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Development of Circular Motion Experiment Set with the Reduction of Friction for High School Physics Students

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The teaching of uniform circular motion in high school Physics consists of a combination between theoretical background and experimental method. In particular, the experimental study can emphasize the concept of centrifugal force for the object moving in a circular path. The experiment set has been developed to study the relationship between the centrifugal force and the moving period. However, the effect of friction in the conventional experiment set has been neglected leading to the deviation of the expected results. In this study, we have developed the circular motion experimental set with the reduction of friction between a hollow tube and a string. The plastic tube in the conventional experiment set was replaced by an aluminum rod to reduce friction at the surface connected to the string. By collecting the experimental data, the mass moving in the circular path was evaluated and showed high accuracy with a deviation of 0.58%. In contrast, a high discrepancy (up to 35%) was observed in the conventional setup due to the surface roughness of the plastic tube. Therefore, the results obtained from our studies can be used to enhance student learning on the uniform circular motion subject in high school.

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