

國立彰化師範大學 101 學年度碩士班招生考試試題

系所：科學教育研究所

組別：乙、丙、丁組

科目：科學教育

☆☆請在答案卷上作答☆☆

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一、名詞解釋（共 6 小題，每小題 5%，共 30%）

1. Technology pedagogical content knowledge
2. Scientific reasoning
3. TIMSS
4. Constructivism
5. Learner-centered design
6. 實作評量

二、當前科學教育學者試著找尋提升學生學習的教學法，有一些學者倡導科學讀寫的教學法，請說明在科學（或是數學）課室中教師可採用哪一些融入閱讀與寫作的方式來提升學生的學習。另外亦請說明融入閱讀與寫作的教學可達成的學習效果有哪一些？（20%）

三、請舉出一個具體的探究教學實例，接著說明為何此教學實例能符合探究教學的特徵。接著再說明這些教學的活動如何培養學生的探究能力。（20%）

四、以下節錄有關 POE 教學（Predict-Observe-Explain）的敘述：

During POE instruction students are first asked to predict the outcome of some sort of exploration or manipulation and then asked to justify their prediction. This is usually done in an area in which they are likely to generate a false prediction based on a misconception. Students then make the relevant observation, usually of a discrepant event that contradicts their prediction. Finally, they are asked to explain the discrepancy in an effort to change their misconception. Viewed in terms of the present theory, we can interpret a student's justification, their misconception, as an alternative hypothesis that deductively generated their previously stated prediction. Thus, the subsequent observation, which does not match their prediction, contradicts their hypothesis and leads to the need to generate an alternative hypothesis (an alternative conception).

（節錄並改自 Lawson, A. E. (2010), Basic inferences of scientific reasoning, argumentation, and discovery. *Science Education*, 94, 336-364.）

1. 請翻譯以上段落大意（不需要逐字翻譯）。（10%）
2. 你認為使用 POE 教學有何優、缺點（請各自表述）？（10%）

五、國民中小學九年一貫課程綱要中包含七項重大議題，請簡述其中『環境教育』與『資訊教育』的教育目標。（10%）