

STEM 07 - STEMMASTER

A project of vacuum cleaner: "Master" your learning with your family



PROJECT INTRODUCTION

WHAT?

WORKSHOP MAKING "VACUUM CLEANER"

WHO?

PRIMARY SCHOOL CHILDREN + PARENT (FAMILY AS A GROUP)

WHY?

MANY ERASER RESIDUES → MESSY → DISSATISFY BY FAMILY,
BUILD RESPONSIBILITY + IMPROVE FAMILY RELATIONSHIP

HOW?

MATERIALS, INCLUDING MORTAR, PLASTIC BOTTLE, ELECTRICAL WIRE,
BLUE TAP, BATTERY, FAN BLADE, ICE-CREAM STICK

TO DESIGN THEIR OWN VACUUM CLEANER CREATIVELY BY THE MATERIALS
PROVIDED ABOVE

WHERE?

SCIENCE PARK ROBO-WORKSHOP



DESIGN RATIONALE

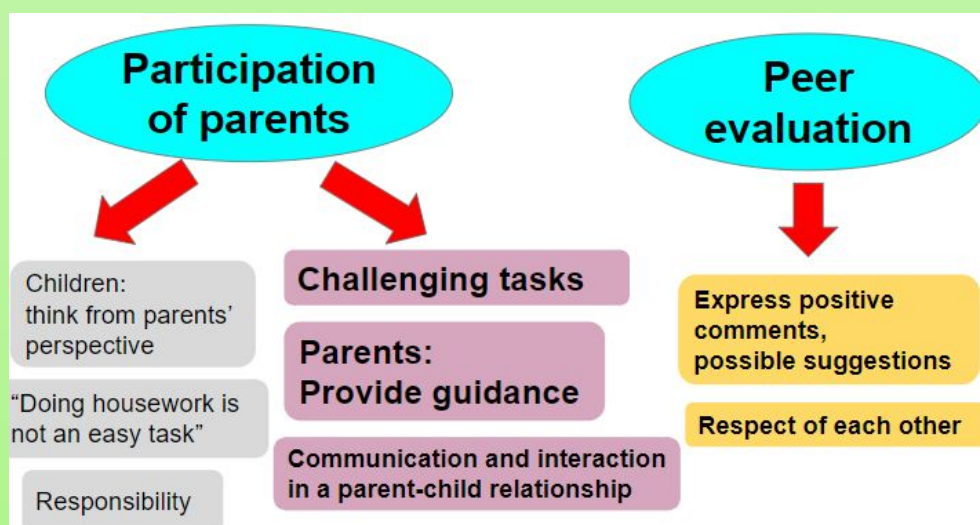
S: AIR PRESSURE: APPLY THE DIFFERENCE OF PRESSURE

T: MOTOR + FAN BLADE: UNDERSTAND + APPLY MOTOR AND FAN BLADE IN
THE DESIGN

E: DEFINE + SOLVE PROBLEM: TEST + RETEST, SYSTEMATIC THINKING,
TRADE-OFF BETWEEN DIFFERENT MATERIALS

M: ATTEND TO PRECISION: APPLY DIFFERENT INSTRUMENTS TO MEASURE
THE LENGTH OF BOTTLE

S - Science	T-Technology	E-Engineering	M-Mathematics
<u>Understanding of science knowledges</u> -pressure difference -using of motor -circuit	<u>Understanding and using of the current technology</u> -mechanical technology/product -motor -fan blade	<u>Define and solve the problem</u> -Prioritising the criteria -Tradeoff -Re-testing -Problem-solving, critical thinking skills	<u>Abstract and quantitative reasoning</u> -measuring the length of bottle, fan blade -use appropriate instruments for measuring, and to attend to precision
<u>Apply science knowledges</u> -observation -designing experiments -testing variables -analyzing data			



LIMITATION AND DIFFICULTIES

DIFFICULTIES:

DISCIPLINE MANAGEMENT: PARENTS COME WITH THEIR CHILDREN → HARD TO ENSURE THEY ARE GUIDING CHILDREN INSTEAD OF DOING ALL THE STEPS FOR THEM.

EXPLAIN SCIENCE CONCEPT: DIFFICULT FOR PRIMARY STUDENTS TO UNDERSTAND PRINCIPLE BEHIND VACUUM CLEANER → NEED TO USE METAPHOR TO EXPLAIN.

LIMITATION:

FINAL PRODUCT: LOTS OF VARIABLES AFFECT EFFECTIVENESS OF VACUUM CLEANER → MAY ONLY USEFUL FOR POLYSTYRENE BEADS BUT NOT ERASER RESIDUES.

LIMITED TIME: DIFFERENT UNIVERSITIES AND TAKES TIME TO DISCUSS THE CONTENTS. CAN ONLY TALK FACE TO FACE ONCE A MONTH.

THE CONTACT PERSON CHANGED → PASS ALL INFORMATION AGAIN, PERSON IN CHARGE IS BUSY AND HARD TO REPLY DIRECTLY.

UNTIL THIS STAGE: HAVE NOT PERFORM THE REAL WORKSHOP TO THE PUBLIC YET → CANNOT GET THE FIRST-HAND FEEDBACKS FROM PUBLIC TO EVALUATE OUR OUTCOME.

INDIVIDUAL REFLECTIONS

It is an enthusiastic experience on preparing workshop on vacuum cleaner, which we can learn from errors and think of different ways to improve its efficiency. There are no right or wrong in STEM, and we should focus on process of learning instead of the products of the workshop.
Ian Chan

It is a valuable chance to explore STEM which can be something simple and based with daily life so that is necessary to consider how to promote STEM to the society.
Gordon Lo

The workshops and lectures are truly inspiring. I learnt a lot more about STEM through this activity. As a teacher-to-be, this event provided me a much clearer picture of what STEM Education really is.
Stella Cheng

It is a treasured chance for me understand the concern of STEM and use its knowledge to create a workshop for the parents and primary students.
Lydia Woo

It is the first time for me to integrate values into STEM education. This project has indeed provided a suitable platform to put "cultivating one's knowledge, skill and attitude" into practice.
Mandy Chan

It is a great opportunity for me to explore to great trend of STEM education. The U-stemist program enriched my knowledge and experience of deliver STEM-related activities.
Kelvin Wu

CONCLUSION AND RECOMMENDATIONS

CONCLUSION:

- THE DEMO WORKSHOP WAS HELD SUCCESSFULLY
- SEVERAL PARTS THAT CAN IMPROVE AND ENSURE THE WORKSHOP UNDERGOES MORE FLUENTLY AND CLEARLY



RECOMMENDATION:

- IN-DEPTH FOCUS IS NEEDED:
- EXPLAIN RELATIONSHIP BETWEEN VACUUM CLEANER AND AIR PRESSURE IN DETAILS.
- RAISE QUESTIONS TO HELP THE CLIENTS UNDERSTAND THE VARIABLES.
- PROVIDE MORE GUIDELINE:
- CLIENTS ARE MAINLY PRIMARY STUDENTS → CLEAR AND DETAIL GUIDELINE IS NEEDED → VIDEO OR STEP-BY-STEP GUIDELINE
- PROCESS SHOULD SEPARATE INTO DIFFERENT STAGES → HELPS THE WORKSHOP UNDERGO FLUENTLY