**The Scientific Method**:

Scientific Method Overview:

Purpose: To explore observations and answer questions, discovering cause-and-effect relationships.

Process: It applies logical problem-solving methods to scientific questions.

Steps of the Scientific Method:

**1. Ask a Question**:

Formulate a measurable and answerable question, starting with who, what, when, where, why, or how.

Example: "Does music impact the behavior of domestic animals?"

**2. Do Background Research**:

Conduct research to support your experiment. Utilize past studies to gather relevant information.

**3. Construct a Hypothesis**:

Make an educated guess using the format: "If [this happens], then [this will occur]."

The hypothesis should be testable and lead to measurable predictions.

**4. Test the Hypothesis**:

Design an experiment, changing only one independent variable at a time.

Repeat the experiment multiple times to ensure consistency in results.

**5. Analyze Data & Draw a Conclusion**:

Collect and evaluate data to determine if it supports the hypothesis.

Summarize findings and reflect on the effectiveness of the experimental procedure.

**6. Communicate Results**:

Share results in a report or presentation, similar to how scientists publish in journals or present at meetings.

**Characteristics of a Good Scientist:**

1. Curiosity: Desire to discover and inquire.

2. Determination: Persistence in scientific endeavors.

3. Open-mindedness: Willingness to consider new ideas.

4. Acceptance of Results: Viewing failure as progress.

5. Objectivity: Avoiding biases; relying on physical observations.

6. Humility: Being modest and recognizing one's limitations.

7. Skepticism: Questioning results until proven reliable.

8. Patience: Understanding that scientific investigations take time.

9. Reflection: Self-assessing actions and decisions.

10. Intellectual Honesty: Reporting truthfully without altering data.

11. Serendipity: Recognizing accidental discoveries.

12. Ethics: Following moral guidelines in scientific work.

**"A History of Science and Technology in the Philippines"**

**1. Development of Science and Technology as a Necessity**

Post-WWII: Governments, particularly in Third World countries, recognized the need for developing science and technology (S&T) for socioeconomic progress, political sovereignty, and economic self-reliance.

**2. Pre-colonial Science and Technology**

50,000 years ago: First Homo sapiens migrated to the Philippines, making simple tools and eventually developing stone tool techniques.

3,000 B.C.: Early Filipinos produced pottery, stone tools, and ornaments.

Second to third century B.C. to the 10th century A.D.: The Iron Age brought advances in extracting iron from ore and smelting.

First century A.D.: Filipinos engaged in weaving, pottery, iron smelting, agriculture, and boat building.

By the 10th century A.D.: Filipinos had mastered advanced boat-building skills, such as the caracoa used for inter-island trade and warfare, and traded with countries like China and Vietnam.

**1225**: Chao Ju-Kua, a Chinese official, documented trade with the Philippines, particularly in Ma-i (Mindoro) and San-hsu (Palawan and Calamian Islands).

**3. Science and Technology during the Spanish Regime**

**1565**: Spanish colonization began under Miguel López de Legazpi. The Spanish introduced schools, hospitals, and a system of education, but progress was mainly focused on religious training.

**1595-1640**: Several religious schools were founded, including:

Colegio de San Ildefonso (1595, by the Jesuits) in Cebu

Colegio de San Ignacio (1595, by the Jesuits) in Manila

Colegio de San Juan de Letran (1640, by the Dominicans) in Manila.

**1611**: Fray Miguel de Benavides founded the University of Santo Tomas (UST), which later became a leading institution of learning.

**1871**: UST opened its schools of medicine and pharmacy. Notable figures include Leon Ma. Guerrero, who became known as the "Father of Philippine Pharmacy."

**1820**: Establishment of the Nautical School in Manila.

**1863**: A royal decree attempted to reform the education system, but full implementation was interrupted by the arrival of the Americans in 1898.

**1865**: The Jesuits founded the Manila Observatory, which became a leading meteorological and climatological research center. Fr. Federico Faura issued the first public typhoon warning in 1879.

**1887**: Creation of the Laboratorio Municipal de Manila to conduct biochemical research and public health studies.

**1565-1813**: The Manila-Acapulco Galleon Trade dominated economic activities, diverting attention away from local industries and agriculture.

**1780**: Governor José Basco y Vargas founded the Real Sociedad Economica de los Amigos del Pais de Filipinas, promoting agricultural and industrial research.

**4. Science and Technology during the American Regime**

**1901**: The Philippine Commission established the Department of Public Instruction, introducing a secular public education system.

**1908**: The University of the Philippines (UP) was founded by Act No. 1870. Early colleges included Agriculture, Engineering, and Veterinary Medicine.

**1905**: Establishment of the Bureau of Government Laboratories, later renamed the Bureau of Science. Figures like Paul C. Freer led pioneering research in biology, chemistry, and medicine.

**1903-1912**: The Pensionado Act sent Filipino students abroad for education. Notable pensionados included Jose Rizal (medicine), Graciano Apacible (medicine), Antonio Luna (pharmacy), and Jose Alejandrino (engineering).

**1933**: Creation of the National Research Council of the Philippines (NRCP) to promote scientific research.

**5. Science and Technology during the Commonwealth Period**

**1935**: The Philippine Commonwealth was established, with the Constitution incorporating the promotion of scientific research.

**1936**: The Commonwealth government created agencies like the National Power Corporation and the National Development Company (NDC) to promote industrial and agricultural development.

**1941-1945**: Japanese occupation during WWII severely disrupted scientific and educational progress.

**6. Post-Independence Science and Technology (1946-Present)**

**1946**: After independence, the government continued expanding the education system, relying heavily on state universities like UP.

**1947**: The Bureau of Science was reorganized into the Institute of Science, continuing its role in research.

**1958**: The Science Act created the National Science Development Board (NSDB) to coordinate science policies. The Philippine Atomic Energy Commission (PAEC) and the National Institute of Science and Technology (NIST) were also established.

**1960s-1970s**: New science agencies were created, including:

Philippine Inventors Commission (1964)

Philippine Council for Agricultural and Resources Research (PCARR) (1972).

**1982**: The NSDB was reorganized into the National Science and Technology Authority (NSTA), leading to better coordination ofresearch and development.

**1983**: President Ferdinand Marcos signed Executive Order No. 889, establishing six national institutes for excellence in basic sciences. The Scientific Career System was also created to attract scientists to government service.