

## 10.2 Medium term

1. Re-release an RFP to STEM providers to identify other providers and programmes that align with the STEMM Action Plan that the Trust could fund. Refine or develop assessment criteria to support investment decision-making and consider longer-term, open-ended funding to build momentum for collective action.
2. Fund and coordinate additional planning hui for interested STEMM providers and stakeholders to build on this plan collectively.
3. Fund and coordinate a series of networking hui across the region for teachers, providers, industry and iwi/hapū reps to meet and understand what is happening in each community.
4. Lead a series of informational sessions on funding opportunities for teachers/schools and communities to access.
5. Fund pilots for 1–2 new short-term STEM initiatives (based on initial feedback from teachers) to test these offerings and allow for community input into longer-term programme offerings.
6. Fund a 'local navigator' role(s), with role and scope developed alongside STEM providers.

## 10.3 Long term

1. Fund 1–2 joint events a year — e.g. STEMM-in-the-community celebrations.
2. Review funded programmes annually against outcomes measurement framework and proactively adapt programmes to meet changing needs, resources and community aspirations.
3. Build support for this STEMM Action Plan collective kaupapa with other regional funders and steadily increase the amount of investment available.
4. Scope out potential for a 'community response' fund which providers and schools/communities can access to develop their own community-led STEM projects and programmes.

# 11 Recommended STEMM Collective actions

This section summarises ideas and actions the STEMM Collective could explore to help foster whanaungatanga and build collective impact towards the STEMM Action Plan's vision, mission and objectives. These ideas were developed alongside stakeholders at the 2-day Trust Horizon workshop. The timeframes are indicative only based on our assessment of what needs to be in place early on to facilitate collective action, as well as the amount of resources, connectivity and coordination that may be required to implement some of the more aspirational ideas.

Detailed commentary is provided in Appendix 3, which sets out further justification and discussions around each recommendation.

## 11.1 Short term

1. Organise and hold regular planning hui for implementing partners. The purpose is to build whanaungatanga and support collective planning around things like a shared calendar of events, sharing contacts and funding opportunities, 'lessons learnt', etc.
2. Create a shared directory of providers and programmes for teachers to access.
3. Create and coordinate joint online presence and 'marketing' of STEMM Collective.
4. Coordinate joint provider-teacher hui annually to check in on what's working/not and teacher needs/priorities.

## 11.2 Medium term

1. Workshop and agree on targets for each group that STEMM providers work with and an outcomes framework for measuring progress towards those targets.
2. With the funders, scope out a role for a local navigator to liaise with teachers and iwi/hapū (to connect, share, listen and seek out opportunities to collaborate).
3. Scope out the feasibility of STEMM providers and kahui ako creating a shared resource library/inventory for "try before you buy" opportunities and improved access to equipment.
4. Scope out opportunities/interest for joint community STEM events.
5. Scope out development of a regional indigenous STEMM roadshow alongside iwi/hapū.
6. Scope out different ways that businesses and local industry can support community-led STEMM and start to establish communications and relationships with businesses.

## 11.3 Long term

1. Coordinate joint communications for external stakeholders and other STEMM providers to communicate regional needs, opportunities and updates.
2. Identify how the STEMM Collective can support or add value to individual iwi/hapū with their STEMM plans.
3. Seek out future funding sources, including new opportunities that may arise through collaboration and deeper engagement with iwi/hapū, industry and other potential partners.
4. Continue to identify and grow business/industry-level partnerships for STEMM programmes.
5. Scope out opportunities for new joint programmes or projects co-designed with teachers and community stakeholders — e.g. a 'House of Tech' box, 'local tech hubs', etc.

# 12 Conclusion

There is significant potential for collaborative action to create sustained changes to STEM capacity and capabilities in the Eastern Bay of Plenty region. The current STEM ecosystem is fragmented with few connections between STEM providers, teachers and the wider community.

STEM providers are not resourced or incentivised to develop collaborative, long-term relationships because of the competitive, short-term and sometime sporadic nature of grant funding. Teachers do not know what is available or how to access and integrate STEM providers into their busy timetables. Iwi/hapū and community-led initiatives are largely hidden but represent a significant untapped source of indigenous knowledge and skills that could increase interest and engagement in STEMM.

Bringing these different players together to work towards a collective vision and mission sits at the core of the STEMM Action Plan. We believe there is a large base of existing people and programmes from which to build. When we strengthen more cross-sector connections to become responsive to community needs and aspirations, impactful STEM programmes will follow.

The STEMM Action Plan actions and recommendations summarised below set out the roadmap for building towards this collaborative action.

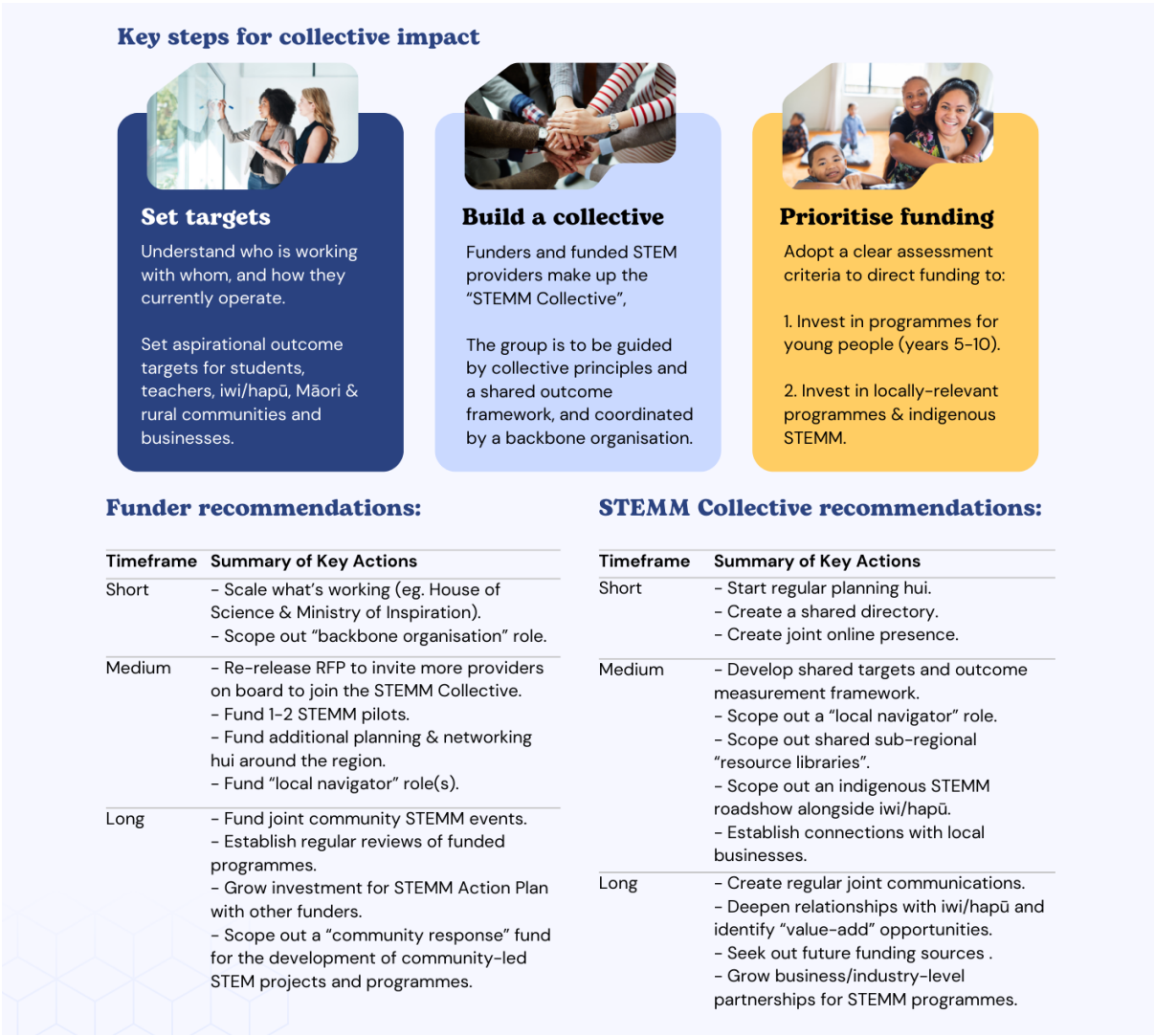



*Figure 7: Summary of STEMM Action Plan recommendations*

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## Appendix 1 - List of STEM Education Providers

| Name | Reach | Focus areas | Focus audience | | | | | Description |
|---|---|---|---|---|---|---|---|---|
| | | | ECE | Primary | Intermediate | Secondary | Teacher PLD | |
| Bay Conservation Alliance | Regional | Environment | | X | X | X | | Our programme provides fully facilitated hands-on experiential conservation education. Activities and learnings include bird banding and ID, reptile and insect monitoring, rongoa, biosecurity challenges including issues like kauri dieback, and of course the huge challenge of pest management. |
| BLAKE | National | Environment | | X | X | | | A series of programmes that inspire environmental leadership through through adventure, participation, education and enjoyment. |
| Cawthron Ahumoana Whakahihiko | Local | Environment | | | | X | | The programme aims to advance the core technologies and systems for growing oysters, scallops, and seaweed in New Zealand's exposed (offshore) waters. Within the program, Cawthron is working with the Whakatōhea Māori Trust Board to assist with the advancement of their aquaculture strategy. |
| Code Avengers | National | Technology | | X | X | X | | An online tool that teaches critical 21st century skills, including computer programming, critical thinking, and problem solving. |
| Department of Conservation | National | Environment | | | | | | Find resources to support conservation teaching and learning, and DOC supported education programmes you can get involved in. |
| Digital Native Academy | Local - Rotorua | Technology | | X | X | X | | A state-of-the-art digital training centre which offers programmes focused on 3D asset development. |
| Eastbay REAP | Local | Education | X | X | X | X | | Educational programmes, courses, resources and events for educators, parents, whānau (family), groups and individuals. |
| Education Perfect/ Science Alive | National | Science, Technology, Engineering, Maths | | X | X | X | | EP is an online teaching and learning resource that provides teachers and students with a comprehensive New Zealand curriculum aligned library of highly engaging, interactive and fully customisable resources. |
| Enviroschools | National | Environment | X | X | X | X | | An environmental action based programme where young people are empowered to design and lead sustainability projects in their schools, neighbourhoods and country. |
| ePRO8 | National | Technology, Robotics, Engineering | | X | X | X | | The EPro8 Challenge is a competition, an engineering and problem solving race, where teams compete to complete a range rewarding challenge. |
| Farmer Time | National | Science | | X | X | | | Farmer Time is an educational programme that connects farmers virtually with New Zealand primary and intermediate school students. It aims to inspire, engage and educate young people about the journey of food from farm to fork in the ever-changing, diverse agricultural industry. |
| Field-Based STEM | National | Science | | X | X | | | Promoting local curriculum through field-based STEM. Through connections with scientists, students experience real-world applications of the sciences. |
| GNS Science | Regional | Science | X | X | X | | | East Coast LAB [Life at the Boundary] brings together scientists, emergency managers, experts and stakeholders across the East Coast to discover more about natural hazards and how they affect us. |
| HALO | Local | Conservation | | X | X | X | | Halo Whakatāne's educational goal is to connect tamariki with Papatūānuku by enhancing their knowledge of and access to experiences within our local rohe. |
| House of Science | National | Science | X | X | X | | X | HoS provide teacher professional development and develop relevant, comprehensive resource kits with all the materials needed to carry out engaging science lessons. |
| Inspiring the Future | National | Science, Technology, Engineering, Maths | | X | X | | | At an Inspiring the Future event, young people hear from volunteer role models in their communities, learn about different jobs and why people love doing them, as well as their pathway and challenges they faced along the way. |
| Kiwibots | National | Technology, Robotics | | | X | X | | Kiwibots engage young New Zealanders in robotics through events and education programmes. |
| Ko Māui Hangarau | National | Technology | | | | X | | A high-powered summit featuring some of the best Māori Tech Innovators and Entrepreneurs from around the country. A Toi Kai Rawa-led initiative. |
| Manawahe Eco Trust | Regional | Conservation | X | X | X | X | | Day programmes that provide local children with environmental education and nurture their continued involvement with regards to conservation. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Marine Stewardship Council | National | Envrionment | | X | X | X | | Explore ocean-themed education resources aligned with the New Zealand curriculum, including ocean lesson plans, videos, fact sheets, games, and activities. |
| Ministry of Inspiration / Aquabots | National | Technology, Environment | | X | X | X | | An underwater robotics where school-aged children form teams to build an underwater Remotely Operated Vehicle to compete in New Zealand-themed challenges. MOI also run PLD and other robotics/STEAM competitions and clubs eg. Robocup Jr. |
| Nanogirl | National | Science, Technology, Engineering, Maths | X | X | X | X | X | Nanogirl are on a mission to ensure that everyone, everywhere has the chance to enjoy a meaningful relationship with STEMM through teacher professional development workshops and live science assemblies. |
| OMG Tech | National | Technology | | X | X | | | OMGTech! gives any primary & intermediate school in NZ the opportunity to take part in its award winning workshops to be inspired and learn how to use future technology. |
| Para Kore | National | Environment | X | X | X | X | | A te ao Māori based, zero-waste education programme called Oranga Taiao. This programme aims to design out waste and strengthen the connection to Papatuānuku and Ranginui. |
| Pūhoro STEMM Academy | National | Science, Technology, Engineering, Maths | | | | X | | Partnering with high schools and stakeholders to launch and grow rangatahi engagement in STEMM by delivering in-school sessions, tutoring, mentoring and regional termly wānanga. |
| Royal Society Te Aparangi Science Teacher Leadership Programme | National | Science | | | | | X | The Science Teaching Leadership Programme provides opportunities for primary schools, secondary science departments and their nominated teachers to enhance the teaching of science within school communities. |
| Science in a van | National | Science | X | X | X | | | Primary and Intermediate School Science Shows that make science even more fun, interactive, and memorable. |
| Science Roadshow | National | Science | | X | X | | | Live shows, hands-on exhibits and teacher resources that broaden student knowledge and experience; connecting with science and technology and the world around them. |
| STEAM-Ed | Regional | Technology, Robotics | | X | X | X | | STEAM-Ed provides education programmes that allow students to explore STEAM fields. Includes after-school, school holiday and one-off events and a specialist in VEX robotics. |
| STEMWana | Regional | Science, Technology, Engineering, Maths | | X | X | | | Inspiring a new generation of scientists, technologists, engineers, and mathematicians (STEM) through initiatives such as Taurana STEMM Fest, Tinkd MakerSpace and a regional lecture series. |
| Teacher in the paddock | Regional | Environment | | X | X | | | An outdoor interactive Education Programme, where children can be children with nature, our farm and family life. |
| Toi Kai Rawa | Regional | Economic | | X | X | X | | The Hihiko Te Rawa Auaha programme seeks to create fit-for-purpose STEAM education by partnering kura with STEM providers to inspire tamariki and rangatahi with digital technology futures. |
| Trees for survival | National | Conservation | | X | X | X | | An environmental education programme providing an opportunity for schoolchildren to make a practical difference to their environment as well as learn about conservation, revegetation, wetland restoration and protecting stream quality. |
| Whakatāne Kiwi Trust | Local | Conservation | X | X | X | X | X | An interactive outdoor field trip into their kiwi habitat to learn about the biodiversity in the forest using fun, nature-related games, activities and experiential challenges. |
| Wonder Project | National | Engineering | | X | X | | | The Wonder Project is Engineering New Zealand's not-for-profit, free schools programme, designed to inspire rangatahi with STEM. |

## Appendix 2 – Recommendations to funders

| Number | Term | Recommendation | Detailed commentary | Strands of Collective Mission | | |
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| | | | | Build on what works | Strengthen connections | Be responsive |
| 1 | Short | Continue to fund House of Science kits across the Eastern Bay of Plenty region. | Work with Eastbay REAP to use this existing platform to:<br>- Deepen engagement with science teachers (ie. Build greater teacher accountability and new feedback channel to the STEMM Action Collective)<br>- Provide more responsive support (ie. Identify extension or collaboration opportunities between schools and other STEM providers). | X | X | X |
| 2 | Short | Scale up the Aquabots programme by funding its introduction into more schools and communities. | Work with Ministry of Inspiration to identify opportunities to:<br>- Connect new schools with more experienced teachers and participants, to build tuakana-teina relationships across schools/groups.<br>- Link the Aquabots competition and associated learning resources with locally relevant contexts. | X | | X |
| 3 | Short | Scope out and fund the role of a "backbone organisation" to coordinate the collective & support plan implementation. | This could be released as an RFP or funders may want to enter into direct discussions with selected providers. Potential organisations that have expressed interest and capability to undertake this role include Eastbay REAP and Toi Kai Rawa. Other organisations may also exist that could fill this role. | X | X | X |
| 4 | Short | Investigate the potential to fund or support regional kahui ako leads to do a stocktake of existing resources & capabilities. | Understanding existing teacher capabilities and science and tech equipment stocks that are already available in schools would be very useful for growing collaboration and resource sharing.<br><br>This action would primarily benefit teachers and kahui ako. But, STEM providers could also make use of this stocktake data to understand the capabilities and needs in the community and adapt their programmes.<br><br>Efficient delivery and more long-lasting outcomes could be gained from making use of what schools already have, or building on prior knowledge. | X | X | |
| 5 | Med | Re-release an RFP to STEM providers to identify other providers and programmes, who align with the STEM Action Plan, that the Trust could fund.<br><br>Refine or develop an assessment criteria and consider longer-term, open-ended funding to build momentum for collective action | The RFP that Trust Horizon released in Sep 2023 had relatively few responses. Feedback from the funder was that there were few providers presenting the 'collective thinking' and solutions that they were hoping for. Concurrently, anecodtal evidence suggests providers did not have enough clarity around what was expected of them and did not see the value (or cost/benefit) of participating in the development of the STEMM action plan. Subsequently, 4 of the 6 providers that were initially targeted by Trust Horizon have pulled out of working in the EBOP region in the short-med term (due to a combination of a lack of resources and organisational priorities, both of which are also impacted by the uncertainty around funding availability).<br><br>An updated RFP should set clear expectations around how providers would need to contribute to the STEMM Action Plan and its collective 'principles'. An assessment criteria could also be included to target providers that work within the STEM Action Plan's priority funding areas and help the Trust to review applications consistently. Making funding longer-term and untagged (ie. 3-year period) would also help to attract more providers and build certainty and momentum for this collective action approach. | | X | X |
| 6 | Med | Fund and coordinate additional planning hui for interested STEM providers and stakeholders to build on this plan collectively. | More work is necessary to flesh out the STEM Action Plan once Collective members are identified. This initial planning and whanaungatanga would be best supported through facilitated meetings and workshops, ideally in person though not necessarily.<br><br>Once the Collective is operational, meetings and activities should be coordinated by the "backbone" organisation. | X | X | X |
| 7 | Med | Fund and coordinate a series of networking hui across the region for teachers, providers, industry and iwi/hapū reps to meet and understand what is happening in each community. | More networking hui across the region will help to grow interest in and support for the STEMM Action Plan, including identifying potential partners (STEM providers as well as community organisations).<br><br>There is potential to fund or partner with organisations like Toi Kai Rawa and Toi EDA to run these events, given their regional focus and connectivity. Alternatively, this action could also fall under the scope of the "backbone" organisation's role and deferred until they are identified and funded. | | X | X |

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| 8 | Med | Lead a series of informational sessions on funding opportunities for teachers/schools to access. | A relatively easy, though perhaps lower priority, action would be for the Trust to make information more accessible to teachers about what they fund, how to apply for funding (if eligible) or to share other funding opportunities and sources that may be relevant. This was specifically requested by several teachers at the 2-day hui.<br><br>Empowering teachers and communities to identify their needs, create 'fundable' proposals and start thinking about different funding sources/mechanisms to support their ideas, is an important step in supporting long-term capability building in the region. These sessions may also support networking and collaborations amongst teachers and across schools. | X | X | X |
| 9 | Med | Fund pilots for 1-2 new short-term STEMM initiatives (based on initial feedback from teachers) to test these offerings with the community and allow for community input into longer-term programme offerings | Based on initial discussions with stakeholders and STEM providers, two potential pilots that could 'fill' a gap in the current eco-system include:<br>- Brain Play's small group, online, after-school or 1-on-1 offerings (depending on school needs)<br>- Kia Kotahi Ako's 'We Share Solar' suitcase as a 'tech in a box' solution for teaching students about solar energy and climate action | X | | X |
| 10 | Med | Fund a "local navigator" role(s), with role and scope developed alongside the STEMM collective providers | This role may fall within the "backbone" organisation's scope of works, or require a separate / alternative resource. The role's key function would be to support all boundary partners to stay connected to the Collective and STEM providers, and in particular, build relationships with iwi/hapū groups (whom are not currently in the Collective's sphere of influence) | | | |
| 11 | Long | Fund 1 – 2 joint STEMM events a year eg. STEMM-in-the-community celebrations | Joint community events are an ideal vehicle for collaboration and showcasing STEMM to communities. The focus of the events would depend on the providers and community, but could include, for example:<br>- providing joint PLD sessions to teachers,<br>- introducing whānau and iwi/hapū representatives to a wide range of providers,<br>- celebrating schools/student STEMM participation and highlighting student achievements.<br><br>Potential providers who are well placed to design and coordinate events like this include Toi Kai Rawa or STEM Wana. | X | X | X |
| 12 | Long | Review funded programmes regularly against outcomes measurement framework and proactively adapt programmes to meet changing needs, resources, and community aspirations. | The outcomes measurement framework needs to be developed with STEMM collective members, but it should ultimately provide a consistent approach to outcomes tracking and reporting. This will enable Trust Horizon and other funders to better understand the outputs and outcomes that providers are creating.<br><br>Regular monitoring enables the Trust to remain flexible and adaptive to changing needs. | X | | X |
| 13 | Long | Build support for this STEM Action Plan collective kaupapa with other regional funders and steadily increase the amount of investment available. | As the STEM Action Plan is further developed/implemented and new partners come on board, both the value of collective action and the quantum of funding needed should become clearer. This will help the Trust to assess its capacity to support the STEM Action Plan and present a case to other funding agencies to grow support and investment. | X | X | |
| 14 | Long | Scope out potential for a 'community response' fund which providers and schools/ communities can access to develop their own community-led STEMM projects and programmes. | Each school or community has unique requirements which a STEM provider can adapt to but may not be specifically designed for. A truly responsive STEMM intervention would ideally be created by communities, for communities. They identify what is important to them, what problems they'd like to tackle and then are equipped with the right STEMM expertise and resources to tackle this problem. A funding model similar to the Curious Minds Participatory Science Platform allows for this responsive, community-led action.<br><br>Further consideration of this action is recommended in the longer-term, primarily because community-led STEMM is only possible when supported by a relatively strong eco-system of teachers, STEMM providers and project facilitators/connectors. At the early stage of the STEM Action Plan, more investment is needed to first grow the capabilities and reach of STEMM providers in the region and facilitate connectivity and collaborative thinking. | | X | X |

## Appendix 3 – Recommendations for the STEMM Collective

| Number | Term | Recommendation | Detailed commentary | Strands of Collective Mission | | |
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| | | | | Build on what works | Strengthen connections | Be responsive |
| 1 | Short | Organise and hold regular planning hui. | Initially, more hui will be needed to build whanangatanga and understanding between partners. As the plan evolves, planning hui are likely to including items such as a shared calendar of events, sharing contacts and funding opportunities, lessons learned etc. | | X | |
| 2 | Short | Create a shared directory of providers and programmes in the region. | A shared and easily accessible summary of provider offerings and contacts would be a useful first step to support cross-sector collaborations. This could be via a Google Drive or website. | | X | |
| 3 | Short | Create and coordinate joint online presence and 'marketing' of STEM Collective | This, along with the shared directory, will support teachers and communities to clearly understand the STEMM outreach offerings available.<br><br>Regular communications via eg. social media to promote and celebrate STEMM activities will help to grow reach and interest. | X | X | |
| 4 | Short | Coordinate annual joint provider-teacher hui. | Joint hui with teachers (and possibly other community stakeholders) will support ongoing cross-sector connections and communications. This check in will help the Collective understand what's working/not and teacher and community needs and priorities. | | X | X |
| 5 | Med | Workshop and agree targets for each 'boundary partner' group and an outcomes framework to measure progress. | Workshop participants identified aspirational goals for the 'boundary partners' (groups and communities) that the STEM Action Plan will influence. Further workshopping is needed to turn these aspirations into quantifiable targets. Setting ambitious but achievable goals that are measurable, will help the Collective to track its progress towards achieving the STEMM Action Plan's mission and ensure everyone is clear in how they are contributing to the collective impact. | | X | X |
| 6 | Med | With the funders, scope out the role of a local navigator to liaise with teachers and communities, to connect, share, listen and seek out opportunities to collaborate. | This role may fall within the "backbone" organisation's scope of works, or require a separate / alternative resource. The role's key function would be to support all boundary partners to stay connected to the Collective and STEM providers, and in particular, build relationships with iwi/hapū groups (whom are not currently in the Collective's sphere of influence) | X | X | X |
| 7 | Med | Scope out the feasibility of STEM providers and kahui ako creating a shared resource library / inventory for "try before you buy" opportunities and improved access to equipment. | Leveraging off existing equipment and shared resources will help to reduce the 'barrier to entry' associated with high capex costs (for schools as well as new providers setting up in the region). A resource library or 'try before you buy' would be particualrly beneficial for technology related equipment, where there is a wide range of equipment available, and many teachers do not know what they need or what will work for their students.<br><br>For a pilot stage, this collaborative action might include a partnership between the "backbone" organisation, a STEM provider and 1-2 high schools in one area. | X | X | |
| 8 | Med | Scope out opportunities / interest for joint community STEMM events | Joint events are a practical way for multiple providers to access a specific area or cohort of teachers/students/communities in one go to maximise learning and networking opportunities.<br><br>Event ideas that were discussed at the workshop include: community STEMM celebrations (certificates and awards to highlight student achievements in STEMM), activations and roadshows, STEM career pathway expos etc. | | x | x |
| 9 | Med | Scope out development of a regional STEMM roadshow alongside iwi/hapū | An opportunity that was higlighted at the workshop was for STEM providers to develop locally relevant and contextual content into their programmes by partnering with iwi, hapū and Māori communities. This would be more likely to be engaged with and have an enduring impact.<br><br>A regional roadshow would be a practical way to showcase this locally relevant content and share what different iwi/hapū and Māori communities are doing across the region. It would also be a platform from which STEM providers can go into new communities and showcase what they have to offer. | X | X | X |

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| 10 | Med | Scope out different ways that businesses and local industry can support community-led STEM and start to establish communications and relationships with businesses. | As the collective action gains momentum, gaps and opportunities for business partnerships and sponsorships will become more evident. Some ideas include:<br>- sponsoring competitions or teams/schools to compete,<br>- sponsoring STEM provider programmes or providing resources, volunteer hours, tools etc. to facilitate programmes<br>- mentorship and role modelling opportunities in schools,<br>- hosting site visits, and<br>- supporting more education-to-employment pathways such as internships.<br><br>The Collective's role in brokering partnerships between businesses and schools/communities could be very influential in terms of increasing a STEM providers' self-sustainability as well as building long-term capabilities in STEM in the region. | | X | |
| 11 | Long | Coordinate joint communications for external stakeholders and other STEM providers to communicate regional needs, opportunities and updates. | An annual zui or regular newsletter update would be a practical way to keep external stakeholders (eg. government agencies, councils, businesses) and other STEM providers informed of the STEMM Collective's activities.<br><br>We envisage that this would be used to communicate the current gaps and needs in the community, so potential funders and providers can understand what value they could add to the collective action and support more successful programmes and/or funding applications. | X | X | X |
| 12 | Long | Identify how the STEMM Collective can support individual iwi/hapū with their STEMM plans | This action first requires strong relationships and trust between the individual iwi/hapū and STEM providers. Smaller collaborative opportunities will likely present itself in the short- to med-term, but this recommendation speaks to creating more robust actions to fully integrate STEM providers into locally-relevant and Māori-driven STEM, shifting the balance of power for iwi/hapū. This action should also set out how iwi/hapū can feed into the STEM Collective's forward planning and priorities. | | X | X |
| 13 | Long | Seek out future funding sources, including new opportunities that may open up through collaboration and deeper engagement with iwi/hapū, industry and other potential partners. | The STEM Collective principles set out an expectation that STEM providers will likely be continually seeking funding opportunities or other ways to become more self-sufficient in the longer term.<br><br>To support this principle, a long-term collective action could be to actively seek out partnerships and new funding opportunities, particularly where multiple providers can band together and mutually benefit. This action also builds off the assumption that different funding sources may open up for STEM providers that they currently don't have access to (due to lack of partnerships), for example, with iwi/hapū, research grants with CRIs and academia, or through business/industry-funded initiatives. | X | X | |
| 14 | Long | Continue to identify and grow business/industry-level partnerships for STEM programmes | This action builds upon existing relationships with businesses and industry stakeholders, with the intention of supporting longer-term sustainability by having local businesses (employers) actively investing in their local STEM education system and providers. | X | X | X |
| 15 | Long | Scope out opportunities for new joint programmes or projects, co-designed with teachers and community stakeholders. | Examples of aspirational projects discussed at the workshop included:<br>- a "House of Tech" programme (similar to House of Science but with technology focus)<br>- setting up local or regional "tech hubs" (which could house, for example, a creative maker space, STEM lab, resource library) and regional tech hub coordinators/educators.<br><br>These ideas align strongly with the STEM Action Plan's mission and objectives but are not likely to be achievable in the short- to med-term due to a lack of connectivity, capability and funding in the region. However, if other actions are implemented successfully over time, these ideas may become more feasible. | X | X | X |