Carolina™ Curriculum Correlation to New Jersey

Core Curriculum Content Standards for Science Grades K-8

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A Correlation of Carolina™ Curriculum to New Jersey Core Curriculum Content Standards for Science

This document gives a quick visual guide to the alignment of Science and Technology for Children® (STC®), Great Explorations in Math and Science® (GEMS®) and Building Blocks of Science™ units with the New Jersey Core Curriculum Content Standards for Science. Although each unit was developed for use at a specific grade level, there is some flexibility in grade placement — any unit may be used a grade above or below the one for which it was developed.

Grades	STC®	GEMS® and Building Blocks of Science™
K–2	Comparing and Measuring Organisms The Life Cycle of Butterflies Plant Growth and Development Soils Solids and Liquids Sound Weather	Building Blocks of Science: Sky Watchers
3–4	Animal Studies Chemical Tests Electric Circuits Motion and Design Rocks and Minerals	Space Science for Grades 3-5
5–6	Experiments with Plants Food Chemistry Land and Water Microworlds	Chemical Reactions Messages from Space
7-8	Catastrophic Events Earth in Space Properties of Matter	

The STC PROGRAM™ is made up of 2 research-based, inquiry-centered curriculums:

- Science and Technology for Children® (STC®) for grades K–6; and
- Science and Technology Concepts for Middle Schools™ (STC/MS™) for grades 6–8

Building Blocks of Science™ is a K-5 supplementary science curriculum that can be used as stand-alone instruction.

Great Explorations in Math and Science® and GEMS Space Sequence
GEMS Kits® are standards-based PreK-8 math and science supplemental kits. The kits have been tested for specific grade levels but can also be used at lower or higher levels. **Space Science for Grades 3-5** is a research-based 3-5 science curriculum that teach fundamental concepts in space science.

LEGEND
To save paper, the curriculum location information in this document has been abbreviated as follows:

- TG = Teacher's Guide
- S-Sec3 = Section 3 (containing a section on safety) in the STC® Teacher's Guide
- L01, L02, etc. = Lesson 1, Lesson 2, etc., Act01=Activity 1 etc. Ses01=Session etc.
- p, pp = page, pages
- RB = STC BOOK™ (a science reading book included in some of the grades 3–5 STC® unit kits)
- Exts = Extensions (found at the end of most lessons in the Teacher's Guide)
- App-A, App-B = Appendix A, Appendix B (found at the end of Section 4 in the Teacher's Guide)

Standard 5.1 (Scientific Process) **All students will develop problem-solving, decision-making and inquiry skills, reflected by formulating usable questions and hypotheses, planning experiments, conducting systematic observations, interpreting and analyzing data, drawing conclusions, and communicating results.**	
Descriptive Statement: **Students best learn science by doing science. Science is not merely a collection of facts and theories but a process, a way of thinking about and investigating the world in which we live. This standard addresses those skills that are used by scientists as they discover and explain the physical universe-skills that are an essential and ongoing part of learning science.**	
Cumulative Progress Indicators	
By the end of Grade 4, **students will:**	
A. Habits of Mind	
1. Raise questions about the world around them and be willing to seek answers through making careful observations and experimentation.	All STC units
2. Keep records that describe observations, carefully distinguish actual observations from ideas and speculations, and are understandable weeks and months later.	All STC units
3. Recognize that when a science investigation is replicated, very similar results are expected.	Compatible with all STC units
4. Know that when solving a problem it is important to plan and get ideas and help from other people.	All STC units
B. Inquiry and Problem Solving	
1. Develop strategies and skills for information–gathering and problem-solving, using appropriate tools and technologies.	All STC units
2. Identify the evidence used in an explanation.	All STC units
C. Safety	
1. Recognize that conducting science activities requires an awareness of potential hazards and the need for safe practices.	All STC units
2. Understand and practice safety procedures for conducting science investigations.	All STC units
By the end of Grade 8, **students will:**	
A. Habits of Mind	
1. Evaluate the strengths and weaknesses of data, claims, and arguments.	All STC units
2. Communicate experimental findings to others.	All STC units
3. Recognize that the results of scientific investigations are seldom exactly the same and that replication is often necessary.	All STC units
B. Inquiry and Problem Solving	
1. Identify questions and make predictions that can be addressed by conducting investigations.	All STC units
2. Design and conduct investigations	All STC units

incorporating the use of a control.	
3. Collect, organize, and interpret the data that result from experiments.	All STC units
C. Safety	
1. Know when and how to use appropriate safety equipment with all classroom materials.	All STC units
2. Understand and practice safety procedures for conducting science investigations.	All STC units
Standard 5.2 (Science and Society) **All students will develop an understanding of how people of various cultures contributed to the advancement of science and how major discoveries and events have advanced science and technology.**	
Descriptive Statement: **Science is a human endeavor involving successes and failures, trials and tribulations. Students should know that great numbers of people from many cultures have contributed to our understanding of science and that science has a rich and fascinating history. This standard encourages students to learn about the people and events that have shaped or revolutionized important scientific theories and concepts.**	
Cumulative Progress Indicators	
By the end of Grade 4, **students will:**	
A. Cultural Contributions	
1. Describe how people in different cultures have made and continue to make contributions to science and technology.	**Animal Studies** RB: (pp50-52) **Electric Circuits** RB: (pp07-10), (pp17-21) **Motion and Design** RB: (pp23-28), (pp41-43) **Weather** TG: L11 (pp101-112), L12 (pp113-122)
B. Historical Perspectives	
1. Hear, read, write, and talk about scientists and inventors in historical context.	**3-5 Space Science** TG: Ses 1.1-4.5 (pp 28-423) **Animal Studies** RB: (pp45-52), (pp56-57) TG: L08.Exts (p94), L12.Exts (p129), L16.Exts (p167) **Electric Circuits** RB: (pp07-21), (pp56-59) TG: L04.Exts (p24) **Motion and Design** RB: (pp07-09), (pp23-40), (pp52-57) **Weather** TG: L11 (pp101-112)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 6, **students will:**	
A. Cultural Contributions	
1. Cultural Contributions: Recognize that scientific theories: develop over time, depend on the contributions of many people, and reflect the social and political climate of their time.	**Microworlds** RB: (pp52-55)

2. Cultural Contributions: Know that scientists are men and women of many cultures who often work together to solve scientific and technological problems.	**Experiments with Plants** RB: (pp11-13), (pp36-46)
3. Cultural Contributions: Describe how different people in different cultures have made and continue to make contributions to science and technology.	**Experiments with Plants** RB: (pp41-43)
B. Historical Perspectives	
Describe the impact of major events and people in the history of science and technology, in conjunction with other world events.	**Experiments with Plants** RB: (pp11-13), (pp36-46), (pp54-56) **Microworlds** RB: (pp07-09), (pp48-55)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 8**, students will:**	
A. Cultural Contributions	
1. Recognize that scientific theories: develop over time, depend on the contributions of many people, and reflect the social and political climate of their time.	**Earth in Space** SG: L10 (pp130-145), L21 (pp334-339) TG: L02.Exts (pp18-19), L10 (pp147-158), L21 (pp309-310) **Properties of Matter** SG: L10 (pp86-97), L25 (pp224-229)
2. Know that scientists are men and women of many cultures who often work together to solve scientific and technological problems.	**Catastrophic Events** SG: L15 (pp170-189) TG: L15 (pp197-218) **Earth in Space** SG: L03 (pp22-41) TG: L02.Exts (pp18-19). L03 (pp21-36), L17.Exts (pp275-276) **Properties of Matter** SG: L07 (pp64-73), L11 (pp98-105)
B. Historical Perspectives	
1. Describe the impact of major events and people in the history of science and technology, in conjunction with other world events.	**Catastrophic Events** SG: L10 (pp114-119), L15 (pp170-189) TG: L10 (pp143-148). L15 (pp197-218) **Earth in Space** SG: L10 (pp130-145), L21 (pp334-339) TG: L02.Exts (pp18-19), L10 (pp147-158). L17.Exts (pp275-276), L21 (pp309-310) **Properties of Matter** SG: L01 (pp2-13), L05 (pp38-55), L07 (pp64-73) L10 (pp86-97), L19 (pp162-167), L20-23 (pp170-217) L25 (pp224-229)
2. Describe the development and exponential growth of scientific knowledge and technological innovations.	**Earth in Space** SG: L20 (pp324-333) TG: L20 (pp293-308) **Properties of Matter** SG: L07 (pp64-73), L10 (pp86-97), L11 (pp98-105) L16 (pp130-139) TG: L10 (pp113-124)

Standard 5.3 **(Mathematical Applications) All students will integrate mathematics as a tool for problem-solving in science, and as a means of expressing and/or modeling scientific theories.**	
Descriptive Statement: **Science cannot be practiced or learned without appreciation of the role of mathematics in discovering and expressing natural laws. This standard recognizes the need for students to fully integrate mathematics skills with their learning of science.**	
Cumulative Progress Indicators	
By the end of Grade 4**, students will:**	
A. Numerical Operations	
1. Determine the reasonableness of estimates, measurements, and computations of quantities when doing science.	**3-5 Space Science** TG: Ses 1.3-1.9 (pp 56-167), 2.1 (pp 172-181), Ses 2.4 (pp 226-245), Ses 4.1 (pp 340-364) **Comparing and Measuring** TG: L01-17 (pp3-120) **Motion and Design** TG: L04 (pp35-46) **Plant Growth and Development** TG: L05 (pp29-34), L07 (pp39-42), L15 (pp89-94) **Solids and Liquids** TG: L09.Exts (p73) **.Weather** TG: L04-10 (pp33-100), L12.Exts (pp116-117)
2. Recognize and comprehend the orders of magnitude associated with large and small physical quantities.	**3-5 Space Science** TG: Ses 1.5-1.7 (pp 86-135) **Rocks and Minerals** TG: L10.Exts (pp73-74)
3. Express quantities using appropriate number formats, such as:	
integers. fractions.	
B. Geometry and Measurement	
1. Select appropriate measuring instruments based on the degree of precision required.	**3-5 Space Science** TG: Ses 1.3-1.9 (pp 56-167), 2.1 (pp 172-181), Ses 2.4 (pp 226-245), Ses 4.1 (pp 340-364) **Comparing and Measuring** TG: L01-17 (pp3-120) **Motion and Design** TG: L04 (pp35-46) **Solids and Liquids** TG: L09.Exts (p73) **Weather** TG: L05-10 (pp43-100), L12.Exts (pp116-117)
2. Use a variety of measuring instruments and record measured quantities using the appropriate units.	**3-5 Space Science** TG: Ses 1.3-1.9 (pp 56-167), 2.1 (pp 172-181), Ses 2.4 (pp 226-245), Ses 4.1 (pp 340-364) **Comparing and Measuring** TG: L01-17 (pp3-120) **The Life Cycle of Butterflies** TG: L12 (pp75-80) **Motion and Design** TG: L04 (pp35-46) **Plant Growth and Development** TG: L05 (pp29-34), L07 (pp39-42), L15 (pp89-94) **Solids and Liquids** TG: L09.Exts (p73) **Weather**

	TG: L05-10 (pp43-100), L12.Exts (pp116-117)
C. Patterns and Algebra	
1. Identify patterns when observing the natural and constructed world.	**3-5 Space Science** TG: Ses 4.2 (pp 364-373) **Comparing and Measuring** TG: L11 (pp75-80) **The Life Cycle of Butterflies** TG: L01 (pp3-10) L04 (pp23-28), L08 (pp47-52) L11 (pp69-74), L12 (pp75-80) **Motion and Design** TG: L07 (pp65-72)
D. Data Analysis and Probability	
1. Use tables and graphs to represent and interpret data.	**Animal Studies** TG: L02-6 (pp11-74), L08 (pp87-96), L09 (pp97-106), L15 (pp157-164) **Chemical Tests** TG: L05 (pp45-56), L08 (pp79-84), L11 (pp101-106) **Comparing and Measuring** TG: L01-17 (pp3-120) **Electric Circuits** TG: L02-16 (pp7-84) **Motion and Design** TG: L04 (pp35-46) **Organisms** TG: L02-16 (pp11-178) **Plant Growth and Development** TG: App-A (pp101-103), TG: L01-17 (pp3-100) **3-5 Space Science** TG: Ses 1.1-4.5 (pp 28-423) **Rocks and Minerals** TG: L03 (pp19-26) **Solids and Liquids** TG: L01-17 (pp3-140) **Sound** TG: L01-17 (pp11-118) **Weather** TG: App-B (pp153-167), L01-16 (pp3-148)
Building upon knowledge and skills gained in preceding grades, by the end of **Grade 6**, students will:	
A. Numerical Operations	
1. Express quantities using appropriate number formats, such as: decimals, percents, scientific notation.	**Experiments with Plants** TG: L14.Exts (pp109-110)
B. Geometry and Measurement	
1. Perform mathematical computations using labeled quantities and express answers in correctly derived units.	**Experiments with Plants** TG: L14.Exts (pp109-110) **Microworlds** TG: L07 (pp37-42)

C. Patterns and Algebra	
1. Express physical relationships in terms of mathematical equations derived from collected data.	**Chemical Reactions** TG: Exts (pp22-23), Part1 (pp9-14) **Experiments with Plants** RB: (pp57-59), (pp62) TG: L06.Exts (p62), L09 (pp75-80), L10 (pp81-84), L13 (pp101-104), L14.Exts (pp109-110), L15 (pp115-122) Part2 (pp15-21) **Messages From Space** TG: Act01-5 (pp6-123), Exts (p38), Exts (p51) Exts (p87)
D. Data Analysis and Probability	
1. Represent and describe mathematical relationships among variables using: graphs; tables.	**Experiments with Plants** TG: L01-8 (pp9-74), L09.Exts (p78), L10-12 (pp81-100), L14 (pp105-114)
2. Analyze experimental data sets using measures of central tendency: mean, mode, median.	**Experiments with Plants** TG: L14.Exts (pp109-110)
3. Construct and use a graph of experimental data to draw a line of best fit and identify a linear relationship between variables when appropriate.	**Experiments with Plants** TG: L01-5 (pp9-56), L08 (pp71-74), L09.Exts (p78), L10-12 (pp81-100), L14 (pp105-114)
4. Use computer spreadsheets, graphing and database applications to assist in quantitative analysis of data.	**Experiments with Plants** TG: L14.Exts (pp109-110)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 8, **students will:**	
A. Numerical Operations	
1. Express quantities using appropriate number formats, such as: decimals, percents, scientific notation.	**Catastrophic Events** SG: L12 (pp134-153) TG: L12 (pp163-176), L14.Exts (pp193-194), L19.Exts (pp274-275), L24.Exts (pp337-338) **Earth in Space** SG: L02 (pp12-21) TG: L02 (pp11-20), L11.Exts (p170) **Properties of Matter** SG: L02 (pp14-23), L04 (pp30-37), L09 (pp78-83) L26 (pp230-235) TG: L02 (pp15-26), L04 (pp39-48), L09 (pp101-112) L25.Exts (pp307-308), L26 (pp313-332)
B. Geometry and Measurement	
1. Perform mathematical computations using labeled quantities and express answers in correctly derived units.	**Catastrophic Events** SG: L12 (pp134-153) TG: L12 (pp163-176), L14.Exts (pp193-194), L19.Exts (pp274-275), L24.Exts (pp337-338) **Earth in Space** SG: L02 (pp12-21) TG: L02 (pp11-20), L11.Exts (p170) **Properties of Matter** SG: L02 (pp14-23), L04 (pp30-37), L09 (pp78-83) L26 (pp230-235)

	TG: L02 (pp15-26), L04 (pp39-48), L09 (pp101-112) L25.Exts (pp307-308), L26 (pp313-332)
C. Patterns and Algebra	
1. Express physical relationships in terms of mathematical equations derived from collected data.	**Catastrophic Events** SG: L12-13 (pp134-163), L15 (pp170-189) L17 (pp194-197), L19-20 (pp210-231) L24-25 (pp264-282) TG: L06.Exts (pp77-78), L12-13 (pp163-186) L14.Exts (pp193-194), L15 (pp197-218) L17 (pp233-256), L19-20 (pp265-292) L23.Exts (pp325-326), L24-25 (pp329-372) **Earth in Space** SG: L02-4 (pp12-61), L18 (pp290-311) L22 (pp340-343) TG: L02-4 (pp11-52), L11.Exts (p170), L18 (pp277-286) L20.Exts (p297), L22 (pp311-326) **Properties of Matter** SG: L02-4 (pp14-37), L08-9 (pp74-83), L13 (pp112-115), L14 (pp116-121), L17 (pp140-149), L19 (pp162-167), L23 (pp208-217), L24 (pp218-223) L26 (pp230-235) TG: L02-4 (pp15-48), L07.Exts (p86), L08-9 (pp91-112) L12.Exts (p140), L13 (pp143-152) L14 (pp153-160), L15.Exts (p166), L17 (pp179-192), L19 (pp209-226), L23 (pp275-294), L24 (pp295-302), L25.Exts (pp307-308), L26 (pp313-332)
D. Data Analysis and Probability	
1. Represent and describe mathematical relationships among variables using: graphs; tables.	**Catastrophic Events** SG: L12-13 (pp134-163), L19 -21(pp210-239), L23-25 (pp252-282) TG: L04.Exts (p54), L06.Exts (pp77-78), L12-13 (pp163-186), L14.Exts (pp193-194), L16.Exts (p225) L19-25 (pp265-372) **Earth in Space** SG: L02-4 (pp12-61), L22 (pp340-343) TG: L02-4 (pp11-52), L11.Exts (p170), L22 (pp311-326) **Properties of Matter** SG: L02 (pp14-23), L04 (pp30-37), L06-10 (pp56-97) L13 (pp112-115), L19 (pp162-167), L21 (pp186-197) L24 (pp218-223), L26 (pp230-235) TG: L02 (pp15-26), L04 (pp39-48), L06 (pp65-78) L07-10 (pp79-124), L13 (pp143-152), L19 (pp209-226) L21 (pp241-260), L22.Exts (p270), L24 (pp295-302) L25.Exts (pp307-308), L26 (pp313-332)
2. Analyze experimental data sets using measures of central tendency: mean, mode, median.	**Catastrophic Events** SG: L12 (pp134-153) TG: L12 (pp163-176), L14.Exts (pp193-194) L19.Exts (pp274-275), L24.Exts (pp337-338) **Earth in Space** SG: L02 (pp12-21) TG: L02 (pp11-20), L11.Exts (p170) **Properties of Matter** SG: L02 (pp14-23), L04 (pp30-37), L09 (pp78-83) L26 (pp230-235) TG: L02 (pp15-26), L04 (pp39-48), L09 (pp101-112) L25.Exts (pp307-308), L26 (pp313-332)

3. Construct and use a graph of experimental data to draw a line of best fit and identify a linear relationship between variables when appropriate.	**Catastrophic Events** SG: L12-13 (pp134-163), L19 -21(pp210-239), L23-25 (pp252-282) TG: L04.Exts (p54), L06.Exts (pp77-78), L12-13 (pp163-186), L14.Exts (pp193-194), L16.Exts (p225) L19-25 (pp265-372) **Earth in Space** SG: L02-4 (pp12-61), L22 (pp340-343) TG: L02-4 (pp11-52), L11.Exts (p170), L22 (pp311-326) **Properties of Matter** SG: L02 (pp14-23), L04 (pp30-37), L06-10 (pp56-97) L13 (pp112-115), L19 (pp162-167), L21 (pp186-197) L24 (pp218-223), L26 (pp230-235) TG: L02 (pp15-26), L04 (pp39-48), L06 (pp65-78) L07-10 (pp79-124), L13 (pp143-152), L19 (pp209-226) L21 (pp241-260), L22.Exts (p270), L24 (pp295-302) L25.Exts (pp307-308), L26 (pp313-332)
4. Use computer spreadsheets, graphing and database applications to assist in quantitative analysis of data.	**Catastrophic Events** SG: L12 (pp134-153) L16 (pp190-193) TG: L04.Exts (p54), L09.Exts (p132), L12 (pp163-176) L13.Exts (p182), L14.Exts (pp193-194) L16 (pp219-232), L18.Exts (pp262-263) L19.Exts (pp274-275), L21.Exts (p299) L24.Exts (pp337-338) **Earth in Space** SG: L02-4 (pp12-61) TG: L02-4 (pp11-52), L08.Exts (pp108-109) L11.Exts (p170) **Properties of Matter** SG: L02 (pp14-23), L04 (pp30-37), L09 (pp78-83) L26 (pp230-235) TG: L02 (pp15-26), L04 (pp39-48), L06.Exts (p74) L09 (pp101-112), L25.Exts (pp307-308) L26 (pp313-332)
Standard 5.4 (Nature and Process of Technology) **All students will understand the interrelationships between science and technology and develop a conceptual understanding of the nature and process of technology.**	
Descriptive Statement: **This standard has three equally important strands: Developing students' understanding of the interrelationship between science and technology; introducing students to and expanding their understanding of the nature of technology; and introducing and developing students' abilities with technological design including experiences in predicting, decision making, critical thinking and ultimately, problem solving.**	
Cumulative Progress Indicators	
By the end of Grade 2**, students will:**	
A. Science and Technology	
Indicators for this strand are introduced at a higher grade level.	
B. Nature of Technology	
1. Select and use simple tools and materials to complete a task.	**Comparing and Measuring** TG: L13 (pp87-92) **The Life Cycle of Butterflies** TG: L01.Exts (p7), L02-9 (pp11-62), L11.Exts (pp71-73), L12 (pp75-80), L14 (pp85-88) **Solids and Liquids** TG: L11 (pp87-94)

	Weather TG: L05-10 (pp43-100)
C. Technological Design	
1. Make a plan in order to design a solution to a problem.	**Comparing and Measuring** TG: L14 (pp93-98) **Solids and Liquids** TG: L06.Exts (pp51-52), L07.Exts (pp59-60)
2. Describe a toy or other familiar object as a system with parts that work together.	
Building upon knowledge and skills gained in preceding grades, by the end of Grade 4**, students will:**	
A. Science and Technology	
1. Distinguish between things that occur in nature and those that have been designed to solve human problems.	**Animal Studies** TG: L14.Exts (p145)
B. Nature of Technology	
1. Demonstrate how measuring instruments are used to gather information in order to design things that work properly.	All STC units
C. Technological Design	
1. Describe a product or device in terms of the problem it solves or the need it meets.	**Animal Studies** TG: L08.Exts (p94) **Comparing and Measuring** TG: L14 (pp93-98) **Electric Circuits** RB: (pp17-21) (pp53-55) TG: L16 (pp81-84) **Motion and Design** RB: (pp29-36), (pp54-57), (pp62) TG: L01 (pp1-14), L02 (pp15-24), L05 (pp47-56) L09 (pp81-90), L15-17 (pp139-156) **Solids and Liquids** TG: L06.Exts (pp51-52), L07.Exts (pp59-60) **Sound** TG: L07 (pp49-56), L15 (pp103-112), 16 (pp113-116)
2. Choose materials most suitable to make simple mechanical constructions.	**Motion and Design** RB: (pp29-31), (pp54-57), (pp62) TG: L01 (pp1-14), L02 (pp15-24), L05 (pp47-56), L09 (pp81-90), L15-17 (pp139-156)
3. Use the design process to identify a problem, look for ideas, and develop and share solutions with others.	**Electric Circuits** RB: (pp39-41) (pp56-59) **Motion and Design** RB: (pp29-31), (pp49-51),(pp54-57), (pp62) TG: L01 (pp1-14), L02 (pp15-24), L05 (pp47-56) L09 (pp81-90), L13-17 (pp117-156) **Rocks and Minerals** TG: L04.Exts (p32)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 6**, students will:**	
A. Science and Technology	
Indicators are reinforced from previous grade level.	
B. Nature of Technology	

Indicators are reinforced from previous grade level.	
C. Technological Design	
1. Select a technological problem and describe the criteria and constraints that are addressed in solving the problem.	**Experiments with Plants** RB: (pp11-13), (pp36-46)
2. Identify the basic components of a technological system:	
input. **process.** **output.** **feedback.**	**Experiments with Plants** TG: L04 (pp39-50) **Land and Water** TG: L02 (pp11-28), L03 (pp29-36), L08-15 (pp85-172)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 8**, students will:**	
A. Science and Technology	
1. Compare and contrast science with technology, illustrating similarities and differences between these two human endeavors.	**Earth in Space** TG: L20.Exts (p297), L21.Exts (p310)
B. Nature of Technology	
2. Analyze a product or system to determine the problem it was designed to solve, the design constraints, trade-offs and risks involved in using the product or system, how the product or system might fail, and how the product or system might be improved.	**Catastrophic Events** SG: L09 (pp102-112) TG: L09 (pp127-142), L23.Exts (pp325-326) **Earth in Space** SG: L21 (pp334-339) TG: L20.Exts (p297), L21 (pp309-310)
C. Technological Design	
Recognize how feedback loops are used to control systems.	**Catastrophic Events** TG: L23.Exts (pp325-326) **Earth in Space** SG: L21 (pp334-339) TG: L20.Exts (p297), L21 (pp309-310)
Standard 5.5 (Characteristics of Life) **All students will gain an understanding of the structure, characteristics, and basic needs of organisms and will investigate the diversity of life.**	
Descriptive Statement: **The study of science must include the diversity, complexity, and interdependence of life on earth. Students should know how organisms evolve, reproduce, and adapt to their environments.**	
Cumulative Progress Indicators	
By the end of Grade 2, **students will:**	
A. Matter, Energy and Organization in Living Systems	
1. Investigate the basic needs of humans and other organisms.	**The Life Cycle of Butterflies** TG: L02 (pp11-18), L05-12 (pp29-80) L15 (pp89-94) **Organisms** TG: L01 (pp3-10), L07-10 (pp75-118), L16 (pp169-178), L17 (pp179-182)
2. Compare and contrast essential characteristics that distinguish living things from nonliving things.	**The Life Cycle of Butterflies** TG: L10 (pp63-68) **Organisms** TG: L01 (pp3-10), L15-17 (pp155-182)

B. Diversity and Biological Evolution	
1. Recognize that different types of plants and animals live in different parts of the world.	**Organisms** TG: L12.Exts (p131), L13.Exts (pp139-140)
2. Recognize that some kinds of organisms that once lived on earth have completely disappeared.	
C. Reproduction and Heredity	
1. Recognize that humans and other organisms resemble their parents.	
Building upon knowledge and skills gained in preceding grades, by the end of Grade 4**, students will:**	
A. Matter, Energy and Organization in Living Systems	
1. Identify the roles that organisms may serve in a food chain.	**Animal Studies** RB: (pp06-08) TG: L01-17 (pp3-172)
2. Differentiate between the needs of plants and those of animals.	**Animal Studies** RB: (pp16-19) (pp58-61) TG: L01-17 (pp3-172)
3. Recognize that plants and animals are composed of different parts performing different functions and working together for the well being of the organism.	**Animal Studies** RB: (pp06-11)(pp16-19), (pp30-32), (pp45-49) **Electric Circuits** RB: (pp11-12),(pp47-49) **Motion and Design** RB: (pp07-09) TG: L01-176 (pp3-168)
4. Describe the basic functions of the major systems of the human body including, but not limited to:	
digestive system. **circulatory system.** **respiratory system.** **nervous system.** **skeletal system.** **muscular system.** **reproductive system.**	**Animal Studies** TG: L13 (pp135-142) **Electric Circuits** RB: (pp53-55)
B. Diversity and Biological Evolution	
1. Develop a simple classification scheme for grouping organisms.	
2. Recognize that individuals vary within every species, including humans.	
C. Reproduction and Heredity	
1. Identify different stages in the lives of various organisms.	**Animal Studies** TG: L09.Exts (pp101-102)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 6**, students will:**	
A. Matter, Energy and Organization in Living Systems	
1. Explain how systems of the human body are interrelated and regulate the body's internal environment.	
2. Identify and describe the structure and function	**Microworlds**

of cells and cell parts.	TG: L11-16 (pp61-86)
B. Diversity and Biological Evolution	
1. Describe and give examples of the major categories of organisms and of the characteristics shared by organisms.	**Microworlds** RB: (pp37-43), (pp46-47) TG: L13.Exts (p74)
2. Compare and contrast acquired and inherited characteristics in human and other species.	**Experiments with Plants** RB: (pp11-13), (pp30-33), (pp36-40), (pp44-46)
C. Reproduction and Heredity	
1. Describe life cycles of humans and other organisms.	**Experiments with Plants** RB: (pp36-40), (pp44-46), (pp54-56), (pp62) **Microworlds** RB: (pp28-30)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 8, **students will:**	
B. Diversity and Biological Evolution	
2. Discuss how changing environmental conditions can result in evolution or extinction of a species.	**Properties of Matter** SG: L04 (pp30-37)
Standard 5.6 (Chemistry) **All students will gain an understanding of the structure and behavior of matter.**	
Descriptive Statement: **Exploring the nature of matter and energy is essential to an understanding of the physical universe. This standard leads students from their experiences with the states and properties of matter, to the development of models of the atom and the underlying principles of chemistry.**	
Cumulative Progress Indicators	
By the end of Grade 2, **students will:**	
A. Structure and Properties of Matter	
1. Sort objects according to the materials from which they are made or their physical properties, and give a rationale for sorting.	**Solids and Liquids** TG: L01-17 (pp3-140) **Sound** TG: L01 (pp11-16), L02 (pp17-22) L04.Exts (pp26-27), L05.Exts (pp35-36)
2. Use magnifiers to observe materials, then draw and describe what more can be seen using the tools.	**Plant Growth and Development** TG: L01 (pp3-8) **Sound** TG: L02 (pp17-22)
3. Observe that water can be a liquid or a solid and can change from one form to the other.	**Solids and Liquids** TG: L09.Exts (p73), L10.Exts (p85), L12.Exts (p98) L15.Exts (p124), L17 (pp137-140) **Weather** TG: L05.Exts (pp47-48), L08.Exts (p76) L13.Exts (p126)
B. Chemical Reactions	
Indicators for this strand are introduced at a higher grade level.	
Building upon knowledge and skills gained in preceding grades, by the end of Grade 4, **students will:**	
A. Structure and Properties of Matter	
1. Sort materials based on physical characteristics that can be seen by using magnification.	**Chemical Tests** TG: L11.Exts (pp103-104) L16.Exts (pp152-153), L17 (pp155-158)

	Rocks and Minerals TG: L01 (pp3-12), L02 (pp13-18)
2. Observe that water can be a liquid or a solid and can change from one form to the other and the mass remains the same.	
3. Recognize that water, as an example of matter, can exist as a solid, liquid or gas and can be transformed from one state to another by heating or cooling.	**Chemical Tests** TG: L08.Exts (p82), L10 (pp93-100)
4. Show that not all materials respond the same way to what is done to them.	**Chemical Tests** TG: L07 (pp69-78),L10.Exts (p97), L11.Exts (pp103-104), L15-17 (pp135-158) **Electric Circuits** RB: (pp13-16)
B. Chemical Reactions	
1. Combine two or more materials and show that the new material may have properties that are different from the original material.	**Chemical Tests** TG: L07 (pp69-78), L15 (pp135-148) L17 (pp155-158) **Electric Circuits** RB: (pp13-16)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 6, **students will:**	
A. Structure and Properties of Matter	
1. Recognize that about 100 different elements have been identified and most materials on Earth are made of a few of them.	
2. Show that equal volumes of different substances usually have different masses.	**3-5 Space Science** TG: Ses 2.1-2.6 (pp 172-281)
3. Describe the properties of mixtures and solutions, including concentration and saturation.	**Microworlds** TG: L09.Exts (p53)
4. Measure characteristic physical properties such as boiling point, melting point, and solubility, and recognize that the property is independent of the amount of sample.	
B. Chemical Reactions	
1. Recognize evidence of a chemical change.	**Chemical Reactions** TG: Exts (pp22-23), Part1 (pp9-14) Part2 (pp15-21) **Microworlds** TG: L01.Exts (p6)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 8, **students will:**	
A. Structure and Properties of Matter	
1. Know that all matter is composed of atoms that may join together to form molecules.	**Properties of Matter** TG: L21.Exts (p251)
2. Recognize that the phase of matter is determined by the arrangement and motion of atoms and molecules and that the motion of these particles is related to the energy of the system.	**Properties of Matter** SG: L06 (pp56-63) TG: L02.Exts (p21), L06 (pp65-78): L07.Exts (p86) L08.Exts (p96), L12.Exts (p140), L14.Exts (p157) L15.Exts (p166)

3 Know that there are groups of elements that have similar properties, including highly reactive metals, less reactive metals, highly reactive non-metals, and some almost completely non-reactive gases.	**Properties of Matter** SG: L22-23 (pp198-274) TG: L22-23 (pp263-294)
4. Recognize that a mixture often can be separated into the original substances using one of more of their characteristic physical properties	**Properties of Matter** SG: L01 (pp2-13), L11 (pp98-105) L12 (pp106-111), L14 (pp116-121) L15 (pp122-129), L17-19 (pp140-167) TG: L01 (pp3-14), L11 (pp125-134) L12 (pp135-142), L14 (pp153-160) L15 (pp161-168), L16.Exts (p178) L17-19 (pp179-226), L22.Exts (p270)
B. Chemical Reactions	
1. Show how substances can chemically react with each other to form new substances having properties different from those of the original substances.	**Catastrophic Events** TG: L19.Exts (pp274-275) **Properties of Matter** SG: L06 (pp56-63), L12 (pp106-111) L18 (pp150-161), L20 (pp170-185) L22-26 (pp198-235) TG: L06 (pp65-78), L12 (pp135-142) L16.Exts (p178), L18 (pp193-208) L20 (pp227-240), L22-26 (pp263-332)
2. Show that in most chemical reactions energy is transferred into or out of a system.	**Catastrophic Events** TG: L19.Exts (pp274-275) **Properties of Matter** TG: L22.Exts (p270)
3. Demonstrate that regardless how substances within a simple closed system interact, the total mass of the system remains the same.	**Properties of Matter** SG: L25 (pp224-229) TG: L25 (pp303-312)
4. Illustrate how atoms are rearranged when substances react, but that the total number of atoms and the total mass of the products remain the same as the original substances.	**Properties of Matter** SG: L22 (pp198-207), L25 (pp224-229) \TG: L22 (pp263-274), L25 (pp303-312)
Standard 5.7 (Physics) **All students will gain an understanding of natural laws as they apply to motion, forces, and energy transformations.**	
Descriptive Statement: **Basic principles of physics emerge in this standard, where the study of force and motion leads students to the concept of energy. All forms of energy are introduced and investigated, and principles of transformation and laws of conservation are developed.**	
Cumulative Progress Indicators	
By the end of Grade 2**, students will:**	
A. Motion and Forces	
1. Distinguish among the different ways objects can move such as:	
fast and slow. **in a straight line.** **in a circular path.** **back and forth.**	**Solids and Liquids** TG: L03.Exts (pp22-23), L04 (pp29-40)
2. Show that the position and motion of an object can be changed by pushing or pulling the object.	**Solids and Liquids** TG: L04 (pp29-40)

B. Energy Transformations	
1. Demonstrate that sound can be produced by vibrating objects.	**Sound** TG: L01-17 (pp11-118)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 4**, students will:**	
A. Motion and Forces	
1. Recognize that changes in the speed or direction of a moving object are caused by force and that the greater the force, the greater the change in motion will be.	**3-5 Space Science** TG: Ses 1.1 (pp 28-45), 2.1-2.6 (pp 172-281) **Motion and Design** TG: L03-5 (pp25-56), L07-17 (pp65-156)
2. Recognize that some forces can act at a distance.	
gravity **magnetism**	**Electric Circuits** RB: (pp07-21), (pp24-44), (pp47-61) TG: L01-17 (pp3-86) **Motion and Design** TG: L03.Exts (pp29-30) **Rocks and Minerals** TG: L11 (pp79-84)
B. Energy Transformations	
1. Identify sources of heat and demonstrate that heat can be transferred from one object to another.	**Chemical Tests** TG: L10 (pp93-100) **Electric Circuits** RB: (pp13-21), (pp24-28), (pp32-33), (pp36-38) TG: L01-17 (pp3-86) **Motion and Design** TG: L06 (pp57-64)
2. Identify sources of light and demonstrate that light can be reflected from some surfaces and pass through others.	**Chemical Tests** TG: L10.Exts (p97) **Electric Circuits** RB: (pp39-41)
3. Use devices that show electricity producing heat, light, sound, and magnetic effects.	**Chemical Tests** TG: L10 (pp93-100) **Electric Circuits** RB: (pp07-21), (pp24-44), (pp47-61) TG: L01-17 (pp3-86) **Rocks and Minerals** TG: L11 (pp79-84)
4. Show that differences in sound (loud or soft, high or low) can be produced by varying the way objects vibrate.	
Building upon knowledge and skills gained in preceding grades, by the end of Grade 6**, students will:**	
A. Motion and Forces	
1. Recognize that an object at rest will remain at rest and an object moving in a straight line at a steady speed will continue to move in a straight line at a steady speed unless a net (unbalanced) force acts on it.	
2. Recognize that motion can be retarded by forces such as friction and air resistance.	

3. Recognize that everything on or near the earth is pulled toward the earth's center by gravitational force.	
B. Energy Transformations	
1. Recognize that heat flows through materials or across space from warmer objects to cooler ones.	**Chemical Reactions** TG: Part2 (pp15-21)
2. Show that vibrations in materials can generate waves that can transfer energy from one place to another.	
3. Design an electric circuit to investigate the behavior of a system.	
Building upon knowledge and skills gained in preceding grades, by the end of Grade 8, **students will:**	
A. Motion and Forces	
1. Use quantitative data to show that when more than one force acts on an object at the same time, the forces can reinforce or cancel each other producing a net (unbalanced) force that will change speed and/or direction of the object.	**Earth in Space** TG: L15 (pp221-244)
B. Energy Transformations	
1. Recognize that the sun is a major source of the Earth's energy and that solar energy includes visible, infrared and, ultraviolet radiation.	**Earth in Space** SG: L07 (pp88-101) TG: L07 (pp83-96)
2. Describe the nature of various forms of energy, including heat, light, sound, chemical, mechanical, and electrical and trace energy transformations from one form to another.	**Properties of Matter** SG: L20 (pp170-185) TG: L20 (pp227-240)
3. Describe how heat can be conducted through materials or transferred across space by radiation and know that if the material is a fluid, convection currents may aid the transfer of heat.	**Catastrophic Events** TG: L03.Exts (pp35-36) **Properties of Matter** SG: L05 (pp38-55)
4. Show that light is reflected, refracted, or absorbed when it interacts with matter and that colors may appear as a result of this interaction.	**Earth in Space** SG: L07 (pp88-101) TG: L07 (pp83-96)
Standard 5.8 (Earth Science) **All students will gain an understanding of the structure, dynamics, and geophysical systems of the earth.**	
Descriptive Statement: **The study of science should include a study of the planet Earth and its relationship to the rest of the universe. This standard describes what students should know about the composition of the Earth and the forces that shape it, while standard 5.9 describes what students should know about astronomy and space science.**	
Cumulative Progress Indicators	
By the end of Grade 2, **students:**	
A. Earth's Properties and Materials	
1. Observe and describe rocks and soil.	**Solids and Liquids** TG: L04 (pp29-40)

B. Atmosphere and Water	
1. Identify the sources and uses of water.	**Solids and Liquids** TG: L10.Exts (p85) **Weather** TG: L10.Exts (p95), L11 (pp101-112)
2. Recognize that water can disappear (evaporate) and collect on cold surfaces (condense).	**Solids and Liquids** TG: L10.Exts (p85) **Weather** TG: L10.Exts (p95), L11 (pp101-112)
3. Describe current weather conditions and recognize how those conditions affect our daily lives.	**Weather** TG: L01-6 (pp3-62), L15-17 (pp135-150)
4. Describe daily and seasonal changes and patterns in the weather.	**Building Blocks of Science: Sky Watchers** TG: Act 02 (pp 1-6) **Weather** TG: L02-5 (pp11-54), L15 (pp135-140), L15.Exts (p137), L16 (pp141-148) L17 (pp149-150)
C. Processes that Shape the Earth	
Indicators for this strand are introduced at a higher grade level.	
D. How We Study the Earth	
1. Record observations that describe the features of the natural world in their local environment.	
Building upon knowledge and skills gained in preceding grades, by the end of Grade 4**, students will:**	
A. Earth's Properties and Materials	
1. Observe that most rocks and soils are made of several substances or minerals.	**Rocks and Minerals** TG: L01-2 (pp3-18), L03.Exts (p22) L04 (pp27-34) L16-17 (pp113-128)
2. Observe that the properties of soil vary from place to place and will affect the soil's ability to support life.	
3. Recognize that fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time.	
B. Atmosphere and Water	
1. Recognize that air is a substance that surrounds us, takes up space, and moves around us as wind.	**3-5 Space Science** TG: Ses 1.1-2.6 (pp 28-281)
2. Recognize that most of Earth's surface is covered by water and be able to identify the characteristics of those sources of water.	
oceans **rivers** **lakes** **underground sources** **glaciers**	
3. Observe weather changes and patterns by measurable quantities such as temperature, wind direction and speed, and amounts of precipitation.	**Electric Circuits** RB: (pp56-59)
4. Observe that when liquid water disappears, it turns into a gas (vapor) in the air and can reappear	**3-5 Space Science** TG: Ses 1.1-2.6 (pp 28-281)

as a liquid when cooled, or as a solid if cooled below its freezing point.	
5. Observe that rain, snow, and other forms of precipitation come from clouds, but that not all clouds produce precipitation.	
6. Recognize that clouds and fog are made of tiny droplets of water and possibly tiny particles of ice.	
C. Processes that Shape the Earth	
1. Recognize that some changes of the Earth's surface are due to slow processes such as erosion and weathering, and some changes are due to rapid changes such as landslides, volcanic eruptions, and earthquakes.	
2. Recognize that moving water, wind, and ice continually shape the Earth's surface by eroding rock and soil in some areas and depositing them in other areas.	
D. How We Study the Earth	
1. Use maps to locate and identify physical features on the Earth.	**3-5 Space Science** TG: Ses 2.1-2.3 (pp 172-225), Ses 3.3 (pp 312-323) **Animal Studies** TG: L03.Exts (p32)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 6**, students will:**	
A. Earth's Properties and Materials	
Reinforce indicators from previous grade level.	
B. Atmosphere and Water	
1. Describe the composition, circulation, and distribution of the world's oceans, estuaries, and marine environments.	**Land and Water** RB: (pp21-25) TG: L01 (pp3-10)
2. Describe and illustrate the water cycle.	**Land and Water** TG: L01-3 (pp3-36), L06 (pp63-74)
C. Processes that Shape the Earth	
1. Summarize the process involved in the rock cycle and describe the characteristics of the rocks involved.	
D. How We Study the Earth	
1. Utilize various tools such as map projections and topographical maps to interpret features of Earth's surface.	**Land and Water** TG: L07.Exts (p79), L08 (pp85-98)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 8, **students will:**	
A. Earth's Properties and Materials	
1. Observe that most rocks and soils are made of several substances or minerals.	**Catastrophic Events** SG: L22 (pp240-251), L24 (pp264-273) TG: L22 (pp303-316), L23.Exts (pp325-326), L24 (pp329-346) **Earth in Space** TG: L12.Exts (pp192-193), L18.Exts (pp285-286)

3. Recognize that fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time.	**Earth in Space** SG: L18 (pp290-311) TG: L18 (pp277-286)
B. Atmosphere and Water	
1. Describe conditions in the atmosphere that lead to weather systems and how these systems are represented on weather maps.	**Catastrophic Events** SG: L02-8 (pp12-101), L24 (pp264-273) TG: L02-8 (pp17-126), L24 (pp329-346) **Properties of Matter** TG: L05.Exts (p56)
C. Processes that Shape the Earth	
1. Explain how Earth's landforms and materials are created through constructive and destructive processes.	**Catastrophic Events** SG: L01-25 (pp2-282) TG: L01-25 (pp3-372)
2. Show how successive layers of sedimentary rock and the fossils contained in them can be used to confirm the age, history, changing life forms, and geology of Earth.	**Earth in Space** SG: L18 (pp290-311) TG: L18 (pp277-286)
D. How We Study the Earth	
1. Utilize data gathered from emerging technologies (i.e. geographic information systems (GIS) and global positioning systems (GPS)) to create representations and describe processes of change on the Earth's surface.	**Catastrophic Events** SG: L02 (pp12-25) TG: L02 (pp17-26)
2. Explain how technology designed to investigate features of the Earth's surface impacts how scientists study the Earth.	**Catastrophic Events** SG: L02-4 (pp12-53), L10 (pp114-119) L11 (pp120-133), L14 (pp164-169) L16 (pp190-193) TG: L02-4 (pp17-56), L10 (pp143-148) L11 (pp149-162), L14 (pp187-196) L16 (pp219-232), L23.Exts (pp325-326) L24.Exts (pp337-338) **Earth in Space** SG: L06 (pp74-87), L10 (pp130-145) L14 (pp200-215), L20 (pp324-333) L21 (pp334-339) **Earth in Space** TG: L01.Exts (p10), L05.Exts (p64), L06 (pp73-82) L07.Exts (pp92-93), L10 (pp147-158) L13.Exts (p206), L20 (pp293-308), L21 (pp309-310) **Properties of Matter** TG: L04.Exts (p45)
Standard 5.9 (Astronomy & Space Science) **All students will gain an understanding of the origin, evolution, and structure of the universe.**	
Descriptive Statement: **The study of science should include a study of the planet Earth and its relationship to the rest of the universe. This standard describes what students should know about astronomy and space science, while Standard 5.8 describes what students should know about the composition of the earth and the forces that shape it.**	
Cumulative Progress Indicators	
By the end of Grade 2, **students will:**	
A. Earth, Moon, Sun System	
1. Recognize that the sun supplies light and heat to the Earth.	**Building Blocks of Science: Sky Watchers** TG: Act 03 (pp 1-6)

2. Observe the patterns of day and night and the movements of the shadows of an objects on the Earth during the course of a day.	**Building Blocks of Science: Sky Watchers** TG: Act 01 (pp 1-3)m Act 02 (pp 1-6) Act 04 (pp 1-7)
B. Solar System	
1. Recognize that the sun can only be seen during the day, but the moon can be seen sometimes at night and sometimes during the day.	**Building Blocks of Science: Sky Watchers** TG: Act 01-5 (pp 1-3), (pp 1-6), (pp 1-6), (pp 1-7) (pp 1-5)
C. Stars	
1. Observe that stars are many, scattered, and different in brightness.	**Building Blocks of Science: Sky Watchers** TG: Act 01 (pp 1-3), Act 02 (pp 1-6)
2. Observe that the position of the stars, with respect to each other (constellations) is unchanging.	
D. Galaxies and Universe	
Indicators for this strand are introduced at a higher grade level.	
Building upon knowledge and skills gained in preceding grades, by the end of Grade 4**, students will:**	
A. Earth, Moon, Sun System	
1. Observe patterns that result from the Earth's position relative to the sun and rotation of the Earth on its axis.	**3-5 Space Science** TG: Ses 1 Post Assessment (pp 1-2), Ses 1 Pre Assessment (p 1) Ses 1.2 (pp 46-55), Ses 1.4-1.9 (pp 70-167), Ses 3.1-3.4 (pp 286-335, 4.1-4.5 (pp 340-423)
2. Recognize and describe the phases of the moon.	**3-5 Space Science** TG: Ses 1 Post Assessment (pp 1-2), Ses 1 Pre Assessment (p 1), Ses 1.4-1.9 (pp 70-167), Ses 2.6 (pp 260-281), Ses 4 Post Assessment (pp 1-2), Ses 4 Pre Assessment (pp 1-2), Ses 4.1 –4.5(pp 340-423)
B. Solar System	
1. Describe Earth as one of several planets that orbit the sun and the moon as a satellite of the Earth.	**3-5 Space Science** TG: Ses 1 Post Assessment (pp 1-2) Ses 1 Pre Assessment (p 1), Ses 1.2 (pp 46-55) Ses 1.4-1.9 (pp 70-137)
C. Stars	
1. Observe that stars are not all the same in brightness, size, and color.	
D. Galaxies and Universe	
1. Recognized that images of celestial objects can be magnified and seen in greater detail when observed using binoculars and light telescopes.	**3-5 Space Science** TG: Ses 1.9 (pp 152-167) Ses 3 Reading (pp 1-2)
2. Observe and record short-term and long-term changes in the night sky.	**3-5 Space Science** TG: Ses 1.2 (pp 46-55), Ses 1.6 (pp 104-121) 3 Post Assessment (pp 1-2), Ses 3 Pre Assessment (pp 1-2), Ses 3.2 (pp 300-311), Ses 3.3 (pp 312-323)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 6**, students will:**	
A. Earth, Moon, Sun System	
1. Explain how the motions of the Earth, sun, and moon, define units of time including:	

days **months** **years**	
2. Recognize that changes in the Earth's position relative to the sun produces differing amounts of daylight seasonally.	
B. Solar System	
1. Using models, demonstrate an understanding of the scale of the solar system that shows distance and size relationships among the sun and planets.	**Land and Water** TG: L02-4 (pp11-50), L09-11 (pp99-128) L12.Exts (pp132-133), L15.Exts (p167) L16 (pp173-182) **Messages From Space** TG: Act02 (pp27-45), Act03 (pp46-87) Act05 (pp96-123)
2. Recognize that the sun's gravitational pull holds the planets in their orbits and that the planets' gravitational pull holds their moons in their orbits.	**Messages From Space** TG: Act02 (pp27-45), Act03 (pp46-87)
C. Stars	
1. Observe and record short-term and long-term changes in the positions of the constellations in the night sky.	**Land and Water** TG: L08 (pp85-98), L10 (pp109-118)
2. Observe that the planets appear to change their position against the background of stars.	**Land and Water** TG: L08 (pp85-98), L10 (pp109-118) **Messages From Space** TG: Act02 (pp27-45), Act03 (pp46-87)
D. Galaxies and Universe	
1. Reinforce indicators from previous grade level.	**Messages From Space** TG: Act01 (pp6-25)
2. Galaxies and Universe: Observe and record short-term and long-term changes in the night sky.	**Messages From Space** TG: Act01 (pp6-25)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 8, **students will:**	
A. Earth, Moon, Sun System	
1. Investigate the Earth, moon, and sun as a system and explain how the motion of these bodies results in the phases of the moon and eclipses.	**Earth in Space** SG: L05 (pp62-73), L06 (pp74-87), L10 (pp130-145), L12 (pp160-173) TG: L02 (pp11-20), L04.Exts (pp45-46), L05 (pp53-72), L06 (pp73-82), L12 (pp181-196) L13 (pp197-208), L14.Exts (p217), L16.Exts (p256)
2. Explain how the regular and predictable motions of the Earth and moon produce tides.	**Earth in Space** SG: L16 (pp244-265) TG: L16 (pp245-268)
3. Explain how the tilt, rotation, and orbital pattern of the Earth relative to the sun produce seasons and weather patterns.	**Catastrophic Events** SG: L02-4 (pp12-53), L07 (pp80-95) TG: L01.Exts (pp10-11), L02 (pp17-26) L03 (pp27-44), L04.Exts (p54), L06.Exts (pp77-78) L07 (pp83-102) **Earth in Space** SG: L02-4 (pp12-61), L06 (pp74-87) L08 (pp102-121) TG: L02-4 (pp11-52), L06 (pp73-82) L08 (pp97-120)

B. Solar System	
1. Describe the physical characteristics of the planets and other objects within the solar system and compare Earth to the rest of the planets.	**Earth in Space** SG: L01-22 (pp2-343) TG: L01-22 (pp3-326)
C. Stars	
1. Understand that the sun is a star and that it shares characteristics with other stars.	**Earth in Space** SG: L02 (pp12-21), L07-8 (pp88-121) TG: L02 (pp11-20), L03.Exts (p33), L04 (pp37-52) L06.Exts (p81), L07-9 (pp83-146), L11 (pp159-180)
D. Galaxies and Universe	
1. Know that the universe consists of many billions of galaxies, each including billions of stars.	**Earth in Space** SG: L02 (pp12-21)
Standard 5.10 (Environmental Studies) **All students will develop an understanding of the environment as a system of interdependent components affected by human activity and natural phenomena.**	
Descriptive Statement: **Creating an awareness of the need to protect, conserve and preserve natural resources is a goal of science education. This standard calls for students to develop knowledge of environmental issues, including management of natural resources, production and use of energy, waste management, and the interdependence of ecosystems.**	
Cumulative Progress Indicators	
By the end of Grade 2, **students will:**	
A. Natural Systems and Interactions	
1. Associate organisms' basic needs with how they meet those needs within their surroundings.	**The Life Cycle of Butterflies** TG: L01-3 (pp3-22), L058 (pp29-52), L10-12 (pp63-80), L15 (pp89-94) **Organisms** TG: L04 (pp36-52), L07-12 (pp75-134) L16 (pp169-178)
B. Human Interactions and Impact	
1. Identify various needs of humans that are supplied by the natural or constructed environment.	**Organisms** TG: L16 (pp169-178)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 4**, students will:**	
A. Natural Systems and Interactions	
1. Differentiate between natural resources that are renewable and those that are not.	
B. Human Interactions and Impact	
1. Explain how meeting human requirements affects the environment.	
Building upon knowledge and skills gained in preceding grades, by the end of Grade 6**, students will:**	
A. Natural Systems and Interactions	
1. Explain how organisms interact with other components of an ecosystem.	**Experiments with Plants** RB: (pp24-25) (pp30-33) TG: L07 (pp65-70)
2. Describe the natural processes that occur over time in places where direct human impact is minimal.	

B. Human Interactions and Impact	
1. Describe the effect of human activities on various ecosystems.	**Experiments with Plants** RB: (pp20-21), (pp24-25) TG: L02.Exts (p24) **Land and Water** TG: L14 (pp153-162)
2. Evaluate the impact of personal activities on the local environment.	**Experiments with Plants** RB: (pp24-25)
Building upon knowledge and skills gained in preceding grades, by the end of Grade 8, **students will:**	
A. Natural Systems and Interactions	
1. Investigate the impact of catastrophic events such as forest fires, floods, and hurricanes on the environment of New Jersey.	**Catastrophic Events** SG: L01-25 (pp2-282) L01-25 (pp3-372)
B. Human Interactions and Impact	
1. Compare and contrast practices that affect the use and management of natural resources.	**Catastrophic Events** SG: L09 (pp102-112) TG: L09 (pp127-142) **Earth in Space** SG: L20 (pp324-333) TG: L20 (pp293-308)