



## **Extension Cards 91 – 100**

The open-ended challenges are designed to expose students to questions which do not have one answer, and which cannot be solved without making some intelligent assumptions. They allow for multiple approaches and solutions. It is best if the open-ended challenges are tackled by student groups, because this encourages mathematical communication, social cooperation, and shared responsibility.

The 10 open-ended extension cards for each year level are divided into the following main areas.

E 91 Area	E 96 Number
E 92 Capacity	E 97 Weight
E 93 Using technology	E 98 Visual skills
E 94 Length	E 99 Data
E 95 Time	E 100 Playing games

This type of questioning is not an original idea, but is based upon the well-known approach of a brilliant scientist. Enrico Fermi (1901 – 1954) was an Italian who fled to America during WWII, escaping the Nazi regime. He made significant contributions to the development of nuclear physics and quantum theory, for which he was awarded the Noble Prize for Physics. Fermi was one of the leading scientists in the Manhattan Project, and oversaw the first controlled nuclear reaction in 1942, which took place in Chicago. He is renowned as a philosophical scientist, who asked broad ranging questions. Fermi enjoyed stating a problem where not enough information seemed to be available, and then working out a solution process. “Fermi Questions” became a label for challenging, open-ended questions.

In Extension cards 91 – 100, student groups will have to find resources and data from a variety of sources, apply their mathematical skills in outdoor settings, conduct surveys, and generally be independent and responsible workers within the wider school environment. Students will also need to make some intelligent assumptions about their findings in order to produce a rational solution. With the emphasis on estimation, the application of data, and need for mathematical reasoning, these open-ended questions are a great challenge, and the best results are produced when the process, with all the working clearly detailed, and the final solution, are both valued highly.

Good luck!