The Development of Scientific Concept of “Momentum and Regarding Collision” For Grade 10th Students Through Leaning Activities Based on The Predict-Observe-Explain (POE) Method.

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Abstract
The purpose of this research was to develop scientific concepts of momentum and collision for grade 10th students though Predict-Observe-Explain (POE) leaning activities. There were 34 grade 10th students of Roi-Et Wittayalai School during the second semester of academic year 2014 (November 2014 – March 2015) participated this study. There were two research tools were used in this study. Firstly, experimental tool is a POE lesson plans. Secondly, data collection tool was a two-tier multiple choice test which was used to investigate the students’ understanding on the scientific concept of momentum and collision. The pre-test results performed that most of the students contained partial conceptual understanding while some students represented alternative concepts. In contrast, the post-test shown that the number of students’ alternative conception was decreased and most of them performed good science conceptual understanding.

Introduction
This study focuses on an effectiveness active learning strategy called predict–observe–explain (POE). The POE approach consists of three main steps: 1) predicting the results of a demonstration; 2) observing the demonstration; and 3) explaining and discussing the results for the reasons and comparing them with the initial prediction. It elicits students’ existing ideas and also promotes discussion of their ideas. The POE strategy is based on the constructivist learning theory, which proposes that students build their own body of knowledge through their experiences. When students confront a new experience they accommodate it with their existing ideas, perhaps changing what they already know, or perhaps discarding the new information as irrelevant. The constructed knowledge is strongly influenced by the current ideas and supported by social interactions. In order to walk this line, classroom instructors have to explore what students already know and use this as a primary resource to promote classroom interactions. Additionally, previous researchers have reported positive outcomes for use of POE tasks in several physics topics (S Rakkapao, 2013).

Momentum and collision are one of most difficult topic in physics, and this content is relevant to their daily lives. The students had misconception on momentum, mostly of them contain the concept that not aligned the scientific concepts (S Roobliem, 2012). In physics focus on student explain phenomena in nature, if student don’t understand and don’t liked knowledge between prior knowledge and current knowledge including they can’t apply knowledge, it make student had low achievement and alternative conception.

So, the researcher interested the leaning activities based on the predict-observe-explain (POE) method to the development the concept on Momentum and Regarding Collision to make the students had scientific concept in correct and complete.

Materials and Methods
The participants of this study were 34 grade 10th students at Roi-Et Wittayalai School. Roi-Et province, Thailand.

This research forms Pre-Experimental Research (One-Group Pre-test Post-test Design)

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The average of the scientific conceptions on momentum and collisions.

<table>
<thead>
<tr>
<th>Conceptual test</th>
<th>N</th>
<th>X</th>
<th>S.D.</th>
<th>t-test</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>6.85</td>
<td>2.64</td>
<td>28.87</td>
<td>0.000</td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>21.15</td>
<td>2.84</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The learning using POE on momentum and collisions. The average of the scientific understanding before and after learning higher than before the study. The mean score of understanding conceptions there are difference significantly at p < 0.05.

Students’ understanding about momentum

The scientific conceptions test on momentum had two questions. The results were compared understanding conceptions between pre-test and post-test shown in Figure 1 (a-b).

Before the study using POE students have understanding concepts three level (NU, AC and PS) in pre-test. After learning POE students developed understanding concepts level from AC though PU and AC. The activities POE allows students to change the completely scientific conceptions. This is consistent with Piernpim Namwad (2011). Found that the learning POE allows students to change the nonscientific understanding to scientific understanding.

Conclusions
The purpose of this research were to develop the scientific concepts on “momentum and regarding collision” for grade 10th students through learning activities based on the predict-observe-explain (POE) method. The result showed that quantitative analysis was done in order to find whether there is a significant difference between pre-test and post-test (p<0.05) and the activities POE allows the students to change alternative concepts through complete understanding

References