

EXPANDING YOUTH HORIZONS RESOURCE NOTEBOOK

This resource notebook summarizes the Key Concepts from the Boston Public Schools and State Learning Standards in literacy, mathematics and science, and includes fun after-school activities linked to these concepts.

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INTRODUCTION

KEY CONCEPTS FOR CHILDREN'S EDUCATIONAL SUCCESS

After-school providers, along with parents and other family members, teachers, mentors, and many other adults, contribute to each child's overall academic, social, and emotional development. Children benefit the most when these adults work together to encourage each child's success.

Over the last several years, education leaders in Boston and across the state have been working to clarify what children should know and be able to do at each grade level in such subjects as English language arts, mathematics, and science. This effort to establish standards has been launched in order to help ensure that all children develop the skills they will need to succeed in today's economy and democracy.

Children's progress toward the academic standards is being measured by the state MCAS, as well as by other tests such as the Stanford 9. To best support children's academic growth it is important that all adults who interact with children be familiar with the academic standards that have been set by both the state and Boston Public Schools. This resource notebook outlines the Key Concepts of these standards.

While schoolteachers have the primary responsibility for helping children succeed academically, after-school time offers a unique opportunity to focus on creative learning activities that can help children build skills in an environment that supports overall healthy social development.

Learning can be fun! This resource book includes hands-on activities tied to the learning standards in literacy, mathematics, and science. Thank you for your ongoing contribution to help children succeed, both in school and beyond.

EXPANDING YOUTH HORIZONS

WORKSHOPS AND ACTIVITIES BY SUBJECT AREA

ELEMENTARY SCHOOL STUDENTS

SUBJECT	9/27 WORKSHOPS	ACTIVITIES (PART 5 OF NOTEBOOK)
LITERACY	Igniting a Love for Books Read All About It Sharing Our Stories Theater for Everyone	Calendar Cooking Do You Want To Come Along? Falling Leaves My Beautiful Neighborhood Nature Acrostics Operation Rocket Ship Shapes In Our Neighborhood Toy Story
MATHEMATICS	All Kinds of Numbers Connecting Music and Mathematics Everyday Math Games	Calendar Cooking Making Cents Number Treasure Hunt Shapes In Our Neighborhood
SCIENCE	Creations and Constructions Soapy Science The Urban Naturalist	Calendar Cooking Falling Leaves Mirror, Mirror Nature Acrostics Operation Rocket Ship

MIDDLE SCHOOL STUDENTS

LITERACY		Breakfast Box Buildings Calendar Cooking Do You Want To Come Along? Giving Directions May I Take Your Order, Please? Nature Acrostics Operation Rocket Ship Tall Tales
MATHEMATICS	Learning at the Computer Clubhouse Making Math Real Through Explorations	Breakfast Box Buildings Calendar Cooking It's About Time May I Take Your Order, Please? Traveling Times
SCIENCE	Bring It and Wing It Creations and Constructions Learning at the Computer Clubhouse Science in the Park What Makes it Work?	Breakfast Box Buildings Calendar Cooking Nature Acrostics Operation Rocket Ship

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READING IS COOL!

TIPS FOR AFTER-SCHOOL PROVIDERS

- 1 Surround children with words and the alphabet, and other materials, such as posters, charts, and maps.
- 2 Create a special and comfortable place in your center for reading and writing.
- 3 Have lots of great books around where children can access them easily.
- 4 Read with children at a regular time every day and whenever they ask you to read with them.
- 5 Talk about books before you begin reading.
- 6 Ask questions about the book while you read.
- 7 Don't be shy; "teach" a little bit about words and books. Talk about the author, illustrator, characters, and different kinds of books.
- 8 Encourage children to write: letters, labels, lists, journals, or captions for pictures they draw.
- 9 Talk with children as you play and do daily activities together to encourage their language development.
- 10 Take field trips to the local public library.

LITERACY STRATEGIES FOR AFTER SCHOOL

READING ALOUD (K - 4)

Reading aloud, either by adults or by children themselves, introduces children to the joys of reading and the importance of listening. Reading the words found in books aloud will help children begin to learn how written language is different from spoken language. To encourage reading aloud, children should be read to frequently and have many opportunities to read literature such as storybooks and children's magazines, as well as everyday items such as signs, labels, and recipes.

SHARED READING (K - 4)

Shared reading with an oversized book that everyone can see provides an opportunity for all children to participate in reading. The after-school provider and children can share the task of reading the book together. As the provider reads and explains the different words in a book, children will begin to recognize unfamiliar words and learn to sound out difficult ones. For example, a provider could read a story such as *The Little Engine That Could* many times over while drawing attention to unfamiliar words and language.

INDEPENDENT READING (K - 8)

The more children read materials they understand, the more they improve and progress toward reading independently. Children should have opportunities to read anything that interests them, such as books, magazines and newspapers, either on their own or with partners. When children choose books containing stories or pictures they enjoy, they take an important step in developing their literacy skills.

INDEPENDENT WRITING (K - 8)

Independent writing provides an opportunity for children to practice using the writing strategies they have learned. Children should have opportunities to write their messages or stories, either on their own or in a group. For example, each child might write his or her favorite foods on different pieces of paper, illustrate the pages using crayons, and then staple or glue pages together to form his or her own book.

SPEAKING, LISTENING AND PRESENTING (5 - 8)

Children should have structured opportunities to engage in small and large group discussions and speak in front of others. Children should gain experience speaking, asking questions, and providing responses in discussions about stories that have been read or a field trip the group has taken.

RESEARCH AND STUDY SKILLS (K - 8)

Children should learn to collect information from places such as the school or public library, the Internet or through interviews. These opportunities will help children develop such study skills as note taking, journal writing, or browsing the Internet.

KEY CONCEPTS: LITERACY

PRE-K THROUGH GRADE 4

LANGUAGE

How Children Learn

Children's oral language develops naturally from opportunities to speak and listen to their own language, the language of others, and the language used in stories, poems, and even television news.

What Children Should Know and Be Able To Do

Through these opportunities, children should demonstrate an understanding of how people interact when speaking the English language, such as how one speaker pauses to allow the other to answer a question.

For Example

After reading a book or story, children should be able to establish and use a set of rules for a discussion of the story, including how to listen to the ideas of others in a discussion, ask questions, and offer their own ideas.

LITERATURE

How Children Learn

Literature, such as poetry, plays, and stories that reflect the diversity of our neighborhoods and nation, sets the foundation for all language learning. Children's enjoyment of literature at a young age instills in them the joy of reading and encourages them to read more.

What Children Should Know and Be Able To Do

Through exposure to and discussion about many types of literature, children should learn to speak and write thoughtfully.

For Example

After reading and/or listening to *The Very Hungry Caterpillar* by Eric Carle several times, children should be able to identify the basic facts and main ideas of the story, such as the days of the week, what the caterpillar eats, and how the caterpillar eventually becomes a butterfly.

COMPOSITION

How Children Learn

Writing is an important way that children, and people in general, express themselves. Children should have many opportunities to write such things as lists, notes, and invitations. Younger children who cannot yet write can dictate their ideas to older children or adults.

What Children Should Know and Be Able To Do

Children should learn to enjoy the process of writing, use logically related ideas to convey their thoughts, and write with a clear focus.

For Example

Following a visit by a musician to the after-school program, children might share ideas to put in a thank you letter and dictate their thoughts to an adult who writes on large paper for everybody to see.

KEY CONCEPTS: LITERACY

GRADE 5 THROUGH GRADE 8

LANGUAGE

How Children Learn

Children's vocabulary and understanding of the English language continue to develop and improve through increased exposure to a variety of literary texts and literacy-related activities such as writing, presentations, and discussions.

What Children Should Know and Be Able To Do

Children should demonstrate an understanding of the rules for both small group and large group discussion through posing questions, actively listening, summarizing important information, taking turns, and staying on topic.

For Example

In a discussion about Harriet Tubman, children should be able to convey (orally or in writing) their understanding of Ms. Tubman's important accomplishments through clear and concise sentences that reflect appropriate use of standard English conventions and grade-level vocabulary.

LITERATURE

How Children Learn

Exposure to challenging literature such as poetry, plays, non-fiction, and fictional stories helps children learn to compose and communicate their ideas through language.

What Children Should Know and Be Able To Do

Through exposure to literature that reflects the diversity of our schools and country, children should learn to identify and understand the four major genres of literature (non-fiction, fiction, drama, and poetry); comprehend and interpret the basic facts they have read or heard; and understand or ask about the new words they encounter.

For Example

After reading or listening to a book on the life of Alexander Graham Bell, children should be able to identify that the text is non-fiction, recall basic facts and the main ideas, clarify ideas by asking appropriate questions, and try to connect the importance of Bell's work to their lives.

COMPOSITION

How Children Learn

Through writing letters, persuasive essays, and biographies, children learn to share ideas, feelings, and experiences with friends, family, and others.

What Children Should Know and Be Able To Do

Children should learn to: organize a first draft of something they are writing; rethink, revise and improve their writing; and understand correct punctuation.

For Example

In order to start a book drive, children might write a letter to a book company explaining their ideas and asking for book donations for their program. In the letters, children should show an understanding of who their audience is, express their ideas clearly and in different paragraphs, use correct punctuation, and read and revise their letters.

BPS BOOK LISTS

The BPS Core Literature List is based on the recommendations of BPS teachers in support of the BPS Learning Standards to provide students with an opportunity to read a variety of literature from different cultures and time periods.

In addition to the required reading, all teachers must select at least three other complete works from the list for their students to read during the school year.

KINDERGARTEN

TITLE	AUTHOR
Anansi and the Moss-Covered Rock	Kimmel
Bunny Money	Wells
Candlewick Book of First Rhymes, The	Anholt, Clark, and Blake
Chicka Chicka Boom Boom	Martin and Archambault
Chrysanthemum	Henkes
Cookies' Week	Ward
Elizabeth's Doll	Bodeen
Everything to Spend the Night	Paul
Go Away, Big Green Monster	Emberly
Houses and Homes	Morris
I Read Symbols	Hoban
It Takes a Village	Cowen-Fletcher
Itsy Bitsy Spider, The	Siomades
Let's Eat	Zamorana
Look Out Kindergarten, Here I Come	Carlson
Mitten, The	Brell
Mom and Me	Ford
Mouse Paint	Walsh
Ms. Bindergarten Celebrates 100th Day	Slate and Wolff
One Duck Stuck	Roal
One Monkey too Many	Koller
Owl Babies	Waddell
Rainbow Fish, The	Pfister
Time to Sleep	Fleming
Tiny Seed, The	Carle
To Be a Kid	Ajmera and Ivan
Welcoming Babies	Knight
We're Going on a Bear Hunt	Rosen
What is Round?	Dotlich

GRADE 1

PICTURE BOOKS

AUTHOR

Biggest House in the World, The	Lionni
Chair for My Mother, A	Williams
Eating the Alphabet: Fruits and Vegetables from A to Z	Ehlert
Feathers for Lunch	Ehlert
Jamaica's Blue Marker	Havill
Julius, the Baby of the World	Henkes
Lilly's Purple Plastic Purse	Henkes
Little Mouse, the Red, Ripe Strawberry and the Big Hungry Bear	Wood
Mailing May	Tunnell
Nana Upstairs and Nana Downstairs	DePaola
Officer Buckle and Gloria	Rathmann
Out of the Ocean	Frasier
Pete's a Pizza	Steig
Red Light, Green Light, Mama and Me	Best
Snow	Shulevitz
So Much	Cooke
Something from Nothing	Gilman
Something Special for Me	Williams
Telling Time with Big Mama Cat	Moser
Thunder Cake	Polacco
Tough Boris	Fox
Ugly Duckling, The	Pinkney

POETRY BOOKS

Just Around the Corner	Jacobs
Not a Copper Penny in Me House	Gunning
Surprises	Hopkins

CHAPTER BOOKS

Ant Plays Bear	Byers
Mr. Putter and Tabby Tout the Horn	Rylant
Oliver, Amanda and Grandmother Pig	Van Leeuwen
Russell Sprouts	Hurwitz

GRADE 2

PICTURE BOOKS

AUTHOR

A is for...?	Horenstein
Amazing Grace	Hoffman
Brave Irene	Steig
Crow Boy	Yashima
Emeka's Gift	Onyefulu
Everything to Spend the Night	Paul
For the Love of the Game: Michael Jordan and Me	Greenfield
Hatseller and the Monkeys, The	Wagne-Diakite
How My Parents Learned to Eat	Friedman
June 29, 1999	Wiesner
Kevin and His Dad	Smalls
Once Upon a Golden Apple	Little and De Vries
Pinkerton, Behave	Kellogg

CHAPTER BOOKS

Adam Joshua Capers: The Halloween Monster, The	Smith
Andy and Tamika	Adler
Chalk Box Kid, The	Bulla
First in the Field: Baseball Hero Jackie Robinson	Dingle
Horrible Harry in Room 2B	Kline
My Big Lie	Cosby
Seven Kisses in a Row	MacLachlan

INFORMATIONAL BOOKS

A is for Asia	Chin-Lee
Blue Butterfly, A	LeTord
Bridges are to Cross	Sturges
Clambake - A Wampanoag Tradition	Peters
Duke Ellington	Pinkney
Samuel Eaton's Day	Waters
Zoo in the Sky	Milton

POETRY BOOKS

Doodle Dandies. Poems that Take Shape	Lewis
Morning, Noon and Night	Taberski

GRADE 3

PICTURE BOOKS

AUTHOR

Abuela's Weave	Castaneda
Angel Child, Dragon Child	Surat
Chicken Sunday	Polacco
Come on Rain	Hesse
Follow the Drinking Gourd	Winter
Isla	Dorros
Legend of the Bluebonnet, The	de Paola
Miss Rumphius	Cooney
Mufaro's Beautiful Daughters	Steptoe
True Story of the Three Little Pigs, The	Scieszka
Young Genius in Old Egypt, A	Lumpkin

CHAPTER BOOKS

Ballad of the Civil War, A	Stoltz
Chocolate Touch	Catling
Good Grief ... Third Grade	McKenna
Gooseberry Park	Rylant
James and the Giant Peach	Dahl
Justin and the Best Biscuits in the World	Walter
Molly's Pilgrim	Cohen
Mouse and the Motorcycle, The	Cleary
Mouse Called Wolf, A	King-Smith
Night Crossing, The	Ackerman
Not-So Jolly Roger, The	Scieszka
Ramona Quimby, Age 8	Cleary
Stories Julian Tells, The	Cameron
Thumbs Up, Rico	Testa
Toad for Tuesday	Erickson

INFORMATIONAL BOOKS

Bird Boy	Hill
Coming Home - from the Life of Langston Hughes	Cooper
Drinking Gourd, The	Monjo
Drop of Water, A	Wick
Great Wonder, The	Howard
Have You Seen Bugs?	Oppenheim
Helen Keller	Davidson
How a Plant Grows	Kalman
Mr. Revere and I	Lawson
Rosa Parks	Brandt
Sounds All Around	Pfeiffer

POETRY BOOKS

Great Frog Race, The	George
Insectlopedia	Florian
Pond Seasons	Alderson

GRADE 4

PICTURE BOOKS

	AUTHOR
Baseball Saved Us	Mochizuki
BOOK	Lyon
Celebrate the States!	Leedy
Last Princess. The Story of Princess Ka'uiliani of Hawaii, The	Stanley
Minpins, The	Dahl
Star of Fear, Star of Hope	Hoestlandt
Starry Night, The	Waldman
Stringbean's Trip to the Shining Sea	Williams and Williams
Thank You, Mr. Falker	Polacco
Three Cheers for Catherine the Great!	Best
Train to Somewhere	Bunting

CHAPTER BOOKS

Abel's Island	Steig
Altogether, One at a Time	Konigsburg
Cabin Faced West, The	Fritz
Castle in the Attic, The	Winthrop
Charlotte's Web	White
Circle of Gold	Boyd
Courage of Sarah Noble, The	Daigliesh
Cricket in Times Square, The	Selden
Fourth Grade Wizards, The	De Clements
From the Mixed-up Files of Mrs. Basil E. Frankweiler	Konigsburg
Hundred Dresses, The	Estes
J.T.	Wagner
Koya Delaney and the Good Girl Blues	Greenfield
Later, Gator	Yep
Maizon at Blue Hill	Woodson
My Name is Maria Isabel	Ada
Night of the Twisters	Ruckman
Onion Tears	Kidd
Owls in the Family	Mowat
Poppy	Avi
Riding Freedom	Ryan
Sadako and the Thousand Paper Cranes	Coerr
Sarah, Plain and Tall	MacLachlan
Sign of the Beaver	Speare
Song of the Trees	Taylor
Spider Boy	Fletcher
Stone Fox	Gardiner
Yang the Youngest and His Terrible Ear	Namioka

INFORMATIONAL BOOKS

Boy Becomes a man at Wounded Knee. A	Wood and Numbli
Rocks and Minerals	Oldershaw
Starry Messenger	Sis
Talking Walls	Knight

POETRY BOOKS

Absolutely Awful Alphabet, The	Gerstein
Honey I Love	Greenfield
My Man Blue	Grimes

GRADE 5

PICTURE BOOKS

	AUTHOR
Amelia and Eleanor Go for a Ride	Ryan
Canyons	Paulsen
Crossing the Starlight Bridge	Mead
Dear Mr. Henshaw	Cleary
Devil's Arithmetic, The	Yolen
Ernestine & Amanda	Belton
Felita	Mohr
Fighting Ground, The	Avi
Good-bye, Vietnam	Whelan
Grandfather's Journey	Say
Great Gilly Hopkins, The	Paterson
Harry Potter and the Sorcerer's Stone	Rowling
In the Year of the Boar and Jackie Robinson	Lord
Island of the Blue Dolphins	O'Dell
JIP, His Story	Paterson
Journey to Jo'burg: A South African Story	Naidoo
Journey to Topaz	Uchida
Kid in the Red Jacket, The	Park
Leon's Story	Tillage
Letters from a Slave Girl: the Story of Harriet Jacobs	Lyons
Lotus Seed, The	Garland
Missing May	Rylant
Mississippi Bridge	Taylor
Moving Mama Town	Young
Passage to Freedom: The Sugihara Story	Mochizuki
Pinballs, The	Byers
Pink and Say	Polacco
Real Thief, The	Steig
Seven Songs of Merlin, The	Barron
Shiloh	Naylor
Sing Down the Moon	O'Dell
Snow Treasure	McSwigan
Star Fisher, The	Yep
Tonight, By Sea	Temple
War Comes to Willy Freeman	Collier and Collier
Whipping Boy, The	Fleischman
Witch of Blackbird Pond, The	Speare

INFORMATIONAL BOOKS

Pride of Puerto Rico	Walker
Sojourner Truth - Ain't I a Woman?	McKissack and McKissack
Two Tickets to Freedom	Freedman

POETRY BOOKS

Don't Read this Book, Whatever You Do! More Poems About School	Dakos
Hey World, Here I Am!	Little
Inner Chimes: Poems on Poetry	Goldstein
Words Words Words	O'Neill

GRADE 6

REQUIRED READING

AUTHOR

Gift Giver, The

Hansen

RECOMMENDED READING

Bridge to Terebithia

Paterson

Catherine Called Birdie

Cushman

Clay Marble

Fong Ho

Going Home

Mohr

Greek Gods, The

Evslin

Guests

Dorris

Island of the Blue Dolphin

O'Dell

Lion, the Witch and the Wardrobe, The

Lewis

Maniac Magee

Spinelli

Mountain Light

Yep

Number the Stars

Lowry

People Could Fly, The (folktales/African-American)

Hamilton

Rainbow People, The (folktales/Chinese)

Yep

Roll of Thunder Hear My Cry

Taylor

Secret Garden, The

Burnett

So Far from the Bamboo Grove

Watkins

Taking Sides

Soto

Tuck Everlasting

Babbitt

View from Saturday, The

Konigsburg

Watsons Go to Birmingham, The

Curtis

Where the Red Fern Grows

Rawls

Wrinkle in Time, A

L'Engle

Yellow Bird and Me

Hansen

GRADE 7

REQUIRED READING

AUTHOR

Let the Circle be Unbroken

Taylor

ALTERNATE REQUIRED READING

Hatchet

Paulsen

RECOMMENDED READING

Among the Volcanoes

Castaneda

Black Pearl

O'Dell

Dark is Rising

Cooper

Dragonwings

Yep

Goodbye, Vietnam

Whelan

Grab Hands and Run

Temple

Homecoming

Voight

Johnny Tremain

Forbes

Monkey Island

Fox

My Brother, My Sister and I

Watkins

My Brother Sam is Dead

Collier

Pigman, The

Zindel

Rumble Fish

Hinton

Scorpions

Myers

Taste of Salt

Temple

Witch of Blackbird Pond

Speare

Young Landlords, The

Myers

Young When Thunders Spoke

Sneve

Zlata's Diary

Filipovic

GRADE 8

REQUIRED READING

AUTHOR

Giver, The

Lowry

RECOMMENDED READING

Brian's Winter

Paulsen

Children of the River

Crew

Diary of Anne Frank

Frank

Dacey's Song

Voight

Dragon's Gate

Yep

Dream Keeper and Other Poems, The

Hughes

Harriet Tubman

Petry

High Elks Treasure

Sneve

Hoops

Myers

Journey of the Sparrow

Buss

Little Women

Alcott

Lyddie

Patterson

Midwife's Apprentice, The

Cushman

Nothing but the Truth

Avi

Outsiders, The

Hinton

Pearl, The

Steinbeck

Road to Memphis

Taylor

Shabanu, Daughter of the Wind

Staples

Summer of My German Soldier

Greene

Tempest, The

Shakespeare

Tree Grows in Brooklyn, A

Smith

Walk Two Moons

Creech

Year of Impossible Goodbyes

Choi

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CHANGES IN MATHEMATICS TEACHING AND LEARNING

Over the past decade, mathematics education has evolved from a subject focused on memorization to one that emphasizes the development of mathematical reasoning and problem solving skills. Such an education develops students' ability to investigate and reason about a wide range of mathematical topics.

Mathematics teaching used to rely heavily on the following:

- Teaching computations out of context
- Drilling on paper-and-pencil algorithms
- Teaching topics in isolation
- Stressing memorization
- Dispensing knowledge

Now a balance is sought, with mathematics teaching taking on aspects like:

- Actively involving students individually and in groups in exploring, conjecturing, analyzing, and applying mathematics in both a mathematical and a real-world context
- Using appropriate technology such as calculators and computers for computation and exploration
- Using concrete materials
- Facilitating learning, in addition to dispensing knowledge

Pursuing this goal has meant changing classroom instruction in some fundamental ways. Rather than viewing mathematics learning as the absorption of a series of facts and mastery of procedural manipulations, teachers and children are now meant to view mathematics as a subject that can be reasoned out and can make sense. Classrooms are intended to function as mathematical communities, in which students have opportunities to reason mathematically, communicate about mathematical ideas, and make connections.

MATHEMATICS TOPICS:

KINDERGARTEN THROUGH GRADE 8

Kindergarten

- Recognize and count numbers to 20;
- Solve addition and subtraction problems using objects to manipulate (i.e. blocks);
- Identify basic shapes; and
- Make graphs using real objects and pictures.

Grade 1

- Recognize numbers to 100;
- Compare objects by length and width;
- Recognize coins (pennies, nickels, dimes, and quarters) and know their values;
- Identify and create patterns; and
- Collect, organize, read, and understand displays of data.

Grade 2

- Recognize and count numbers to 100;
- Skip count by 2s, 5s, and 10s;
- Estimate quantities up to 100;
- Explore addition, subtraction, and multiplication; and
- Collect, organize, read, and understand displays of data.

Grade 3

- Read, write, and identify place value of numbers from 0 to 9,999;
- Multiply three digits by one digit (e.g. 125×7);
- Write and solve word problems;
- Use standard units to measure (cup, pint quart, inch, foot, etc.);
- Tell time using digital and standard clocks, by the $\frac{1}{2}$ hour, $\frac{1}{4}$ hour, and minutes; and
- Use tally marks and charts to collect, organize, and describe data.

Grade 4

- Skip count forwards and backwards using numbers 1-12;
- Identify and apply place value through hundred thousands;
- Recognize and understand fractions, decimals, and simple percents;
- Compare simple fractions and place them in order; and
- Know when to use addition, subtraction, multiplication, and division.

Grade 5

- Develop sense for whole numbers, fractions, decimals, and integers;
- Visualize and build two- and three- dimensional geometric figures;
- Make, read, and interpret a variety of graphs, and be able to decide which kind of graph is appropriate in a situation; and
- Recognize the value and equivalents in common bills and coins.

Grade 6

- Understand place value to the billions;
- Compare integers, decimals, and fractions; and
- Understand perimeter, area, volume, and angles.

Grade 7

- Identify and use place value for standard numbers, exponents and expanded numbers; and
- Collect, organize, display, and describe information and data in many forms.

Grade 8

- Recognize and use ratio and proportion;
- Investigate and describe the relationship among fractions, decimals, and percents; and
- Use estimation to solve problems involving money, length, area, perimeter, and volume.

KEY CONCEPTS: MATHEMATICS

PRE-K THROUGH GRADE 4

NUMBER SENSE

How Children Learn

Number sense is the foundation for mathematics. Understanding numbers and what they stand for helps children make sense of the world around them and is necessary for more complicated problem solving.

What Children Should Know and Be Able To Do

Initially, children should know that numbers they see around them have meaning. For example, a child should learn that a telephone number helps people to communicate and that the numbers on a road sign help people know how fast to drive. Children should learn to recognize, write, and compare numbers.

For Example

To learn how numbers are used in real-life situations, children might take a trip to the market to buy items for a cooking project and then compare the prices found on the grocery bill. Or, children playing with baseball cards might learn to compare the batting averages of the different players, determining who has the highest average.

PATTERNS, RELATIONS, AND FUNCTIONS

What Children Learn

Patterns, such as the black and red design on a checkerboard, and numerical relations, such as the number of stars on an American flag, also form the foundation of mathematics.

What Children Should Know and Be Able To Do

Children should learn to recognize patterns and relationships among objects and identify their similarities and differences.

For Example

A group of children might make a list of insects and record the corresponding number of legs each insect has. Or, a teacher may ask children to figure out how many times one must add a pair of shoes to a pile to reach a total of 10 shoes.

GEOMETRY

What Children Learn

An understanding of geometry begins when young children have opportunities to explore the size, shape and position of objects, such as the fruit in the grocery store or the plates they eat on.

What Children Should Know and Be Able To Do

Children should learn to describe and draw the shape of objects they observe in their school, at home, or outside.

For Example

Children should learn that the tables in their after-school program are the shapes of rectangles, or that the manhole cover they observe as they walk in their neighborhood is the shape of a circle. To reinforce children's learning about shapes, they should have opportunities to build these shapes using blocks or models, as well as draw these shapes.

MEASUREMENT

What Children Learn

Measurement helps children to organize and evaluate many parts of their daily lives, such as how long it might take to walk to the school bus or how many books they can carry in their knapsack.

What Children Should Know and Be Able To Do

Children should begin to understand different types of measurement such as length, width, and weight. Children should use these concepts, as well as the different tools of measurement, to estimate the weight of an object, such as a storybook, or estimate the length of distance between two points.

For Example

Using the concepts of measurement, children might try to determine if a jar of salt is half-full or quarter-full, measure ingredients for a cooking project, use a thermometer to measure temperature, or estimate whether the doorway to the room is greater than 10 inches or less than 10 inches.

STATISTICS

What Children Learn

Children learn how to collect, organize, and describe information and data.

What Children Should Know and Be Able To Do

Children should be able to collect data and other kinds of information to describe things or events that have happened. They can collect and interpret information using tally marks, graphs, tables, or charts.

For Example

A group of children can survey one another to find out how many of them have pets and what kinds of pets they have. They can use tally marks to count the different kinds of pets and then make a bar graph with picture of the animals. When finished, they can share the results with other children in the program.

KEY CONCEPTS: MATHEMATICS

GRADE 5 THROUGH GRADE 8

NUMBER SENSE

How Children Learn

Number sense helps children to develop the ability to make estimations and computations, as well as develop strategies for solving mathematical challenges.

What Children Should Know and Be Able To Do

Children should learn to write and use numbers in different forms, such as fractions, decimals and percents, and understand their meanings. Children should learn to use estimation, computation, and proportions to solve problems.

For Example

Children can brainstorm a list of groceries they would find at the supermarket, estimating the price of each. After a trip to the supermarket to record the actual prices of different products, children can discuss whether the prices seem reasonable for the amount that a consumer receives and determine what price they would set for each item.

PATTERNS, RELATIONS AND FUNCTIONS

How Children Learn

Patterns and functions are the foundation for higher mathematics, such as algebra. When children have opportunities to look for and observe patterns in simple mathematical situations, they begin to develop problem-solving strategies that can apply to other situations.

What Children Should Know and Be Able To Do

Children should recognize and describe simple mathematical patterns, such as how much the volume of water in a large bucket increases each time a smaller cup of water is added.

For Example

An after-school provider could describe an imaginary situation about a girl who uses the money she saved from her paper route to buy a new bicycle. This girl was excited and told two friends. Ten minutes later, each of these friends told two more friends. Ten minutes later, each of these friends then told two more friends. Children can be asked to form small groups and figure out how many people would know about the new bicycle if the news continued to travel in this way for 80 minutes, 100 minutes, and two hours.

GEOMETRY

How Children Learn

Children should learn to describe and draw geometric shapes, and use concepts such as size, shape, and position to gain a better understanding of the shapes they find in their daily lives.

What Children Should Know and Be Able To Do

Geometry encourages children to engage in the discovery and building of one-, two-, and three-dimensional objects. Children should have opportunities to draw and construct useful objects that will help them understand the importance of size and shape.

For Example

Children could be asked to build a bookshelf to hold books for their after-school programs. Children should be asked to consider how wide the shelves should be and why, how much space should be left between shelves, and how different sizes and shapes would make the bookshelf more or less useful.

MEASUREMENT

How Children Learn

Children gain an understanding of their world through opportunities to measure what they find around them in their daily lives.

What Children Should Know and Be Able To Do

Children, through direct hands-on experiences in their environments, should learn to use measurement tools such as thermometers, rulers, and measuring cups to investigate and solve problems they find in mathematical situations.

For Example

Children can make boxes or containers using paper or cardboard in order to measure and discuss the concept of volume. Students can make popcorn, estimate the amount of popcorn that will fit in each container, and then fill the containers and check their estimates with actual amounts of popcorn.

STATISTICS

How Children Learn

Working with statistics helps children develop problem-solving strategies. Activities that offer children opportunities to do experiments, make educated guesses, conduct follow-up tests and refine their ideas based on new information are critical.

What Children Should Know and Be Able To Do

Children should know how to read and talk about tables, charts and graphs. They should be able to make a circle graph, pie chart, or bar graph to present information or data.

For Example

Children can count the number of children in their after-school program and sort them by age, sex, or ethnicity. Children can then discuss which group has the highest percentage of members, make a circle graph, and color code each category on the graph.

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4

Divider Title: _____

SCIENCE TOPICS:

KINDERGARTEN THROUGH GRADE 8

Kindergarten

- The five senses (sight, smell, hearing, touch, and taste);
- Local natural environment; and
- Water.

Grade 1

- Living things;
- The sky/weather; and
- Movement of objects.

Grade 2

- Interaction of living things;
- Sun, moon, and Earth;
- Balancing and weighing; and
- Light and color.

Grade 3

- Plant and animal life cycles;
- Sounds; and
- Liquids.

Grade 4

- The skeletal system;
- The Earth's surface;
- Magnets and electricity; and
- Characteristics of animals.

Grade 5

- Microorganisms and cells;
- Physical properties;
- Astronomy;
- Chemical properties; and
- Plants and animals in their environments.

Grade 6

- Human body systems;
- Electromagnets and motors;
- Food chemistry; and
- Oceans.

Grade 7

- Varieties of life on Earth;
- Solids, liquids, and gases;
- Geologic events and disasters; and
- Force and motion.

Grade 8

- Cells;
- Astronomy;
- Optics; and
- Chemistry.

KEY CONCEPTS: SCIENCE

PRE-K THROUGH GRADE 4

INQUIRY

How Children Learn

Children learn science best through an inquiry approach involving hands-on activities based on concrete, everyday occurrences and using common household materials.

What Children Should Know and Be Able To Do

Through science activities, children should be able to ask questions about the world around them. In answering these questions, children should be able to observe and classify objects and events, as well as record changes in objects and events over time. Children should be able to use numbers to measure objects and communicate their observations and discoveries.

For Example

Children might sort objects they collect, such as leaves or rocks by color, size, and shape, and compare and contrast groups of objects such as animals. They might also observe a tree in their neighborhood and record how it changes over the course of the spring.

LIFE SCIENCE

What Children Learn

Life science refers to the study of living organisms, such as plants or animals.

What Children Should Know and Be Able To Do

Children should explore and describe the difference between non-living things, plants, and animals. They should be able to describe how plants and animals grow and change, and understand that some animals that once lived on earth have completely disappeared.

For Example

Children might have opportunities to watch and talk about how a caterpillar grows into a butterfly. On a visit to Franklin Park Zoo, children can identify the animals and sort them into categories. Or, children might have opportunities to explore the five senses and discuss how our senses help us to understand the world around us.

EARTH AND SPACE SCIENCE

What Children Learn

Earth and space science refers to the origin and physical make-up of the Earth and the Universe.

What Children Should Know and Be Able To Do

Children will gain awareness that the Earth is composed of land, water, and air, and have opportunities to observe and talk about each. In space science, children will learn to recognize visible objects in the night sky.

For Example

Children should have the opportunity to find different rocks and observe that they come in different sizes and colors, and are made of different materials. They can also explore and discuss water, and watch how water takes the shape of a container it is in. To learn more about space, children might view pictures of the Universe and learn that the Earth is one of several planets, and that the Moon goes around the Earth.

PHYSICAL SCIENCE

What Children Learn

The physical sciences include the study of both matter and forms of energy.

What Children Should Know and Be Able To Do

Children, through observation, should learn the differences between a solid, a liquid, and a gas. Children should gain an understanding of energy, such as how the sun supplies heat and light to the earth, and that magnets and their effect on metal objects create a form of energy.

For Example

Children can observe how ice melts from a solid to a liquid and measure the temperature of the liquid over a period of time. Children should also recognize the differences between a balloon full of air and a helium balloon. To learn more about energy, children might use and compare magnets of different sizes and strengths.

TECHNOLOGY AND MECHANICAL TOOLS

How Children Learn

Children learn best about engineering and technology by using, adapting, and creating simple tools to build objects in response to problems. Their introduction to technology can happen through the use of common items such as a thermometer, magnifying glass, or a ruler.

What Children Should Know and Be Able To Do

Children should be able to build a simple object using common items, draw a rough diagram of the object, and be able to describe its parts. Children should also be able to distinguish between human-made objects and natural objects.

For Example

Children could design and a rain gauge using common items like a ruler and a bucket to record the amount rain that falls. Children can draw a diagram of the rain gauge they are going to build and describe the different parts of the rain gauge.

SCIENCE APPLIED TO PEOPLE AND SOCIETY

How Children Learn

Children become aware of problems in society and how to use science as a way to solve some of those problems by being exposed to scientific inquiry and the impact science has on the world.

What Children Should Know and Be Able To Do

Children should be able to understand the impact science has on their lives and know that it can help solve some problems for people and communities, but that it cannot solve other problems.

For Example

Children understand that the chemicals used to clean their houses get rid of germs, but they are dangerous if people ingest them. They might also design posters to warn of the dangers of swallowing these chemicals.

KEY CONCEPTS: SCIENCE

GRADE 5 THROUGH GRADE 8

INQUIRY

How Children Learn

Children learn science best through an inquiry approach involving simple experiments with an emphasis on using data from one experience to develop general rules for the way things work.

What Children Should Know and Be Able To Do

Children should be able to ask questions and make predictions about the natural world that can be tested. They should subsequently be able to plan and conduct a simple experiment where they control the conditions to answer questions about the natural world. In their experiments, they should be able to make measurement observations using simple instruments. From collected data they should be able to interpret data and create reasonable explanations for the results of their experiments. They should be able to communicate their findings through presentations, using tables, graphs, models, etc., and use appropriate science terminology.

For Example

Children might test the ability of a sponge, paper towel, and piece of paper to absorb liquids, and create a chart or graph showing which object absorbed the most liquid. Children might also experiment to see which factor - light, water or heat - is most important to grow seedlings by controlling how the seeds are cared for.

LIFE SCIENCE

What Children Learn

Life science refers to the study of living organisms, including how plants and animals grow and behave, and how they relate to their environments.

What Children Should Know and Be Able To Do

Children should be able to explain and give examples of the organization of living matter from cells through systems as well as differences and similarities. They should be able to classify living things into kingdoms.

For Example

Children could observe a variety of living things in an aquarium and point to which living things are plants, amphibians, or fish. The children could discuss the relationships between the various forms of marine life, such as what creature eats another creature in the aquarium, where the creatures like to sleep in the aquarium, etc.

EARTH AND SPACE SCIENCE

What Children Learn

Earth and space science refers to the origin and physical make-up of the earth and the universe, which includes the study of the earth's surface, the oceans, and outer space.

What Children Should Know and Be Able To Do

Children should know the history and physical features of the earth; they should know the relationship of the objects in the sky and their effect on planet earth (i.e. the seasons and days); and they should understand the characteristics and relationships of the oceans, the atmosphere, and weather.

For Example

Children might work in a group to design and make a model of the planets and the solar system, explaining to others the differences in temperature and size among the planets, including Earth. Children can also follow events in the news, such as earthquakes and floods, and investigate why the event happened and what effects the event had on the Earth and people in that area.

PHYSICAL SCIENCE

What Children Learn

Physical science refers to the study of both energy and matter, including the relationships that exist between them.

What Children Should Know and Be Able To Do

Children should learn the properties of objects and matter such as volume, density, and boiling point. They need to know the effect that temperature has on these properties. They should know the difference between elements and compounds. Children also need to understand the difference between forces and acceleration, and the effect that friction and gravity have on the motion of objects.

For Example

Children could measure the volume of an irregularly shaped object such as a vase by filling it with water and then measuring the amount of water required to fill the object. They could measure the densities of air-filled and helium-filled balloons. Children might also measure the time it took for a toy car to roll down ramps of different heights and surfaces to help them understand acceleration, friction, and gravity.

TECHNOLOGY AND MECHANICAL TOOLS

How Children Learn

Children learn to answer engineering questions by designing real solutions to problems.

What Children Should Know and Be Able To Do

Children should be able to come up with an idea to solve a problem, design three-dimensional models for that solution and, wherever possible, build their models using tools.

For Example

Children could design a bridge to hold a weight, and build a scale model of a bridge using toothpicks. The weight would be added to test the design of the bridge. When building models, children could master the safe use of a simple power tool, such as a sander.

SCIENCE APPLIED TO PEOPLE AND SOCIETY

How Children Learn

Children learn to evaluate the application of science to society by having opportunities to apply scientific inquiry to real world situations.

What Children Should Know and Be Able To Do

Children should be able to look at a problem in society and evaluate how science could or could not help resolve the problem. Children should also be able to apply their knowledge about science to problems in society.

For Example

Children could design a recycling project in their after-school program or neighborhood, or create an emergency plan in the event of an earthquake or flood in their neighborhood.

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Divider Title: _____

LITERACY
MATHEMATICS
AND
SCIENCE
ACTIVITIES

TITLE: BREAKFAST BOX BUILDINGS
SUBJECTS: LITERACY, MATHEMATICS, SCIENCE
AGES: 10 to 13
TIME: 60 to 90 Minutes

ACTIVITY DESCRIPTION

After reading *How a House Happens* by Jan Adkins, children are ready to begin the planning, design, and construction of their own building. They create new buildings using simple instruments and tools.

MATERIALS

Squares of cardboard, 2" by 4"
Drawing materials, such as crayons and markers
Scissors and rulers
Plastic drinking straws

PREPARATION

1. Collect cereal boxes.
2. Measure and cut out squares 2" by 4".
3. Measure and cut straws into 2-inch pieces. Cut a tiny slit into each end.
4. Gather all other materials.

HOW YOU DO IT

1. Take your group to the closest library, either at the after-school site or at a Boston Public Library branch, and get a copy of *How A House Happens* by Jan Adkins.
2. Read the story aloud to children and talk about how the author shows the necessary steps in building a house.
3. Organize the children into teams.
4. Pass out materials for children to begin their project.
5. Children should slide the straw into the edge of the card.
6. The cards will connect when you slide the straw into the edge of the card.
7. Color and decorate the new buildings.
8. Set up a display of the finished buildings and have each team write a short paragraph on the use of their new building.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children **design** and carry out a plan to build a structure that could help them solve an everyday problem of needing more space. Children should be able to **organize** their materials, **plan** the work and choose the best **tools and techniques** to complete this activity. They should be able to use **numbers, computation skills, and measurement** as they work with the straws, cardboard, and other materials.

EXTENDING THE ACTIVITY

Purchase enough gumdrops and toothpicks to give each child a small plastic bag filled with 15 gumdrops and 20 toothpicks. Challenge the children to make circles, squares, triangles, or rectangles with these materials. Have fun eating when finished!

BOOK SUMMARY

In the story *How a House Happens* by Jan Adkins, children read about a family that needs a bigger house. The author takes the reader through the construction of a house in its various stages.

TITLE: CALENDAR COOKING
SUBJECTS: LITERACY, MATHEMATICS, SCIENCE
AGES: 5 to 12
TIME: 30 Minutes for 5 Days

ACTIVITY DESCRIPTION

Children learn about weather, measurement, and calendars after listening to a very funny story called *Cloudy with a Chance of Meatballs* by Judi Barrett. Children use a thermometer to measure temperature outside, and then predict how the weather makes the mercury rise or go down.

MATERIALS

A copy of *Cloudy with a Chance of Meatballs* by Judi Barrett
Thermometers
Blank calendar of one week
Pencils, crayons, or markers

PREPARATION

1. Get a copy of *Cloudy With a Chance of Meatballs* from your local library.
2. Xerox enough copies of a blank calendar for each child.
3. Obtain an outdoor thermometer.

HOW YOU DO IT

1. Read aloud *Cloudy with a Chance of Meatballs* to the children.
2. Review the story characters and events with children to make sure they understand the story line.
3. Remind children that the people of Chewandswallow in the book *Cloudy with a Chance of Meatballs* listened to the weather report to find out what the weather would be like the next day. Now with their blank calendars they will record the weather for a week.
4. Begin with Monday and review the days of the week.
5. Each day children should draw a picture of the weather. The picture should tell if the weather is sunny, cloudy, rainy, windy, or cold that day.
6. Discuss what kinds of numbers to use when talking about the temperature on a hot day or the temperature on a cold day.
7. Bring in a thermometer and leave it outside.
8. Let the children observe the temperature when you first put it outside. Each day they can record the temperature with their picture of the day's weather.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children should be able to make **observations** about **weather**, ask questions, and talk about what they see. They will also learn that **temperature** affects the weather by making it cold or hot. Children should be able to observe **patterns** in the weather.

EXTENDING THE ACTIVITY

Have the children make a fruit or vegetable salad that they think the people of Chewandswallow would enjoy. Ask them to create a recipe in which each ingredient amount is a fraction, such as $5\frac{1}{2}$ carrots or $3\frac{3}{4}$ cups of raisins.

BOOK SUMMARY

Cloudy with a Chance of Meatballs is a story about a tiny town called Chewandswallow. This town is like many other towns except for the weather. Three times a day, it rained things like soup, juice, mashed potatoes and hamburgers. Then one day the weather took a turn for the worse, and awful things began to happen.

TITLE: DO YOU WANT TO COME ALONG?
SUBJECT: LITERACY
AGES: 5 to 13
TIME: 60 to 90 Minutes

ACTIVITY DESCRIPTION

Children write a book about their after-school program.

MATERIALS

Paper
Pencils
Crayons and markers

PREPARATION

1. Go to the closest library and take out a variety of books for the different age levels in your group.
2. Display different books so that children can see how they are written.
3. Gather all materials.

HOW YOU DO IT

1. Tell the children that the after-school program needs more children to attend.
2. You need their help in making a book about the after-school program to convince more children to attend.
3. Have the children each write a page in the book about the program.
4. Review the parts of a book.
5. Develop a list to include the following:
 - Title and authors
 - What the program is about
 - Your opinion
 - Illustrations
6. Pass out writing paper and give children time to complete their page of the book.
7. Assist younger children when they need help.
8. The book will have one title and author page. Every child will be listed as an author.
9. Collect all pages when finished and put them together in a book.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children should have many opportunities to **read** and enjoy good books. They should be able to identify the different parts of a book and then learn how to write a book. Children learn how to **write**, rethink and revise their writing until they have a finished product.

EXTENDING THE ACTIVITY

Have the children select and read a book. When finished reading, give them paper, crayons, or markers, and have them illustrate their favorite part.

TITLE: FALLING LEAVES
SUBJECTS: LITERACY, SCIENCE
AGES: 5 to 9
TIME: 30 to 45 Minutes

ACTIVITY DESCRIPTION

Children make a beautiful display of the leaves they collect and share this with other children in the program. The written work can be hung on display beneath the leaf display.

MATERIALS

Different kinds of leaves
Glue
Cardboard
Recycled supermarket bags to hold the leaves
Books about leaves from the Boston Public Library
Magnifying glass

PREPARATION

1. Try this activity in the fall.
2. Collect enough recycled supermarket bags for leaves.
3. Collect some leaves ahead of time.
4. Gather all other materials.

HOW YOU DO IT

1. Pass out empty bags to groups of children.
2. Take the children outside to collect as many different kinds of leaves as they can find.
3. After collecting the leaves, lay them on tables.
4. Ask children to sort the leaves by color, size, or shape.
5. To sort by size, children can take a ruler and measure the leaves and arrange them from shortest to longest.
6. To sort by pattern, give children a magnifying lens and tell them to look at the leaves carefully to find patterns on the leaves.
7. Pass out the books on leaves, paper, and pencils.
8. Children can read the books on leaves to help them write a few sentences about the leaves they collected.
9. They can glue the leaves onto the cardboard and decorate the cardboard with other things they saw outside near the leaves.
10. When they are finished, put the leaves out for everyone to see.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children learn about their **local natural environment** by looking at leaves. Children should recognize that some leaves are alike and others are different in their appearance. They can **observe and recognize** patterns in the leaves. They spend time **comparing, contrasting, identifying and classifying**. Children share what they have learned by drawing, speaking or writing.

EXTENDING THE ACTIVITY

Children choose a leaf and draw an animal that could use the leaf for a home or food. They can write a few sentences to explain their choice.

TITLE: GIVING DIRECTIONS
SUBJECT: LITERACY
AGES: 10 to 13
TIME: 60 Minutes

ACTIVITY DESCRIPTION

Children practice writing and illustrating directions for things they do every day.

MATERIALS

Paper
Pencils
Crayons and markers
Cake mix boxes, brownie mixes, macaroni & cheese boxes, or any other packaged food items with directions on the box

PREPARATION

1. Prepare one of the food items and display it next to its packaging.
2. Gather all other materials.

HOW YOU DO IT

1. Ask the children what it would be like to do something without directions.
2. Show the sample food item and ask the children to tell you how it was made. Brainstorm the steps and have children put them in order as a group.
3. See how close they come to using the same ingredients and doing everything in the same order.
4. Compare their answers with the directions on the box.
5. Pass out the other food boxes and tell them to work with a partner.
6. One person keeps the directions and the other person tries to guess what the ingredients are.
7. Children should try to guess the order of events for making the food.
8. Make the food and have it as a snack!

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children should have experience **reading and writing different kinds of information** such as recipes, lists, and directions. This helps them become better speakers and listeners. Children learn better ways to **collect and organize information**.

EXTENDING THE ACTIVITY

Have the children pair off and practice giving and writing directions for things like folding a piece of paper or playing jump rope.

TITLE: IT'S ABOUT TIME
SUBJECT: LITERACY, MATHEMATICS
AGES: 9 to 13
TIME: 40 Minutes

ACTIVITY DESCRIPTION

Children listen to a short story and explain it using a time line.

MATERIALS

Paper
Pencil
Tape
Large sheets of paper
List of imaginary things that must be done before 8:00 p.m. this evening.

PREPARATION

1. Gather materials.
2. Tape several sheets of the large paper together to make a time line.

HOW YOU DO IT

1. Have the children listen to this story as you read it.
2. It is 4:00 p.m. and you are at a friend's house. You want to go to the movies before 7:00 p.m.
You must do the following tasks before you can depart:
 - Go home
 - Walk and feed the dog
 - Do homework
 - Eat dinner
 - Wash the dishes
 - Change clothes
3. Ask them the best way to organize all of these tasks so that they get done in a logical order.
4. Make a time schedule on one large sheet of paper showing the order in which things need to be done.
5. Write the amount of time they think they would need to do it. For example, 10 minutes, 25 minutes, or 60 minutes.
6. Draw a line going across the timeline papers.
7. Make a small line at the beginning, and write 4:00 p.m. underneath.
8. Every time you add another job, make a small line and write the time and event under it.
9. Remember to start the time line at 4:00 p.m. and end it at 7:00 p.m.
10. When finished ask the children this question: Is the time line information any easier to understand than reading it in a story or listening to it?

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children should be able to read and interpret a time line. They should also be able to use a time line to keep their own records. Children can use rules for group work such as **active listening, taking turns, and staying on the topic**. Children should begin to understand **measurement** such as **time**, and how to use time to help them **solve mathematical problems**.

EXTENDING THE ACTIVITY

Children can make time lines of their own lives. The time lines should include events that are important to them, such as their birth, beginning school, first tooth lost, getting a new pet, or moving to a new home or city.

TITLE: MAKING CENTS
SUBJECT: MATHEMATICS
AGES: 5 to 9
TIME: 60 Minutes

ACTIVITY DESCRIPTION

Children learn how to play a game buying and selling play toys.

MATERIALS

Pennies, nickels, dimes, quarters, dollar bills
Pictures of toys the children can cut out from magazines
Paper, pencils
Crayons
Scissors
Calculators

PREPARATION

1. Collect small toy items that children can sell.
2. Gather toy catalogues.
3. Make price tags for toys in amounts ranging from \$0.05 to \$2.00.
4. Gather all other materials.

HOW YOU DO IT

1. Review the names of the coins and how much each one is worth with the children.
2. Have the children cut out toys from magazines, or draw some, using paper and crayons.
3. Put price tags on all of the toys.
4. Divide the group so that some children will be buying toys while the others will be shopkeepers.
5. The shopkeepers should have money to make change, paper, pencil, and a calculator to check their work.
6. Next, give each child one dollar in coins and a dollar bill, and tell them to go shopping and buy their favorite toys.
7. When each child has had an opportunity to buy a toy, give the groups a chance to switch roles.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children should be able to **identify and count** using a penny, nickel, dime, quarter, half-dollar, and dollar. Children should **understand the value of each coin or bill**, and associate the written word with the coin or bill that it matches. In the early years, children should recognize that coins are money that can buy things and be able to **perform a simple exchange** of buying something with money **using a simple instrument like a calculator** to check their work.

EXTENDING THE ACTIVITY

Plan a party for the after-school program with a budget of \$25.00. Together, prepare a shopping list without going over the budget. Check the prices using a supermarket circular. Use calculators if you have them. Have a party!

TITLE: MAKING CENTS
SUBJECT: MATHEMATICS
AGES: 5 to 9
TIME: 60 Minutes

ACTIVITY DESCRIPTION

Children learn how to play a game buying and selling play toys.

MATERIALS

Pennies, nickels, dimes, quarters, dollar bills
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2. Have the children cut out toys from magazines, or draw some, using paper and crayons.
3. Put price tags on all of the toys.
4. Divide the group so that some children will be buying toys while the others will be shopkeepers.
5. The shopkeepers should have money to make change, paper, pencil, and a calculator to check their work.
6. Next, give each child one dollar in coins and a dollar bill, and tell them to go shopping and buy their favorite toys.
7. When each child has had an opportunity to buy a toy, give the groups a chance to switch roles.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children should be able to **identify and count** using a penny, nickel, dime, quarter, half-dollar, and dollar. Children should **understand the value of each coin or bill**, and associate the written word with the coin or bill that it matches. In the early years, children should recognize that coins are money that can buy things and be able to **perform a simple exchange** of buying something with money **using a simple instrument like a calculator** to check their work.

EXTENDING THE ACTIVITY

Plan a party for the after-school program with a budget of \$25.00. Together, prepare a shopping list without going over the budget. Check the prices using a supermarket circular. Use calculators if you have them. Have a party!

TITLE: MAY I TAKE YOUR ORDER, PLEASE?
SUBJECTS: LITERACY, MATHEMATICS, TECHNOLOGY
AGES: 10 to 13
TIME: 60 Minutes

ACTIVITY DESCRIPTION

Children design, create, and use their own menus for their after-school program.

MATERIALS

Different colors of construction paper or plain lined paper
Pencils
Calculators
Play or real money
Computer, if possible, to print up the menus

PREPARATION

1. Pick up some sample menus from restaurants.
2. Gather all materials.

HOW YOU DO IT

1. Children should develop a menu of food that children like.
2. Make a reasonable price list to go with each item created.
3. Write the items by hand and draw pictures of different items.
4. Divide the children into groups to practice taking orders, paying the bill, and giving change.
5. Make some word problems for take-out orders on a computer.
6. After 30 minutes let them change roles.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

When children use money they should be able to **understand the values of all coins and bills and use them in everyday situations**. They should be able to understand and use **dollar and cent signs** as well as **decimal points**. They can make change from \$1, \$5, \$10, or \$100. Finally, children should know how to make change starting with larger coins or bills.

EXTENDING THE ACTIVITY

Bring in some advertisements from Tower Records. Tell each child that he or she has \$300.00 to spend. What will you buy? Keep track of all the money you spend. Be able to tell how much tax you have to pay. The first one to spend \$300.00 without going over wins.

TITLE: MIRROR, MIRROR
SUBJECT: SCIENCE
AGES: 7 to 10
TIME: 30 Minutes

ACTIVITY DESCRIPTION

Children use a mirror to write a secret message.

MATERIALS

One mirror for every two children
Paper
Crayon or pencil
Table space

PREPARATION

1. Gather materials.
2. Put children in pairs.

HOW YOU DO IT

1. Pass out the mirrors, papers, and pencil to each pair.
2. Ask children to place a piece of paper on the table in front of them.
3. Set the mirrors at a 90-degree angle on top of the piece of paper.
4. Print a word on the paper, and then look at the reflection.
5. How does the writing come out? What does the word look like? How could you write it so that children could read it? Use the example of an ambulance, where the word "Ambulance" is written backwards on the hood of the vehicle so that it can be read in the rear view mirror of a car.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children learn how light works with a simple **tool** like a mirror.

EXTENDING THE ACTIVITY

Plan a trip to The Children's Museum in Boston. Make sure that you visit the mirrors on the second floor near the giant telephones.

TITLE: MY BEAUTIFUL NEIGHBORHOOD
SUBJECTS: LITERACY, SCIENCE
AGES: 5 to 9
TIME: Session 1: 30 Minutes/Session 2: 60 Minutes

ACTIVITY DESCRIPTION

Children read *Miss Rumphius* by Barbara Cooney and discuss ideas for making their neighborhood more beautiful. Then, write a group letter to the editor of a local neighborhood newspaper like the *Jamaica Plain Gazette* or *Dorchester Community News*.

MATERIALS

A copy of *Miss Rumphius* by Barbara Cooney
Paper and pencils
Crayons and markers
Envelopes and stamps

PREPARATION

1. Get a copy of *Miss Rumphius* from your local library.
2. Gather all materials.
3. Review the questions you will ask the children after reading *Miss Rumphius*.

HOW YOU DO IT

1. Ask children some of these questions before they read *Miss Rumphius*. Have any adults ever told you stories about themselves when they were young? What did you like about these stories? What did you learn from them?
2. Point out that this story is about a make-believe character that could be real. Miss Rumphius' grandfather tells her that even though she is a child, she has to help make the world more beautiful too. What do you think she will do? What kinds of things would you do to help make your neighborhood more beautiful?
3. Read the story aloud to a group of children.
4. After the story is read, ask the children to think about ways that they can make their neighborhood more beautiful. Brainstorm a list of ideas.
5. Children can each compose a letter, and then edit it with the help of other children or adults.
6. When they are satisfied with their letter they can mail it to one of the neighborhood newspapers, such as *Dorchester Community News*, the *Jamaica Plain Gazette*, *The Boston Globe* or the *Boston Herald*.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children learn about their natural local environment and ways to keep it beautiful. They put their ideas in a letter to their local neighborhood newspaper. **Independent writing** will give them an opportunity to practice using **writing strategies** that they have learned. They should **write thoughtfully and revise their writing** as they go along. Children strengthen **literacy skills** through activities like these.

EXTENDING THE ACTIVITY

Plan a trip to the Arnold Arboretum in Jamaica Plain.

BOOK SUMMARY

In the story *Miss Rumphius*, written by Barbara Cooney, children learn about a child who travels with her grandfather and helps him plant flowers all over the world. They make plans to beautify their neighborhood and write a letter to the local community newspaper.

TITLE: NATURE ACROSTICS
SUBJECTS: LITERACY, SCIENCE
AGES: 5 to 13
TIME: 45 to 60 Minutes

ACTIVITY DESCRIPTION

Children will write acrostic poems to describe natural events such as rain, sunshine, wind, and snow. They can draw pictures when finished.

MATERIALS

Paper
Pencils
Crayons or markers
A walk outside

PREPARATION

1. Make a sample acrostic before you begin. (An acrostic is a poem in which the first letter from every line combines to form a word.) For example:

A little nut
Covered
On the ground
Run, squirrel!
Now it's dinnertime!

2. Gather all the other materials.

HOW YOU DO IT

1. Take the children on a walk outside to observe the sky, trees, birds, sun, or feel the air if the wind is blowing.
2. Ask them if they have ever thought how they might describe these natural happenings.
3. Tell the children that they will make a special poem to describe some of the things they saw outside.
4. Pass out lined paper and pencils to everyone.
5. Show the sample acrostic that you made, and give directions on how to do this. Tell them to write the nature word in capital letters down the left side of the paper. Have them skip lines between each letter.
6. Tell the children to pick something they saw outside and spell it out, just like the example.
7. Pick a word that describes the nature word. Do this for each letter.
8. You will have an acrostic poem when you are finished.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children should be able to **express their thoughts in different ways, both orally and in writing.** They should be familiar with **different kinds of literature**, including poetry.

EXTENDING THE ACTIVITY

Cut out different words from magazines, comic books, or advertisements. Paste them onto large sheets of paper and make a word collage in acrostic form.

TITLE: NUMBER TREASURE HUNT
SUBJECT: MATHEMATICS
AGES: 5 to 9
TIME: 30 to 45 Minutes

ACTIVITY DESCRIPTION

This activity has children treasure hunting for numbers, both outside and in the after-school program space.

MATERIALS

Paper and pencils
Number hunt list
Construction paper
Scissors
Tape

PREPARATION

1. Prepare the number hunt list.
2. Make king and queen crowns out of construction paper for children to wear.
3. Gather paper and pencils.

HOW YOU DO IT

1. Bring your children together for a discussion about numbers, and ask them to name other places where they can find numbers.
2. Tell them they will work with partners and go on a number treasure hunt.
3. They have to find examples of each kind of number listed on the paper.
 - A fraction
 - A price
 - Today's date
 - A time showing on a clock or watch
 - A house or apartment number
 - A dress, shirt, shoe, or pants size
 - Ounces in a bottle or bag of chips
 - Money
 - The number of animals you saw outside
 - The number of pieces of fruit you and your partner(s) ate today
4. When they find the number, they have to write it next to the word.
5. Set a time for children to come back together.
6. Children can share their answers with the others in the group.
7. Give each child a paper crown after they have shared their work.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children learn that the **numbers** they see around them have **meaning**. They know that numbers on a clock face or the inside of a shirt tell the time or a shirt size. Children should be able to **recognize, write, read, and compare** the numbers.

EXTENDING THE ACTIVITY

Make a list of things that can or cannot be done in groups of 10, 25, 50, and so on. For example, children can write that they could eat 50 M&Ms, but not 50 peaches, in one sitting.

TITLE: OPERATION ROCKET SHIP
SUBJECTS: LITERACY, MATHEMATICS, SCIENCE
AGES: 5 to 13
TIME: 60 to 90 Minutes Over 2 Days

ACTIVITY DESCRIPTION

Children complete this project by making their own rocket ship, a wall mural of outer space, and a space log that records their imaginary journey in space.

MATERIALS

A copy of *Regards to the Man in the Moon* by Ezra Jack Keats
Paints and brushes
Old newspapers
Butcher paper or an old sheet to create a mural
Old boxes (a refrigerator box is great)
Construction paper for the planets
Aluminum foil for the stars
Scissors
Pencils and paper
Books about the solar system

PREPARATION

1. Get a copy of *Regards to the Man in the Moon* by Ezra Jack Keats
2. Check supermarkets, hardware, or department stores for old boxes
3. Gather all materials
4. Assign group leaders to supervise the different parts of the project

HOW YOU DO IT

1. Read aloud *Regards to the Man in the Moon* to a small group of children.
2. Review the story characters and events with children to make sure they understand the story line.
3. Tell the children that next they will paint a mural of outer space.
4. Discuss what belongs in outer space, and brainstorm a list together.
5. Talk about the different parts that need to be done, such as painting the background on the mural, cutting out the stars and planets, or making the rocket ship out of the boxes.
6. Assign or let children choose what part they want to do.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children learn that the arrangement of the different objects in **the sky** is called the **solar system**.
Children learn to ask appropriate questions about **astronomy** or use instruments like a telescope to **investigate questions** they might have.

EXTENDING THE ACTIVITY

Arrange a field trip to the Planetarium at the Boston Museum of Science. Take a look at a simple telescope or a pair of binoculars.

BOOK SUMMARY

In the story *Regards to the Man in the Moon* by Ezra Jack Keats, Louie's father isn't just the junkman the kids tease him about. Louie's father encourages him to use his imagination to build a rocket ship for a trip into outer space.

TITLE: SHAPES IN OUR NEIGHBORHOOD
SUBJECT: LITERACY, MATHEMATICS
AGES: 5 to 9
TIME: 45 to 60 Minutes

ACTIVITY DESCRIPTION

Children spend time looking at shapes they can find in pictures, buildings, clothes, and nature. They can then make a shape collage with pictures.

MATERIALS

Pictures from magazines or catalogues
Pencils
Paper
Glue
Scissors
Paper

PREPARATION

1. Collect old magazines or catalogues.
2. Gather all other materials.

HOW YOU DO IT

1. Pass out the catalogues or old magazines.
2. As children look at pictures, have them describe the shapes they see by size, color, and where the shape is on the paper.
3. Pass out paper, scissors, and glue.
4. Have children cut out different shapes they find, and glue them on paper to make a shape collage.
5. When they are finished, let them share their work with others in the group before you hang it up for display.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children should know that shapes are everywhere. They should be able to **recognize, describe, draw,** and classify the shapes they see. When finished with their activity, children should be able to **organize** their **ideas** and **speak clearly** about the collage they have completed.

EXTENDING THE ACTIVITY

Take the children outside to look for plants or insects, or at buildings, and ask them to find the shapes in those objects. Have them make a shape collage using construction paper based on the shapes they saw outside.

TITLE: TALL TALES
SUBJECT: LITERACY
AGES: 10 to 13
TIME: 45 to 60 Minutes

ACTIVITY DESCRIPTION

Children will have fun reading some tall tales or talking about exaggerations like *"it's raining cats and dogs."* The real fun comes when they try creating some tall tales on their own.

MATERIALS

Books
Plain writing paper
Pencils

PREPARATION

1. Visit your local library and find some books about legendary heroes like Paul Bunyan, Johnny Appleseed, John Henry or Annie Oakley.
2. Gather the other materials.

HOW YOU DO IT

1. Read one of the tall tale stories together and have the children find examples of exaggerations.
2. Point out that tall tales could:
 - Be funny
 - Have exaggerations
 - Be about something that could really happen
3. See if they can pick out the exact words that make up the exaggerations.
4. Have the children discuss and compare what they have found.
5. Next, they can work in teams to create their own superhero and write an exaggerated story to go with it.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

As children write, they take time to **edit, revise, and improve their work** as needed. When all revisions and corrections have been made, children can "**publish**" their stories in their best handwriting or turn them into a group booklet with illustrations and covers.

EXTENDING THE ACTIVITY

Children can draw or make tall tales heroes "in action" using any crafts materials you have.

TITLE: TOY STORY
SUBJECT: LITERACY
AGES: 5 to 9
TIME: 30 to 40 Minutes

ACTIVITY DESCRIPTION

Children become good listeners as they pay attention and hear about a special toy.

MATERIALS

Each child's favorite toy from home
Extra toys
Paper and pencils
Large plastic bag

PREPARATION

1. Have some extra toys available for those children who did not bring in a toy.
2. Write each toy story question (see below) on an index card or piece of paper.
3. Gather all other materials.

HOW YOU DO IT

1. Pass out a toy story question to each child in the group.
2. Help each child put his toy in the bag before he comes to the front of the group.
3. The child cannot show the toy until all the questions have been answered.
4. Call on the children in the audience one at a time to read these questions.
5. Give help in reading if needed.
6. The child with the toy must answer the question before he can continue to the next question.
 - How big is your toy?
 - What color is your toy?
 - How long you have had this toy?
 - When do you play with this toy?
 - Did you have to learn how to use the toy?
 - Is it a toy that a lot of children have?
 - Where can you get this toy?
 - What do you like most about this toy?
 - Call on someone to guess the name of this toy. Continue to call on children until the toy is guessed.
7. The child who correctly guesses the toy will come up next.

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children should be able to **collect** enough information about their toy to share with others. They should be able to **organize and present** them in an organized way and **speak** in clear sentences. Other children **listening** should be able to understand the words used and hear the child speaking. If questions need to be asked, children will know how to **wait** until someone is finished talking before another child comes up to share his toy.

EXTENDING THE ACTIVITY

Take a weekly TV schedule and ask each child to pick his or her favorite TV show. Tell him or her to write five sentences or less describing the show without giving the name. Read it. See if anyone can guess what show it is.

TITLE: TRAVELING TIMES
SUBJECT: MATHEMATICS
AGES: 10 to 13
TIME: 45 to 60 Minutes

ACTIVITY DESCRIPTION

Children grasp the concepts of time, distance, and map scales when they look at a map and try to figure out the distance between two cities and how long it will take a person to get there using different types of transportation.

MATERIALS

Massachusetts maps
Paper and pencils
Rulers
Calculators

PREPARATION

1. Get enough maps of Massachusetts for your group.
2. Make several of the following transportation charts for the children before you begin this activity.
3. Gather all materials.

HOW YOU DO IT

1. Divide the children into small groups.
2. Give each group a map of the State of Massachusetts.
3. Open the map and help the children locate the scale of distance at the bottom of the map.
4. Spend a few moments making sure each child can locate the key, and remembers how to use it.
5. Find two cities that you know.
6. Take a ruler and measure the distance between these two cities.
7. Pass out paper and pencil and figure out much time that it would take to get from one city to the other using different kinds of transportation.
8. Pass out the chart to figure out how long it will take to travel using the following forms of transportation:

☐ Foot	4 mph	☐ Jet plane	550 mph
☐ Bicycle	12 mph	☐ Supersonic plane	1,400 mph
☐ Car	55 mph	☐ Space shuttle	17,150 mph
☐ Train	90 mph		

9. Give the children time to discuss among themselves how each problem is solved.
10. After the children have finished their work, encourage a discussion about the fastest and slowest ways to travel. Which way would they travel and why?

WHAT CHILDREN SHOULD KNOW AND BE ABLE TO DO

Children first learn to develop a **plan** to **solve problems** before they begin their work. They also learn to **measure** and judge the most efficient way to travel between two places. They are able to set up and solve each problem using the appropriate form of **computation** to determine the travel time. Children should be able to write a **ratio or fractions** to solve problems like these.

EXTENDING THE ACTIVITY

Use this same activity when going on a field trip. How long would it take you to get from the after-school program to the field trip by walking? By bus?

CITYACCESS PROGRAM

CityACCESS is a cultural access program founded in 1994 with the support of the Mellon Trust. The program's goal is to work closely with community-based organizations to provide the residents of Boston's underserved neighborhoods with access to the city's leading cultural institutions. CityACCESS links four groups together - The Children's Museum, the Museum of Science, the New England Aquarium, and the Wang Center for the Performing Arts - with grants to work with community-based organizations to augment their outreach initiatives. Mellon Trust's sponsorship pays for free admission and transportation to exhibitions, performances, workshops, and special events at the five institutions.

In addition, the program sponsors and recruits high school students known as "Teen Ambassadors" who are paid to serve as liaisons between the cultural institutions and community agencies. Part of the teens' responsibilities are to work with community groups, acting as facilitators and guides to the institutions. In turn, the Teen Ambassadors learn about possible career opportunities within the institutions and are encouraged to seek higher education. Teen Ambassadors who are seniors and who choose to attend college are awarded a \$2,500 Mellon/CityACCESS scholarship.

For more information about the CityACCESS initiative, please contact
Lucy Nguyen, CityACCESS Outreach Liaison, at
(617) 722-7602 or via e-mail at nguyen.ll@mellon.com.

To participate directly in CityACCESS at any of the five institutions, please contact the following individuals listed below:

The Children's Museum - Deirdre Bradley, (617) 426-6500, ext. 405
Museum of Science - Maria Cabrera, (617) 589-0418
New England Aquarium - Helen Chin, (617) 973-0281
Wang Center - Michael O'Keefe, (617) 482-9393, ext. 259

MUSEUM RESOURCES

Boston Marine Society	(617) 242-0522
Boston Tea Party Ship & Museum	(617) 338-1773
Bunker Hill Museum	(617) 242-1843
Children's Museum	(617) 426-6500
Hull Lifesaving Museum	(617) 242-8806
Institute of Contemporary Art	(617) 266-5152
Isabella Stewart Gardner Museum	(617) 566-1401
John F. Kennedy Library and Museum	(617) 929-4523
John Hancock Observatory	(617) 247-1977
Longyear Museum - Chestnut Hill	(617) 278-9000
Museum of Afro-American History	(617) 739-1200
Museum of Fine Arts	(617) 267-9300
National Center of Afro-American Artists	(617) 442-8614
Museum of Science	(617) 723-2500
Museum of Transportation	(617) 522-6547
New England Aquarium	(617) 973-5206
Nichols House Museum	(617) 227-6993
Old South Meeting House	(617) 482-6439
Old State House	(617) 720-3290
Paul Revere House	(617) 523-1676
Shirley-Eustis House	(617) 442-2275
Sports Museum of New England	(617) 624-1234
USS Constitution Museum	(617) 426-1812