



Benchmarks for Lesson Plan: How One Part Relates to Others (3-5)

CENTRAL BENCHMARKS

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.

RELATED BENCHMARKS

3A Technology and Science (K-2)#1

Tools are used to do things better or more easily and to do some things that could not otherwise be done at all. In technology, tools are used to observe, measure, and make things.

3A Technology and Science (K-2)#2

When trying to build something or to get something to work better, it usually helps to follow directions if there are any or to ask someone who has done it before for suggestions.

3B Design and Systems (9-12)#5

The more parts and connections a system has, the more ways it can go wrong. Complex systems usually have components to detect, back up, bypass, or compensate for minor failures.

3C Issues in Technology (K-2)#1

People, alone or in groups, are always inventing new ways to solve problems and get work done. The tools and ways of doing things that people have invented affect all aspects of life.

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)#3

Within cells, many of the basic functions of organisms—such as extracting energy from food and getting rid of waste—are carried out. The way in which cells function is similar in all living organisms.

5C Cells (9-12)#1

Every cell is covered by a membrane that controls what can enter and leave the cell. In all but quite primitive cells, a complex network of proteins provides organization and shape and, for animal cells, movement.

How One Part Relates to Others (3-5) *(continued)*

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.

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.

11A Systems (K-2)#1

Most things are made of parts.

11A Systems (K-2)#2

Something may not work if some of its parts are missing.

11A Systems (K-2)#3

When parts are put together, they can do things that they couldn't do by themselves.

11A Systems (6-8)#1

A system can include processes as well as things.

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.

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.

12C Manipulation and Observation (K-2)#1

Use hammers, screwdrivers, clamps, rulers, scissors, and hand lenses, and operate ordinary audio equipment.

12C Manipulation and Observation (K-2)#2

Assemble, describe, take apart and reassemble constructions using interlocking blocks, erector sets, and the like.

How One Part Relates to Others (3-5) *(continued)*

12C Manipulation and Observation (K-2)#3

Make something out of paper, cardboard, wood, plastic, metal, or existing objects that can actually be used to perform a task.

12C Manipulation and Observation (3-5)#3

Keep a notebook that describes observations made, carefully distinguishes actual observations from ideas and speculations about what was observed, and is understandable weeks or months later.

12C Manipulation and Observation (6-8)#5

Inspect, disassemble, and reassemble simple mechanical devices and describe what the various parts are for, Then, estimate what the effect that making a change in one part of a system is likely to have on the system as a whole.

12D Communication (3-5)#1

Write instructions that others can follow in carrying out a procedure.

12D Communication (3-5)#2

Make sketches to aid in explaining procedures or ideas.

12D Communication (9-12)#2

Write clear, step-by-step instructions for conducting investigations, operating something, or following a procedure.

12E Critical-Response (K-2)#1

Ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask them the same question.

12E Critical-Response (3-5)#2

Recognize when comparisons might not be fair because some conditions are not kept the same.

12E Critical-Response (3-5)#3

Seek better reasons for believing something than “Everybody knows that . . .” or “I just know” and discount such reasons when given by others.

12E Critical-Response (6-8)#4

Be aware that there may be more than one good way to interpret a given set of findings.

12E Critical-Response (9-12)#6

Suggest alternative ways of explaining data and criticize arguments in which data, explanations, or conclusions are represented as the only ones worth consideration, with no mention of other possibilities. Similarly, suggest alternative trade-offs in decisions and designs and criticize those in which major trade-offs are not acknowledged.