

ABSTRACT

The aim of this study was to investigate the concepts held by selected high school fourth and fifth form physics students, in Jamaica and Trinidad and Tobago, concerning force and motion and the particle theory of matter. Possible relationships among selected independent variables and measures of performance in physics were also to be explored.

The results of the study included the following:

- i) The responses to most questions on the force and motion instrument were similar for the fourth and fifth form samples. Common conceptions included motion-implies-a-force and equilibrium as a result of unbalanced forces. Newton's third law was often inappropriately applied.
- ii) The responses to several questions on the particle theory instrument were similar for both samples. Common conceptions included the motion of gas particles being maintained by forces and matter being continuous. Properties such as expansion and changes of state were attributed to the particles of the model. The particle model of gas pressure was poorly understood.
- iii) Trinidadian students scored significantly higher than Jamaican students on all cognitive and environmental independent variables, on the particle theory instrument and in the C.X.C. physics examination.

Fifth form male students scored significantly higher than female students on MARK and FORCE and on the measure of spatial ability. Fifth form girls in single-sex schools scored significantly higher than girls in coeducational schools on MARK and FORCE. In coeducational schools boys scored significantly higher than girls on three criterion measures. Fourth form female students scored significantly higher than males on a measure of reading comprehension level and the particle theory instrument.

- iv) The reading comprehension level emerged as the strongest predictor of performance in physics. The socio-economic status of the student, the student's level of cognitive functioning, the qualifications and experience of the physics teacher and the level of provision for physics in the school emerged as secondary predictors of criterion performance.

Recommendations included the need to highlight learners' ideas in the training of physics teachers and continue research into Caribbean students' ideas in physics.