

# Science Academy

## Our Programme

Based on the current issues and research trends in Science pedagogy, the Science Academy's programme is designed to keep Science educators abreast on the strategies used to better engage and motivate students in learning Science. The courses provide educators with both knowledge and training in curriculum development and innovation, Science Inquiry Approach as well as assessment modes in Science teaching and learning that will be applicable and helpful to their classroom practices.

## Science Courses

### PRIMARY SCIENCE

#### Concept-Based Courses

##### Core Courses

##### **SCP101 Inquiry Approach to Teaching Primary Science (6 hours)**

This course provides teachers with an introduction to the Science Inquiry Approach for teaching Science. Teachers will have hands-on experiences with Science activities focusing on the teaching of concepts from the lower and upper primary syllabus using the above approach. They will also be equipped with the knowledge and skills on how to plan and design science activities teaching the relevant concepts in the Primary Science syllabus with the inquiry approach.

##### **SCP102 Using the Incubation Model of Teaching for Science (6 hours)**

This course is a foundation to the use of the Incubation Model to cultivate critical and creative thinking in students when teaching Science. Teachers will have hands-on experiences with Science activities focusing on the teaching of concepts from both the lower and upper Primary syllabus using the above approach. They will also be equipped with the knowledge and skills on how to plan and design Science activities as well as teaching the relevant concepts in the Primary Science syllabus with the Incubation model.

##### **SCP103 Curriculum and Pedagogy for Teaching Primary Science (6 hours)**

Using the Singapore Science Curriculum Framework, this course will enable Science teachers to gain an overview of the aims and goals of the Primary Science syllabus in Singapore to better grasp the learning theories and strategies underpinning the teaching of Science in Singapore. Teachers will acquire better understanding in the nature of Science and the use of Science as Inquiry approach to arouse students' interest and motivation to learn Science.

##### **SCP104 Assessment – Planning, Implementing and Evaluating (Overview) (6 hours)**

This course introduces the various modes that teachers can adopt to assess students' understanding in Science. There will be opportunities for hands-on practice, role-play, group discussion & presentation as well as cooperative learning to help prepare teachers for effective classroom practice when assessing students in their learning of Science.

### **SCP105 Summative Assessment – Planning, Implementing and Evaluating (6 hours)**

This course introduces beginning teachers to the Dos and Don'ts of item setting for Science examination papers. There will be opportunities for teachers to set mock papers for the various levels. Teachers will also have hands-on practice on data analysis to study student performance for the Science papers set.

### **SCP106 Trends, Issues and Challenges In Teaching Primary Science (6 hours)**

This course covers the trends, issues and challenges experienced in teaching Primary Science and introduces teachers to questioning techniques and curriculum models that can enhance their professional development and teaching as a Science teacher.

### **SCP107 Curriculum Adaptation (Lower Primary) (6 hours)**

This course is carried out at the departmental level whereby Science teachers would like to adapt and design their school-based science curriculum using the various models like problem-solving inquiry or UBD model. Teachers will be introduced to curriculum mapping and designing of the lower primary Science curriculum.

### **SCP108 Curriculum Adaptation (Upper Primary) (9 hours)**

This course is carried out at the departmental level whereby Science teachers would like to adapt and design their school-based science curriculum using the various models like problem-solving inquiry or UBD model. Teachers will be introduced to curriculum mapping and designing of the upper primary Science curriculum.

Note: This course will be conducted on 2 days, set several days apart to allow participants some time to create the mock papers and run the data analysis.

### **SCP109 Innovative Pedagogies in Science Teaching (6 hours)**

This course covers and exposes teachers to a repertoire of innovative strategies and resources for teaching and learning Science. There will be opportunities for hands-on practice, role-play, group discussion & presentation as well as cooperative learning to help prepare teachers for effective classroom practice when teaching Science.

### **SCP113 ICT for Meaningful Teaching and Learning in Science (6 hours)**

This course prepares teachers to engage their students in meaningful learning in Science using information and communications technology (ICT) and web-based platforms. Teachers will analyse the various affordances of ICT in promoting opportunities in Science teaching and learning and then apply the relevant knowledge and skills into designing meaningful ICT enabled teaching and learning Science activities for students' collaborative and self-directed learning.

### **SCP114 Differentiated Instruction in Primary Science (6 hours)**

This course introduces teachers to the various ways of differentiating instruction in the teaching of Science to meet the needs and abilities of their children in class. Teachers will have hands-on sessions to apply concepts learnt in the course to differentiate a particular unit for teaching.

## **Elective Courses**

### **SCP119 Using Children's Literature for Science Teaching (3 hours)**

Children's stories and literature can be interesting medium for teaching concepts in Science whilst arousing students' interest and encourage positive attitudes in Science learning. This course will introduce teachers to some popular stories that can be used for the teaching of Science to teach ethics, attitudes as well as to introduce the students to famous scientists.

### **SCP122 Reflective and Journal Writing for Science (3 hours)**

Teachers will be introduced to some modes of journal writing to encourage students to be more reflective in science learning and concept acquisition, including ICT tools that can be leveraged on to boost students' interest.

### **SCP127 Science Trails - An integrated approach using ICT (3 hours)**

This course introduces teachers to the 'out of the classroom' experience to learn and acquire Science concepts through outdoor trails, using ICT.

## **SECONDARY SCIENCE**

### **Lower Secondary Science**

#### **Concept-Based Courses**

##### **SCS101 An Overview of the Constructivist-Inquiry Approach in Lower Secondary Science (3 hours)**

In this course, participants will learn how they can teach with the constructivist-inquiry approach. This course includes teaching/ learning strategies used in this approach and explains how to incorporate trigger questions and activities in their lessons. They will also be exposed to case studies during the course.

### **Upper Secondary Science**

#### **Concept-Based Courses**

##### **SCS102 Inquiry-based Approach to Newtonian Physics (3 hours)**

Newton's laws of motion, kinematics, mass-energy and conservation of mass, energy and momentum are inter-related topics in classical mechanics. This course explains how to apply inquiry-based approach to Newtonian Physics using essential questions, a key component of inquiry-based learning.

##### **SCS103 Inquiry-based Approach to Basic Wave Theory (3 hours)**

Waves are around us in today's digital age. Waves in nature can be both enjoyable and at times destructive. This course explains how to apply inquiry-based learning to the study of waves and the use of mathematical modelling of waves.

##### **SCS104 Inquiry-based Approach to Matter and Chemical Bonding (3 hours)**

Matter is everywhere and we use it constantly. States of matter, kinetic particle theory, atomic structure and chemical bonding are inter-related topics. This course explains how to apply inquiry-based approach to the study of matter and chemical bonding using essential questions, a key component of inquiry-based learning.

##### **SCS105 Teaching of Stoichiometry (3 hours)**

Problem solving is an integral part of stoichiometry in pure chemistry. This course provides a common framework of problem solving so that students can deal with stoichiometric problems more systematically and effectively. During the course, participants also get to do hands-on activities to make lessons on stoichiometry more engaging to students.

