

Form B-5

Date (日付)

19 / March / 2012

Activity Report -Science Dialogue Program-
(サイエンス・ダイアログ事業 実施報告書)

- Fellow's name (講師氏名): Michael P. Delmo (ID No. P11358)

- Participating school (学校名): Takada Senior High School (Mie Prefecture)

- Date (実施日時): 09 March 2012 (Date/Month/Year: 日/月/年)

- Lecture title (講演題目): (in English) Large Magnetoresistance in Silicon

(in Japanese) シリコンにおける大きな磁気抵抗効果

- Lecture summary (講演概要): Please summary your lecture 200-500 words.

The lecture is divided into three sections; self-introduction, my research in Osaka University, and the reason how I became a researcher. In the self-introduction part, I talked about my academic background, my family, and little about Manila and the Philippines. In the second part of the lecture I talked mainly about the effect of magnetic field on the electrical conductivity of silicon in very large applied voltage – my research in Osaka University. Here, I explained first the basic electrical properties of different materials, such as metals, insulators, and semiconductors in terms of the behavior of electrons inside these materials. I focused my talk on semiconductors and insulators – materials that are poor conductors of electricity. I explained a method on how to measure the electrical conductivity of insulators and semiconductors. Also, I explained the electrical properties of semiconductors and insulators in terms of the basic Ohm's law (a law that states that the electricity moving into a conductor is directly proportional to the voltage applied into it) and a new concept called Mott-Gurney law (a law that says that the electricity moving inside an insulator at very large applied voltage is directly proportional to the square of that voltage applied). This new concept is not actually learned in high school because the high level of Physics necessary to understand this phenomenon. But I tried to explain this concept by showing illustrations so that pupils understand its basic concept. This is important because it is the core of my research in Osaka University. Then, I explained the effect of magnetic field on the electrical properties of semiconductors (silicon) and insulators. I showed them that the response of the electrical conduction in Ohm's law and Mott-Gurney law are very different and this kind of behavior has just been observed recently in my research. Finally, I talked about how I became a scientist and researcher. I talked about the kind of education I obtained when I was in elementary school and high school and how it shaped me to pursue science as a career and as a way of life. I gave the pupils an advice that in science hard work, asking a lot of questions, patience, honesty, making a lot of friends, and keeping a health lifestyle are important factors to become successful in this very competitive world.

- Language used (使用言語): English (80%) and Japanese (20%)

- Lecture format (講演形式):

◆Lecture time (講演時間) 90 min (分), Q&A time (質疑応答時間) 10 min (分)

◆Lecture style (ex.: used projector, conducted experiments)

(講演方法 (例: プロジェクター使用による講演、実験・実習の有無など))

Projector only

◆Interpretation (ex.: assistance by accompanied person, provided Japanese explanation by yourself) (通訳 (例: 同行者によるサポート、講師本人による日本語説明))

◆Name and title of accompanied person (同行者 職・氏名)

No accompanied person

◆Other note worthy information (その他特筆すべき事項):

- Impressions and opinions from accompanied person (同行者の方から、本事業に対する意見・感想等がありましたら、お願いいたします。):