Abstract

Hands-on projects have been widely used as alternative approaches for teaching and learning of science with direct practical experience on doing to promote students’ development of 21st-century skills. Here, we present an implementation of hands-on projects into teaching and learning of magnetic field topic that corresponds with indicators and core content of the curriculum of Thailand Basic Education. Notably, we demonstrated the hands-on projects of magnetization and magnetic force using low-cost materials but strived toward an understanding of science through the active and prolonged engagement of students with experiments. For the magnetization, when a current flow through a solenoid coil, magnetic material inside the coil turns to be magnet: temporary (cutter/scissors/metal-rod) or permanent (screwdriver). For the magnetic force demonstration, when a current-carrying wire is in a magnetic field produced from horseshoe shape magnet such that the direction of current flow is perpendicular to the magnetic field lines, the magnetic force moves the wire with its direction determined from Fleming's right-hand rule. We envisage that this work would be useful for helping teachers to explain and visualize the magnetic field phenomena and might facilitate future work that encourages the students to pursue inquiry-based approaches.

Keywords: Hands-on project, learning by doing, magnetic field, magnetization, magnetic force.