

Role of Mathematics in Applied Sciences

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Abstract

Counting various quantities is one of the activities that people engage in from young. Mathematics was developed to understand the cycle of nature as observed in the seasons. Ancient people understood the need to define time in relation to celestial movements for agricultural, astronomical and navigational reasons. Although all careers require a foundation of mathematical knowledge, some are mathematics intensive. In this changing world, those who understand and can do mathematics will have significantly enhanced opportunities and options for shaping their future. Generally it is an assumption that mathematics is only for the select few. On the contrary, everyone needs to understand mathematics. Mathematics helps the man to give exact interpretation to his ideas and conclusion. The literal meaning of mathematics is “things which can be counted”. The rapid improvements of high-level development and user environments of both hardware and software of calculators in recent years, in various scientific fields such as life science, information technology and nano-technology, has undergone tremendous changes at a pace we could never have envisaged while the creation of new fields of study continue. Amidst that transformation, the academic needs of mathematics and mathematical science have intensified rapidly. At the same time, problems posed in each field provide feedback for mathematics, leading to expectations for the development of new academic fields within the framework of mathematics.

Mathematics is one of the oldest and most elemental sciences in the world. Math is used widely in a range of professions; however, it is of particular importance in the field of industry and manufacturing. Mathematicians fall into two broad categories; theoretical or pure mathematics and applied mathematics.

Mathematicians working in the manufacturing sector often find that they have to combine both

pure and applied mathematics in order to remain functional at their jobs. Math is used in many ways and is applied in sectors of management, operations, administration, as well as production.

The fact of the matter is that regardless of what you think or feel about maths as a subject, its grasp is inescapable – no matter how hard you run away from it, it’s everywhere, from the material, physical world we all operate in, and

to the material items that we use, touch, or feel everyday. And here are 6 reasons why Maths are so important when it comes to manufacturing the things we use for daily living.

Decision Management And Analysis

Mathematics is useful for decision-making processes or when a manufacturing group needs to determine the best alternative to solve a problem. For instance, mathematical theories and models such as the multi-attribute theory and the network flow model can help individuals assess how many products need to be manufactured at a particular point.

Mathematics For Industrial Engineering Applications

Many manufacturing plants and industries are vulnerable to disruptions resulting from design characteristics, as well as differing operation philosophies. Disruptions can be long lasting and can affect the success of the business. As such, it is crucial to understand the manufacturing system in order to probe for weaknesses and predict possible outcomes. This can only be achieved with mathematical proficiency.

Mathematical Programming Models

Mathematical programming is essential as it is used to provide solutions to a wide range of industrial problems. For instance, mathematical programming can be used to develop an optimization model that can determine the optimal lifecycle of a motor vehicle.

Inventory Management

Among the large category of issues that many mathematical models can address is inventory. Inventory requires money, which means it is often subjected to mismanagement. In a large supply chain such as that of factories, having a knowledge of when to order for equipment, how much should

be ordered and the amount of money it will cost to order the products is essential.

Ultimate Solutions To Industrial Design Problems

Numerous mathematical models have been used to take care of a range of industrial problems. Some mechanical design issues that may be solved using mathematics include the design of cars and airplanes using techniques such as computation fluid dynamics. Every mechanical component manufactured industrially, such as machinery, robots, automobiles, and even automated garage doors – mathematics guarantees that the production methods used, as well as the exacting measurements for these products, are the best ones available.

Maths On An Industrial Scale For Planning

Factories face numerous aggregate planning problems that are solved through mathematics. For instance, if one needs to make a decision regarding employees and factory capacity over a long period of time, one may use mathematical techniques such as linear programming.

Mathematics plays an essential role in various industries and various functions in life. Particularly, Maths is important in the agricultural sector because it is applicable in so many diverse ways. A wealth of mathematical research and knowledge is required for a farmer to be successful – there isn't any other way about it.

If you think Maths is a subject you can afford to forego as an agriculturalist, farmer, or budding horticulturist, think again – you'd be surprised as to how much maths figures in the field, and even more so for those at the forefront and the cutting edge of discoveries, large and small, to the science and discipline in general. Whether you are a novice beginner seeking to expand your

knowledge, skills, and training in small, artisanal indoor grow operations, or whether you work for a conglomerate that focuses on maximizing farming yields for third world countries, maths are a sound foundation that every professional or amateur in the field needs to give proper time, focus, and practice to.

Without much further ado, let's discuss 7 reasons and ways why Maths are such a key component to people working, studying, or researching in the fields of agriculture and farming – and underline, without getting too preachy, its importance for all of us.

Mathematics Allows You To Design Better Climate Models

Accurate weather forecasts predict when and where extreme weather may strike, whilst climate projections are key to identifying weather patterns changing on a longer time scale. Our ability to predict weather and climate has advanced in leaps and bounds in the last few decades, thanks to maths. Modern weather forecasts rely on computers to solve the complex equations that simulate the atmosphere's behaviour – from global processes that influence the flow of the jet stream down to local rain clouds.

Mathematicians play an important role in this process, working with a set of equations that describe the atmosphere, taking into account temperature, pressure and humidity. Global Circulation Models (GCMs) describe the interactions between oceans and atmosphere to look at what the average conditions could be in decades to come.

Mathematics Improves The Accuracy of Soil Analysis

Mathematical skills are useful for the analysis of the soil's acidity levels as well as the moisture content. The measuring and monitoring allow

farmers to determine the kinds of crop that would thrive in the soil as well as the brand of fertilizer that should be utilized for the process.

Mathematics Makes Chemical Content Analysis For Fertilizers More Accurate.

Fertilizers are typically made up of various chemical components in precise proportions. Farmers are supposed to determine which chemical nutrients are necessary for which crops and in which amounts. The fertilizer must be applied in specific quantities. Otherwise, the yield can fail.

Conversion Of Units At A Drop Of A Hat Requires A Strong Background In Maths

. Units and measurements used in farming are fairly unfamiliar to other areas. We can use proportions to make conversions from the unfamiliar to the familiar. Land is measured in acres, for example. It is hard to understand the size of an acre because our minds are trained to visualize miles or kilometers. We can use conversions to put an acre into perspective. There are 43,560 square feet in an acre. This is slightly smaller than the size of a Canadian football field, without the end zones. Other farm measurement terminology include quarters and sections. A quarter is 160 acres and a section is 4 quarters. Professionals who work in grain elevators frequently use conversions.

Planning, Plotting, And Laying Out Plot Sizes And Dimensions

The area of the plot is an important factor to consider in the process of planting crops. Since farming is unpredictable owing to changeable climates and weather patterns, farmers must determine the crop yield by assessing the square

footage of a plot. This helps to approximate the yield in relation to the size of land available.

Improving Estimates For Expenditure And Yields

One of the most frequently used math concepts on the farm is the use of proportions. Grain prices are often given per ton, but producers want to know the price per bushel. Agriculture specialists are required to do these conversions quickly and accurately. Farmers will also estimate elements of time. They know approximately how many hours they will need to seed and harvest and can plan accordingly. These estimates of time are based on crop types and machine availability, as well as human resources. Farmers consider past trends of weather and moisture conditions to decide when to start seeding. Furthermore, farmers can estimate the time remaining until harvest by calculating growing degree days. This is the measurement of heat units needed by the plant to reach its full maturity. It also accounts for the ripening of the crop. An approximation is made of how many days remain until the crop is ready to be harvested. Some processes affect this calculation such as desiccating the crop, and can change the number of growing degree days.

Mathematics Lays The Foundation For Innovation In Agricultural Methods

All of the most important innovations throughout history are possible because of mathematics. These are just 7 of the myriad of reasons and ways why Maths are just so important in every career path – in fact, it speaks volumes on the universality and absolutes of mathematics as a topic: that of being an inescapable discipline that needs to be practiced by everyone seeking to be the best in their discipline.

Conclusion

There is no doubt that Maths are a topic that can be difficult to learn and more so to master, but its universality guarantees its importance and relevance to pretty much every discipline of study in every field, even one you may think is totally unrelated to it. Mathematics forms bridges between knowledge, tradition, and contemporary life. The continuous development and growth of its many branches, both classical and modern, permeates and fertilizes all aspects of applied science and technology, and so has a vital impact on our modern society. Although all careers require a foundation of mathematical knowledge, some are

References

1. Ashlock, R.B. and Herman Jr. W.L, *Current Research in Elementary School Mathematics*, New York: Macmillan, 1970.
2. James.Anice, *Teaching of Mathematics*, Neelkamal Publication Pvt. Ltd. Hyderabad
3. Kulshishtha, A.K. *Teaching of Mathematics*, R. Lall Book Depot, Meerut-250001
4. Miglani,R.K. & Singh, D.P. *Teaching of Mathematics At Elementary Level* Part I & Part II, Arya Book Depot Karol Bagh, New Delhi-110005
5. *National Curriculum Framework 2005* (NCF-2005)-A Paradigm Shift-Mathematics (2005); NCERT publications, New Delhi.
6. Roy Hollands (1990) *Development of Mathematical Skills* Blackwell Publishers, Oxford, London
7. Skemp,R.R., *The Psychology of Learning Mathematics*, Hatmondsworth: Penguin Books, 1971.
8. Thomas A. Sonnabend (1993) *Mathematics for Elementary Teachers (An Interactive Approach)*, HBJ Publishers, Florida