

Benchmarks for Science Literacy Levels K-2

	Kindergarten Beginnings	Level 1 Material Objects	Level 1 Organisms	Level 2 Interaction and Systems	Level 2 Life Cycles
Chapter 1: The Nature of Science					
<i>The Scientific World View</i>					
When a science investigation is done the way it was done before, we expect to get a very similar result.	◆	◆	◆	◆	◆
Science investigations generally work the same way in different places.	◆	◆	◆	◆	◆
<i>Scientific Inquiry</i>					
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.	◆T	◆	◆LT	◆T	◆LT
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.	◆	◆	◆	◆	◆
Describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.	◆	◆	◆	◆	◆
When people give different descriptions of the same thing, it is usually a good idea to make some fresh observations instead of just arguing about who is right.	◆	◆	◆	◆	◆
<i>The Scientific Enterprise</i>					
Everybody can do science and invent things and ideas.	◆T	◆	◆	◆L	◆
In doing science, it is often helpful to work with a team and to share findings with others. All team members should reach their own individual conclusions, however, about what the findings mean.	◆	◆	◆	◆	◆T
A lot can be learned about plants and animals by observing them closely, but care must be taken to know the needs of living things and how to provide for them in the classroom.	◆		◆		◆
Chapter 2: The Nature of Mathematics					
<i>Patterns and Relationships</i>					
Circles, squares, triangles, and other shapes can be found in things in nature and in things that people build.	◆L	◆			
Patterns can be made by putting different shapes together or taking them apart.	◆	◆			
Things move, or can be made to move, along straight, curved, circular, back-and-forth, and jagged paths.	◆			◆	
<i>Mathematics, Science, and Technology</i>					
No benchmarks for this level					
<i>Mathematical Inquiry</i>					
Numbers and shapes can be used to tell about things.	◆LT	◆T	◆	◆T	◆

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Chapter 3: The Nature of Technology					
<i>Technology and Science</i>					
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.	◆T	◆	◆	◆L	◆
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.	◆	◆	◆	◆	◆
<i>Design and Systems</i>					
People can use objects and ways of doing things to solve problems.	◆	◆	◆	◆L	◆
People may not be able to actually make or do everything that they can design.		◆	◆T	◆	◆T
<i>Issues in Technology</i>					
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.		◆L	◆	◆L	◆
When a group of people wants to build something or try something new, they should try to figure out ahead of time how it might affect other people.			◆	◆	◆
Chapter 4: The Physical Setting					
<i>The Universe</i>					
There are more stars in the sky than anyone can easily count, but they are not scattered evenly, and they are not all the same in brightness or color.					
The sun can be seen only in the daytime, but the moon can be seen sometimes at night and sometimes during the day. The sun, moon, and stars all appear to move slowly across the sky.					
The moon looks a little different every day, but looks the same again about every four weeks.					
<i>The Earth</i>					
Some events in nature have a repeating pattern. The weather changes some from day to day, but things such as temperature and rain (or snow) tend to be high, low, or medium in the same months every year.				◆	L
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.		◆		◆	
Water left in an open container disappears, but water in a closed container does not disappear.	◆	◆		◆	

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Processes That Shape the Earth					
Chunks of rocks come in many sizes and shapes, from boulders to grains of sand and even smaller.		◆		◆	
Change is something that happens to many things.	◆L	◆	◆L	◆	L
Animals and plants sometimes cause changes in their surroundings.	◆	◆	◆L		◆
Structure of Matter					
Objects can be described in terms of the materials they are made of (clay, cloth, paper, etc.) and their physical properties (color, size, shape, weight, texture, flexibility, etc.).	◆LT	◆LT	◆	◆T	◆
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.		◆		◆	
Energy Transformations					
The sun warms the land, air, and water.		◆		◆	
Motion					
Things move in many different ways, such as straight, zigzag, round and round, back and forth, and fast and slow.	◆		◆	◆	◆
The way to change how something is moving is to give it a push or a pull.				◆	
Things that make sound vibrate.					
Forces of Nature					
Things near the earth fall to the ground unless something holds them up.					
Magnets can be used to make some things move without being touched.		◆		◆T	
Chapter 5: The Living Environment					
Diversity of Life					
Some animals and plants are alike in the way they look and in the things they do, and others are very different from one another.	◆		◆		◆
Plants and animals have features that help them live in different environments.	◆L		◆		◆L
Stories sometimes give plants and animals attributes they really do not have.	◆L	L	◆L	◆	◆
Heredity					
There is a variation among individuals of one kind within a population.	◆		◆		◆
Offspring are very much, but not exactly, like their parents and like one another.	◆		◆		◆
Cells					
Magnifiers help people see things they could not see without them.	◆	◆	◆	◆	◆
Most living things need water, food, and air.	◆		◆LT		◆LT
Interdependence of Life					
Animals eat plants or other animals for food and may also use plants (or even other animals) for shelter and nesting.	◆		◆L		◆L
Living things are found almost everywhere in the world. There are somewhat different kinds in different places.			◆		◆

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Flow of Matter and Energy					
Plants and animals both need to take in water, and animals need to take in food. In addition, plants need light.	◆		◆LT		◆LT
Many materials can be recycled and used again, sometimes in different forms.		◆L	◆	◆L	◆
Evolution of Life					
Different plants and animals have external features that help them thrive in different kinds of places.	◆		◆		◆
Some kinds of organisms that once lived on earth have completely disappeared, although they were something like the others that are alive today.					
Chapter 6: The Human Organism					
Human Identity					
People have different external features, such as the size, shape, and color of hair, skin, and eyes, but they are more like one another than like other animals.					
People need water, food, air, waste removal, and a particular range of temperatures in their environment, just as other animals do.	◆		◆		◆
People tend to live in families and communities in which individuals have different roles.					
Human Development					
All animals have offspring, usually with two parents involved. People may prevent some animals from producing offspring.	◆L		◆		◆
A human baby grows inside its mother until its birth. Even after birth, a human baby is unable to care for itself, and its survival depends on the care it receives from adults.					
Basic Functions					
The human body has parts that help it seek, find, and take in food when it feels hunger - eyes and noses for detecting food, legs to get to it, arms to carry it away, and a mouth to eat it.					
Senses can warn individuals about danger; muscles help them to fight, hide, or get out of danger.					
The brain enables human beings to think and sends messages to other body parts to help them work properly.					
Learning					
People use their senses to find out about their surroundings and themselves. Different senses give different information. Sometimes a person can get different information about the same thing by moving closer to it or farther away from it.	◆L	◆	◆	◆	◆

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Some of the things people do, like playing soccer, reading, and writing, must be deliberately learned. Practicing helps people to improve. How well one learns sometimes depends on how one does it and how often and how hard one tries to learn.	◆	◆	◆	◆	◆
People can learn from each other by telling and listening, showing and watching, and imitating what others do.	◆	◆	◆	◆	◆
Physical Health					
Eating a variety of healthful foods and getting enough exercise and rest help people to stay healthy.					
Some things people take into their bodies from the environment can hurt them.					
Some diseases are caused by germs; some are not. Diseases caused by germs may be spread by people who have them. Washing one's hands with soap and water reduces the number of germs that can get into the body or that can be passed on to other people.					
Mental Health					
People have many different feelings--sadness, joy, anger, fear, etc.--about events, themselves, and other people.					
People react to personal problems in different ways. Some ways are more likely to be helpful than others.					
Talking to someone (a friend, relative, teacher, or counselor) may help people understand their feelings and problems and what to do about them.					
Chapter 7: Human Society					
Cultural Effects on Behavior					
People are alike in many ways and different in many ways.					
Different families or classrooms have different rules and patterns of behavior. Some behaviors are not accepted in most families or schools.					
People often choose to dress, talk, and act like their friends, do the same things they do, and have the same kinds of things they have. They also often choose to do certain things their own way.					
Group Behavior					
People belong to some groups by birth and belong to some groups because they join them.					
The way people act is often influenced by the groups to which they belong.	◆	◆	◆	◆	◆
Social Change					
Changes happen in everyone's life, sometimes suddenly, more often slowly. People cannot control some changes, but they can usually learn to cope with them.					

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Social Trade-Offs					
Getting something one wants may mean giving up something in return.				◆	
Different people make different choices for different reasons.	◆	◆	◆	◆	◆
Choices have consequences, some of which are more serious than others.					
Political and Economic Systems					
Money can buy things that people need or want. People earn money by working at a job making or growing things, selling things, or doing things to help other people.					
Everyone wants to be treated fairly, and some rules can help do that.	◆	◆	◆	◆	◆
Social Conflict					
Disagreements are common, even between family members or friends. Some ways of dealing with them work better than others. People who are not involved in an argument may be helpful in solving it.	◆	◆	◆	◆	◆
Rules at home, at school, and in the community let individuals know what to expect and so can reduce the number of disputes.	◆	◆	◆	◆	◆
Global Interdependence					
For many things they need, people rely on others who are not part of the family and maybe not even part of their local community.					
Chapter 8: The Designed World					
Agriculture					
Most food comes from farms either directly as crops or as the animals that eat the crops. To grow well, plants need enough warmth, light, and water. Crops also must be protected from weeds and pests that can harm them.					◆
Part of a crop may be lost to pests or spoilage.					◆
A crop that is fine when harvested may spoil before it gets to consumers.					◆
Machines improve what people get from crops by helping in planting and harvesting, in keeping food fresh by packaging and cooling, and in moving it long distances from where it is grown to where people live.					◆
Materials and Manufacturing					
Some kinds of materials are better than others for making any particular thing. Materials that are better in some ways (such as stronger or cheaper) may be worse in other ways (heavier or harder to cut).		◆		◆	
Several steps are usually involved in making things.				◆T	
Tools are used to help make things, and some things cannot be made at all without tools. Each kind of tool has a special purpose.		◆		◆	
Some materials can be used over again.		◆L	◆	◆L	◆
Energy Sources and Use					
People can save money by turning off machines when they are not using them.					
People burn fuels such as wood, oil, coal, or natural gas, or use electricity to cook their food and warm their houses.					

T See Technonology Correlation
L See Literature Correlation

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Communication					
Information can be sent and received in many different ways. Some allow answering back and some do not. Each way has advantages and disadvantages.		◆	◆	◆	◆
Devices can be used to send and receive messages quickly and clearly.					
Information Processing					
There are different ways to store things so they can be easily found later.		◆	◆	◆	◆
Letters and numbers can be used to put things in a useful order.		◆		◆	
Health Technology					
Vaccinations and other scientific treatments protect people from getting certain diseases, and different kinds of medicines may help those who do become sick to recover.					
Chapter 9: The Mathematical World					
Numbers					
Numbers can be used to count things, place them in order, or name them.	◆	◆	◆	◆	◆
Sometimes in sharing or measuring there is a need to use numbers between whole numbers.	◆			◆	◆
It is possible (and often useful) to estimate quantities without knowing them exactly.	◆	◆	◆	◆	◆
Simple graphs can help to tell about observations.	◆	◆T	◆	◆T	◆T
Symbolic Relationships					
Similar patterns may show up in many places in nature and in the things people make.	◆	◆	◆	◆	◆
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.	◆	◆	◆	◆	◆
Shapes					
Shapes such as circles, squares, and triangles can be used to describe many things that can be seen.	◆L	◆	◆	◆	◆
Uncertainty					
Some things are more likely to happen than others. Some events can be predicted well and some cannot. Sometimes people aren't sure what will happen because they don't know everything that might be having an effect.	◆	◆	◆	◆	◆
Often a person can find out about a group of things by studying just a few of them.	◆	◆	◆	◆	◆
Reasoning					
People are more likely to believe your ideas if you can give good reasons for them.	◆	◆	◆	◆	◆
Chapter 10: Historical Perspectives					
<i>No benchmarks for this level</i>					

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Chapter 11: Common Themse					
<i>Systems</i>					
Most things are made of parts.				◆T	
Something may not work if some of its parts are missing.				◆	
When parts are put together, they can do things that they couldn't do by themselves.		◆		◆	
<i>Models</i>					
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.		◆		◆	
A model of something is different from the real thing but can be used to learn something about the real thing.	◆	◆	◆	◆T	◆
One way to describe something is to say how it is like something else.	◆	◆	◆	◆	◆
<i>Constancy and Change</i>					
Things change in some ways and stay the same in some ways.	◆	◆	◆	◆	◆
People can keep track of some things, seeing where they come from and where they go.	◆	◆	◆	◆	◆
Things can change in different ways, such as in size, weight, color, and movement. Some small changes can be detected by taking measurements.	◆	◆	◆	◆	◆
Some changes are so slow or so fast that they are hard to see.	◆	◆	◆	◆	◆
<i>Scale</i>					
Things in nature and things people make have very different sizes, weights, ages, and speeds.	◆	◆	◆	◆	◆
Chapter 12: Habits of Mind					
<i>Values and Attitudes</i>					
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.	◆	◆	◆	◆	◆
<i>Computation and Estimation</i>					
Use whole numbers and simple, everyday fractions in ordering, counting, identifying, measuring, and describing things and experiences.	◆	◆	◆	◆	◆
Readily give the sums and differences of single-digit numbers in familiar contexts where the operation makes sense to them and they can judge the reasonableness of the answer.		◆	◆	◆	◆
Give rough estimates of numerical answers to problems before doing them formally.	◆	◆	◆	◆	
Explain to other students how they go about solving numerical problems.	◆	◆	◆	◆	◆
Make quantitative estimates of familiar lengths, weights, and time intervals and check them by measurements.	◆	◆	◆	◆	

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Manipulation and Observation					
Use hammers, screwdrivers, clamps, rulers, scissors, and hand lenses, and operate ordinary audio equipment.	◆	◆	◆	◆	◆
Assemble, describe, take apart, and reassemble constructions using interlocking blocks, erector sets, and the like.				◆	
Make something out of paper, cardboard, wood, plastic, metal, or existing objects that can actually be used to perform a task.				◆	
Measure the length in whole units of objects having straight edges.					
Communication Skills					
Describe and compare things in terms of number, shape, texture, size, weight, color, and motion.	◆	◆	◆	◆	◆
Draw pictures that correctly portray at least some features of the thing being described.	◆	◆	◆	◆	◆
Critical-Response Skills					
Ask "How do you know?" in appropriate situations and attempt reasonable answers when others ask them the same question.	◆	◆	◆	◆	◆