

(For JSPS Fellow)

Form B-2
(FY2018)

Date (日付)
17/12/2018 (Date/Month/Year: 日/月/年)

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): _____ (ID No. 17802)
Pierre Marchand

- Participating school (学校名): 兵庫県立川西緑台高等学校

- Date (実施日時): _____ (Date/Month/Year: 日/月/年)
17/12/2018

- Lecture title (講演題目): *The death of stars*

- Name and title of your accompanying person (講義補助者 職・氏名)
None

- Lecture format (講演形式):

◆Lecture time (講演時間) 40 min (分), Q&A time (質疑応答時間) 25 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))

Powerpoint presentation

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

The stars form in the interstellar medium. When gravity pulls interstellar gas together ("gravitational collapse"), density and temperature increase until nuclear fusion reactions can occur. Stars can be small, 0.1 solar mass with a low temperature (3000 K), or massive, more than 100 solar mass with high temperature (30 000 K). Star lives until the hydrogen, helium and Carbon used in fusion reactions are depleted.

Low-mass stars (< 8 solar mass) live the longer, 10 to 100 billion years. At the end of their life, they become red giants, before ejecting their envelope and becoming a white dwarf. These objects are the size of the Earth and the mass of the sun. Their gravity is supported by electron pressure. They slowly cool down over time.

Higher mass stars become neutron stars. This time, neutrons hold the matter against gravity. They are twice the mass of the sun but only 10 km diameter. They are extremely dense, fast rotating (sometimes 1000 turn per second), with a very high magnetic field. The magnetic field can create a directional electromagnetic emission, which is called a "pulsar" if the beam cross the path of the Earth once per rotation.

For very high mass stars, nothing can hold gravity and all the matter falls onto one point of

space, called "singularity". Gravity is so intense that, in a region around this singularity, nothing can escape, not even light. This is a black hole. They have interesting properties like bending the light rays or slowing the time.

Neutron stars and black holes are often born after a supernova, an exploding massive star. The explosion is as luminous as a whole galaxy.

The matter ejected goes into the interstellar medium and influence both dynamically and chemically the formation of the next generation of stars.

- Overall advice or comments to future participants in the program (今後の講師へのアドバイス):

Keep things simple and use a lot of images and drawing.

- Other noteworthy information (その他特筆すべき事項):

- Impressions and comments from the accompanying person (講義補助者の方から、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。)