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| **Lesson 4: MotorsGoal:** Students will construct and understand a circuit that uses a switch to control a motor |
| **Objective:** | **Below (1)** | **Approaching (2)** | **Proficient (3)** | **Advanced (4)** |
| A. Turn on a motor from a AA battery  | Could not turn on motor | Turns motor on intermittently; cannot explain how or why | Turns on motor consistently; able to explain how to do it | (3) + able to relate task to other experiences of motors |
| B. Identify and change direction of motor | Not aware than motor can turn in either direction  | Can change direction of motor, but can’t explain how it was done | Can change direction of motor and explain how to reverse the wires to make the motor go opposite way  | Can identify polarity of motor wiring (e.g., red wire to + terminal) and direction of motion (e.g., CCW) and record which polarity results in which direction  |
| C. Create a battery holder and use it to attach battery to motor | No battery holder | Battery holder does not make reliable connection | Makes a reliable battery holder and uses it to connect to motor | (3) + assists other students with their battery holders  |
| D. Add a switch to the circuit and use it to control the motor | No switch  | Makes a switch but did not insert it in circuit | Adds switch to circuit and uses it to control motor | (3) + helps other students troubleshoot their circuits |
| E. Writing and drawing for communication and reflection | No writing or drawing | Some writing or drawing, but not both, showing minimal understanding | Both writing and circuit diagram show parts and connection accurately | (3) + description of how a motor transforms electric to kinetic energy |