SUBJECT: MATHEMATICS

TOPIC: NEED FOR STATISTICS

CLASS: JSS 1

OBJECTIVES

At the end of the teaching, students should be able to:

- List purposes of statistics;
- Recognize the usefulness of statistics for planning purposes

- Apply the occurrence of chance events /application of probabilities in everyday life
- Recognize the usefulness of statistics for prediction purposes.

STATISTICS

Statistics is a branch of mathematics that deals with the study of data.

It involves gathering (collecting), sorting, tabulating and presenting data usually through diagrams (charts, tables and graphs) and interpreting results.

PURPOSE FOR STATISTICS

- Statistics is known to provide useful information in our everyday life.
- For planning purposes
- To forecast or predict future events

- For record keeping
- For decision making
- To gather useful information that can be passed from one source to another.

MORE ON PURPOSE OF STATISTICS

Statistics keeps us informed about what is happening in the world around us. Some of the usefulness of statistics are discussed below:

Weather information is given in the newspapers, on the radio, on the television and on the internet.

Scientists use statistics to compare previous weather with the current weather, and to then predict future weather in a particular area.

Statistics play an important role in the development of new medicines. The new medicines have to be tested and results have to be recorded in order to see if these new medicines actually do help in the way they are supposed to, and if they have bad side-effects.

Statistics play an important part in financial businesses. Traders and people in business use statistics to decide how they should invest and make money.

News reporters make predictions of winners for elections based on statistics collected about how people are going to vote

Statistics is used by demographers and planners to project population growth

SATISTICAL DATA

The first step in statistics is to decide **what it is you want to find out about**.

The next thing you do is **plan how you are going to gather enough information** so you can find out what you want to know. The information used in statistics is called

- ✓ After planning, you begin to gather the information, which in statistics is called **collecting data**.
- ✓ Examples of data that you could collect about yourself, your friends or your family are:
- ✓ where different people live

- ✓ what different people eat for breakfast
- ✓ People’s favorite drink
- ✓ People’s ages, heights or weights
- ✓ The number of siblings (brothers and sisters) that people have
- ✓ Which size shoe people wear and so on.

Once you have collected the data, you can put it in a table or chart, so it is easier to read and understand. Having the data organised in a table or chart (or graphs) makes it easier to see what the data tells you, and to answer questions about the data. This is called **analysing data**.

Having the data organized in a table or chart (or graphs) makes it easier to see what the data tells you, and to answer questions about the data. This is called **analyzing data**.

If data is collected from a number of people, we say that we have surveyed the people. We "do a survey" to collect information from the people, such as where all the students in a school live.

DEFINITION

Data: Data is information in the form of facts, such as numbers, measurements or observations.

- **Collecting data:** Collecting data is gathering together and recording the information needed.

- **Analysing data:** Analysing data is making sense of the data to see what it tells you.

WORKED EXAMPLE

A researcher wanted to compare the numbers of female and male students at different schools. She did a survey to find out the number of male and female students there were in six different schools.

She recorded the results in this table.

A	School A	School B	School C	School D	School E	School F
Male student	18	8	9	3	9	5
Female student	11	2	10	4	15	6

- How many students were there at School A?
- How many students were there at School D?
- Which school had the most male students?

- Which school had the most female students?
- Arrange the schools in order of most students to fewest students.

EXAMPLE 2

- You surveyed the students in your class at school to find out whether they preferred fruit juice, lemonade, orange fizz or cola.
- The table shows the results of your survey.

Drink	Students
Fruit juice	12
Lemonade	10
Orange fizz	11
Cola	7

Question

- How many students took part in the survey?
- Which drink was preferred by the largest number of students in your class?

- Which drink was preferred by the smallest number of students in your class?
- Arrange the drinks in rank order. Rank order means from the one preferred by the largest number to the one preferred by the smallest.

SOURCES OF SATISTICAL INFORMATION

One source of statistical information would be the results of a survey. A second source of statistical.

- information from the Nigerian National Bureau of Statistics website at https://www.nigerianstat.gov.ng/
- Suppose we wanted information about the ages of the people in Nigeria. We could source this https://www.ncdc.gov.ng/.

- vote in the next elections, we could source the information from the Independent National Election
- Suppose we wanted to find out about our rights as a customer in a bank, we could source this https://www.cbn.gov.ng/Supervision/cpdconedu.asp.

More Examples

Chidi sourced information about the top eight causes of death in Nigeria from a survey published by the Centre for Disease Control and Prevention in 2013. The following table shows the results.

Reason for death	Percentage of total number of death in 2012
Malaria	20%
Chest infection	19%
HIV and AIDS	9%
Diarrhea	5%
Road accidents	5%
Malnutrition	4%
cancer	3%
TB	2%

- What percentage of deaths in 2012 were due to road accidents?
- In 2012, what was the difference in the percentage of deaths that were caused by chest infections and by cancer?

- Approximately 2,500,000 Nigerians died during 2012. How many of these Nigerians died from malaria?

PROBABILITY

Probability is the study of the laws of chance. It is about how probable or how likely it is that something will happen.

We often use the word "chance" when we are talking about probability, for example, "I have no chance of winning the prize!".

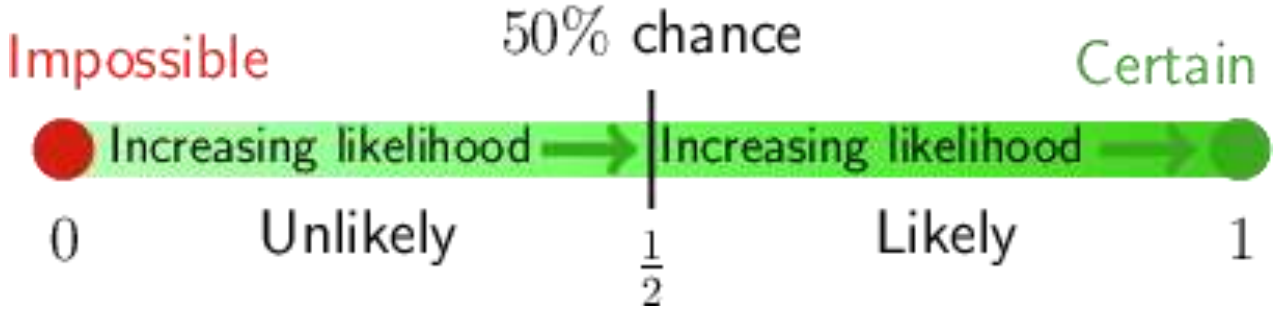
Examples of other statements that try to predict how likely an event will happen are:

i. "I am sure it will never happen."
ii. "It might rain today."
iii. "She is unlikely to visit tomorrow

PROBABILITY SCALE

- To describe the probability that something will happen, we can use a probability scale.
- The probability scale is a line that starts with impossible events at the left-hand end, and ends with certain events at the right-hand end.

The Probability Scale



All probabilities must fall somewhere on this line.

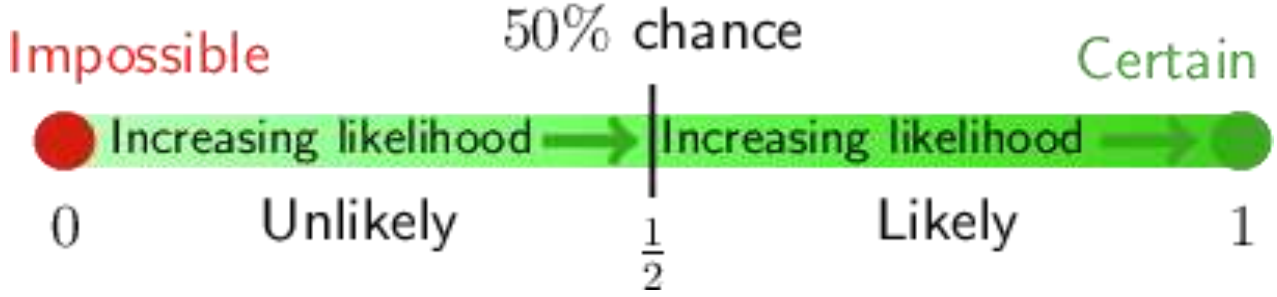
An event that is described as *impossible* is one that we know will never happen, such as having 8 days in one week. An event that is impossible is given a probability of 0

An event is described as *certain* if we know that it will definitely happen, such as having a Monday in a week. An event that is certain is given a probability of 1.

Between the two ends of the line are word descriptions and decimals, such as:

- Very unlikely (a probability of 0.2)
- Unlikely (a probability of 0.4)
- 50% chance, which means an equal chance that two things will happen (a probability of 0.5)
- Likely (a probability of 0.6) and very likely (a probability of 0.8).

The Probability Scale



- Use the probability scale to find a word description for each of the events listed for two months?
- What are the chances of someone winning the lottery if he buys a ticket every week

- How likely is it that the sun will rise tomorrow morning?
- What are the chances of a pregnant woman having a female child or a male child?

Statement 1: The chance of winning the lottery is extremely small, no matter how often one buys tickets. Choose a word description from the scale that describes this**.**

- It is *highly unlikely* that this person will win the lottery.

Statement 2: The sun will definitely rise tomorrow morning. Choose the best word from the scale that describes this.

- It is *certain* that the sun will rise tomorrow morning.

Statement 3: Choose a word description from the scale that describes this.

- There is a *50% chance* (or you could say an *equal chance*) of a pregnant woman having a female or a male child.

USING SATISTIC FOR ILLUSTRATION

Statistics can be used when planning a project or a task. It can help us with financial decisions or with buying the correct stock for a business.

Writing statistics in a table often helps when it comes to making predictions

Illustration:

- Adija sells Agege bread in large loaves and small loaves from her stall. Every day, she buys 24 large loaves and 24 small loaves from the bakery.
- Adija finds that she has several loaves of bread each day that she has not sold.

- She decides to record the numbers of large loaves and small loaves that she sells every day for a week. She wants to use this table to guide her as to how many of each size loaf she should buy in future.

Size	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Large	20	18	19	16	19	18	20
Small	24	21	22	24	20	20	24

Use the table to answer the following questions.

- How many large loaves did Adija sell altogether in that week?
- How many small loaves did Adija sell altogether in that week?

- During that week, did Adija sell more large loaves or small loaves?
- During that week, what was the maximum number of large loaves sold on one day?

- During that week, what was the maximum number of small loaves sold on one day? 6.Of which size loaf should Adija buy fewer?

Step 1: Add the number of large loaves sold.

- Number of large loaves sold = 20 + 18 + 19 + 16 + 19 + 18 + 20 = 130

Step 2: Add the number of small loaves sold.

- Number of small loaves sold = 24 + 21 + 22 + 24 + 20 + 20 + 24 = 155

Step 3: Compare the number of large loaves sold and the number of small loaves sold, and say which total is greater.

- Adija sold more small loaves than large loaves.

Step 4: Look along the row showing large loaves and give the maximum number sold on a day.

- Maximum number of large loaves sold on a day = 20

Step 5: Look along the row showing small loaves and give the maximum number sold on a day.

- Maximum number of small loaves sold on a day = 24

Step 6: Compare the maximum number of large and the maximum number of small loaves sold, which one Adija should buy fewer of.

- Adija should buy fewer large loaves.

EVALUATION

- The students in your class were surveyed to find out what size shoe they wear. The results were organized into the following table.

Shoe size	Total number
4	7
5	9
6	5
7	11
8	3
9	1

- Which shoe size is worn by the most students in your class?
- Which shoe size is worn by the fewest students in your class?

- How many students took part in the survey?
- Arrange the shoe sizes in rank order (from the shoe size worn by the most students to the shoe size worn by the fewest students).

- A stationery shop kept a record of the number of exercise books it sold in a week, as well as the total profit it made on the sale of these exercise books.

Exercise book size	Numbers sold	Profit made on the sale of each book (in #)
60 pages	100	5
90 pages	20	7
120 pages	40	9

Use the table to answer the following questions.

- Rank the size of the exercise books in order of the numbers sold.
- What is the total profit made on the sale of 60-page exercise books?

- What is the total profit made on the sale of 90-page exercise books?
- What is the total profit made on the sale of 120-page exercise books?

- On which size exercise book did the stationery shop make the biggest profit?
- If the stationery shop had to stop stocking one of the exercise books, which one should it stop stocking?

THANK YOU FOR WATCHING!!!