

RELATIONSHIP OF MATHEMATICS WITH OTHER SUBJECTS

The relation may be inverse or direct. For example if there are two variables 'a' and 'b', if there is increase or decrease in one will affect on other. It is really a brainstorming activity which involves lots of efforts to be establishing relationship between school Subjects.

In modern scenario, due to the number of innovation of 21st century involves lots of development in the education. These involve meaningful knowledge of the concept. Here child's mind is an integrated whole, he wants to receive experiences in a fruitful manner.

Definition

"Correlation indicates a joint-relationship between two variables." **Lathrop**

"Correlation is concerned with describing the degree of relation between variables." **Ferguson**

"Correlation is an analysis of co-variation between two or more variables." **A.M. Taule**

"Correlation analysis deals with the association between two or more variables." **Simpson & Kafka**

Types of correlation

- *Positive correlation* – when an increase in one variable, increases the value of another variable or vice versa.
- *Negative correlation* – when an increase in one variable, decreases the value of another variable or vice versa.
- *Incidental correlation* — It is not a planned/pre-decided, no deliberate or a systematic attempt made to correlate it. Teacher plays a leading role. E.g. If any teacher has basic knowledge of concepts/elements of versatile or different subjects, he can easily make correlation between two or more subjects. A teacher cannot establish incidental correlation without having knowledge of different subjects.
- *Systematic correlation* – teachers can sit together with his students and how to correlate? While doing systematic correlation, the previous knowledge/content of the student should be related with the current knowledge. To relate the same is called systematic correlation. Here, the student and the teacher have to think about the application of the fact, laws, principles, and correlation of two subjects. After that knowledge becomes interesting.
- *No correlation* – when there is no mutual relationship between the two variables. It is also known as no linear dependent.

Uses of correlation:

- The aim of education is "to achieve the all round development of a child", this cannot be done by teaching only in simple classroom.
- In correlation, the practical subjects like maths and science plays important role. Where the correlation with concepts is used in learning of students.
- It makes learning permanent and concrete and knowledge to the learner.
- It makes the lesson easy and clear for the student.

- It enhances the mental abilities like problem solving, logical reasoning, imagination, and analytical power of student, because these can easily correlate acquired knowledge with the other subjects.
- It strengthens the skill, complexity of practical subject and makes mastery over the practical subject.
- It develops social relationship like – human and social qualities in students.
- For teachers; it helps to complete the curriculum within short period of time and provides time for revision.
- Knowledge is useful and is maintained so that it can be developed and used in day to day life.

Examples of dependent phenomena include the

1. Relation between parents and their offsprings.
2. The correlation between the price and availability of product in the market.
3. The theoretical aspect of anything explains the practical concept.
4. Even a crime is also related to wrong addictions.
5. The negative correlation between age and normal vision.
6. The positive correlation between the incidence of lung cancer and cigarette smoking.

Correlation of Mathematics with other disciplines

Mathematics is “*Science of all Sciences*” and “*Art of all Arts*”. After understanding the basic concept of mathematics, students need to correlate the importance and concept of mathematics with other subjects, so as to understand other subjects easily and establishing relationship. Mathematical knowledge plays a crucial role in understanding the contents of other subjects.

1. **MATHEMATICS WITH GENERAL SCIENCE:** Science without mathematics is totally meaningless, because chemical reactions, scientific theories and detail of elements are only generated/ counted with the help of mathematics. Mathematics is used in most of applications like in work, energy, electricity, motion, gravitation, magnetism etc.
2. **MATHEMATICS AND PHYSICS:** child should have rich knowledge of mathematics to understand physics. Generally final shape to the rules of physics is given by mathematics; it presents these rules in practically workable form. Mathematical calculations occur in every step of physical science. Charles’s law of expansion of gases is based upon mathematical calculations, numerical problems on liquid, pressure, frictional force, laws of motion, gravitation, momentum etc.
3. **MATHEMATICS AND CHEMISTRY:** Molecular weights of organic compounds are calculated with mathematics. To measure the constituents of mixtures and Chemical compounds. To calculate Empirical or molecular formula. In balancing the chemical equations. In electronic configuration of atom of the element. Charles’s law of expansion of gases is based upon mathematical calculations.
4. **MATHEMATICS AND BIOLOGY:** Mathematics has very high correlation with biology. The Normal Weight, Caloric value, Rate of Respiration, Nutritive Value of Food, Transpiration, is calculated by Maths. The Growth in Weight of infants’ upto Nine months. To count the

number of bones in human being and other different species. To measure blood pressure. To count the number of WBC & RBC in different blood groups. To count Sex chromosomes.

5. **MATHEMATICS AND SOCIAL SCIENCES:** After completion of the unit child can read, interpret, and draw the graphs. For example, to compare the Population- students can draw bar graphs, Population Density of various countries, Per Capita Income etc.
6. **MATHEMATICS AND GEOGRAPHY:** Geographical figures are explained in the terms of numbers only like seasonal conditions, temperature, humidity, degree, measurement of rain etc. the geographical conditions also defines the economy of a rich/poor country. Many countries like India have agricultural based economy due to its climate, rainfall, rivers and weather prediction.etc.

Certainly Mathematics is used for constituting the map, Formation of Nights & Days, Solar & Lunar Eclipse, Longitude Latitude, Maximum and Minimum Temperature, Barometric Pressure, Height above Sea Level, Surveying, Calculation of International, Local and Standard Time, Instruments etc. And here are also many other calculations. Punjab, Haryana and U.P are very fertile states in India, so contribute to grain stores, industries are established there but in these states there are no mines.

7. **MATHEMATICS AND HISTORY:** in history Mathematics helps in Calculation of Dates like duration of Britishers ruled in India? When Gandhi ji was born? Celebrate National Days and festivals, Cost in building of Taj-Mahal. Tenure of President in India. This gives us new information of the historical world. When the First and second world wars were fought? On account of economic considerations industrial revolution in Europe.
8. **MATHEMATICS AND ECONOMICS:** Statistical Methods are used to calculate and to know the Volume of Trade, Trend of Import and Exports, Economic Forecasts, Trade Cycles, It helps in calculating various indexes like crop production inflation, etc.

All economists, citizens and the businessmen can get the market trends & economic conditions. Through currencies market, the Current updates of currency and through stock and commodity market the current updates of the stock and commodity of different countries.

9. **MATHEMATICS AND FINE ARTS:** decides size, Ratio and Proportion while constructing the Similarity, Scale appreciation, Balance and Symmetry, Postulates, Drawing images on cloth and paper, Rhythm in Music etc.
10. **MATHEMATICS AND LANGUAGE:**
 - *Math and Reading:-* Students read about the discoveries or work of great mathematicians, and they can make poem on numbers.
 - *Math and Writing* (numbers are converted into writing):- A student makes the pie chart and interprets in his own words.

e.g. Counting of alphabet, vowel, Read About The Life History of Mathematicians. Student can draw make a bar graph of time spent in school and home the whole week and can interpret. (Interpretation of Non-Verbal Data)

11. **MATHEMATICS WITH AGRICULTURE:** Agriculture has close relationship with Maths. Agriculture has correlation with maths like area of crops, which season is suitable for which crop. How much quantity of water may be used in irrigation is also calculated in concern of agriculture by the use of mathematics. Investment, expenditure and saving in sowing specific crop, Division of land, Cost of labour, seed, fertilisers, expenditure in transportation of vegetables to the market, has the use of mathematics. As due to scientific inventions, there is lot of growth of agriculture & economy takes place.
12. **MATHEMATICS WITH COMMERCE/ACCOUNTS:** With the rich knowledge of commerce it is possible to study the economy of the country. Only by the knowledge of mathematics, Debit, Credit process & expenditure in accounts of industry, banks firm, etc are determined. The commerce teacher of should try to teachor make understand in such a way that students may relate and explain all specific terms mathematically.
13. **MATHEMATICS AND ICT:** The ICT is strongly correlated with mathematics. Computer programmes, applications, software and different languages without mathematics are impossible to operate and follow. Students are taught computers only because of knowledge of mathematics. Computer Provides important software for calculation e.g. SPSS software used in the long statistical calculations for research work. Many mathematical packages are used included Logo, dynamic geometry software, graph plotting etc., which are used in the teaching programmes.
14. **MATHEMATICS WITH ENGINEERING:** without mathematics Engineering is like sea without water. Mathematics has very strong correlation with each and every branch of engineering. Mathematics is used in every branch of engineering like Electronics, Electrical, Mechanical, Architect, Civil, Chemical, Computer etc. To get admission in any engineering stream, student must read Mathematics as a subject upto class 12.
15. **MATHEMATICS WITH PSYCHOLOGY:** Mathematics has correlation with Psychology for measuring I.Q, S.D, coefficient of correlation, Significance of difference, Measure of central tendency (Mean, Median, and Mode). "Likert Scale" used in psychology to make questionnaire. Mathematics is used in different modes of psychology like industry, army, social etc.
16. **MATHEMATICS WITH ASTRONOMY:** Counting of Stars and Planets, No. of moon/satellite of all planets. No. of stars in galaxy. Time taken in revolving at its own orbit. Formation of seasons, Life of star, galaxy etc. And Distance between two planets.
17. **MATHEMATICS WITH PHYSICAL EDUCATION:** Mathematics is used to measure structure of the body, blood pressure, the height, weight, rules of the games etc. Temperature of the normal human body, Size of playground, norm and standard of game like boot-ball, hockey, cricket, volleyball, tennis, wrestling, boxing etc.
18. **MATHEMATICS WITH INDUSTRY:** Mathematics is used in industrial work for example:- weaving, knitting, making furniture, leather work, making paints and fertilisers etc. Mathematical calculations are required to calculate all work and the cost.