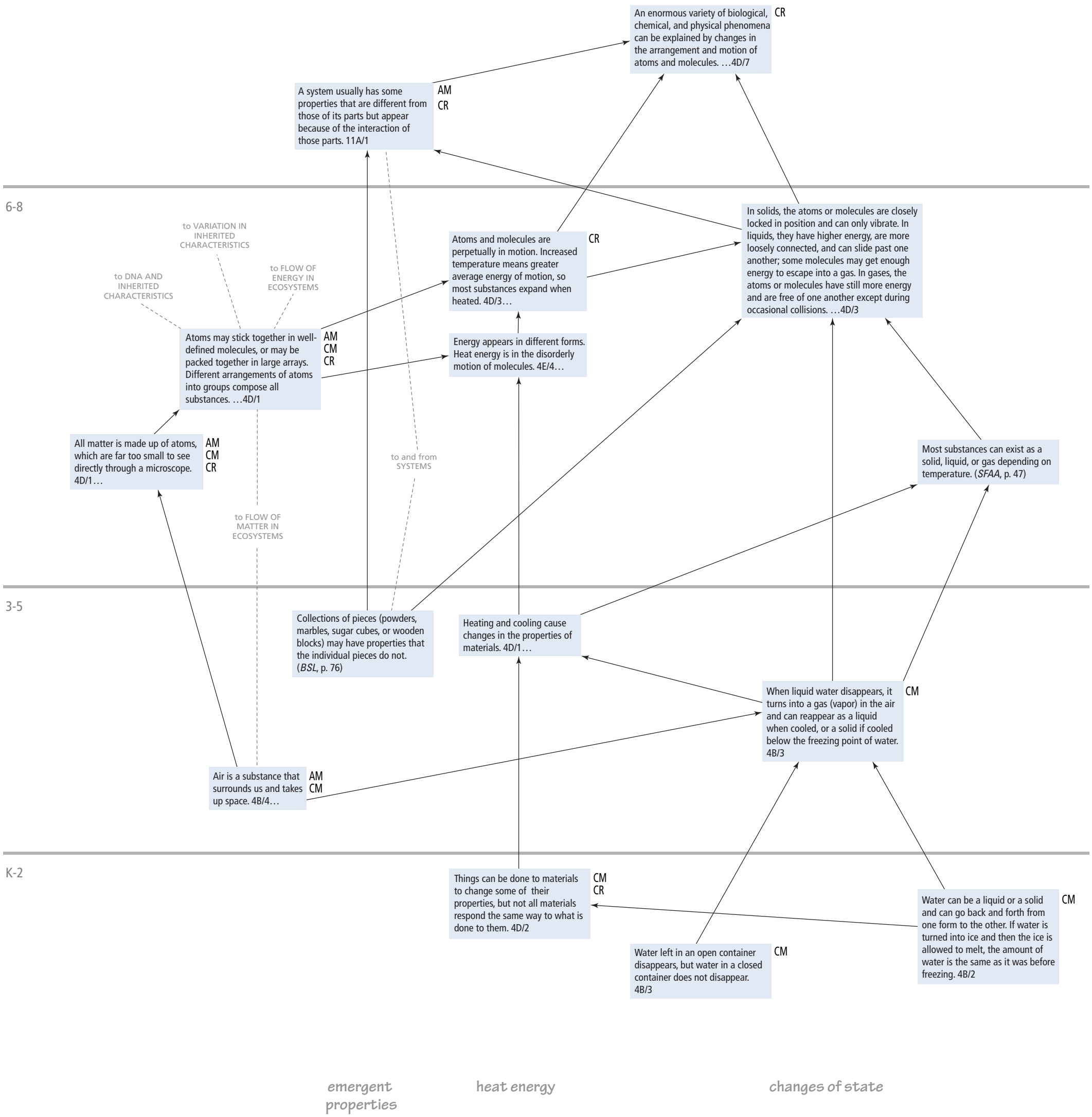
9-12
An enormous variety of biological, chemical, and physical phenomena can be explained by changes in the arrangement and motion of atoms and molecules. …4D/7
CR
A system usually has some properties that are different from those of its parts but appear because of the interaction of those parts. 11A/1
AM
CR
6-8
to VARIATION IN INHERITED CHARACTERISTICS
to DNA AND INHERITED CHARACTERISTICS
to FLOW OF ENERGY IN ECOSYSTEMS
Atoms and molecules are perpetually in motion. Increased temperature means greater average energy of motion, so most substances expand when heated. 4D/3…
CR
In solids, the atoms or molecules are closely locked in position and can only vibrate. In liquids, they have higher energy, are more loosely connected, and can slide past one another; some molecules may get enough energy to escape into a gas. In gases, the atoms or molecules have still more energy and are free of one another except during occasional collisions. …4D/3
Atoms may stick together in well-defined molecules, or may be packed together in large arrays. Different arrangements of atoms into groups compose all substances. …4D/1
AM
CM
CR
Energy appears in different forms. Heat energy is in the disorderly motion of molecules. 4E/4…
All matter is made up of atoms, which are far too small to see directly through a microscope. 4D/1…
AM
CM
CR
to and from SYSTEMS
Most substances can exist as a solid, liquid, or gas depending on temperature. (SFAA, p. 47)
to FLOW OF MATTER IN ECOSYSTEMS
3-5
Collections of pieces (powders, marbles, sugar cubes, or wooden blocks) may have properties that the individual pieces do not. (BSL, p. 76)
Heating and cooling cause changes in the properties of materials. 4D/1…
When liquid water disappears, it turns into a gas (vapor) in the air and can reappear as a liquid when cooled, or a solid if cooled below the freezing point of water. 4B/3
CM
Air is a substance that surrounds us and takes up space. 4B/4…
AM
CM
K-2
Things can be done to materials to change some of their properties, but not all materials respond the same way to what is done to them. 4D/2
CM
CR
Water can be a liquid or a solid and can go back and forth from one form to the other. If water is turned into ice and then the ice is allowed to melt, the amount of water is the same as it was before freezing. 4B/2
CM
Water left in an open container disappears, but water in a closed container does not disappear. 4B/3
CM
emergent properties
heat energy
changes of state