PHOENIX SPACE

PHOENIX SPACE PROGRAMS

2025

Content

Who Are We

At Phoenix Space, we provide **educational and upskilling programs to children and youth from disadvantaged and refugee communities to develop scientific and technological literacy.** Phoenix Space programs help unlock the enormous intellectual potential of young people and enable underserved children and youth to become self-sufficient and self-reliant in their communities

Vision

We are building a future where every individual is a catalyst for thriving, sustainable communities.

Mission

Enabling underserved children and youth to become **self-reliant and empowered to shape their communities** through education, upskilling and employment opportunities.

Our Students' Journey

Comprehensive and diverse programmes offering an array of 21st century skills to individuals of all ages.

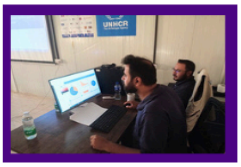



8 Years Old — **35 Years Old**

Nova Maths | STEM Spark | Teaching Machines | PS Voyager | Balloon Camp | Moon eQuest | Python Pioneers | English Proficiency | Digital Upskilling | Work Experience





Cutting Edge STEM Education

Phoenix Space Voyager programs aim to equip students not only with STEM literacy, but also provide them with motivation to purpose education and passion for science. These initiatives go beyond the conventional boundaries of teaching STEM education, offering it under the captivating theme of space science. This approach allows for an interdisciplinary perspective and enables beneficiaries to see the interconnectedness of STEM disciplines, transforming abstract subjects into tangible and fascinating areas of study through hands-on experiments and real-world applications. This nurtures their curiosity, retains engagement, and deepens their understanding.

These initiatives are carefully crafted to ignite curiosity and instil a passion for learning within underserved youth. Participants not only enhance their proficiency in STEM disciplines, but also cultivate essential skills in critical thinking and problem-solving.

Voyager provides a nurturing and inclusive environment where young individuals can excel and explore the boundless opportunities that STEM education presents. Through these enriching experiences, refugee youth are empowered with tools to embrace ambitious goals and pursue the opportunities available within and beyond STEM careers.

1. Phoenix Voyager

Phoenix Voyager (Phoenix Space Flagship Program) is our flagship course, which takes young people on a **stimulating and unique journey through the cutting edge of space travel, while teaching transferable fundamentals of science, mathematics and programming**. It provides students with education in high-school level **algebra, geometry, Newtonian mechanics, space and scientific knowledge, and an introduction to programming**. It is aimed at students aged 14-18. Each lesson takes students through examples, exercises and leaves them with homework and optional extension problems. The course is designed to stimulate home learning and incorporates a **project-based learning framework**.

Every five or six lessons comprise a 'unit', which is organised around a project that the students must complete. **Each project is pulled together into a 'super-project' where students will learn about space, design a habitat on Mars and then choose the right way to reach it and conduct a scientific investigation once there. The choices taken at each unit project affect subsequent projects and thus, each student will end the course with their own unique projects.**

The first project involves students using their geometry skills to calculate the minimum area and perimeter of a Martian settlement; the second project requires them to choose the appropriate rocket to reach Martian orbit; the third requires students to calculate the fuel needed to descend to the surface; the fourth involves analysing data and statistics to select the best landing site; the fifth module requires students to analyse scientific data and to encode the results of experiments in an encrypted form to be sent back to earth; and finally the sixth module is a programming project where students must learn to program using the visual language Scratch, to attempt to find the most efficient way of locating water near the surface of Mars.

Overview

- 6 unique, original, realistic STEM projects
- 36 lessons, approximately 1.5 hours long, broken down into around 200 individual activities
- 500 exercises and homework questions.
- 100 class discussion questions
- 70 original extension questions to push and identify the brightest students

Phoenix Voyager: Phoenix Flagship Program	
Typical Audience	Refugee and underserved students between the ages of 14-18
Content Type	A series of lesson plans, worked solutions and links to resources
Hours	~50 hours (36 lessons at 1.5h per lesson) + approximately 45h of homework
Typical Duration	Recommended to be either a weekly class or twice-weekly i.e. between 36 and 18 weeks
Prerequisites	Students should be able to carry out arithmetic, read simple graphs and have been introduced to the fundamentals of algebra and the use of formulae. No special knowledge is assumed about knowledge of space.
User Requirements	N/A
Outcomes	• Increased and improved educational motivation and awareness for refugee and underprivileged youth, especially in STEM areas Increased appetite for lifelong learning • Growth and development in the following skills: Collaboration, communication, critical thinking, creative thinking, problem solving, time management • Self-reported and observed improved state of curiosity, agency and resilience, adaptability, responsibility and initiative • Open-mindedness and hope for the future • Increased opportunity for skilled employment opportunities for refugee and underprivileged youth, especially in STEM areas Increased competence in the use of digital technology
Knowledge	• Basic and mathematical understanding of the fundamentals of modern physics: forces, energy, speed, heat and the structure of the universe • Elementary geometry, statistics and data presentation, algebra
Skills	• Problem-solving, trial-and-improvement, calculation, rearranging equations and solving them
Attitudes	• Persistence, curiosity, increased confidence and self-motivation

2. Balloon Camp

An intensive four or five day in-person camp where the **students put their knowledge to the test by carrying out practical activities, investigations and experiments.** These experiments all work towards understanding the science of a near-space high-altitude balloon mission. They use geometry to determine the distance to the horizon at different altitudes, graphing to make predictions about the temperature in the upper atmosphere, use their knowledge of forces and air resistance to design and improve parachutes, and gain experience in collaborating and communicating in groups. They create a digital thermometer that is used to deduce properties of how heat behaves. **The students end up with an experiment they will be able to send to the UK to be launched onboard a high-altitude balloon.**

Balloon Camp	
Typical Audience	Refugee and underserved students between the ages of 13-18
Content Type	Instructions and resources for all activity
Hours	30 hours (21 hours if taken after Phoenix Voyager), unevenly split between many activities. The Balloon Camp's activities can be adjusted to make it shorter if time is limited.
Typical Duration	Spread over a 4/5-day intensive period
Prerequisites	Having taken Phoenix Voyager or similar high-school maths and science courses
User Requirements	Smartphone or Laptop
Outcomes	• Increased competence in the knowledge and skills taught in the Phoenix Voyager • Improved understanding of how science, maths, and programming can be applied to real-life • Increased enthusiasm for STEM as a solo and collaborative activity

3. Moon eQuest

This short, **five lesson course is aimed at boosting students' confidence and problem solving skills after graduating from the Phoenix Voyager.** Each lesson is centred around a particular problem involved in a mission to the moon and looking at ways to solve it. Here is a brief description of each lesson, which can be between 1.5 and 2 hours long:

Lesson 1: Getting there

Students calculate the sort of speeds required to reach the moon in a reasonable amount of time. After this, they must determine which rocket will be able to deliver them to the moon. As an extension, students can learn a way to approximate calculus and the rocket equation.

Lesson 2: What! No air?

The students have arrived on the moon. One of the first things students should know about the moon is that it has no atmosphere. Why does this matter and how do objects behave differently on the moon?
Students learn to calculate the volume of air astronauts must take with them, why parachutes work on Earth but won't on the moon, and what that means for landing and moving on the moon.

Lesson 3: Heavy News. Gravity and Its Effect on Space Missions

Students learn the formula for gravitational field strength and see why the moon has much less gravity than Earth. They also use this fact to calculate the maximum height that an object can reach when launched upwards. Students can apply this knowledge to make judgements about other bodies in the solar system and discuss the future of their moon base as a stepping stone.

Lesson 4: Message Received. Communications in Space

Students learn about the communication time delay between Earth and the moon and how to use the formula for speed/distance/time to calculate one of the

missing variables. They can then use this to work out the time delay between a network of satellites.
After this, students learn to convert letters to numbers and decimals to binary representation to allow them to send messages back to Earth using flashes of light.

Lesson 5: A Home Away From Home, Designing a Moonbase

The Phoenix Moonbase needs to be made and it's up to our students to design it using calculations about area, distance and efficiency. Students get an introduction to the challenges posed to designers and engineers when creating any large project. They answer questions such as:

- Which shape should be used to maximise the area of the moonbase while minimising wall material costs?
- If everybody must be within 100m of an emergency shelter in case of a meteor impact, how many shelters do we need to ensure everybody's safety?
- The moonbase needs a certain number of experiments and modules, but we can't carry them all in one rocket ship. Each rocket can carry 600 tons of hardware, each varying in weight and scientific value. Students must find the best scientific payload under the weight limit.

Lesson 6: Bonus programming problems

This lesson is only applicable to students who have studied programming independently or as part of our Python programming course. It takes numerous realistic, practical problems and gives students some small example solutions of smaller, easier problems. After this, they must solve the problems using computer programming. The students are required to write code which quickly finds the correct answer(s) and can easily be expanded or edited later. Examples of these problems are:

- Design an algorithm to sort out the combination of objects to be taken to the moon with maximum utility
- Find the best place for a new base which minimises the overall total travel time for vehicles travelling from other bases, mines, and research stations
- Numerically integrate changes in speed to determine the full acceleration of a rocket losing mass

Moon eQuest	
Typical Audience	Refugee and underserved students between the ages of 13-18 globally.
Content Type	Lesson plans, instructions for practicals, video links, and question sheets.
Hours	12 hours (6 lessons of length 2 hours per lesson)
Typical Duration	Either once weekly over 6 weeks, or can be compressed into an intensive week camp
Prerequisites	This is meant to follow on from the Phoenix Voyager. So, students should be familiar with standard form, Pythagoras, and circle geometry and have a basic knowledge of space, motion, acceleration, and forces.
User Requirements	Smartphone or Laptop Internet Connection(When delivered online) or N/A (When delivered offline)
Outcomes	• Increased and improved educational motivation and opportunities for refugee and underprivileged youth, especially in STEM areas, and increased competence in the use of digital technology • Vastly improved confidence and competence in tackling numerical and lateral thinking problems, especially those faced in STEM
Knowledge	• As a problem-solving course, Moon eQuest doesn't teach much knowledge directly but incidentally imparts knowledge about science, space, engineering, and the idea that scientists and engineers progressively solve problems in a thoughtful and rational way.
Skills	• Extending technical or physical principles to more complicated situations • Decomposing problems into simple sections • Using intelligent trial-and-improvement to home in on approximate answers • Spotting patterns in data • Using approximations to solve problems and point towards more precise answers
Attitudes	• Increased confidence in the application of existing skills and awareness of the variety of mathematical problems presented in technical endeavours.

4. STEM Spark

This course is designed to spark interest in **physics, maths, and programming among younger students (9 to 13 years old)** and also serves as a taster for our longer courses in the future. **STEM Spark is also aimed** at **discussing science and society to connect STEM to a wider range of education** and incorporates written and video material from the **Airbus Foundation.**

Lesson 1 - 7 [Airbus Foundation Lessons]

In each of the first practical lessons students learn about some aspect of a fictional mission to a space hotel. Students learn, through a combination of a video-assisted practical followed by a theoretical question, about the following aspects:

- How composite materials make space planes lighter
- How aerofoils create lift
- How hydrogen is created
- How burning fuel creates thrust
- How objects can orbit the earth
- Why spacesuits are required.

In the seventh lesson, students practise their communication and imaginative skills when making a presentation to their classmates about their learning so far.

Lesson 8: Falling: Investigating Gravity and Acceleration

Using household objects such as elastic bands, paper clips, and water bottles, students investigate the effect of gravity and understand how forces work in concert and opposition.

Lesson 9: Introduction to SCRATCH

Students learn the basics of computer programs using MIT's Scratch to create a short animation. This animation will teach the basic flow, conditions, and use of variables that are the fundamentals of computer programming. With this, students will be able to pursue further computer programming courses and develop an interest in making their own creative programs.

Lesson 10: Paper Maths

In this lesson, students investigate the maths of simple shapes that they make from paper and discover the real essence of mathematics: surprising results, deep rules and a simple and creative attitude of investigation and analysis.

Lesson 11: The size of space

Students learn about scale, specifically about how to think about the scale of space despite how much everything out there dwarfs us. Along the way they pick up knowledge about the structure of the solar system and some of the names of astronomical bodies.

Lesson 12: A New World (discussion)

In this lesson, students connect their learning to their wider understanding of the world. We ask them to discuss the following questions, giving them the task of imagining a future society in space. We ask them to picture and explain their own role within that new society. What would they bring? Students must discuss and evaluate each others' proposals.

STEM Spark	
Typical Audience	Refugee and underserved students between 9-13 years.
Content Type	Lesson plans, instructions for practicals, video links, and question sheets.
Hours	12-15 hours, depending on if extension activities are included
Typical Duration	Well suited for an intensive 5-day program, or weekly classes
Prerequisites	Basic literacy and numeracy, ability to take notes
User Requirements	Smartphone or Laptop Internet Connection(When delivered online) or N/A (When delivered offline)
Outcomes	• Increased educational motivation and opportunities for refugee and underprivileged youth, especially in STEM areas • Enhanced competence in the use of digital technology • Understanding the basics of scientific investigations • Increased understanding of what science, maths, programming and

	engineering aim to do and what problems they can solve
Knowledge	• Knowledge of: space, orbits, forces, thrust, rockets, gas and the development of space travel
Skills	• How to carefully assemble practical activities • How to investigate nature through scientific thinking • Mathematical and logical problem solving • How to create simple computer programs using Scratch
Attitudes	• Increased curiosity and confidence in the natural sciences and mathematics

5. LaunchPad Challenge

The Phoenix Space LaunchPad Challenge offers upper-high/secondary school and lower-level undergraduate university students the **opportunity to develop and present a creative, idea-based solution to a space science-themed problem**.

Students apply their knowledge and research skills to **solving scientific challenges, leverage creativity, develop presentation and teamwork skills while connecting to and competing against a global community of like-minded students** who have an interest in space science.

Students between the ages of 15 and 19 from anywhere in the world can enter Phoenix Space's LaunchPad academic challenge. After submitting an initial conceptual solution to a problem faced in a given space mission they progress through multiple rounds of judging with increased levels of detail required with each revision. The few remaining finalists take part in a live event where a panel of experts, academics and space business leaders quiz them and require them to defend their ideas. The details of this challenge change slightly from year to year.

What do the entrants gain?

Experience in picking from and sifting through the results of chosen research questions. Entrants learn to compare ideas; think critically about their own solutions and others'; present their findings in organised and logical manners;

prioritise key information; correct, revise and expand ideas; reference properly and present to and interact with adult experts. On top of all this, they gain a large amount of scientific knowledge throughout their research, either by osmosis or by direct study. By entering teams, develop interpersonal and project management skills, as well as deeper friendships.

LaunchPad Challenge	
Typical Audience	Global learners from 15 to 19 years old
Content Type	Online competition - competition outline, registration form, submission form
Hours	N/A
Typical Duration	8 months from the competition announcement to the finals and winner announcement
Prerequisites	General STEM knowledge on the high school level
User Requirements	Smartphone or Laptop Internet Connection
Outcomes	• Global awareness and increased youth interest in STEM topics • Improved soft skills in critical thinking, communication, collaboration and time management • Increased competence in the use of digital technology • Increased and improved educational motivation and opportunities for refugee and underprivileged youth, especially in STEM areas • Increase prospects of project and organisation sustainability • Positioning of Phoenix Space as an unique provider of quality educational courses/content worldwide

6. Nova Maths

Phoenix Space's innovative Nova Maths program is designed to instil indispensable arithmetic skills to displaced and marginalised children between the ages of 10 and 13. Our curriculum focuses on creating stimulating content and practice exercises to keep students engaged and deepen their understanding. Moreover, it helps teachers and schools identify the most gifted

students who have the potential for accelerated programs in maths, computer science and similar projects.

Phoenix Space provides schools and educators with the curriculum, content, models, and practice exercises to implement, expand, and build upon as they see fit, aiming to **offer students the most comprehensive experience possible.**

This program focuses on teaching multiplication, addition, subtraction, division, number classifications, and strategies for complex problem-solving at the high school level. Students enrolled in this course will develop solid foundations in mathematics, ensuring they have the **skills and confidence to excel throughout their high school careers and beyond.**

The Phoenix Space Nova Maths	
Typical Audience	Marginalized and displaced children ages 10-13
Content-Type	The content is designed to provide stimulating practice materials and exercises to improve essential arithmetic skills and enhance creative thinking.
Hours	12-15 Hours
Typical Duration	Teachers/Schools discretion
Prerequisites	Have knowledge of standard algorithms for multiplication, addition, subtraction, and division. Recommended students are confident in number bonds, skip counting, and using a number line to help with subtraction over 10 and multiplication tables up to 10 Teachers should be experienced in teaching high-school maths
User Requirements	Access to stationary (pen, paper, notebook, whiteboards, counters)
Outcomes	• Gain comprehension of number classifications (odd, even, composite, Fibonacci, square and triangular). • Increased proficiency in addition and the properties of associativity and commutativity • Increased ability to subtract complex problems

	• Increased proficiency in multiplication and division • Build confidence in students' ability to problem solve and think critically • Opportunity to engage and progress in a large range of mathematical exercises • Gain valuable mathematical skills at a high-school level • Increased ability to solve complex problems
Knowledge	• Develop essential skills and a deeper understanding of practical mathematical equations as well as how to implement effective problem-solving strategies.
Skills	• Develop essential arithmetic skills, including addition, subtraction, division, multiplication, number classifications, properties of associativity and commutativity
Attitudes	• Enhance problem-solving, critical thinking and cultivate an analytical mindset • Develop self-discipline and creative thinking. • Enhance confidence both within themselves as well as within the field of maths.

7. Python Pioneers

This programming course is aimed at older students (14+ years old) with a good understanding of English. Students receive access to an online teaching platform on bsd.education and access lessons and **exercises online and work through a series of programming problems on the theme of space science.** This gives them a way to test their newly learned skills and begin developing a programming portfolio.

Python Pioneers teaching and exercises comprise of:

- ➢ 120 multiple choice questions.
- ➢ Instructional Videos
- ➢ 30 short elementary exercises which will teach and test one particular coding skill

- 20 longer exercises which will require a combination of programming skills and knowledge
- 12 extension exercises will be designed to stretch the abilities of the most able or enthusiastic students
- Further reading will introduce the history and culture of programming

These lesson cover the following topics:

- Introducing Python Syntax - students will learn how to communicate and write intelligible code
- Strings and Console Input - students will understand how the language processes basic text and how to input it live using a console
- Conditionals and Control Flow - students will learn how programs can very their output based on commands issued by conditional functions
- Functions - students will learn the importance of writing processes which will be repeatedly called into action as functions
- Lists and Dictionaries - Students will learn how to store data in easy to read and write structures, and the pros and cons of lists and dictionaries
- Lists and Functions - Students will learn to manipulate data stored in lists using functions and outputting new lists and other variables
- Loops - Students will learn how to use while and for loops, including nested loops, to execute sections of code repeatedly
- Classes - Students will get their first proper introduction to object-based programming, by creating classes to describe different bodies in the solar system
- File Input/Output - students will learn how to take data in and out from the computer *beyond the progr***am itself, as well as learning about basic file formats such as .csv and .txt**

Python Pioneers	
Typical Audience	Older, tech-literate refugee and underserved students globally above 14+ (average between 17 and 24 years old)
Content Type	Instructional videos, multiple choice questions, longer form questions, worked answers
Hours	14 lessons divided into 42 self study hours (3h per lesson). It takes at least 1 hour to get to grips with the material, and between 1 and 2 hours to answer the questions.
Typical Duration	14 weeks - 1 lesson (3 hours) per week

Prerequisites	Good arithmetic and command of elementary algebra
User Requirements	Smartphone or Laptop
Outcomes	• Increased and improved educational motivation and opportunities for refugee and underprivileged youth, especially in STEM areas • Increased ability for refugee and underprivileged youth to pursue additional education, particularly in STEM areas • Increase in development of soft skills such as responsibility, creative thinking, critical thinking, problem-solving, time management and the use of one's agency Increased opportunity for skilled employment opportunities for refugee and underprivileged youth, especially in STEM areas • Increased competence in use of digital technology Increased capacity and motivation for self-study
Knowledge	• Knowledge of the uses of and basic syntax and format of the Python 3 programming language. • How to read and write good-quality code. • Hundreds of specific commands in Python.
Skills	• How to use existing and free resources to learn programming. • How to decompose a program into modular parts • How to build and adapt programs to solve particular problems. • How to turn a realistic problem into a programming problem. • How to organise one's time and work independently to a strict deadline
Attitudes	• Persistence, curiosity, increased confidence and self-motivation, hopefully it will also show a shift in the attitudes towards technology away from a 'black box' mentality.

8. Resilience Academy

Phoenix Space's Resilient Academy STEM Toolkit is an innovative set of programs designed to empower marginalised communities at the forefront of the climate crisis who have limited or no access to education with agile, locally informed, sustainability and crisis prevention oriented STEM educational tools and resources. This initiative will enable current and future generations to become more resilient and empowered even in unstable political, economic and environmental conditions.

Resilience Academy STEM Toolkit is a fundamental arithmetic, geometry, data collection and processing syllabus which involves problems directly relevant to

the tasks, challenges and opportunities of children at the forefront of the climate crisis. The program seeks to impart not just mathematical skills but also heuristics for practical problem solving. After learning mental and written arithmetic, geometry and data management students will be able to solve realistic problems involved in agriculture, aquaculture, flood resilience, collecting and recording information, trading and borrowing and resource allocation.

Module 1: Math Seeds

- A 6-week module totalling 20 hours of learning. Lessons are based on 6 main areas of basic arithmetic coupled with 200 pages of exercises and word problems, 3 hours of video instruction on how to use maths manipulatives (physical teaching tools).

Module 2: Geometry Seeds

- 2-week module totalling 6 hours of learning. This course builds upon the teachings of Maths Seeds to build upon more complex arithmetic skills, including area, perimeter, distance, and their uses.

Module 3: Data Collection and Processing

- 2-week module totalling 10 hours of learning. Utilising the teachings from Maths Seeds and Geomentry Seeds, students gain fluency in basic data collection, data presentation and data analyses.

Module 4: Real Life Application - STEM Sprouts

- A two-day module totalling 10 hours. Students utilise their newly formed skills to work on a comprehensive project where they must use data, geometry and arithmetic to choose the best path through a difficult set of choices presented to them in a narrative which reflects their situations regarding their environments. Allowing them to see how maths can be utilised to solve real-world challenges.

Maths Seeds:

Audience	3rd and 4th graders

Content Type	Lessons based on 6 main areas, 200 pages of exercises and word problems, 3 hours of video instruction on how to use maths manipulatives (physical teaching tools)
Hours	20
Typical Duration	6 weeks
Prerequisites	Identify and name numbers up to 100, ability to count fluently
User Requirements	None
Teaching Materials	• Two documents: one will be the teacher guide, the other will be an exercise book. The teacher guide contains the images, links to the videos, written guidance on how to teach the material and use the resources. The exercise book will contain hundreds of exercises and word problems and will be referred to in the teaching guide. The exercise book will try to contain as many exercises as possible per page to keep printing costs down if necessary. • A collection of videos: we will upload the videos to youtube so they are accessible to anyone with an internet connection, but also will host them on google drive so they can be downloaded and saved to phones, computers etc. avoiding the need for a reliable internet connection. • Instructions for the dimensions of the number grid and the size of the counters are included in the teaching guide.
Outcomes	• Understand and explain the 10-base system • Understand the value of digits in numbers and recognize digits positions • Learn how to perform addition, subtraction, multiplication, division • Understand the relationship between theses operations • Solve word problems involving one or more operations • Use mathematical operations in real world contexts
Knowledge	• Understanding numbers • Learning mathematical operations • How to use mathematical operations in problem solving
Skills	• Ability to perform accurate calculations • Apply operations to solve real world problem • Develop logical thinking

Impact & Application	This material will teach the fundamentals of arithmetic: ordering, comparing, adding, subtracting, multiplying and dividing and classifying numbers. When carrying out these operations either mentally or using written algorithms, students will be able to count, combine and calculate with numbers from the world allowing them to carry out skills such as: • Managing a budget for a household or small business • Measure and account agricultural produce • Measure and calculate when constructing buildings, or handcrafts. • Share out resources such as food, time, money, distance to solve practical problems. • Make estimates when purchasing commodities or planning economic activities. • Use maths to make better decisions e.g. when offered loans, or when given health or developmental advice. • Understand numbers when interacting with governments, NGOs and other institutions. Without these skills it is impossible to learn any higher mathematics which are essential for many, if not most, developed economic activity in construction, farming, commerce, handcrafts, communication. After health, sanitation, security, food, water and shelter it is hard to think of a greater return than that basic numeracy will generate for individuals and communities.

Geometry Seeds:

Audience	Students that have completed the previous number course and those with a solid grasp of arithmetic
Content Type	Lesson plans, instructional videos, exercises
Hours	4-6

Typical Duration	2 weeks
Prerequisites	Arithmetic operations
User Requirements	• Students need paper, pen(cil), and access to a hundreds board and counters like this, or a paper grid simulation. • Teachers will ideally need access to paper copies of the exercises and lesson plans and their own hundreds board, but also electronic copies and videos. Access to rulers and lots of paper - ideally squared paper 5mm x 5mm.
Outcomes	• Use basic ideas in arithmetic and geometry to solve real-life problems around shape and space
Knowledge	• Area, perimeter, distance and their uses. Awareness of basic principles
Skills	• Estimation of areas, perimeters and distances, comparison of areas, decomposition of large shapes into smaller ones.
Impact & Application	• Able to better calculate in farming, construction, solar energy. Creates foundations for more skilled work required in engineering, construction, agriculture, crafts.

Data Collection and Processing:

Audience	Students that have completed the previous number course and those with a solid grasp of arithmetic
Content Type	Lesson plans, instructional videos, exercises, student project
Hours	10
Typical Duration	2 weeks
Prerequisites	Counting, ordering, place value, arithmetic operations
User Requirements	• Students need paper, pen(cil), and access to a hundreds board and counters like this, or a paper grid simulation. • Teachers will ideally need access to paper copies of the exercises and lesson plans and their own hundreds board, but

	also electronic copies and videos. Access to rulers and lots of paper - ideally squared paper 5mm x 5mm.
Outcomes	• Fluency with the basics of data collection, an elementary introduction on how to present and deduce from data. The students will leave with an appreciation of the importance of using numerical data to make better decisions and measure.
Knowledge	• The importance of data collection and processing • How to collect data well • Tallies, Bar and line charts • Basic operations on data to compare them
Skills	• How to read and write tallies • How to construct a bar chart to compare between classes • How to make a line chart to quickly see trends
Impact & Application	• Being sensitive to elementary presentations of data opens up skilled work to students in the future such as in medicine, business, government work as well and being receptive to information presented in charts, tables and graphs. Without the basic grasp of data in these forms, any further education in statistics will be of little use.

Real Life Application-STEM Sprouts:

Audience	Students who have completed the previous three courses
Content Type	Lesson plans and outline for student project where they must use data, geometry and arithmetic to choose the best path through a difficult set of choices presented to them in a narrative fashion based on their situation.
Hours	10 hours
Typical Duration	2 days x 5 hours
Prerequisites	Outcomes of previous courses.

User Requirements	Students need paper, pen(cil), and access to a hundreds board and counters like this, or a paper grid simulation. Teachers will ideally need access to paper copies of the exercises and lesson plans and their own hundreds board, but also electronic copies and videos. Access to rulers and lots of paper - ideally squared paper 5mm x 5mm.
Outcomes	Increased confidence and fluency. Improved self-esteem. An understanding of how life and maths intersect.
Knowledge	All of the previous knowledge from the other courses combined.
Skills	Combining existing maths with judgement about the best course of action.
Impact & Application	Creates numerate problem solvers with experience and confidence of solving problems using data and its manipulation.

9. Teaching Machines

Students make their first steps into the world of machine learning by collecting, classifying and training a machine vision model to help a space agency find a suitable site for a future Martian base. In under 15 hours, they learn how to use, clean, and augment data; the importance of large datasets; how to evaluate the success of machine learning algorithms and finally see some examples of the power they have in saving human effort.

This course is unique because it combines fundamental maths and computer science skills with inspirational, cutting-edge ideas from machine learning and space exploration.

Teaching Machines	
Typical Audience	11-18 age

Content-Type	Computer science, IT, and mathematics lessons based around a machine learning project
Hours	6 x 1.5 hour lessons (might be more - 12 of 1 hour lessons)
Typical Duration	Variable
Prerequisites	Have knowledge of standard arithmetic Internet access
User Requirements	Internet access, desktop computers (ideally one per student), projector or monitor
Outcomes	Students learn to train a machine vision algorithm and see its powerful application
Knowledge	The importance of collecting, processing and cleaning data. How to measure success in an algorithm, and the applications of machine learning to solve problems in the modern world.
Skills	Using Google Drive, using a file system, collecting and processing data in tables, calculating percentages and elementary statistics.
Impact & Application	Machine Learning is one of the crucial technologies of the 21st century. Awareness of it, exposure to it, and even making it can be immensely empowering and inspiring.

Upskilling and Career Readiness

Phoenix Space's Compass programs focus on Digital Upskilling and Career Readiness. They aim to bridge the gap between education and employment among underserved populations. Through hands-on training, mentorships and work experience, we aim to empower students to develop the skills needed to prepare them for entry-level positions and capitalise on employment opportunities amidst the digital revolution. By fostering a supportive learning environment, Compass programs ensure that older students feel confident and prepared to pursue exciting opportunities in the digital realm. With a focus on both technical skills and professional development, Compass paves the way for a successful transition into the dynamic STEM field.

10. PS x PwC Digital Heroes

Launched as a partnership between Phoenix and PwC Middle East, the Digital Heroes programme supports disadvantaged individuals including refugees 17-35 year olds to develop and enhance their digital acumen and skills to support their journey to employment and/or further academic opportunities.

Data analytics allows students to unpick data, draw conclusions from this data, and also judge the reliability of and confidence in these conclusions. Those who analyse data properly should be able to make better decisions, or inform others to make better decisions, be it in business, government, science or anywhere else where large amounts of information are to be processed.

Students enrolled in the programme have the opportunity to acquire new in-demand digital skills through engaging on a global online digital learning platform, and **the guidance and mentorship of PwC Middle East Digital Accelerators.** The Digital Accelerators are armed with the skills, knowledge and digital technology to help solve complex challenges.

This 4-week programme focuses on 3 mandatory modules: digital literacy, Microsoft Excel, and Microsoft PowerBi, with an optional module in Alteryx.

PS x PwC - Digital Heroes	
Typical Audience	Refugee and underserved students between ages of 17-34 in or from the Middle East..
Content Type	Online self-study platform that provides structured, bite size learning in the areas of data analytics and visualisation. One-on-one sessions with Digital Accelerators (PwC expert resources) to answer questions and guide their assigned students.
Hours	11-12 mandatory essential units (25-30 Hours) and 11-12 optional modules (20-25 Hours).
Typical Duration	28 days (4 weeks)

Prerequisites	General STEM knowledge past high school level Sufficient English lingual capabilities (B level proficiency or higher)
User Requirements	Computer/Laptop and High-speed internet Connection (Windows recommended) 10-15 hours to commit per week
Outcomes	• Increased data literacy and analytics capabilities, including Power BI, Alteryx and Excel. • Issuance of accredited learning certificates and diploma from the Kubicle platform and a certificate of completion issued by PwC & Phoenix Space.
Knowledge	• Develop in-demand data analytics capabilities, including a deeper understanding of data literacy fundamentals, data communication, data visualisation using Power BI, data organisation using Alteryx, with the purpose of upskilling.
Skills	• Develop self-led learning-to-learn strategies, time management, perseverance, increased digital literacy
Attitudes	• Develop responsibility, resilience, motivation

11. Capstone Project(s)

Phoenix Space Capstone Project is a work experience opportunity designed to provide a path for personal and professional growth for individuals who may have limited access to educational and upskilling opportunities. We offer Capstone Projects to the best graduates of our Digital Upskilling programs. They are designed to meet the needs and interests of a specific group of students. Their primary objective is to equip participants with the necessary resources and knowledge to excel in careers of the future. Each Capstone program is crafted to attend to the unique needs, aspirations, and challenges faced by underprivileged and displaced youth in mind. **This proactive approach ensures that underserved youth have the necessary skills to enter the future job market, leaving no young person behind in the digital revolution.**

Capstone Project	
Typical Audience	Refugee and displaced youth ages 18-32
Content-Type	The content is designed based on a specific collaboration with a company/organisation that provides students with a concrete discrete project (a short internship style project),
Hours	20 to 120 hours
Typical Duration	2 weeks to 3 months
Prerequisites	Being a graduate of Phoenix Space English comprehension is between A1 and B2
User Requirements	Access to computer/laptop and internet connection
Outcomes	(SAMPLE OUTCOMES from Pilot Capstone AI Prompt Engineering Project) • Increased data literacy and digital skills • Gain valuable work experience to enhance employability • Opportunity to engage in networking and building professional connections to further their knowledge of the tech industry • Build confidence in participants' STEM abilities for successful career entry and growth
Knowledge	(SAMPLE KNOWLEDGE from Pilot Capstone AI Prompt Project) • Develop in-demand skills including a deeper understanding of data literacy and AI enhancement strategies to secure entry-level positions in the thriving tech industry. Gain insight into professional settings and industry knowledge through hands-on experience.
Skills	(SAMPLE SKILLS from Pilot Capstone AI Prompt Engineering Project) • Develop in-demand data analytics capabilities. Students gain proficiency in key concepts such as data analytics, programming foundations, data visualisation and machine learning.

Attitudes	(SAMPLE ATTITUDES from Pilot Capstone AI Prompt Engineering Project) • Develop responsibility, adaptability, resilience, motivation, and self-discipline and cultivate an analytical mindset. Enhance confidence both within themselves as well as within professional settings.

12. PS x DataCamp Upskilling

This DataCamp Upskilling provides the opportunity for displaced and marginalised youth aged 16 to 25 to acquire essential skills in data analytics and become more confident data-driven decision-makers. **Through this online initiative, students benefit from a blended teaching approach that combines self-led study with teaching clinics facilitated by the Phoenix Space Education team.** This format allows beneficiaries to develop self-management strategies while also receiving guidance and support in their development.

Students gain **access to 440+ comprehensive courses on the latest technologies,** practice exercises to refine their skills, assessments to test their knowledge, and projects based on real-world scenarios to allow them to apply theory to practise, all whilst being guided by our experts.

Through this program, students gain not only essential skills but also an understanding of indispensable data terminology. This empowers them to communicate more effectively in team settings and equips them with the hard and soft skills necessary for leadership roles. Students also benefit from extra features such as Workspace, Certification, and Jobs.

By the end of the scholarship, participants emerge as informed, data-driven decision-makers ready for entry-level positions in the dynamic digital job market. They have the potential to broaden their opportunities, improve their livelihoods, and empower their communities.

We have identified 4 courses we guide students through: Data Skills for Business, AI Business Fundamentals, Data Literacy, Professional, AI Fundamentals. Learning Format for each of those courses is 8 weeks of Online Learning, 2 hours per week, students engage in independent learning on the online platform.

13. PS x BSD Upskilling

Launched in partnership with BSD Academy, the BSD Scholarship offers students access to a comprehensive range of technology courses specifically designed to empower young learners with the skills essential for succeeding in future digital careers. The BSD platform offers access to hundreds of hours of learning, catering to learners of all backgrounds and proficiency levels.

Beneficiaries emerge from the BSD program equipped with the necessary skills to demonstrate professionalism, communicate effectively both digitally and in-person, meet deadlines, and navigate the software and systems used in everyday business life. With an emphasis on hands-on learning experiences, this initiative ensures students grasp both theoretical concepts and practical insights that are applicable to real-world scenarios.

Courses vary from 10-40 hours in potential learning time. The BSD Scholarship program fosters self-led learning coupled with one-to-one support by Phoenix Space's Education team to ensure support and a deeper level of comprehension. Through this intiative students are not only empowered with technical proficiency but also the confidence and capability to participate and excel in today's ever-evolving digital world, making it an invaluable investment in their future success.

We guide enrolled students through three courses: Principles of Digital Technologies in the Workplace, Workplace/Virtual Internship Preparation Program, and High School (Virtual) Internship. All of these courses equip beneficiaries with a comprehensive tool kit to gain the essential skills and experience to excel, develop, and thrive in their first professional experiences.

14. PS x Reallyenglish Uskilling

In collaboration with Really English, The Really English Scholarship program offers students access to 13 comprehensive English courses that empower learners of all levels to master English literacy across industry and business settings. The program aims to empower learners with the confidence to articulate their opinions effectively in both verbal and written communications in their respective fields.

This program utilises adaptive learning technology, tailoring the learning experience to individual needs, ensuring long-term retention, mastery of complex concepts, and fostering a deeper understanding of English comprehension. Students within this program are supported by Phoenix Space's experts who aid beneficiaries to improve their communication with exercises rooted in real-world scenarios. In most of the courses, students need to commit 2 to 3 hours of learning a week for 3 months.

15. Notes

Phoenix Space CIO is the developer, manager, organiser, and owner of the Phoenix Space CIO Programs.

Phoenix Space CIO provides the curriculum, teacher training and the impact measurement for Phoenix Space CIO Programs.

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