Pakistan School
Kingdom of Bahrain

BIOLOGY CLASS. 9TH.

Ch. 2. Solving the Biological problems

Topic. Theory,law and principle.
And
Data organization and Data analysis.

Objectives

- At the end of this lesson students will be able to learn
- **How theories, law or principle are made**?
- **Describe the importance of data organization and data analysis.**

Theory

- When a hypothesis is given a repeated exposure to experimentation and is not falsified, it increases biologist's confidence in hypothesis. The hypothesis that stands the test of time is called a **theory**.
- A theory is supported by a great deal of evidences.

Law and Principle

- Many biologists take it as a challenge and exert greater efforts to disprove the theory. If a theory survives such doubtful approach and continues to be supported by experimental evidence it becomes a law or principle. e.g. Hardy-Weinberg law and Mendel's laws of inheritance.

Data Organization

- In order to formulate and then to test hypothesis, scientists collect and organize data. It is very important for a scientist to describe data collection methods.
- Data is organized in a different formats like graphics, tables, flow charts, maps and diagrams.

Data Analysis

- Data analysis is necessary to prove or disprove a hypothesis by experimentation. It is done through the application statistical methods e.g. ratio and proportion.
- When a relation between two numbers e.g. “a” and “b” is expressed in terms of quotient (a/b), it is called the ratio of one number to the other.
- Proportion means to join two equal ratios by the signs of equality (=). E.g. a:b = c:d is a proportion between the two ratios.

Mathematics as an integral part of scientific process

- Biological methods also involve the use of applied mathematics to solve biological problems. Major biological problems in which knowledge of mathematics is used include gene finding, protein structure, and protein-protein interaction etc.

Activity no.1

- Give short answers of the following;

I. Differentiate between theory and law.

II. How are the principles of ratio and proportions used in biological methods ?

III. Justify mathematics as an integral part of biological process.

Activity no.2

- Choose the correct option.

1. A scientific theory has which of the following properties?
   a) It agrees with available evidence
   b) It cannot be rejected
   c) It has been absolutely proven

Closure

- Today we have done the topic----------.
- Data organization and data analysis are important steps in biological ----------.
- Mathematics is an integral part of scientific ----------.

Home Work

- Confirm, modify or reject a hypothesis using data analysis.

- Use ratio and proportion in appropriate situations to solve problems.