# CHAPTER I
# INTRODUCTION

## 1.1. Background

Education in the 21st century is marked by the rapid development of science and technology (science and technology). Education can encourage students to have skills that are responsive to change. As per the regulation issued by government No. 57 of 2021, education in Indonesia requires national standards that require adjustments to the dynamics and development of science, technology, and people's lives for the benefit of improving the quality of education.

Many demands must be met by society, including the people of Indonesia in order to survive and develop in this information era, one of which is the demand in the field of education is the mastery of scientific literacy by students (Sumarni, 2021). Science has a vital role in facing the global challenges of the 21st century, which have complex problems such as global warming, economic crisis, energy crisis, and environmental pollution. Therefore, to deal with this problem, students are required to have a critical spirit in solving problems, be independent, and have the ability to think rationally and logically. In response to this problem, scientific literacy is essential for students to master (Situmorang, 2016).

Scientific literacy is not only useful for understanding science concepts but can also lead students to solve problems in everyday life and be able to make decisions based on scientific considerations (Munawaroh et al, 2022). The provision of quality science education will have an impact on a country's development skills (Pratiwi, 2019). Furthermore, scientific literacy can be promoted by problem solving skill in personal and social (Lederman et al., 2013).

Developed countries have made efforts for students to have scientific literacy skills as early as possible. Countries with high literacy skills will also have a rapid level of development (Situmorang, 2016). Therefore, measuring scientific literacy is important to determine the level of students' scientific literacy ability and make particular efforts to improve it so that the quality of education in Indonesia can improve and compete with other countries (Pratiwi, 2019).

Measurements of students' scientific literacy achievement can be known based on the Programme for International Student Assessment (PISA) standards. PISA is a program initiated by countries that are members of the Organization for Economic Cooperation and Development (OECD). PISA was first held in 2000 with the aim of helping countries in the world to prepare human resources who have the competencies needed by the international market10. The results of the 2018 PISA Measurement for the field of science, Indonesia obtained a score of 396 with a lower score than PISA 2015 which received a score of 402. Over the past 20 years, Indonesia has almost always been at the bottom, this shows that the quality of science learning still needs to be improved in developed countries (Merta, 2020).

According to Rusilowati et al. (2016), scientific literacy can be seen by measuring and analyzing the level of students' ability to master each assessment in the aspect of science literacy. Improving scientific literacy can be pursued by reading activities and practicing questions that can increase students' critical power such as questions presented by PISA. PISA science literacy questions consist of a combination of complex multiple-choice questions and structured descriptions. These questions not only test the ability to remember or understand a concept but also test more complex reasoning skills. The results of low scientific literacy ability indicate the need for more application of science by students in everyday life (Ayub, 2022). Referring to the PISA 2018 framework, Indonesian students are still in the level 1a at competency category, meaning students are only able to use general materials and procedural knowledge to recognize or distinguish explanations of simple scientific phenomena.

Biology is one of the branches of Natural science that provides a variety of learning experiences to understand natural concepts and phenomena related to the life of living beings. In addition, biological phenomena are also solved through a student's ability to process skills so that students can find facts and build students concepts, theories, and scientific attitudes. One of the biology topics that can train students' scientific literacy skills is ecosystem. Ecosystem is one of the biology topics closely related to everyday life and an excellent material for students to raise curiosity about what they find in nature. Through ecosystem material, students will be directly related to their environment and conclude the problems found by

students in everyday life (Situmorang, 2016). Students are said to have scientific literacy skills when they are able to apply concepts or facts obtained from school to natural phenomena that occur in everyday life (Anjarsari, 2014).

This research was conducted in Senior High School 17 Medan class X. Based on interviews with Mr. Yusuf Ginting S. Pd., a teacher of SMAN 17 Medan, stated that the KKM for biology subjects was 74. The learning activities in the school are based on the 2013 curriculum using a scientific approach with the inquiry/discovery method. In the learning process, the teacher does not give something to stimulate students to think. Other than that, the biology teacher has never given a question related to scientific literacy. Based on the background of the problem, this conducted study entitled; **"An Analysis of Scientific Literacy in Ecosystem Topic on 10th Grade Students at SMAN 17 Medan."**

## 1.2. Problem Identification

Based on background, the problem identification of this study, namely:

1. Inadequate or lack of human resources ability qualification in the 21st century.
2. Low scientific literacy ranking of Indonesian children based on PISA study.
3. Lack of students understanding of scientific literacy in SMAN 17 Medan.

## 1.3. Scope of Study

Based on the problem identification, the scope of study will be focused on:

1. An analysis of scientific literacy on $10^{th}$ grade students at SMA Negeri 17 Medan academic year 2021/2022.
2. The learning topic studied is limited to ecosystem.

## 1.4. Research Problem

Based on the background, the research problem is formulated as: "How is the scientific literacy mastery related to SMAN 17 Medan?"

## 1.5. Scope of Problem

Based on the problem identification, then this research problem will be limited to the student scientific literacy in 10th-grade students at SMAN 17 Medan.

## 1.6. Study Objective

Based on the research question, then the objective of this research is to find out the scientific literacy mastery related to ecocsytem topic in 10th-grade students at SMAN 17 Medan.

## 1.7. Research Purposes

This research can provide the following benefits:

1. For students, this research can be used as information about the scientific literacy parameter of each student in SMAN 17 Medan.
2. For teachers, this research can be used as additional knowledge and information about the importance of instilling scientific literacy learning in students.

## 1.8. Operational Definition

To explain the understanding in the research conducted, the following explanation is presented:

1. Scienctific literacy is a knowledge e and understanding of the concepts and processes of science that allows a person to make a decision with the knowledge he has.
2. Science knowledge is the mastery of science materials and knowledge of how to learn science
3. Science context is recognizing life situations involving science and technology.
4. Science competence is the ability to identify scientific issues, explain about scientific phenomena and the use of scientific evidence.
5. Science attitude are demonstrating an interest in science, supporting scientific inquiry, and motivation to be responsible.
6. Ecosystem is an interaction between living things and nonliving objects in their environment.