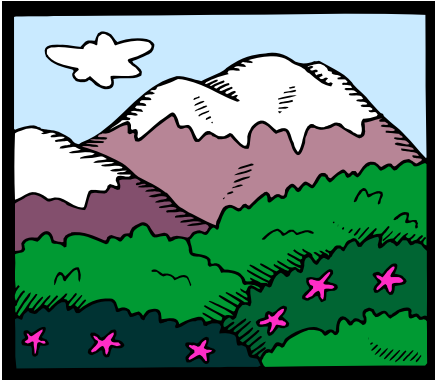


INTERDISCIPLINARY LESSONS

Idaho Department of Education



Grade 4

Language Arts
Mathematics

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**Marilyn Howard Ed.D.
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Math Stories

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Math Stories

Introduction

Words differently arranged have a different meaning and meanings differently arranged have a different effect.

Blaise Pascal (1623-1662)

The following Fourth Grade Interdisciplinary Math Story Problem Lessons integrate various Idaho Achievement Standards. Specifically, grade-level social studies, science, health, and humanities connections provide the context within which relative mathematics and language arts standards are identified and addressed. Therefore, while these Interdisciplinary Lessons are aligned with 4th Grade Language Arts and Mathematics Achievement Standards, they incorporate science, social studies, health, and humanities connections and present opportunities for students to become familiar with math story problems within those relative contexts. A language arts emphasis of writing across the curriculum and a mathematics emphasis of reasoning and problem solving are addressed through exercises involving reading and writing math story problems.

The primary purpose of this document is to help teachers teach language arts and mathematics through best practice techniques and within interesting contexts, while at the same time documenting standards references and alignment. A secondary purpose is to help teachers justify teaching other content areas (science, social studies, health, and humanities) as prescribed in State Board Rule, but often not addressed due to time constraints and ISAT/AYP concerns and pressures.

In addition to giving students the opportunity to solve word problems and communicate their strategies, it is also important to give students opportunities to delve into the world of math story problems at a much deeper level. These opportunities involve helping students to read and write math story problems and to understand what they are reading and what is being asked of them. Then, students can better attempt to formulate plans for solving the story problems. Student familiarity with the many aspects inherent to math story problems, as well as the related language arts skills, mathematical concepts, and other content area standards involved, will be a tremendous benefit to students in a wide variety of situations.

Although aligned to 4th grade standards, the lesson exercises could be adapted to other grade levels; teachers are encouraged to use this resource as best fits their students' needs. The included generic graphic organizers and specific Idaho-related literature resources could be useful to teachers at many different grade levels. Many possibilities exist for teachers to expand on resources contained in this Interdisciplinary Math Story Problem Lesson document.

Gail Rochelle
English Language Arts

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Math Stories

Using This Document

These Interdisciplinary Lesson Plans provide a starting point for teachers whose districts have not formalized their own standards-based curriculum as well as additional support for those whose districts have developed and published standards-based curriculum. Although the suggestions that follow form a framework that addresses all relevant Idaho standards, we are hopeful that teachers will incorporate their own professional training and experience to complete the course. The suggested activities representative alternative activities that may assist students achieve objectives. We encourage teachers to seek those activities that most capitalize on local resources or interests. Employed strategies may implement or extend opportunities for students to meets standards. We encourage teachers to identify additional activities and the standards they address for possible inclusion in a future revision and expansion of this guide.

Math Stories

Student Evaluation Philosophy

Assessment of student progress toward mastering individual standards should be on-going and imbedded within instructional blocks. Ideally, assessments should be formative in nature and assist to guide subsequent instruction. We encourage a variety of approaches to assessing student performance: performance, portfolios, and traditional testing. At the completion of this course, an end of course summary assessment device can validate student achievement.

Math Stories

Applying the Writing Process to Student-Generated Math Story Problems

Instruction should begin with the teacher modeling each part of the **writing process** for the whole class. Guided practice, students working in pairs, and independent practice should follow.

The goal of the writing process is for students to make applications to and connections between their knowledge of writing, math, Idaho history, health, science, art and/or music.

Pre-write: Generate ideas and develop a plan for writing the problem. Students use ideas from their study of the content areas to write a math story problem.

Draft: Students write their math story problem (story and question) based on their plan. Next, the student author solves the story problem and shows/explains the solution (steps and answer).

Revise: Students make changes to their story as needed by asking and answering questions such as:

- Do I have an interesting story?
- Does my story have a question?
- Can I solve my problem?
- Can my partner solve my problem?
- Do I have all the needed information to solve the problem?
- Does my answer match my question?
- Does it make sense?

Edit: Students correct all errors in conventions (spelling, punctuation, capitalization, grammar and usage).

Publish: Students write the final copies of their story problems and display/present solutions. Write the solution on a separate page from the story problem.

Options: Illustrate; publish a class book; share stories with another class.

Math Stories

Lesson

1

Grade Level: Four

Focus: Reading Math Story Problems

Concept: Reading a Variety of Grade Level Materials

Idaho Achievement Standards:

Language Arts:

707.01 Read a variety of traditional and electronic materials for information and understanding.

707.03 Read a variety of traditional, technical, and electronic materials for critical analysis and evaluation.

707.04 Read to locate information from a variety of traditional, technical, and electronic sources.

707.05 Read for technical information.

Mathematics:

298.01 Understand and use a variety of problem-solving skills.

- **Content Knowledge and Skills:**

- a. Select strategies appropriate to solve a problem.

298.02 Use reasoning skills to recognize problems and express them mathematically.

- **Content Knowledge and Skills:**

- a. Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning and concepts

298.04 Communicate results using appropriate terminology and methods.

- **Content Knowledge and Skills:**

- b. Use appropriate vocabulary to communicate mathematical information.

Procedure for Teaching:

Present examples of math story problems on transparencies for whole group (do first three steps with all examples; do next four steps as possible extension?):

1. Read math story problem together (identify vocabulary within the text?).
2. Identify two parts: story and question (highlight the question); story statements are declarative sentences and questions are interrogative.

Math Stories

3. Interpret questions: What does it mean? Is it reasonable? Can it be solved?
4. Brainstorm other possible questions: What other question(s) can we ask?
5. Write questions as a group...*draft*
6. Solve...in small groups
7. Revise (and rewrite) as whole group

Lesson Extensions:

Have students rephrase story problems, placing the question within the story, rather than at the end.

Given story problems with a question incorporated within, ask students to identify the question.

Materials and Resources:

Story problems from various textbooks

Jane's Family Trip to Yellowstone National Park (Direct Math Assessment Toolkit)

Math Story Problems and Questions – Blackline Master

Math Stories

Math Story Problems and Questions

1. **On the way to school, Cameron saw 35 cows, 17 horses, 6 dogs, 3 cats, and 15 geese.**

How many animals did Cameron see on the way to school?

2. **The highest point in Idaho is Mt. Borah at 12,662 feet. The lowest point in Idaho is the city of Lewiston at 747 feet.**

What is the difference in the elevations of the highest and lowest points in Idaho?

3. **The Ruiz family has a bird feeder in their backyard. One day they counted 32 robins, 18 crows, 2 eagles, 25 magpies, and 48 starlings.**

How many birds did they count that day?

Math Stories

4. At the concert, 4th grade students sang 3 western songs, 2 pop songs, and 1 jazz song.

How many more western and jazz songs did they sing than pop songs?

5. Idaho Elementary School had a bake sale to raise money for their Idaho History field trip to the Capitol. The 4th grade students sold 126 brownies, 96 cupcakes, and 200 cookies. Each item was sold for 25¢.

How many bake sale items did they sell?

6. In Science, 4th grade students learned there are 8 bones in the human skull that protect the brain, 14 bones that protect the face, and 6 bones in each ear.

How many bones are in the human head?

Math Stories

- 7. In June, Miss Brown's class recorded the following temperatures: 85°F, 70°F, 95°F, and 80°F. What was the average temperature for the days recorded?**
- 8. The Sager family migrated west on the Oregon Trail. They made a block quilt that was 24 inches wide and 36 inches long. How many 6-inch square blocks did they need to complete their quilt?**

Grade Level: Four

Focus: Writing Math Story Questions

Concept: Writing Process

Idaho Achievement Standards:

Language Arts:

708.01 Understand and use the writing process.

708.02 Write and edit for correctness and clarity.

Procedure for Teaching:

Guided (teacher models with whole group; then individual/small group work).

Present examples of math story only (without any questions) on transparencies for whole group discussion.

For each story, remind students that story problems have a story and at least one question. Ask students, “Based on this story, what questions could you ask?”

Math Stories and Example Questions

1. [Health Connection] At recess, the principal watched the students play. He saw 27 children playing soccer, 4 on the swings, and 48 playing on the big toy.

Example questions to get students started:

- How many total children were playing?
- How many more children were on the big toy than playing soccer?
- The next day there were twice as many children on the swings. How many children were swinging the next day?
- The principal thought that 27 students playing in one soccer game was too many. He divided the students into 3 equal groups. How many students were in each group?

2. [Social Studies Connection] Mrs. Brown’s fourth grade class took a survey of their school on favorite symbols of Idaho. They found out 86 liked the Mountain Bluebird, 42 chose the Appaloosa Horse, 110 liked the Cutthroat Trout, and 16 picked the Star Garnet.

Example questions to get students started:

- How many total students were surveyed?

Math Stories

- How many more students choose the Cutthroat Trout than the Star Garnet?
 - What was the total number of students who choose the Appaloosa Horse and Mountain Bluebird?
 - In a survey the following year, twice as many students picked the Star Garnet. How many chose the Star Garnet the following year?
3. [Science Connection] Jasper was counting the rocks in his rock collection. He had 45 Quartz, 23 Star Garnets, 6 Obsidian, 87 Opal, and 17 Galena rocks.

Example questions to get students started:

- How many different types of rocks did Jasper collect?
 - How many more Galena did Jasper have than Obsidian?
 - That afternoon Jasper collected three times as many Star Garnets as he had, and added them to his collection. How many did he now have in his collection? (Be sure to add the Star Garnets he already had to those he collected that afternoon.)
 - Jasper decided to divide the Quartz into 5 equal groups. How many rocks will be in each group?
4. [Social Studies Connection] During the fall, the Shoshone tribe was preparing for winter. They gathered 1,000 camas bulbs, 489 huckleberries, 5 buffalo, 12 deer and caught 156 salmon.

Example questions to get students started:

- How many more camas bulbs did they gather than huckleberries?
 - If they gathered three times as many buffalo, how many buffalo would they have?
 - If they divide the deer equally among six families, how many deer would each family have for the winter?
5. [Health Connection] Ally was reading the nutrition label on her candy bar. According to the label, her candy bar had 10 grams of fat, 20 grams of sugar, 3 grams of protein, 1 gram of fiber, and 1 gram of salt.

Example questions to get students started:

- How many more grams of fiber are there than salt in Ally's candy bar?
- Another candy bar had 3 times as much protein as Ally's candy bar. How many grams of protein were in the other candy bar?

Materials and Resources:

Blackline Master – Math Stories

Grade Level: Four

Focus: Writing Math Story Problems

Concept: Writing Process

Idaho Achievement Standards:

Language Arts:

708.01 Understand and use the writing process.

708.02 Write and edit for correctness and clarity.

Procedure for Teaching:

Part A – Teacher Modeling

Teacher models the writing process using the think-aloud strategy and writing process addendum.

“When I think about creating a story problem, I start by brainstorming all the topics that we have studied this year, such as:

- Wildlife of Idaho;
- The Journey of Lewis and Clark;
- Native Americans of Idaho.”

“After I have a list of topics, I select one. I am going to select the Native Americans of Idaho as my topic.”

“Using a graphic organizer, I list specific details that will help me construct my math story. Specific details for this story could be:

- The Native Americans of Idaho caught salmon for their main source of food;
- Chief Joseph caught 12 salmon;
- Falling Star caught 3 salmon;
- Ollokot caught 6 salmon.”

“From the details, I construct my story.”

“The main source of food for the Native Americans of Idaho was salmon. In one tribe, Chief Joseph caught 12 salmon, Falling Star caught 3, and Ollokot caught 6.”

“Now that I have a story, I need to write a question. I will start by brainstorming a few questions, such as:

- How many salmon did they catch altogether?
- How many more salmon did Chief Joseph catch than Ollokot?

- How many times more salmon did Ollokot catch than Falling Star?”

“Once I have a list of questions, I pick one.”

“The next step in the writing process is **revising**. Revising math story problems is a bit different than revising narrative writing. Of course, I still check for good details, but I also ask questions like:

- Do I have a math story?
- Does my story have a good question?
- Can I solve my math problem?
- Does the story make sense?
- Do I have all the needed information to solve the math problem?
- Can someone else solve the math problem?
- Does my answer match my question?”

“One way to do this revision is working with partners. Class, will you be my partner and help me revise by solving this story problem?”

“The next step in the writing process is **editing**. When we edit, we look for spelling, punctuation, capitalization; grammar and usage.”

“The final step is **publishing**. Here’s my final math story problem and question.”

The main source of food for the Native Americans of Idaho was salmon. In one tribe, Chief Joseph caught 12 salmon, Falling Star caught 3, and Ollokot caught 6.

How many salmon did they catch altogether?

$$12 + 3 + 6 = 21$$

Part B – Brainstorming as a Whole Group

Repeat the steps in Part A, while putting the following on the board:

- units being worked on
- current news
- current school events

Draft the scenario on the board for the problem.

Generate possible questions for this story.

Draft the story problem as a whole group.

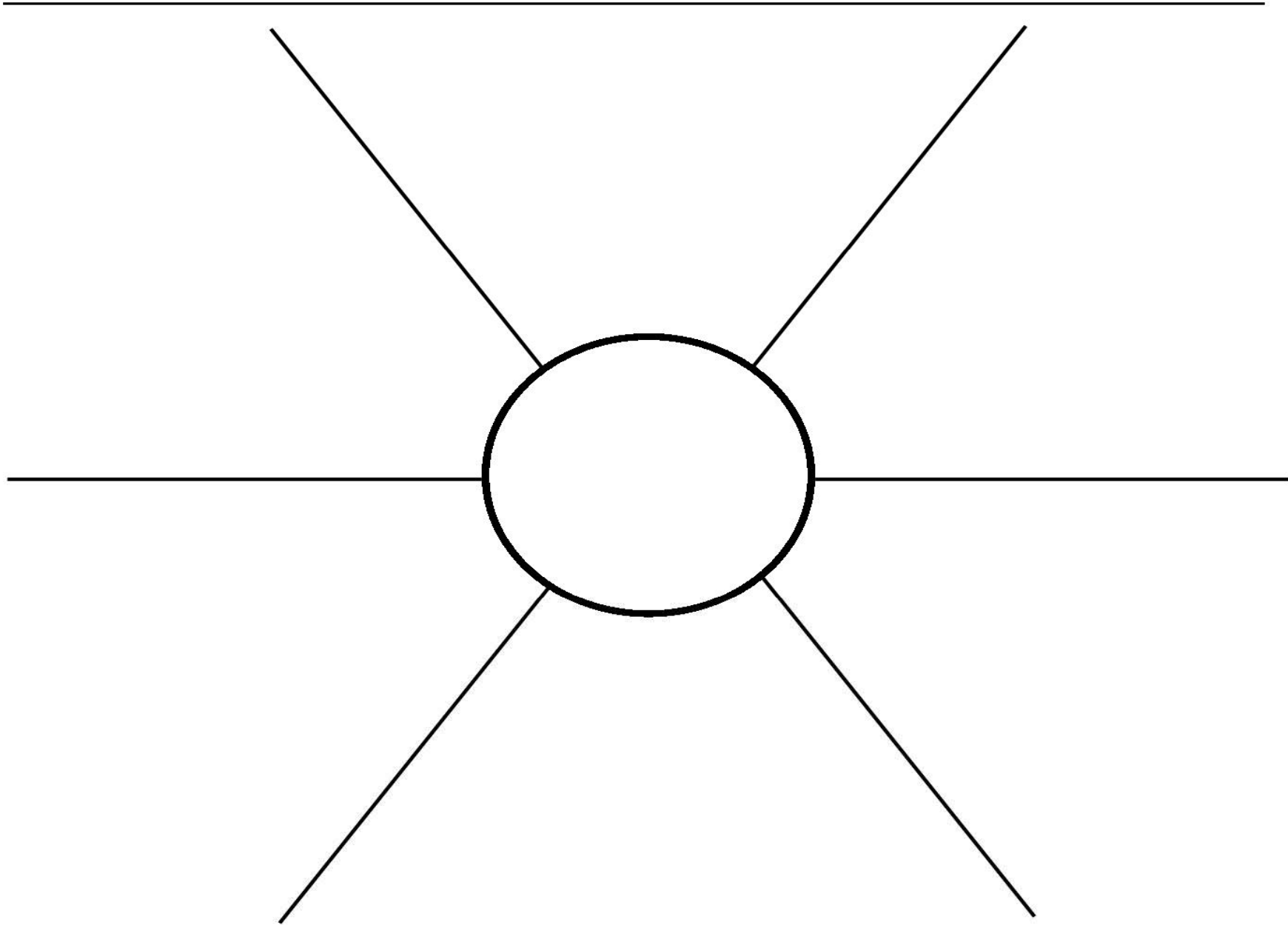
Part C – Small Group

Follow the format in Part B, using small groups.

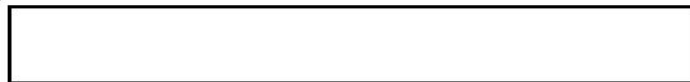
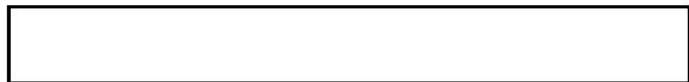
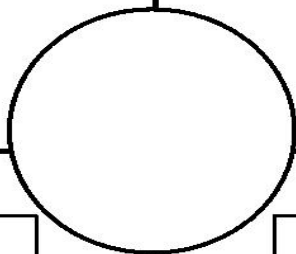
Teacher continues to support the writing process.

APPENDIX A
Graphic Organizers

NAME _____



NAME _____



NAME:

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APPENDIX B
Resources

Idaho-Related Literature

- Beatty, Patricia. *Bonanza Girl*. Beech Tree Books, 1993.
- Boos, Kevin. *The Canyon Door*. Writer's Press, 1994.
- Brink, Carol Ryrie. *Caddie Woodlawn*. Aladdin, 1990.
- Hall, Elizabeth and Scott O'Dell. *Thunder Rolling in the Mountains*. Yearling, 1993.
- Herbert, Janis. *Lewis and Clark for Kids: Their Journey of Discovery with 21 Activities*. Chicago Review Press, 2000.
- MacGregor, Carol Lynn. *Shoshoni Pony: First Horse in the Northwest*. Caxton Press, 2003.
- Morrow, Honore. *Seven Alone*. Scholastic Paperbacks, 1977.
- Morrow, Honore and Edward Shenton. *On to Oregon!* HarperTrophy, 1991.
- O'Dell, Scott. *Streams to the River, River to the Sea*. Fawcett, 1987.
- Paulsen, Gary. *Mr. Tucket*. Yearling, 1995.
- Speare, Elizabeth George. *The Sign of the Beaver*. Yearling, 1994.
- Stapilus, Randy. *It Happened in Idaho*. Falcon, 2002.
- Steiner, Joy and Stan. *P is for Potato: An Idaho Alphabet*. Sleeping Bear Press, 2005.
(Teacher guide available online: www.sleepingbearpress.com)
- Sullivan, George. *Lewis and Clark – In Their Own Words*. Scholastic, 2003.
- Thomasma, Kenneth. *Naya Nuki: Shoshoni Girl Who Ran*. Baker Books, 1983.
- Thomasma, Kenneth. *Soun Tetoken: Nez Perce Boy Tames a Stallion*. Econo-Clad Books, 1999
- Tunnell, Michael O. *Mailing May*. HarperTrophy, 2000.

Additional: Canyon River
Crossing the Mountain
Facing West
Idaho History for Kids
Sacajawea
Seaman's Journal
The Voice of Sacajawea

APPENDIX C

Idaho Achievement Standards: Language Arts

669. LANGUAGE ARTS/COMMUNICATIONS STANDARDS.

Language, the gateway to learning, provides our most powerful and readily available tool to represent the world to ourselves as well as ourselves to the world. Not only a means of communications, language serves as our primary instrument of thought, a defining feature of culture, and an unmistakable mark of personal identity. (5-3-03)

706. LANGUAGE ARTS/COMMUNICATIONS STANDARDS - GRADE 4, SECTIONS 707 THROUGH 711.

707. READING.

Rationale: Read a variety of grade-level materials and apply strategies appropriate to various situations. Content knowledge and skills of prior grade levels must be acquired in addition to addressing current grade level.

Standard - The student will:	Content Knowledge and Skills:
<p>01. Read a variety of traditional and electronic materials for information and understanding.</p>	<p>a. Use decoding strategies to fluently read fourth-grade materials.</p>
	<p>Phonics</p>
	<p>b. Use spelling patterns, syllabication and other strategies to identify words.</p>
	<p>c. Use phonics cues to automatically and accurately identify and pronounce words.</p>
	<p>Word Analysis</p>
	<p>d. Apply knowledge of derivations, synonyms, antonyms, homonyms, multiple meanings, and idioms to determine meanings of words and phrases.</p>
	<p>e. Use knowledge of root words to determine meanings of unknown words within a passage.</p>
	<p>Context Clues</p>
	<p>f. Use context clues to determine correct meanings of identified words within a reading passage.</p>
	<p>g. Recognize relationship between a pronoun and its referent.</p>
	<p>h. Recognize words that signal transitions to determine sequences as well as contribution to text's meaning.</p>
	<p>Sentence Structure</p>
	<p>i. Use knowledge of written language to anticipate words when reading.</p>
	<p>j. Use knowledge of written language to comprehend text.</p>
	<p>k. Before, during, and after reading, locate information to clarify text structure and content.</p>
	<p>l. Identify and begin to use analytic processes for understanding and remembering words, phrases, and information from reading material.</p>
	<p>m. Locate and gather information for a variety of purposes.</p>
	<p>n. Paraphrase and summarize text.</p>
	<p>o. Draw inferences and conclusions from text.</p>
	<p>p. identify language and literary devices: - Mood; - Tone; - Style; - Figurative language; - Format; - Structure;</p>
<p>q. Determine main idea or essential message within a text and identify relevant details and facts.</p>	

02. Read and respond to a variety of literature to compare and contrast the many dimensions of human experience.	a. Identify defining characteristics of the following literary forms and genres: fiction, nonfiction, fairy tales, fables, myths, poems, and plays.
	b. Evaluate new information and hypotheses by testing against known information and ideas.
	c. Compare and contrast information about same topic after reading two or more passages or articles.
	d. Demonstrate an understanding of how reading can provide enrichment and information as well as serve as a tool for lifelong learning.
	e. Distinguish between cause and effect and fact and opinion within expository text.
	f. Determine main idea of text and identify relevant and supporting details and facts; arrange in chronological order.
03. Read a variety of traditional, technical, and electronic materials for critical analysis and evaluation.	a. Identify author's purpose and describe how language, setting, and information support purpose within literary text.
	b. Identify the following story elements within a literary text; - Characters and their traits and motivations to determine causes for actions; - Setting; - Main events of plot; - Point of view; - Problems and solutions.
	c. Compare and contrast information from multiple sources.
	d. Use personal or objective criteria to do the following: - Draw conclusions; - Make inferences; - Determine meanings; - Form opinions; - Make judgments.
	e. Distinguish between statements of fact and opinion and identify cause and effect relationships within narrative and expository text.
04. Read to locate information from a variety of traditional, technical, and electronic sources.	a. Use appropriate strategies when reading for the following purposes: - Full comprehension; - Locating information; - Personal enjoyment.
	b. Generate questions about important and interesting issues; use discussion to narrow research.
	c. Organize and interpret information to draw logical conclusion based on investigation.
	d. Present acquired information in the form of a letter, report, story, and poster.
05. Read for technical information.	a. Identify and use traditional sources such as reference books, library materials, experts, and electronically-stored sources to locate and acquire information.
	b. Identify uses of graphics, graphs, tables, diagrams, parentheses, italics, and bold print.
	c. Identify format of various technical and reference texts.
	d. Locate and understand sequence words.

(4-6-05)

708. WRITING.

Rationale: Students write to demonstrate skill and conventions according to purpose and audience. Content knowledge and skills of prior grade levels must be acquired in addition to addressing current grade level.

Standard - The student will:	Content Knowledge and Skills:
01. Understand and use the writing process.	a. Demonstrate an understanding and application of writing process: - Brainstorm; - Draft; - Revise; - Edit; - Publish.
	b. Write legibly in a variety of formats to record, generate, and reflect upon ideas.
	c. Identify and use appropriate style and vocabulary for audience and purpose.
02. Write and edit for correctness and clarity.	a. Apply rules and conventions for the following: - Grammar; - Punctuation; - Capitalization; - Spelling; - Legibility.
	b. Develop a paragraph that incorporates a clear and focused main idea and is supported by details and examples that are appropriate to topic, audience, and purpose. - Incorporate topic sentences, appropriate word choices and sentence structure, transitions, paragraphing, indentation, and organization. - Write for personal and practical needs; messages, diaries, journals, thank-you notes, friendly letters, and step-by-step directions.
03. Write a narrative essay that align with the fourth-grade Direct Writing Assessment.	a. Create a multiple-paragraph narrative composition that provides an introductory paragraph and establishes and supports a central idea. Include supporting paragraphs with thoughtful transitions, simple facts, details, and explanations. Conclude with a paragraph that summarizes key points. Properly indent.
	b. Write and publish original creative works that incorporate figurative and descriptive language.

(4-6-05)

709. LISTENING.

Rationale: Use skills of listening to effectively understand, comprehend, and critique oral and visual presentations. Content knowledge and skills of prior grade levels must be acquired in addition to addressing current grade level.

Standard - The student will:	Content Knowledge and Skills:
01. Listen for information and understanding.	a. Listen and respond to a variety of electronic and live presentations.
	b. Listen to gain enrichment and information about various cultures.
	c. Use responsive listening skills such as paraphrasing, summarizing, and asking questions for elaboration and clarification.
02. Listen for literary response and expression.	a. Respond in a variety of ways to oral presentations.
	b. Note similarities and differences within a variety of oral presentations.
03. Listen for critical analysis and evaluation.	a. Identify the purpose, content, organization, and delivery of verbal communication and non-verbal cues.

(4-6-05)

710. SPEAKING.

Rationale: Use skills of speaking to effectively present information and present analysis or critiques of written or viewed material. Content knowledge and skills of prior grade level must be acquired in addition to addressing current grade level.

Standard - The student will:	Content Knowledge and Skills:
01. Speak to share understanding of information.	a. Use oral communication for various purposes and audiences that incorporate a variety of word choices, inflection, volume, phrasing, physical gestures, and eye contact.
	b. Plan and deliver an oral presentation that incorporates appropriate grammar, and vocabulary, as well as effective use of illustrations, pictures, and charts.
02. Speak for literary response and expression.	a. Use oral interpretation, memorization, presentation, and dramatic readings to share personal or literary works.
	b. Orally read or recite a poem.
03. Speak for critical analysis and evaluation.	a. Express opinions and solutions to problems.
	b. Use cause/effect and similarities/differences to demonstrate a key point.
	c. Encourage others' participation while exhibiting courteous, attentive, and appropriate behavior during discussions: - Listen well and verify understanding; - Avoid monopolizing conversations; - Raise pertinent questions; - Exhibit cultural sensitivity.

(4-6-05)

711. VIEWING.

Rationale: Use skills of viewing to effectively understand and comprehend visually-presented information and use visual elements to produce visual presentations.

Standard - The student will:	Content Knowledge and Skills:
01. View for information and understanding.	a. Identify a variety of visually-presented material (books, films, videos, Internet).
	b. Determine main concept and supporting details within non-print media.
02. View media sources for personal response and expression.	a. Demonstrate understanding of significant relationships, ideas, and cultures which various media represent.
	b. Compare effectiveness of media presentations.
03. View media to engage in critical analysis and evaluation.	a. Interpret literal and figurative meanings of communication.
	b. Differentiate between fact and opinion.
04. Use a variety of resources to produce visuals that communicate through print and non-print media.	a. With guidance, explore use of multiple visual tools to produce visuals.

(3-15-02)

APPENDIX D

Idaho Achievement Standards: Mathematics

255. MATHEMATICS STANDARDS.

The Language of mathematics is a powerful tool for exploring, explaining, and understanding the universe. Proficiency in using mathematics is vital to citizens of an increasingly technological society.

When students exit high school they will be able to use mathematics to solve problems in real world situations. Students will apply mathematics across disciplines, using appropriate technology in applying and communicating their strategies and solutions. Appropriate technology may include paper and pencil, graph paper, simple calculators, graphing calculators, computers and spreadsheets, or specialized software.

296. MATHEMATICS STANDARDS – GRADE 4, SECTIONS 297 THROUGH 303.

297. BASIC ARITHMETIC, ESTIMATION, AND ACCURATE COMPUTATIONS.

Rationale: An understanding of numbers and how they are used is necessary in the everyday world. Computational skills and procedures should be developed in context so the learner perceives them as tools for solving problems.

Standard – The student will:	Content Knowledge and Skills:
01. Understand and use numbers.	a. Read, write, order, and compare whole numbers to 1,000,000, commonly used fractions, and decimals through hundredths.
	b. Demonstrate and apply the knowledge of whole numbers, decimal place value, and patterns of periods (hundredths to millions).
	c. Determine by counting the value of a collection of bills and coins up to \$100.00.
	d. Use concrete materials to recognize, represent, and compare commonly use fractions.
	e. Understand decimals with money through hundredths.
	f. Understand and apply appropriate vocabulary.
02. Perform computations accurately.	a. Consistently and accurately add and subtract whole numbers.
	b. Multiply and divide whole numbers.
	c. Add and subtract fractions with like denominators (without requiring simplification).
	d. Add and subtract decimals using money.
	e. Instantly recall multiplication facts through 10s.
	f. Select and use an appropriate method of computation from mental math, paper and pencil, calculator, or a combination of the three.
	g. Use appropriate vocabulary.
03. Estimate and judge reasonableness of results.	a. Use estimation to predict computation results.
	b. Evaluate the reasonableness of an answer.
	c. Use appropriate vocabulary.

298. MATHEMATICAL REASONING AND PROBLEM SOLVING.

Rationale: These processes are essential to all mathematics and must be incorporated in all other mathematics standards.

Standard – The student will:	Content Knowledge and Skills:
01. Understand and use a variety of problem-solving skills.	a. Select strategies appropriate to solve a problem.
	b. Select and use appropriate operations.
	c. Make predictions and decisions based on information.
02. Use reasoning skills to recognize problems and express them mathematically.	a. Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning and concepts.

03. Apply appropriate technology and models to find solutions to problems.	a. Appropriately use a 4-function calculator to solve complex grade-level problems.
	b. Select appropriate models to represent mathematical ideas.
04. Communicate results using appropriate terminology and methods.	a. Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to communicate mathematical information.
	b. Use appropriate vocabulary to communicate mathematical information.
	c. Use appropriate notation.

299. CONCEPTS AND PRINCIPLES OF MEASUREMENT.

Rationale: The first step in scientific investigation is to understand the measurable attributes of objects.

Standard – The student will:	Content Knowledge and Skills:
01. Understand and use U.S. Customary and metric measurements.	a. Select and use appropriate units and tools to make formal measurements in both systems (time, length, temperature, perimeter, area).
	b. Apply estimation of measurement to real-world and content problems using actual measuring devices.
	c. Apply understanding of relationships within the U.S. Customary system.
	d. Apply understanding of relationships within the metric system.
	e. Tell time using both digital and analog clocks, to the nearest minute.
	f. Apply understanding of relationships to solve real-world problems related to time.
	g. Use appropriate vocabulary.

300. CONCEPTS AND LANGUAGE OF ALGEBRA.

Rationale: Algebra is the language of mathematics and science. Through the use of variables and operations, algebra allows students to form abstract models from contextual information.

Standard - The student will:	Content Knowledge and Skills:
01. Use algebraic symbolism as a tool to represent mathematical relationships.	a. Represent vertical notation in horizontal form.
	b. Write a number sentence using symbols (boxes or letters) to represent an unknown number.
	c. Use symbols (<, >, =) to express relationships.
02. Evaluate algebraic expressions.	a. Explore and use the commutative properties of addition and multiplication.
03. Solve algebraic equations and inequalities.	a. Solve missing addends and missing factor problems using inverse operations.

301. CONCEPTS AND PRINCIPLES OF GEOMETRY.

Rationale: The study of geometry helps students represent and make sense of the world by discovering relationships and developing spatial sense.

Standard – The student will:	Content Knowledge and Skills:
01. Apply concepts of size, shape, and spatial relationships.	a. Identify, compare, and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes.
	b. Explore relationships among and properties of shapes (congruence, similarity, symmetry).
	c. Use concrete objects to determine perimeters of triangles, and areas and perimeters of rectangles/squares.
	d. Predict and describe the results of sliding, flipping, and turning two-dimensional shapes.
	e. Use appropriate vocabulary.

02. Apply graphing in two dimensions.	a. Apply ideas about direction and distance.
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302. DATA ANALYSIS, PROBABILITY, AND STATISTICS.

Rationale: With society's expanding use of data for prediction and decision making, it is important that students develop an understanding of the concepts and processes used in analyzing data.

Standard – The student will:	Content Knowledge and Skills:
01. Understand data analysis.	b. Read and interpret tables, charts, and graphs.
	c. Explain and justify conclusions drawn from tables, charts, and graphs.
	d. Understand and use vocabulary.
02. Collect, organize, and display data.	a. Collect, order, and display data in appropriate notation in tables, charts, and graphs (bar graphs, tally charts, pictographs), in order to answer a question and/or test a hypothesis.
03. Apply simple statistical measurements.	a. Determine and average (mean) of a set of whole numbers.
04. Understand basic concepts of probability.	a. Predict, perform, and record results of simple probability experiments.
05. Make predictions or decisions based on data.	a. Make predictions based on simple experimental probabilities.
	b. Understand and use appropriate vocabulary.

303. FUNCTIONS AND MATHEMATICAL MODELS.

Rationale: One of the central themes of mathematics is the study of patterns, relationships, and functions. Exploring patterns helps students develop mathematical power.

Standard – The student will:	Content Knowledge and Skills:
01. Understand the concept of functions.	a. Extend patterns and identify a rule (function) that creates the pattern.
	b. Discover, describe, and extend patterns by using manipulatives and pictorial representations.
	c. Understand and use vocabulary.

APPENDIX E
Idaho Student Information Technology Standards

TECHNOLOGY STANDARD 1: Basic Operations and Concepts

Standard -- The student will:	Content Knowledge and Skills:
1. Demonstrate a sound understanding of the basic nature and operation of technology systems.	a. Use developmentally appropriate and accurate technology terminology.
	b. Explore the appropriate technology device to complete a task.
	c. N/A
2. Demonstrate proficiency in the use of technology.	a. Demonstrate increasingly sophisticated operation of technology components.
	b. Acquire and apply strategies for identifying and solving routine software and hardware problems that occur in everyday use.

TECHNOLOGY STANDARD 2: Social, Ethical, and Human Issues

Standard -- The student will:	Content Knowledge and Skills:
1. Demonstrate an understanding of the ethical, cultural, and societal issues related to technology.	a. Discuss common uses of technology in daily life and related advantages and disadvantages.
	b. Discuss basic issues related to responsible use of technology and information and describe personal consequences of inappropriate use.
2. Practice responsible use of technology systems, information, and software.	a. Practice responsible use of technological devices and software.
	b. Demonstrate respect for others while using technology.
	c. Exhibit legal and ethical behaviors when using technology and information.

TECHNOLOGY STANDARD 3: Technology Productivity Tools

Standard -- The student will:	Content Knowledge and Skills:
1. Use technology tools to enhance learning, increase productivity, and promote creativity.	a. Use formatting capabilities of technology for communicating and illustrating.
	b. Use a variety of technology tools for data collection and analysis.
	c. Publish and present information using technology tools.
	d. Use technology tools to support analysis and modeling.

TECHNOLOGY STANDARD 4: Technology Communications Tools

Standard -- The student will:	Content Knowledge and Skills:
1. Use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.	a. Use telecommunications efficiently and effectively to access remote information and communicate with others in support of facilitated and independent learning.
	b. Use technology tools for individual and collaborative writing, communication and publishing activities to create curricular related products for audiences inside and outside the classroom.
	c. Collaboratively use telecommunications and online resources.

TECHNOLOGY STANDARD 5: Technology Research Tools

Standard -- The student will:	Content Knowledge and Skills:
1. Use technology to locate, evaluate, and collect information from a variety of sources.	a. Locate information from electronic resources.
	b. Evaluate the accuracy, relevance, appropriateness, comprehensiveness and bias of electronic information sources

2. Use technology tools to process data and report results.	a. N/A
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TECHNOLOGY STANDARD 6: Technology Problem-Solving and Decision Making Tools

Problem solving is inherent in all disciplines. Technology Standard 6 is designed to provide a cumulative (capstone) experience.

Standard -- The student will:	Content Knowledge and Skills:
1. Use technology resources for solving problems and making informed decisions.	a. N/A

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