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# Connections to Benchmark for Science Literacy

## American Association for the Advancement of Science



### 1. The Nature of Science

#### B Scientific Inquiry

K-2 People can often learn about things around them by just observing those things carefully, but sometimes they can learn more by doing something to the things and noting what happens.

K-2 Tools such as thermometers, magnifiers, rulers, or balances often give more information about things than can be obtained by just observing things without their help.

3-5 Scientific investigations may take many different forms, including observing what things are like or what is happening somewhere, collecting specimens for analysis, and doing experiments. Investigations can focus on physical, biological, and social questions.

#### C The Scientific Enterprise

K-2 Everybody can do science and invent things and ideas.

### 2. The Nature of Mathematics

#### A Patterns and Relationships

K-2 Circles, squares, triangles, and other shapes can be found in things in nature and in things that people build.

K-2 Things move, or can be made to move, along straight, curved, circular, back-and-forth, and jagged paths.

#### C Mathematical Inquiry

K-2 Numbers and shapes can be used to tell about things.

### 3. The Nature of Technology

#### A Technology and Science

K-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.

3-5 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

3-5 Measuring instruments can be used to gather accurate information for making scientific comparisons of objects and events and for designing and constructing things that will work properly.

### 4. The Physical Setting

#### F. Motion

K-2 Things move in many different ways, such as straight, zigzag, round and round, back and forth, and fast and slow.

K-2 The way to change how something is moving is to give it a push or a pull.

3-5 Changes in speed or direction of motion are caused by forces. The greater the force is, the greater the change in motion will be. The more massive an object is, the less effect a given force will have.

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## TOYS: The Inside Story

Montshire Museum of Science  
Norwich, Vermont

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3-5 How fast things move differs greatly. Some things are so slow that their journey takes a long time; others move too fast for people to even see them.



## 9. The Mathematical World

### B. Symbolic Relationship

K-2 Similar patterns may show up in many places in nature and in the things people make.

K-2 Sometimes changing one thing causes changes in something else. In some situations, changing the same thing in the same way usually has the same result

## 11. Common Themes

### A. Systems

K-2 Most things are made of parts.

K-2 Something may not work if some of its parts are missing.

K-2 When parts are put together, they can do things that they couldn't do by themselves.

3-5 In something that consists of many parts, the parts usually influence one another.

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

6-8 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.

6-8 Any system is usually connected to other systems, both internally and externally. Thus a system may be thought of as containing subsystems and as being a subsystem of a larger system.

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

### B. Models

K-2 Many of the toys children play with are like real things only in some ways. They are not the same size, are missing many details, or are not able to do all of the same things.

K-2 A model of something is different from the real thing but can be used to learn something about the real thing.

K-2 One way to describe something is to say how it is like something else

3-5 Seeing how a model works after changes are made to it may suggest how the real thing would work if the same were done to it.

6-8 Models are often used to think about processes that happen too slowly, too quickly, or on too small a scale to observe directly, or that are too vast to be changed deliberately, or that are potentially dangerous.

### C. Constancy and Change

K-2 Things can change in different ways, such as in size, weight, color, and movement. Some small changes can be detected by taking measurements.

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K-2 Some changes are so slow or so fast that they are hard to see.



12. Habits of Mind

A. Values and Attitudes

K-2 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.

3-5 Offer reasons for their findings and consider reasons suggested by others.