

CHAPTER I

INTRODUCTION

1.1 Background

Children develop ideas and beliefs about the natural world through their everyday life experiences. These include informal instruction like, sensual experiences, language experiences, cultural background, peer groups, as well as formal instruction. Osborne, *et al* (1983) stated that studies have revealed that during science class students bring about certain ideas and explanations to natural phenomena that are inconsistent with the ideas accepted by the scientific community (Tüysüz, 2009).

Brown in Naz and Nasreen (2003) stated that even the very little child of 3-4 years also has thoughts and his creative thinking helps him to understand the outside world; the old concept of child being a blank slate is over now. One of the key element of science teaching is making explanations and classifying concepts of science. Concepts are the construction blocks for the structure of knowledge. Student's concepts display their interpretations of objects and events in the material world. Students have concepts in their minds nearly about everything which they see hear and observe during all ages. Experts have continuously made efforts to identify and take in hand ideas of students and found these ideas contradictory with the ideas of scientists is called misconception.

The low achievement of student especially in biology subject matter because students are less able to understand the concept being taught. Meanwhile the understanding of basic concepts in biology is very important for student so that they understand other concepts. Student who does not understand the related concept may undergo misconception (Fuadah, *et al.* 2015).

Trowbridge and Mintzes in Cardak (2009) stated that misconceptions of students in the field of science education have become a focal point for researchers in recent years. Whether they are called preconceptions,

misconceptions, naïve theories or alternative conceptions, these notions clearly pose formidable barriers to learning. These misconceptions can be seen among primary and secondary education students as well as university students.

Tekkaya (2002) stated that there is a need to identify the sources of these misconceptions. Misconception may originate from certain experiences that are commonly shared by many students. Misconception also arises when students combined newly learned concepts with previously held, more primitive concept. Such situation creates conceptual conflict in the students' mind. Sanders in Tekkaya (2002) stated that the result of study also shown that teachers could have played a role in the formation of misconceptions by their students. Misconception passed from teachers through wrong or inaccurate teaching, especially for assessment strategies used by biology teachers could be a factor influencing the development of misconceptions in their students. She says "teachers should not only assess to get mark for the pupils. They need to listen to what their pupil tell them, as it can provide information about pupils' understanding. Pupils require constant feedback about their correct and incorrect ideas".

Storey in Tekkaya (2002) stated that another factor that contributes occurrence of misconceptions by students is textbooks, which include many errors and incorrect information. Many concepts in biology are interrelated and they are keys to understanding other concepts. Therefore, not only lack of integration among topic but also inappropriate presentation of topic in textbooks influence students' further understanding. In general, the cause of misconceptions summarized into five groups: student, teachers, textbooks, context and methods of teaching (Suparno, 2005).

In biology learning a lot of concepts that must be mastered by the students and there is a relationship between one concept with another concept. This causes difficulties for students to understand the concept. In biology many Latin terms to be memorized by students without knowing their meaning, so that students are not able to develop their understanding. For Ecosystem topic, the most misconception found in sub topic of food chains and food webs, and they may assume that the two apply in different ecosystems. In truth, food chains are just simplifications of

a food web, showing how energy passes along one path of the web. Students may also include only predators and prey in their webs, neglecting to include producers, which are at the bottom of the food web. They may also assume that all carnivores are bigger and stronger than herbivores, even though some carnivores are small and relatively weak -- like spiders or birds -- and some herbivores are larger and relatively strong -- like bulls and gorillas (Perles, 2016).

The result of researcher with some students and biology teachers at grade X SMA in district Medan Denai indicates that will be occur the probability of misconception in biology learning. The teachers (Mrs. Berliana Hutabarat from SMA Negeri 14 Medan and Mr. Mula Siahaan from SMA Negeri 21 Medan) states that the topic of ecosystem is difficult understood because there are terms, cycles and process in ecosystem. From year to year, student is difficult to make differences between food chain and food web, the trophic level of energy flow, and teachers found difficulties from student in biogeochemical cycle. The students said that the topic of ecosystem is one of difficult topics at X grade because the large scope of ecosystem make them confuse, namely terms, cycles and the complexity of energy flows in the earth.

Misconception is the danger that may interfere with the learning process of students. If misconceptions have entered into the cognitive structure of students, then such misconceptions will continue so that it will affect the students in accepting a new concept. If misconceptions cannot be eliminated, misconceptions will impact negatively on subsequent learning activities. All the factor that lead misconception seem to be not only results in rote learning and the compartmentalization of ideas, but also defeat the aim of the biology syllabus to promote meaningful learning (Tekkaya, 2002).

So what can we do to prevent misconceptions and challenge misconceptions held by the student? Teacher need tools to identify misconception of student, so that teacher is expected to make the decision to overcome that msiconception (Fuadah, *et al.* 2015). The first step is to attempt to discover what misconceptions the student by asking open-ended questions and truly listen to the students' ideas, and then to test out their ideas and prove the correct concepts to

themselves. Another good method to counter misconceptions is to use concept mapping during the lessons. A good way to utilize concept mapping is to do a before lesson concept map and an after lesson map, so that the learners can see what they have accomplished (Marshall, 2003).

Based on the background, it has been done a study to analyze misconception with title:

"Analysis Of Student's Misconception in Biology Subject Matter of Ecosystem Grade X at SMA Negeri in District Medan Denai".

1.2 Problem Statement

Based on the above background, then that becomes problems identification in this study is:

1. There are misconceptions of students in understanding concept of ecosystem grade X at SMA Negeri in District Medan Denai.
2. There are some misconception namely over concept or not clearly concepts when biology's teachers are teaching in the class.
3. Misconceptions give the danger effect because can make the misunderstanding between students and teachers of the wrong and true concepts.

1.3 Scope of the Study

From the above problem identification, then becomes problem limitations are:

1. Students that studying ecosystems grade X at SMA Negeri in District Medan Denai.
2. Identifying which concept most often have misconceptions on students of ecosystem grade X at SMA Negeri in District Medan Denai.

1.4 Research Question

Based on problem restricted in above, problems formulation of this research are:

1. How big is the percentage of students' misconceptions about the topic of ecosystem grade X at SMA Negeri in district Medan Denai?
2. What concepts in ecosystem that student have misconception?

1.5 Research Aim

Based on the problem formulation which has been described, the objectives of this study are to:

1. Know the number of percentage of misconceptions that occur on students about topic of ecosystem grade X at SMA Negeri in District Medan Denai.
2. Know what concepts of ecosystem that students have misconception

1.6 Significance of the Study

Results of this research are expected to provide inputs and contributions for several parties, including:

1. Theoretically the results of this study are expected to add insight and knowledge for decision-makers in the field of education on the issue of misconceptions in biology learning and the factor that cause it.
2. In the practical results of this study are expected to be input for the information for education department and principals to provide a solution to the misconception in biology learning. As an input for the teacher to know the problems that exist in biology learning.
3. For students, it can give a correct understanding of the concept, so as to increase student learning outcomes.
4. For researchers, theoretically to improve the scientific insight especially about things that allow misconceptions, so it can be used as references in the next time when enter to education profession.