Benchmarks for Lesson Plan: Exploring Parts and Wholes (K-2)

CENTRAL BENCHMARKS

11A Systems (K-2)#1
Most things are made of parts.

11A Systems (K-2)#3
When parts are put together, they can do things that they couldn't do by themselves.

RELATED BENCHMARKS

3A Technology and Science (3-5)#2
Technology enables scientists and others to observe things that are too small or too far away to be seen without them and to study the motion of objects that are moving very rapidly or are hardly moving at all.

4D Structure of Matter (3-5)#3
Materials may be composed of parts that are too small to be seen without magnification.

4D Structure of Matter (6-8)#1
All matter is made up of atoms, which are far too small to see directly through a microscope. The atoms of any element are alike but are different from atoms of other elements. 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.

5C Cells (3-5)#2
Microscopes make it possible to see that living things are made mostly of cells. Some organisms are made of a collection of similar cells that benefit from cooperating. Some organisms' cells vary greatly in appearance and perform very different roles in the organism.

5C Cells (6-8)#1
All living things are composed of cells, from just one to many millions, whose details usually are visible only through a microscope. Different body tissues and organs are made up of different kinds of cells. The cells in similar tissues and organs in other animals are similar to those in human beings but differ somewhat from cells found in plants.

5C Cells (9-12)# 2
Within the cell are specialized parts for the transport of materials, energy capture and release, protein building, waste disposal, information feedback, and even movement. In addition to these basic cellular functions common to all cells, most cells in multicellular organisms perform some special functions that others do not.

Exploring Parts and Wholes (K-2) *(continued)*

5C Cells (9-12)#3
The work of the cell is carried out by the many different types of molecules it assembles, mostly proteins. Protein molecules are long, usually folded chains made from 20 different kinds of amino-acid molecules. The function of each protein molecule depends on its specific sequence of amino acids and the shape the chain takes is a consequence of attractions between the chain's parts.

5C Cells (9-12)#5
Complex interactions among the different kinds of molecules in the cell cause distinct cycles of activities, such as growth and division. Cell behavior can also be affected by molecules from other parts of the organism or even other organisms

5C Cells (9-12)#8
A living cell is composed of a small number of chemical elements mainly carbon, hydrogen, nitrogen, oxygen, phosphorous, and sulfur. Carbon, because of its small size and four available bonding electrons, can join to other carbon atoms in chains and rings to form large and complex molecules.

6C Basic Functions (6-8)#1
Organs and organ systems are composed of cells and help to provide all cells with basic needs.

11A Systems (K-2)#2
Something may not work if some of its parts are missing.

11A Systems (3-5)#1
In something that consists of many parts, the parts usually influence one another.

11A Systems (3-5)#2
Something may not work as well (or at all) if a part of it is missing, broken, worn out, mismatched, or misconnected.

11A Systems (6-8)#2
Thinking about things as systems means looking for how every part relates to others.
The output from one part of a system (which can include material, energy, or information) can become the input to other parts. Such feedback can serve to control what goes on in the system as a whole.

11A Systems (9-12)#1
A system usually has some properties that are different from those of its parts, but appear because of the interaction of those parts.

11A Systems (9-12)#4
Even in some very simple systems, it may not always be possible to predict accurately the result of changing some part or connection.

11C Constancy and Change (K-2)#1
Things change in some ways and stay the same in some ways.

Exploring Parts and Wholes (K-2) *(continued)*

12A Values and Attitudes (K-2)#1
Raise questions about the world around them and be willing to seek answers to some of them by making careful observations and trying things out.

12A Values and Attitudes (3-5)#1
Keep records of their investigations and observations and not change the records later.

12A Values and Attitudes (3-5)#2
Offer reasons for their findings and consider reasons suggested by others.

12A Values and Attitudes (6-8)#1
Know why it is important in science to keep honest, clear, and accurate records.

12A Values and Attitudes (9-12)#2
View science and technology thoughtfully, being neither categorically antagonistic nor uncritically positive.

12C Manipulation and Observation (K-2)#2
Assemble, describe, take apart and reassemble constructions using interlocking blocks, erector sets, and the like.

12D Communication Skills (K-2)#2
Draw pictures that correctly portray at least some features of the thing being described.

12E Critical-Response Skills (K-2)#1
Ask: “How do you know?” in appropriate situations and attempt reasonable answers when others ask them the same questions.

12E Critical-Response Skills (9-12)#4
Insist that the critical assumptions behind any line of reasoning be made explicit so that the validity of the position being taken—whether one’s own or that of others—can be judged.