Identify the relationship of electromagnets to electric cars

Identify how electromagnets relate to electric motors.

Build an electromagnetic buzzer

Identify the basic properties of electromagnet(ism)

Synergistic activities helping to enhance understanding

Build an electromagnetic coil gun

Build an electromagnet

Tool operation

Follow experiment instructions

Basic concept and vocabulary knowledge (magnetism, bolt etc.)

Application

Notes:

1) Basic concept and vocabulary knowledge would be a prerequisite for students to understand the concepts covered in the learning module and the relationships among them (i.e., principles). Therefore, on the basis of the pretest, the learning module may include some sort of concept learning. Then, the remaining decision is whether this will be an inquiry approach or an expository approach located before beginning to learn the principles or embedded into learning principles themselves.

2) The possible range of concepts would include:

Magnet, electricity, electrical circuit, current, electromagnet(ism), strength…Closely related to the concepts, knowledge of the following vocabulary items would be necessary: wire, nail, to wind, washer(s), nut, bolt, sandpaper, wire cutter, power supply, enamel, electrical tape, linear trend, loop.

3) Similar to concept learning a decision has to be made regarding whether an inquiry or expository approach will be implemented in learning of the principle(s).

4) Presentation of concepts and vocabulary items may be enriched through visual materials such as pictures.

5) We need to insert application or do activities in which learners will be asked to engage in practice of the principle(s). What kind of practice need to be included in the online module and to what extent it should be separate from the hands-on experiences need to be determined.

6) Even though hands-on experiments themselves constitute application of the principle(s), it seems we are in need of connect activities that will bridge the online learning module to the hands-on experiments.

Overall electromagnet lesson flow (content/style to be discussed and determined):

1. Gaining attention of the learners.
2. Establishing and conveying the instructional purpose to the learners.
3. Preview of the lesson
4. Tapping prior knowledge (acquisition and application of concepts)
5. Presenting or processing information (inquiry-based or expository)
6. Focusing attention and employing learning strategies (cueing, typography, examples vs. non-examples, etc.)
7. Practice
8. Stating the principle (declarative knowledge)
9. Identifying situations or examples in which principle(s) can be applied.
10. Predicting, explaining the relationship among concepts by creating their own examples etc.
11. Discriminating correct applications of the principle from the incorrect ones.
12. Providing feedback
13. A summary or review
14. Transfer of knowledge (how the principle(s) can be applied in relation to others or in given situations such as electric cars).
15. Identifying the relevance or applications or examples of the principle(s) in learners` daily lives.