# <ACTIVESG – SOLVING DAILY HEALTH PROBLEM>

**Programme:** Micro:bit Training for Sec 1 **Level:** Secondary 1

**Theme / Challenge Statement:** ACTIVESG
Design a device to encourage people to stay fit

**Summary**

Programme started with training on basic programming skills using the micro:bit for 4 lessons. On the 5th and 6th lessons, students were tasked to design a device (with guidance) to encourage people to stay fit. Students also provided feedback for one another and make improvements to their product.

| Prior Knowledge: | Students should already know:<br>1. Nil<br>2. Nil<br>3. Nil |
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| Learning Objectives: | By the end of the lesson, students should be able to:<br>1. Use a programming language to solve a variety of computational problems, making appropriate use of data.<br>2. Use logical reasoning to explain algorithms and to detect and correct errors in algorithms and programs.<br>3. Program a hardware to perform given task.<br>4. Applied sensor values to determine decisions.<br>5. Identify and define authentic problems and plan activities/projects to develop programming solutions. |

Lesson Plan

| | 6. Solve problems by breaking them into smaller parts and solving the smaller parts first. |
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| Time | Teacher Activities | Purpose | Resources Needed |
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| **Introduction/Pre-activity** | | | |
| | Introduction <br> ● Why Program? <br> ● Showing of video on Art + Science Solutions in our daily live <br> *Identifying problems and creating solutions.* <br> *Creating Effective, Efficient and Consistent solutions* | To introduce students to programming and its application to real life. | Video / Activity Workbooks |
| **Lesson development/Main activities** | | | |
| Week 1 – 1 hour | Getting started with programing. <br> ● Demonstration of simple program (Friend Meter) <br> ● User interface introduction <br>   o Colored blocks, shapes and its grouping <br> ● Creating, saving and opening projects. <br> ● Introduction to right clicked to duplicate and delete functions. <br><br> Understand fundamental blocks. <br> ● Starting a program. <br> ● Basic blocks and Displays <br> ● Simple Inputs <br><br> **Session Review** <br> Wrap up Questions <br> *What have the students learned?* <br> *Why is coding important?* <br> *What are the programmable blocks used in this Session?* <br> *How they can share their Microbit project.* <br> *Name some example of how program can reduce work load.* <br><br> Sharing of experiences by Students | To let students understand programming and the available features / functionalities of the micro:bits | Micro:bit & Activity Workbook |
| Week 2 – 1 hour | Apply Looping concept to Microbit. <br> ● Counting Loop: Variable <br>   o Counting Up <br>   o Counting Down <br>   o Counting Up and Down <br>   o Fading LED <br> ● While Loop | To let students understand programming and the available features / functionalities of the micro:bits | Micro:bit & Activity Workbook |

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| | o Forever Loop<br>o Input Control<br><br>Sensors and Inputs<br>● Displaying of sensor value<br><br>**Session Review**<br>Wrap up Questions<br>*What have the students learned?*<br>*Why is coding important?*<br>*What are the programmable blocks used in this Session?*<br>*How they can share their Microbit project.*<br>*Name some example of application of automation can make work more efficient*<br><br>Sharing of experiences by Students | | |
| Week 3 – 1 hour | Sensors and Inputs<br>● Operators and variables<br>o Storing value<br>o Comparing value with condition<br>● Light sensor: Auto lighting system<br><br>**Session Review**<br>Wrap up Questions<br>*What have the students learned?*<br>*Why is coding important?*<br>*What are the programmable blocks used in this Session?*<br>*How they can share their Scratch project.*<br>*Name some example of how application of microcontroller can make work more effective*<br><br>Sharing of experiences by Students | To let students understand programming and the available features / functionalities of the micro:bits | Micro:bit & Activity Workbook |
| Week 4 – 1 hour | ● Compass: Fitbit, stepper counter<br>o Application of while loop<br>o Application of display block to display number.<br>o Setting of accelerometer Condition to measure movement<br> ▪ Upwards<br> ▪ Sideways | To let students understand programming and the available features / functionalities of the micro:bits / application | Micro:bit & Activity Workbook |

Lesson Plan

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| | ▪ Shaking<br><br>Should time permit, allow students to provide feedback for one another and make improvements to their product.<br><br>**Session Review**<br><u>Wrap up Questions</u><br>*What have the students learned?*<br><br><u>Sharing of experiences by Students</u> | | |
| Week 5 – 1 hour | ● Design a device to encourage people to stay fit<br>● Accelerometer: Fitbit, stepper counter<br>    o Application of while loop<br>    o Application of display block to display number.<br>    o Setting of accelerometer Condition to measure movement<br>        ▪ Walking<br>        ▪ Jumping<br>        ▪ Buddha Clap<br>        ▪ Pushup counter<br><br>Should time permit, allow students to provide feedback for one another and make improvements to their product.<br><br>**Session Review**<br><u>Wrap up Questions</u><br>*What have the students learned?*<br><br><u>Sharing of experiences by Students</u> | To let students apply what they learnt in programming and use the available features / functionalities of the micro:bits to design a device to encourage people to stay fit | Micro:bit & Activity Workbook |
| Week 6 – 1 hour | ● Design a device to encourage people to stay fit<br>● Presentation of Ideated solutions with prototype (partial or Full).<br><br>**Session Review**<br><u>Wrap up Questions</u><br>*What have the students learned?*<br>*What is their design thinking process?* | | Micro:bit & Activity Workbook |

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| | <u>Sharing of experiences by Students</u> | | |

Please send this template, together with any additional resources, e.g. Powerpoint slides, worksheets and .hex file, to: digital_maker@imda.gov.sg.

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**<u>Contributed by:</u>**

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Date: 23/1/2018

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