- A Suggested Unit in Thermo-chemistry in The Light of Next Generation Science Standards (NGSS) for Developing The Understanding of Core Ideas and The Application of Scientific and Engineering Practices among The First-Grade Secondary Stage Students

ABSTRACT

The present study aimed at developing a suggested unit in thermo-chemistry in the light of next generation science standards (NGSS) for developing the understanding of core ideas and the application of scientific and engineering practices among the first-grade secondary stage students. To achieve this objective, a list of NGSS which should be included in the chemistry curriculum at the secondary stage has been developed. Therefore, a suggested unit and teacher's handbook in thermo-chemistry for first-grade students has been designed. Three tools have been prepared: A test of core ideas understanding, a test of scientific and engineering practices tasks, and an observation checklist of scientific and engineering practices. These tools were administered to a sample of 30 female students at the first-grade. The suggested unit has been experimented and, thus, the three tools were used in the post-testing. The study findings revealed that:

1) There was a statistically significance difference at 0.01 between the scores means of the pre-application and those of the post-application on the core ideas test, in favour of the latter.

2) There was a statistically significance difference at 0.01 between the scores means of the pre-application and those of the post-application on the test of scientific and engineering practices tasks in favour of the latter.

3) There was a statistically significance difference at 0.01 between the scores means of the pre-application and those of the post-application on the observation checklist of scientific and engineering practices, in favour of the latter.

4) In the light of these findings, the suggested unit in thermo-chemistry in the light of next generation science standards (NGSS) was effective in developing the understanding of core ideas and the application of scientific and engineering practices among the first-grade secondary stage students.

- **Keywords**: Unit in thermo-chemistry – next generation science standards – chemistry curriculum – secondary stage – core ideas understanding – scientific and engineering practices