National SCIENCE EDUCATION STRATEGY
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It is my great pleasure to present to you the Cayman Islands National Science Education Strategy 2018-2023. This strategy is a comprehensive plan to bring science to the forefront of education over the next five years.

Science is a fundamental subject for all, as like the other core subjects of English and Mathematics, it has an important bearing on our everyday lives. Science plays a key role in the development of inquiry, collaborative, reasoning and critical thinking skills. Regardless of whether our students end up in a science-related career or not, chances are, they will definitely require these skills to be globally competitive, and positive change agents within our communities.

Not only is this Science Education Strategy important for our students and the communities they belong to, but science is fundamental to the economic wellbeing of Cayman. Global trends indicate that there is, and will continue to be growth in; the numbers of jobs, numbers of careers, average wages, and national income as the result of STEM related fields.

Achieving the National Objective of the Science Education Strategy will help our students foster a love of learning and will create innovators, problems solvers, and critical thinkers.

A lot of work has already been done to improve science education across all government schools such as; ongoing continued professional development for all government primary school teachers in investigative science, establishment of a Cayman Islands Association of Science Educators, a full suite of supporting science textbooks and teachers resources for all government primary school students and teachers, continued support and development of science related programmes and annual events such as the STEM conference, Rotary Science Fair, Seaperch and FIRST Robotics.

National Objective

Develop a passion for science by raising the level of scientific curiosity, skills, knowledge, and confidence for all students.
In order to achieve the National Objective the following 3 goals drive the Science Education Strategy:

1. **High Quality Science Education**
   
   Ensure all students have access to high quality science education that includes scientific inquiry based skills as well as subject knowledge.

2. **Improved School Leadership & Teaching Capacity**
   
   Enhance the quality of science related teaching and learning through improved school leadership and teaching capacity.

3. **Partnerships with Tertiary Institutions, Businesses, Industry & Charities**
   
   Improve the skills, engagement, and participation of students by developing science related opportunities through partnerships with tertiary education, businesses, industry and charities.

This strategy and related action plans will provide the pathway necessary for the growth of successful science education. It will provide all students with the knowledge and skills to be successful on a local and global context, as well as developing an important science related pillar of Cayman's economic success.

*Hon. Juliana O'Connor-Connolly, JP.*

*Minister for Education, Youth, Sports, Agriculture and Lands*
Background

Science is integral in developing inquiry based learning skills that can be used to apply new understanding to different contexts. Science is an important subject in its own right, with specific topics that foster an understanding of how the world works.

The skills learnt as part of the science curriculum are important in making students become, critical, responsible, and informed citizens.

There is an international consensus that a strong science education is a necessary prerequisite to having an economy based on knowledge and innovation. Evidence shows there is a growing global trend in science (and STEM) related employment/industry.

- As a specific example from the Office of National Statistics (UK), there has been a rise in Healthcare related employment from 1,850,000 in 2001 to 2,935,000 2017.
- In a recent research report from PwC, Artificial Intelligence (AI) will be responsible for global GDP gains of $15.7 trillion by 2030.

In addition to this the US Bureau of Labor Statistics report titled ‘STEM Jobs: 2017 Update’ states:

- “In 2015, there were 9.0 million STEM workers in the United States. About 6.1 percent of all workers are in STEM occupations, up from 5.5 percent just five years earlier.
- Employment in STEM occupations grew much faster than employment in non-STEM occupations over the last decade (24.4 percent versus 4.0 percent, respectively), and STEM occupations are projected to grow by 8.9 percent from 2014 to 2024, compared to 6.4 percent growth for non-STEM occupations.
- STEM workers command higher wages, earning 29 percent more than their non-STEM counterparts in 2015. This pay premium has increased since our previous report, which found a STEM wage advantage of 26 percent in 2010.”
**Cayman Islands Context**

In recent years, in government schools, there has been a significant focus on English and mathematics in order to improve performance in both of these subjects. It is necessary to develop the numeracy and literacy skills to be able to effectively access many aspects of science. “Reading, writing and argument are central to any conception of science as it is currently constituted” Osborne, J. (2002). As a result of this, there has been less attention on science (especially investigative based science) at the primary level. However, in Government secondary schools there has been an increase in the percentage of students achieving a higher level pass (CXC Grade 1-3 or IGCSE Grade A*-C) in at least one science subject due to an increased strategic focus to raise standards in that subject area by the end of high school. Whilst the improvements at secondary level have been significant, a **more coordinated strategic focus is needed** to raise national standards at all levels of compulsory education.

**Data collection is essential** to the Science Education Strategy and needs to be collected and analysed from all schools (public and private). Currently only Government schools produce data reports which are available to the public and which outline the outcomes for students across a range of subject areas including science. In reviewing science education in the Cayman Islands some key areas have been identified. There is a need to:

- Ensure the allotted science instructional time every week
- Significantly reduce or eliminate various events that interrupt science teaching time
- Improve the quality of science teaching and learning across schools and eliminate the variation in quality from classroom to classroom and from school to school (as identified in Quality Indicator 3.1 of the Successful Schools and Achieving Students, 2018 document)
- Collate reliable information on the quality of science teaching and learning and the standards of achievement in science
- Reduce the amount of content/subject knowledge focus and increase focus on key scientific inquiry and investigation skills
- Increase the amount of relevant, hands on, practical science investigations being carried out by students
- Link science planning and teaching to the appropriate national curriculum content
- Improve the monitoring of science teaching and learning
- Improve the quality of science specific data collected
- Improve the analysis of data and plan for student progress and achievement based on this data analysis
It is imperative that teachers evolve their subject knowledge, skills and practical know-how to support science education using evidence-based practices (research). This needs to include the development and implementation of evidence-based pedagogical practices such as ones that improve:

- Critical and Creative Thinking Skills
- Practical and Problem-Based Inquiry Skills
- Innovative Thinking
- Sound Subject Knowledge

The Science Education Strategy aims to prepare students for post compulsory opportunities including further education and employment in scientific disciplines. By extension these students will become positive contributors to society. As part of this, teachers (including non-specialists) require support, access to shared good practice. This includes:

- ensuring teachers are supported with science specific professional development,
- providing careers awareness from primary school level onwards with role models from scientific industry,
- enhancing collaboration between science education policy makers, school administrators and teaching professionals.


There is a need to develop a strategic framework to improve the outcomes and raise the profile of science in education for students of all ages. This strategy focuses on specific goals, with associated actions to be achieved over the next five years.

In the Cayman Islands, there is a current employment (2017) of 10.7% in the “Professional, scientific, and technical” sector. Of which, only 44.3% are Caymanian. This demonstrates that there are thousands of science related jobs that could be filled by Caymanians.
Vision
The vision of the national Science Education Strategy is aligned with the purpose of the Civil Service strategic plan:

To make the lives of those we serve better

A World Class Civil Service
Cayman Islands Government

Science is a subject that drives the modern world, and understanding its many facets and related skills is essential in providing solid foundations for all students.
Analysis of Current Provision

In developing the Science Education Strategy there has been a multitude of data and information considered in order to understand the environment and identify key issues and drivers for change. The analysis considered internal and external factors that impact the education system’s ability to achieve the stated national science objective.

PESTLE Analysis

A PESTLE analysis is a tool used to identify the external factors (political, economic, social, technological, legal and environmental) influencing the strategy.

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**Political**

The Strategic Policy Statement for 2018-2019 Government outlines two science-related objectives, which this strategy seeks to achieve. These goals are:

1. Develop and implement a new approach to technical and vocational education and training that maximizes the opportunity for all students to develop the skills needed for future employment
2. Invest in programmes that support improved attainment in academic disciplines at all levels with a focus on literacy, numeracy and science

**Economic**

Consideration is given to current and future science-related employment opportunities. In the Cayman Islands there are opportunities for students to gain merit-based scholarships for further educational studies in science. This includes, but is not limited to:

- Pharmaceuticals
- Biology
- Medicine (including sports medicine)
- Veterinary Science
- Agricultural Science
- Computer Science
- Physics
- Biological Sciences
- Medical Tourism
- Analytical Chemist
There are also many current science related careers in the fields of: medicine, computer science, aviation, engineering, environmental studies and agriculture to name a few. In addition to these fields, there is likely to be future growth in the fields of STEM cell research and therapy, computer science and cryptocurrencies etc.

Based upon data from the economics and statistics office, national job trends indicate that there will be a rise in science-related careers. In the Cayman Islands Labour Force Survey report from 2012 the data from the science related categories was as follows:

There has been a combined increase of 6.1% from 2012 to 2017 in science related professions.

**Social**

As education is a human service, the social aspects for analyses are extensive. Science is explored from the early years right through to the end of high school and the Cayman Islands Further Education Centre (CIFEC). In government primary schools, general science is offered for 2 hours per week. At the high school level, including CIFEC, the following science subjects are available to students as exam subjects:

- Biology
- Chemistry
- Physics
- Marine Science
- Integrated Sciences
- Engineering
- Health and Social Care
- Child Development
- Electrical and Electronics Technology
- Food and Nutrition
- Human and Social Biology
- Physical Education
Results from government schools of Key Stage 4 science exams for 2017 are as follows:

<table>
<thead>
<tr>
<th>Subject</th>
<th>No of Entries</th>
<th>% of Cohort</th>
<th># of Level 2 (A*-C)</th>
<th>% Level 2 Passes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology (CSEC)</td>
<td>85</td>
<td>21%</td>
<td>70</td>
<td>82%</td>
</tr>
<tr>
<td>Chemistry (CSEC)</td>
<td>64</td>
<td>16%</td>
<td>31</td>
<td>48%</td>
</tr>
<tr>
<td>Chemistry (iGCSE)</td>
<td>3</td>
<td>1%</td>
<td>2</td>
<td>67%</td>
</tr>
<tr>
<td>Child Development (iGCSE)</td>
<td>6</td>
<td>1%</td>
<td>3</td>
<td>50%</td>
</tr>
<tr>
<td>Electrical &amp; Electronics Technology (CSEC)</td>
<td>42</td>
<td>10%</td>
<td>21</td>
<td>50%</td>
</tr>
<tr>
<td>Food &amp; Nutrition (CSEC)</td>
<td>90</td>
<td>22%</td>
<td>68</td>
<td>76%</td>
</tr>
<tr>
<td>Health &amp; Social Care (BTEC Extended Cert.)</td>
<td>9</td>
<td>2%</td>
<td>7</td>
<td>78%</td>
</tr>
<tr>
<td>Human &amp; Social Biology (CSEC)</td>
<td>165</td>
<td>41%</td>
<td>93</td>
<td>56%</td>
</tr>
<tr>
<td>Integrated Science (CSEC)</td>
<td>253</td>
<td>63%</td>
<td>157</td>
<td>62%</td>
</tr>
<tr>
<td>Physical Education (CSEC)</td>
<td>54</td>
<td>13%</td>
<td>54</td>
<td>100%</td>
</tr>
<tr>
<td>Physics (CSEC)</td>
<td>66</td>
<td>16%</td>
<td>36</td>
<td>55%</td>
</tr>
<tr>
<td>Physics (iGCSE)</td>
<td>5</td>
<td>1%</td>
<td>1</td>
<td>20%</td>
</tr>
</tbody>
</table>

On island, science-related subjects are offered at A-Level, International Baccalaureate and Advanced Placement. The International College of the Cayman Islands and the University College of the Cayman Islands offer Associate and Bachelor degree programmes in science related fields.

**Technological**

Technological resources and advancements that potentially impact science education include:

- limited science resources in some schools (physical and electronic)
- sufficient computer hardware and software
- science parks
- existing internet infrastructure (bandwidth)
- available computing devices (Interactive White Boards, laptops, computers, tablets, etc.)

**Legal**

The Cayman Islands Education Law (2016) lists science as a mandatory subject for all students, as part of a broad, balanced and relevant curriculum (clause 17.4). It also stipulates that the basic requirement for the curriculum in every school, shall promote equality of access and opportunity for all students to; learn, achieve well, and shall –

- Be broad, balanced and relevant to the needs and interests of all students;
- Promote the spiritual, emotional, moral, social, cultural, physical, intellectual and economic development of the students; and
- Prepare students for the subsequent stages of their education, training or employment and for the opportunities, responsibilities and experiences of later life, such as being active participants in the workforce and productive citizens (clause 17.1)

**Environmental**

The implementation of the Science Education Strategy will take into consideration a green agenda, for example, looking for ways to reduce the use of paper-based products.
Political
The Government Strategic Policy Statement has two science related objectives linked to TVET & attainment in academic disciplines.

Economic
Scholarships are available for further educational studies in science. There has been an increase in science related job trends in the Cayman Islands.

Social
There is a range of science subjects for further study at the high school and post compulsory levels. This includes TVET and academic subjects.

Technological
There are a range of resources available including hardware, software, computing devices, physical and online resources for teaching inquiry-based science.

Legal
Science is a mandatory subject in the Education Law (2016) for students of compulsory school age in all schools.

Environmental
Globally and locally there is more awareness of a green agenda and protection for the natural environment.
SWOT Analysis
The SWOT analysis is a planning technique used to identify the strengths, weaknesses, opportunities and threats that affect the strategy. In this analysis, the SWOT factors have been crossed referenced with the PESTLE factors for a more detailed understanding of the factors influencing the strategy, and their impact.

This data was used to identify:

**Strengths**
- The Strategic Policy Statement, issued by The Elected Government, calls for “The Best Education Opportunities for All Our Children” as one of the Strategic Broad Outcomes. Included in this is the desire to:
  - develop and implement a new approach to technical and vocational education and training that maximises the opportunities for all students to develop the skills needed for future employment
  - invest in programmes that support improved attainment in academic disciplines at all levels with a key focus on literacy, numeracy and science
  The Science Education Strategy contributes to the goals of the Strategic Policy Statement.
- The mission of the Civil Service Strategic Plan which states “We are dedicated to supporting The Elected Government by delivering caring, modern and customer-centred public services and programmes, which deliver value for money.” helps to ensure that the Ministry of Education and all other areas of the Civil Service work to deliver the outcomes of the Strategic Policy Statement.
- The Ministry of Education Budget for 2018-2019 was approved in the Legislative Assembly and included an allocation for new science resources, including science support texts, equipment and consumables that will underpin the support of inquiry-based teaching and learning across all key stages. In addition, financial resources were approved for the recruitment of the first Science Coach, who will assist with the implementation of the strategy through training and development of all relevant staff. The budget also included funds for private schools, some of which should be supporting science education.
- The range and number of scholarships available for students interested in science-related careers allows for clear pathways for students to pursue scientific career paths from compulsory education to post-compulsory education to employment.

- The growing number of science-related jobs available helps to ensure that students who successfully complete post-compulsory science degrees are able to find related employment.

- The provision of science as a mandatory subject in the Education Law (2016) ensures that students in compulsory education are engaged in science lessons. It should be noted, while this is a strength, the quality of such lessons is still varied.

- Science is a key aspect of Successful Schools and Achieving Students’ (2018), which encourages schools to review their own academic standards in this subject. Schools will be inspected from September 2018, and will evaluate attainment and progress in science for all phases of the school.

**Weaknesses**

- Observations from the STEM specialist of science lessons indicate that the overall quality of science lessons is varied. This means that the strategy needs to target the improvement of teaching and learning strategies in order to meet the objective.

- There is a lack of practical, inquiry-based instruction partially due to the availability and use of science resources from school to school. For government schools, additional resources have been allocated in the 2018-2019 budget, which will help mitigate this issue.

- In recent years there has been a lack of focus on science at a primary school level, and thus has impacted science education at a secondary level and therefore employment in scientific careers.

**Opportunities**

There are opportunities to:

- Create a national focus on science education.

- Promote the uptake of science related subjects at higher and further educational levels.

- Partner with tertiary institutions, businesses and industry to improve the skills, engagement and participation of students by developing science related opportunities.

- Build a strong evidence base to allow for data-tracking and informed interventions.

- Provide opportunities for all students to make significant progress and achieve high standards.

- Improve science provision, including resources, for all primary schools.

**Threats**

- The education system includes a multitude of strategies, and there is a risk of initiative overload, which may threaten the success of the Science Education Strategy. It is therefore imperative that priorities are identified across all strategies to ensure accelerated and sustained change as well as equitable access to resources.
**S**
Strengths to enable the success of the strategy
- Strategic Policy Statement
- Ministry of Education Budget
- Scholarship opportunities
- Science related jobs available
- Science as a mandatory subject in the Education Law
- Academic standards for science

**W**
Weaknesses that need to be overcome
- Quality of science teaching and learning is varied
- Availability and effectiveness of science resources is varied
- Lack of focus on science at a primary school level

**O**
Opportunities that can be harnessed
- National focus on science education
- Uptake of science related subjects
- Partnerships with tertiary institutions, businesses and industry
- Data tracking for improvement
- High expectations
- Sufficient resources

**T**
Threats that need to be avoided
- Initiative Overload: Too many different priorities distract from the teaching and learning of the core subjects English, mathematics and science
Goal 1:
Ensure all students have access to **HIGH QUALITY SCIENCE EDUCATION** that includes scientific inquiry based skills as well as subject knowledge.

**National Objective**
Develop a passion for science by raising the level of scientific curiosity, skills, knowledge, and confidence for all students.

Goal 2:
Enhance the quality of science related teaching and learning through **IMPROVED SCHOOL LEADERSHIP & TEACHING CAPACITY**.

Goal 3:
Improve the skills, engagement, and participation of students by developing science related opportunities, through **PARTNERSHIPS** with tertiary institutions, businesses, industry and charities.
Goal 1: HIGH QUALITY SCIENCE EDUCATION

Ensure all students have access to HIGH QUALITY SCIENCE EDUCATION that includes scientific inquiry based skills as well as subject knowledge.

Actions

1.1. School leaders will develop their own school based science teaching and learning policy, which is aligned with the national Science Education Strategy. This will help to create focus on improving science teaching and standardise expectations.

1.2. School leaders and teachers will provide students with science teaching and learning opportunities that:
- are aligned with the curriculum
- include inquiry based lesson plans and practices (practical and investigative activities)
- develop conceptual and procedural understanding
- include locally contextualised examples
- are complementary to or integrated with other curriculum areas
- are linked to school wide or community programmes
- this will create an evaluative and reflective culture within all science related educational programmes and initiatives.

1.3. School leaders and the STEM specialist will review existing science resources and/or identify (research and select) developmentally appropriate science texts and resources that provide:
- a scope and sequence
- practical resources that allow for students to regularly engage in practical/investigative science learning

This will ensure that science is a well-resourced subject, supporting teachers’ teaching and students learning.
1.4. School leaders and teachers will develop and/or utilise **formative and summative assessments** to be used by teachers to:

- gauge and track student progress (both subject knowledge and skills)
- adapt teaching to meet students’ needs (inform interventions)
- ensure students make progress

This will allow teachers and school leaders to use both types of science specific test data as a (low stakes) measure of successful improvements in science teaching and learning/student outcomes.

1.5. The Science and Technology Coach(es) will develop/identify a centralised online resource centre that includes examples of **best practices, subject content and skills** based Continuing Professional Development materials. This will allow teachers to access a full bank of resources and training that can be used in teaching and to improve their pedagogical practice in science.

1.6. School leaders will create and develop a **fully catalogued resource centre(s)** for science equipment and resources (including science specific literacy resources). This will allow for the monitoring and easy access of said resources by all classroom teachers, encouraging more practical, inquiry based learning.

1.7. School leaders will implement **mandatory science instructional time** per week for all classes. This will ensure that adequate instructional time is allocated to science teaching and the covering of all skills and topics that related to the science national curriculum.

**Key Performance Indicator**

Student performance data in science related fields show improvement from year to year. Baseline data to be established for all schools based on exam data from the 2017-2018 academic year.
Enhance the quality of science related teaching and learning through IMPROVED SCHOOL LEADERSHIP & TEACHING CAPACITY

**Actions**

1.1. School leaders, the STEM specialist and the Science and Technology Coach(es) will continue to provide specific Continued Professional Development to both primary teachers and secondary science specialists. This will encourage the reflection and development of teachers’ inquiry and evidence based pedagogy in science, thus improving student outcomes.

1.2. The STEM specialist and science and technology coach(es) will establish a working group of science leaders from primary and secondary schools that can also provide support, collaborative planning and Continued Professional Development. This will assist with the cascading of training, the development of evidence based, inquiry led, teaching and learning skills and subject knowledge. This will help build capacity for science specific support.

1.3. The Ministry of Education will develop and the school leaders will utilise a standard set of guidelines outlining effective science teaching. This will help support teachers in effective planning, and for lesson observers to appropriately measure/give valuable feedback.

1.4. The DES and HR for the Ministry of Education will enhance the recruitment process for primary school teachers so that:

- there is a minimum requirement for at least one higher level (A*- C or grades 1-3) pass in a level 2 science qualification (e.g. IGCSE, CXC, etc.)
- a minimum standard of science teaching experience is established through the advertisement, shortlisting and review process

This will ensure that all new primary teachers employed will have a basic knowledge of science, investigative skills and teaching science.
1.5. The DES and HR for Education will **enhance the recruitment process for secondary school science teachers** so that:

- there is a minimum requirement of a science degree at a standard of 2:1 (or equivalent) or higher as well as a science specific post graduate qualification
- a minimum standard of science teaching experience is established through the advertisement, shortlisting and review process

This will ensure that all new secondary science teachers employed will have a sound knowledge of and foundation in science, investigative skills and teaching science.

**Key Performance Indicator**

The quality of teaching of science related subjects improve and measured through performance management. Baseline data needed.
Goal 3: Partnerships with Tertiary Institutions, Businesses & Industry

Improve the skills, engagement, and participation of students by developing science related opportunities, through PARTNERSHIPS with tertiary institutions, businesses, industry and charities.

**Actions**

3.1. School leaders and/or the Ministry of Education will develop public-private partnerships with business/industry. This support can assist with national, school and teacher level support with subject knowledge, skills (from industry experts), and career links/pathways. This will improve stakeholder awareness of the importance of science education as a tool to enhance students’ inquiry based processing, critical thinking skills, and complex problem solving skills.

3.2. School leaders and the STEM specialist will improve awareness and diversity of local and international science related projects and competitions. This will help with participation and engagement in science subjects.

3.3. The STEM specialist will establish a national science committee that involves the full range of stakeholders in order to develop direct links with the community, businesses and schools. This will help develop the required skills needed for employability.

3.4. School leaders will improve career and school options guidance and communication related to scientific fields, as well as, developing partnerships with Cayman based companies that are linked to science. This will allow students to have a better understanding of the steps they can follow to realise their career aspirations.

3.5. The STEM specialist, Science and Technology Coach(es) and the Science Council will improve links with higher and further education institutions, to map routes for students into relevant science fields (both in Cayman and abroad). This will allow students to have links with institutions that are highly rated for their science related degrees.
3.6. Secondary school leaders will develop **TVET and Apprenticeship** routes in scientific fields for students. This will help with cultivating more positive mind sets towards science and its importance in the wider community/world.

**Key Performance Indicator**

Increase in the percentage of persons who achieve science related scholarships and in science related careers.
Measures and Links to the Inspection Framework

The overarching outcomes of these goals and related actions are to improve student outcomes in science based upon evidence-based pedagogical practise. This should potentially improve the capacity for students taking science related degrees, which will in turn improve employment in science related fields/industries.

**GOAL 1: Ensure all students have access to HIGH QUALITY SCIENCE EDUCATION that includes scientific inquiry based skills as well as subject knowledge**

<table>
<thead>
<tr>
<th>Actions</th>
<th>Measures</th>
<th>Quality Indicators from the Inspection Framework</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Develop science teaching and learning policy for each school</strong></td>
<td>• All schools have an updated and relevant science teaching and learning policy</td>
<td>• 6.2 – Planning for School Improvement</td>
</tr>
<tr>
<td><strong>Increase and improve inquiry based science teaching and learning</strong></td>
<td>• Learning walks and lesson observations, review of medium term planning and lesson plan</td>
<td>• 2.2 – Understanding Caymanian Life; Local and Global environmental issues</td>
</tr>
<tr>
<td></td>
<td>• Number/percentage of science lessons rated three or above in termly monitoring and performance management</td>
<td>• 3.1 – Lesson Planning</td>
</tr>
<tr>
<td></td>
<td>• Number/percentage of science lessons rated “good” as part of schools’ regular inspections</td>
<td>• 4.1 – Review and development; Continuity and progression; Links to the community and environment</td>
</tr>
<tr>
<td><strong>Introduce developmentally appropriate science texts and resources</strong></td>
<td>• Audit of science equipment</td>
<td></td>
</tr>
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<td></td>
<td>• Review of science resource orders for schools</td>
<td></td>
</tr>
<tr>
<td><strong>Regularly conduct formative and summative assessments of science</strong></td>
<td>• Data across all year groups shows significant progress in line with value-added (expected) levels</td>
<td>• 1.2 – Progress in science</td>
</tr>
<tr>
<td></td>
<td>• Regular review of data by class teachers, year groups and senior management teams</td>
<td>• 3.1 Strategies to meet the needs of all students</td>
</tr>
<tr>
<td></td>
<td>• Identification of students exceeding/meeting grade level expectations as well as those that require additional support or interventions</td>
<td>• 3.3 – Assessment as part of the teaching and learning process; Use of assessment information; Teachers knowledge of students strengths and weaknesses</td>
</tr>
<tr>
<td></td>
<td>• Planning for improvement based on data</td>
<td></td>
</tr>
<tr>
<td><strong>Share best practices, subject content and skills</strong></td>
<td>• Usage statistics</td>
<td></td>
</tr>
<tr>
<td><strong>Develop school based resource centres</strong></td>
<td>• Every school has a centralised resource centre</td>
<td>• 3.1 – Lesson planning and teachers management of resources in lessons</td>
</tr>
<tr>
<td></td>
<td>• Fully populated database of resources</td>
<td>• 6.4 - Use of resources</td>
</tr>
<tr>
<td></td>
<td>• Checking school orders annually</td>
<td></td>
</tr>
<tr>
<td><strong>Implement mandatory minimum science instructional time</strong></td>
<td>• Timetable submitted with appropriate policy linked to instructional time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Spot checks</td>
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</tr>
</tbody>
</table>
### GOAL 2: Enhance the quality of science related teaching and learning through IMPROVED SCHOOL LEADERSHIP AND TEACHING CAPACITY

<table>
<thead>
<tr>
<th>Actions</th>
<th>Measures</th>
<th>Quality Indicators from the Inspection Framework</th>
</tr>
</thead>
</table>
| Improve Continued Professional Development for teachers                | • Schools Professional Development (PD) plans and internal registers of attendance  
• Ministry of Education PD registers for teachers  
• Number/percentage of science lessons rated 3 or above as part of performance management and termly monitoring.  
• Number/percentage of science lessons rated “good” as part of schools’ regular inspections | • 6.1 – Development of relationships, teams and leaders at all levels  
• 6.2 – Planning for school improvement |
| Form a working group of science school leaders                         | • Bi-monthly meetings with the Cayman Islands Association of Science Educators  
• Number and attendance of collaborative PD sessions  
• Survey data about attitudes and comfort levels of teaching science | |
| Develop guidelines that outline effective science teaching             | • Guidelines are used by school leaders  
• Learning walks and lesson observations  
• Review of units of study (including sample lesson plans) for each term across all year groups | • 3.1 – Subject knowledge and Teacher-student interactions  
• 6.1 – Leadership qualities |
| Enhance the recruitment process for primary and secondary school teachers to ensure they have sound knowledge of the foundation of science | • Employment statistics  
• Job descriptions and adverts | • 6.4 – Staff deployment, qualifications and levels of retention |

### GOAL 3: Improve the skills, engagement, and participation of students by developing science related opportunities, through PARTNERSHIPS with tertiary education, businesses, industry and charities.

<table>
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<tr>
<th>Actions</th>
<th>Measures</th>
<th>Quality Indicators from the Inspection Framework</th>
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| Further develop career links and/or pathways in science related fields  | • Number and range of Public-Private Partnership (PPPs) including student participation  
• Use of evaluative tools to gauge the quality and outcomes of each PPP | • 6.3 – The schools role in the local and wider community |
| Improve awareness and diversity of local and international science related projects and competitions | • Participation statistics of projects and/or events  
• Student feedback and/or surveys | • 6.3 – Engagement with parents and the School’s role in the local and wider community |
| Form a National Science Committee that includes a range of stakeholders | • Quarterly meetings  
• Number of projects and/or initiatives established | |
| Improve science related career and school options guidance              | • Number of career fairs  
• Percentage of representation by science related businesses  
• Number of students on science related scholarships, apprenticeships and internships | • 5.2 – Staff student relationships advice and support |
| Map routes for students into relevant science fields                    | • Number of links developed  
• Number of students on science related scholarships  
• Number of students on science related scholarships to universities rated in the top 10% for science | • 5.2 – Staff student relationships advice and support |
| Introduce TVET & Apprenticeship pathways in science fields              | • Number of science related Technical and Vocational Education and Training (TVET) programmes and apprenticeship  
• Enrolment and Pass rates in TVET Programmes | |

25
Processes and Monitoring Milestones

The Science Education Strategy is a 5 year plan and there is a structured and integrated planning, implementation, and reporting process that will ensure a high level of transparency and accountability over the life cycle of the plan.

Each action outlined in the Science Education Strategy identifies lead person responsible for that action. In many cases, the lead person is the school leader or principal who can work with their individual Senior Management Teams and teachers to deliver these actions.

Individual schools are responsible for the implementation of the Science Education Strategy as each school has different needs and vary in terms of the level of progress made in science. This increased autonomy to schools helps to ensure that the Science Education Strategy is implemented in a manner that will bring about the best outcomes for individual schools and students. This will also support a culture and practice of evaluation, reflection, and continuous improvement.

All Government schools are required to develop action plans that detail their implementation of the Science Education Strategy as part of a wider school improvement process. As a measure of best practice, private schools should also develop action plans. This includes utilising assessment data to regularly monitor student progress and achievement and adjusting teaching practices, resources, etc. to further meet the needs of students. Action plans will include success measures, budgetary implications, key lead persons and milestones.

The Department of Education Services will support Government schools in the development of the actions plans and will be responsible for monitoring student performance data from primary school to high school, and where applicable, at the Cayman Islands Further Education Centre (CIFEC). Similarly, school boards for the private schools should work with school principals to utilise the Science Education Strategy to raise standards in their schools as part of a wider school improvement agenda and as a measure of best practice.

The Ministry of Education will be responsible for monitoring the overall outcomes of the Science Education Strategy. This includes the collation and analysis of data for Government and private schools over time in order to track and report on national trends. Data collated will be used as a tool to measure the effectiveness of the Science Education Strategy overall.

Annual data reports will be developed looking specifically at science for students of compulsory school age, focused on both subject knowledge and skills.
References

The Education Law (2016) Cayman Islands

Successful Schools and Achieving Students’ (2018) Cayman Islands Schools Inspection Framework


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