



INTRODUCTION TO AMGEN BIOTECH EXPERIENCE



CHARISSA LIN
SENIOR MANAGER, LIFE SCIENCES

AMGEN® Biotech Experience

Scientific Discovery for the Classroom

Singapore

OVERVIEW OF ABE



Provides teachers and students with research-grade equipment and supplies, as well as invaluable professional development for teachers and workshops for students to conduct real-world experiments.



ABE IN SINGAPORE



- **3 year sponsorship from Amgen Foundation**
- **More than 15 schools have taken part since 2017**
- **Very positive feedback**
- **Target group: Secondary and tertiary level**

ABE GOALS

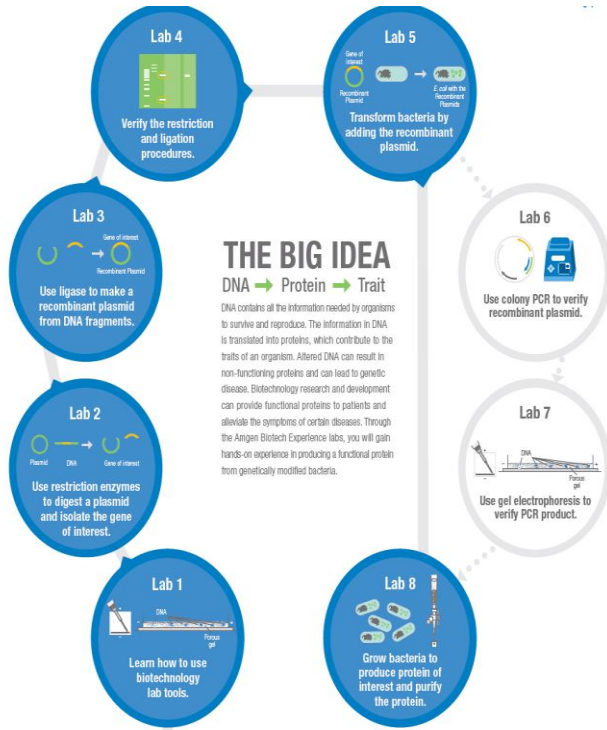
- **Through their participation in the programme:**
 - **Teachers:**
 - **are prepared to engage students in science learning experiences that promote knowledge of biotechnology and biology**
 - **show students how the science they are learning has real-life applications**
 - **provide students with information about careers related to pharmaceutical biotechnology**

ABE GOALS

- **Through their participation in the programme:**
 - **Students gain:**
 - **understanding of key biology concepts**
 - **knowledge of real-world biotechnology applications**
 - **awareness of biotechnology and biotech careers**
 - **interest in biotechnology and science**

IMPLEMENTATION OF THE PROGRAMME

LABS INVOLVED



There are currently 8 labs available:

- Lab 1 – Learn tools of the trade
- Lab 2 - Restriction digest
- Lab 3 - Ligation
- Lab 4 - Verification by gel electrophoresis
- Lab 5 - Bacteria transformation
- Lab 6 – Colony PCR*
- Lab 7 – Gel electrophoresis for PCR product*
- Lab 8 – Protein purification

Schools can choose to do all labs or to do some of the labs only.

*Lab 6 and 7 are only for schools who have been in the programme for at least 1 year, and for Sec 4 and tertiary level.

OTHER PROGRAMMES OFFERED

In addition to the 8 ABE Labs, we offer a few planned workshops:

- **ABE Express**
 - Condensed version of the full ABE curriculum
 - Conducted over one to two days, depending on the level of difficulty
 - Beginner
 - Intermediate
 - Advance
- **ABE: Developing a Scientist's Mind**
 - Combining the techniques learnt in ABE with experiment design and understanding of the scientific method

METHODS OF IMPLEMENTATION

CONDUCTED IN SCHOOL

ABE Labs 1-8

- Conducted by school teacher -> Free
- Conducted by SE -> \$9/lab

CONDUCTED IN SCHOOL OR SCIENCE CENTRE

Developing a Scientist's Mind - \$45

CONDUCTED IN SCIENCE CENTRE

ABE Labs 1-8

- Conducted by SE -> \$5/lab

ABE Express

- Beginner: \$20
- Intermediate: \$30
- Advance: \$35

WHAT IS PROVIDED



- **Teacher and student guidebook**
- **Teaching resources**
- **Training for teachers and lab officers**
- **All reagents**
- **All equipment**
- **Transportation of kits to schools**

WHAT THE SCHOOL NEEDS



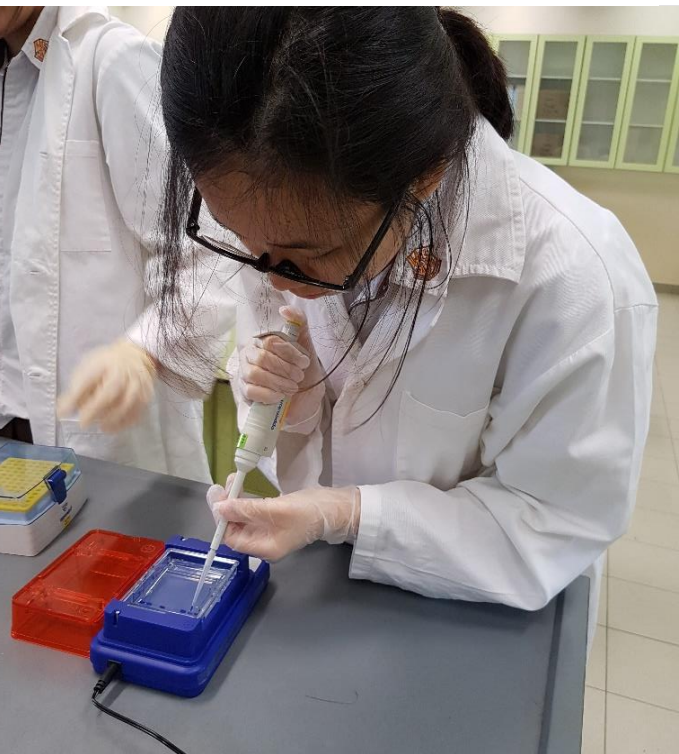
- **Science lab (if done in school)**
- **Ice, refrigerator, freezer**
- **Lab coat (optional)**
- **Gloves**
- **Microwave (Lab 4)**

WHAT IS REQUIRED OF THE SCHOOL



- Teachers conducting the programme **MUST** attend the teacher workshop
- Lesson schedule
- Student attendance number
- Handle kit with care
- Set up of lab and preparation of some reagents
- Student and teachers feedback
- Observation of lessons and taking of photos

HOW TO JOIN THE PROGRAMME



- **Attend any upcoming Teachers Workshop**
- **Discuss with Science Centre on method of implementation**
- **Complete the booking form (first-come-first-serve basis) and checklist of available items**

STUDENT WORKSHOP BOOKING FORM

AMGEN Biotech Experience

Scientific Discovery for the Classroom
Singapore



FORM 4: ABE STUDENT WORKSHOP BOOKING FORM

Delivery Information

School		
School address		
Venue for delivery of items <i>(eg. Level 3, Biology lab)</i>		
Is there a lift or number of flights of steps to delivery venue?		
Contact Person	Main contact person	Alternative contact person
Name		
Contact Number (Office and Handphone number)		

Student Workshops

Chapter	Date and Time	When would you like to receive the items?	Class	No. of Students/ No. of groups	Level of students	Lesson conducted by <i>(Please tick accordingly)</i>			Remarks
						School teacher in school	Science Centre Educator in school	Science Centre Educator in Science Centre	
<i>Example: Lab 2</i>	<i>2nd February, 3pm</i>	<i>26th Jan</i>	<i>2E1</i>	<i>20 students/ 5 groups</i>	<i>Sec 2</i>	<input checked="" type="checkbox"/>			

Please provide information based on per class (eg, if there are 3 classes doing Lab 2, please use 1 row per class). You may attach additional sheets if necessary.

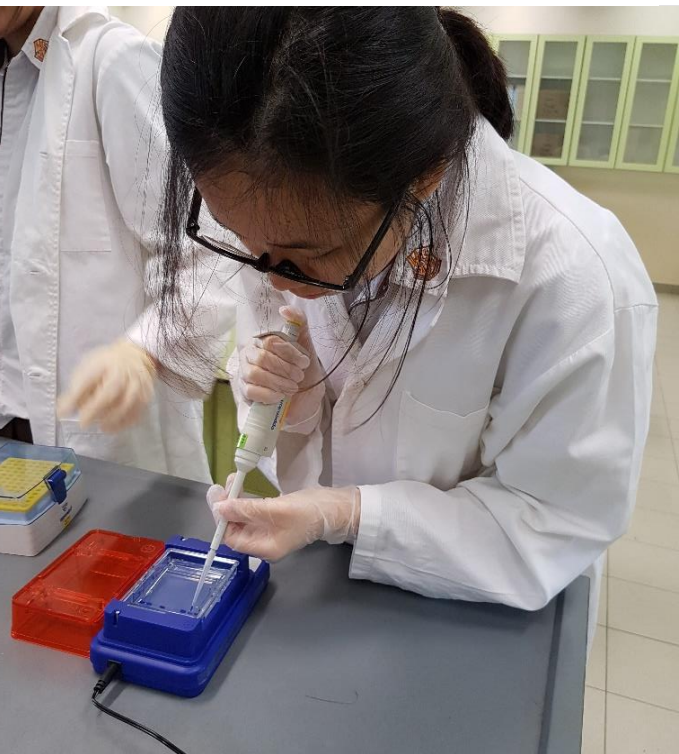
AMGEN Biotech Experience

Scientific Discovery for the Classroom
Singapore

CHECKLIST OF AVAILABLE ITEMS

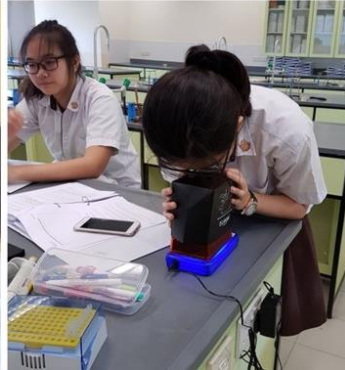
Form 3 - Checklist of Available Items			
Please indicate if your school has the following item for use during the ABE Programme.			
No	Item	Tick if school has item which is accessible for use during the ABE lessons.	Remarks (if any)
1	Waste container at every student bench for disposal of used tips, microfuge tubes and waste liquids		
2	Latex or nitrile gloves for students (various sizes)		
3	70% ethanol (for cleaning work bench)		
4	Microfuge tube rack (1 per bench)		
5	Fine tip permanent marker for labelling tubes (1 per bench)		
6	C-fold towels/ tissues (to clean any spillage)		
7	Retort stand (required only for Lab 6) - 1 per group of 4		
8	-20°C lab grade freezer		
9	-80°C lab grade freezer		
10	4°C lab grade refridgerator		
11	Microwave (for melting of agarose required for Lab 4)		
12	Water bath (temperature can be set between 37°C-70°C)		
13	37°C Incubator (for incubating plates in Lab 5)		
14	Autoclave machine		
15	Minicentrifuge (can spin up to 13000rpm, required only for Lab 6)		
16	Microcentrifuge (quick spin of microfuge tubes)		
17	Camera/ students' handphones (to take picture of gel results)		
18	Ice (preferably shaved ice)		

CONSIDERATIONS FOR SCHEDULE



- **No -20°C or -80°C lab grade freezer
=> delivery 1-2 days before the class**
- **Try not to arrange Lab 5 practical lesson on a Monday**
- **If Science Centre science educator is conducting the lesson:**
 - Arrange lesson for multiple classes on the same day
 - Lessons to start from 9.30am
 - Minimum number per class: 20

QUESTIONS?



For more information, please contact:

Charissa Lin

Charissa_lin@science.edu.sg

6425 2789

AMGEN® Biotech Experience

Scientific Discovery for the Classroom
Singapore