

Immaculate Heart of Mary College
Plan on Use of One-off Grant to Secondary Schools for the Promotion of STEM Education 2017-2019

No.	Item / Programme	Income	Expenses	Balance
1	Grant received 2016 - 2017	\$200,000.00		\$200,000.00
2	Enhance teachers' knowledge in STEM education		\$15,000.00	\$185,000.00
3	Organise STEM-related activities		\$50,000.00	\$135,000.00
4	Nourishing biology students' knowledge on Biotechnology		\$75,200.00	\$59,800.00
5	To equip students in using new technologies		\$34,800.00	\$25,000.00
6	3D Printing Class		\$2,000.00	\$23,000.00
7	Support students to participate in various STEM-related activities		\$23,000.00	\$0.00
Total		\$200,000.00	\$200,000.00	\$0.00

Major Area(s) of Concern	To enhance teachers' knowledge in STEM education.
Strategies / Tasks	<ul style="list-style-type: none"> • Introduce the STEM-related facilities in school to all teachers. • Invite sharing of STEM education activities from other schools / EDB. • Provide staff development programme for teachers so that different teams can cultivate the problem solving skills in school.
Benefits Anticipated	<ul style="list-style-type: none"> • Teachers get familiar with the STEM-related facilities in school which can allow brainstorming for new STEM-related activities in different teams. • Teachers understand more about STEM education. • Teachers gain more ideas in how to implement STEM-related activities
Time Scale	1 September 2017 to 31 August 2019
Total Expenses	\$15,000.00
Success Criteria	<ul style="list-style-type: none"> • The STEM-related facilities are introduced to all teachers. • At least 1 staff development programme related to STEM is organized for teachers. • At least one sharing of STEM education activities from other schools / EDB is organized. • 75% teachers are satisfied with the sharing / staff development programme related to STEM education.
Method(s) of Evaluation	Surveys to collect teachers' opinions, Observation and Oral feedback from teachers
People Responsible	Mr. Wong Chi Wai

Major Area(s) of Concern	To organise STEM-related activities such as school-based scientific and technological activities/competitions
Strategies / Tasks	<ul style="list-style-type: none"> • Procure resources and/or upgrade some existing resources for the implementation of school-based STEM-related activities including projects and competitions. • STEM-related activities such as school-based scientific and technological activities/competitions are organised. • Cross-disciplined STEM-related activities are given a higher priority. • A team of students, STEM team, is set up to assist organising STEM activities in school.
Benefits Anticipated	<ul style="list-style-type: none"> • Teachers can organise more STEM-related activities (whole form and/or selected students). • Resources related to STEM education are purchased and/or upgraded which facilitate the development of STEM education in school for the long run. • Students have STEM hands-on experiences which allow them to use the new technologies to solve problems. • Through organising STEM activities in school, students are more engaged in learning new technologies.
Time Scale	1 September 2017 to 31 August 2019
Total Expenses	\$50,000.00
Success Criteria	<ul style="list-style-type: none"> • At least one whole form STEM-related activity or at least two STEM-related activities for selected students are organised by each team which procure resources / upgrade existing resources using the grant. • 30% students have at least one STEM hands-on experience in the school. • A team of students, STEM team, is set up to assist organising STEM activities in school.
Method(s) of Evaluation	<ul style="list-style-type: none"> • Surveys to collect students' and teachers' opinions, Observation, Oral feedback from teachers and students, Report
People Responsible	Mr. Wong Chi Wai

Major Area(s) of Concern	<ul style="list-style-type: none"> To nourish biology students' knowledge on Biotechnology
Strategies / Tasks	<ul style="list-style-type: none"> Biotechnology practicals are costly. It involves a lot of expensive equipment and chemicals are needed. Besides, a lot of consumable items are needed such as tips and microtubes. For our students, they can learn biotechnology from textbook and youtube video only as we do not have these equipment in our laboratory. Therefore, students' performance in these areas are poor. Through a series of practical sessions designed and funded by Amgen Biotechnology Experiences Programme (provided by CUHK), students can now have a chance to have hand-on experiences in this top leading science learning area. ABE programme is a world-wide well established programme supported by Amgen, a biopharmaceutical company in America. Through the collaboration of different universities in different areas to provide biotechnology experience for high school students all around the world. ABE programme provides all necessary chemicals and other consumable items for biotechnology practical sessions. They also provide training to teachers and laboratory technicians so that our teachers and technical staff members are more confident to run biotechnology practical sessions.
Benefits Anticipated	<ul style="list-style-type: none"> All biology students can have practical experiences which are well designed by Science Educators and Biotechnology Scientists. Through this program, students can learn biotechnology not only from books and internet, but also have hands-on experiences on biotechnological techniques. If the students are found to have genius on biotechnology, teachers can nominate them to join the iGEM competition, a top leading international biotechnology competition for high school and university students.
Time Scale	May 2018 onwards
Resources Required	<p>All the equipment is prepared for 10 groups of students.</p> <ul style="list-style-type: none"> Gel Electrophoresis system $\times 10 = \\$20,000.00$ Mini-PCR machine $\times 5 = \\$32,000.00$ Mini-centrifuge $\times 5 = \\$14,000.00$ Shipping cost $= \\$4,000.00$ <p>(The above items are designed based on a mini-scale protocols which suit the consumable items provided by the ABE programme. They are not available in Hong Kong and should be purchased from the US)</p> <ul style="list-style-type: none"> 1.5 mL microfuge and 0.2 mL PCR tube rack $\times 10 = \\$1,000.00$ Floating rack for 1.5 mL tube $\times 15 = \\$1,800.00$ Yellow Tip box (0.2 mL) $\times 5 = \\$125.00$ Yellow tips $\times 1 = \\$800.00$ Blue Tip box (1 mL) $\times 5 = \\$125.00$ Blue tips $\times 1 = \\$800.00$ PCR micro test tube 1.5 mL $\times 1 = \\$150.00$ PCR microtest tube 0.2 mL $\times 1 = \\$400.00$ <p>TOTAL= \$75,200.00</p>
Success Criteria	Practical sessions are held for Biology students each academic year
Method(s) of Evaluation	Feedback from the students
People Responsible	Ms. Lee Cheuk Wah Celesta

Major Area(s) of Concern	To equip students in using new technologies.
Strategies / Tasks	<ul style="list-style-type: none"> • Purchase services from external course providers to organise on-site training courses related to STEM-education for students.
Benefits Anticipated	<ul style="list-style-type: none"> • Students learn how to use new technologies (e.g. experimental instruments, equipment for biotechnology, data loggers, robotics kits, electronic modules, virtual reality tools, 3D printers, laser cutting machines, programming) for their future development of careers. • The purchase of service relieves teachers' workload at the kick-start of STEM education in school. • Teachers learn how to conduct similar training for new technologies. • Form-based training is given a higher priority.
Time Scale	1 September 2017 to 31 August 2019
Total Expenses	\$34,800.00
Success Criteria	75% of the participants are satisfied with the on-site training courses related to STEM education.
Method(s) of Evaluation	Surveys to collect students' and teachers' opinions, Observation and Oral feedback from teachers and students
People Responsible	Mr. Wong Chi Wai

Major Area(s) of Concern	To nourish students and teachers' knowledge in 3D printing technology
Strategies / Tasks	<ul style="list-style-type: none"> • Recruit one tutor for one 10-lesson 3D printing class (after school interest class). • Tutor is familiar with 3D drawing software and the use of 3D printer. • The tutor has to prepare teaching materials for the class. • The class size is about 20 students.
Benefits Anticipated	<ul style="list-style-type: none"> • Students learn how to use 3D drawing software & printer to make products. The printing technology would be used in other projects in the future. • The teaching materials of the 3D printing class can be further used • It makes our teachers more confident in using 3D drawing software.
Time Scale	From Nov 2017 to May 2018
Total Expenses	To employ 1 tutor : Salary of each lesson (1.5 hours) = \$200; total salary = \$200 x 10 lessons = \$2,000
Success Criteria	<ul style="list-style-type: none"> • Students learn how to use the 3D drawing software and 3D printer • Teaching materials are prepared
Method(s) of Evaluation	Feedback from tutors and students
People Responsible	Mr. Wong Chi Wai and Mr. Chan Kim Pong

Major Area(s) of Concern	To support students to participate in various STEM-related local, national and international competitions/exhibitions/programmes.
Strategies / Tasks	<ul style="list-style-type: none"> • Students are nominated to participate in STEM-related competitions / exhibition / programmes. • Students have to share their experiences in the STEM-related competitions / exhibition / programmes to other students.
Benefits Anticipated	<ul style="list-style-type: none"> • Students have widened their exposure in new technologies when they participate in STEM-related competitions/exhibition/programmes. • Students have widened their exposure in new technologies through the sharing of STEM-related competitions/exhibition/programmes.
Time Scale	1 September 2017 to 31 August 2019
Total Expenses	\$23,000.00
Success Criteria	<ul style="list-style-type: none"> • 75% of the participants are satisfied with the STEM-related competitions / exhibitions / programmes. • Students share their experiences in the STEM-related competitions / exhibition / programmes to other students.
Method(s) of Evaluation	Surveys to collect students' and teachers' opinions, Observation, Teachers and Students oral feedback, Report
People Responsible	Mr. Wong Chi Wai