Learning Progression Levels of Achievement

Level 4: Coherent scientific accounts: Students successfully apply fundamental principles such as conservation of matter and energy at multiple scales. (e.g., trees use carbon dioxide from the air and water to make sugar molecules, which store chemical energy in the tree and are used to build the tree’s mass).

Level 3: Incomplete or confused scientific accounts: Students show awareness of important scientific principles and of models at smaller and larger scales, but they have difficulty making connections across scales and applying principles consistently. (e.g., trees use photosynthesis to make sunlight into food; exercise converts food into energy).

Level 2: Elaborated force-dynamic accounts: Students’ accounts focus on actors, enablers, with some connections to larger and smaller scales. (e.g., the tree needs air to breathe, and gives us air to breathe, too).