National Curriculum Standards and Benchmarks

Language Arts
Listening/Speaking
Reading
Writing
Literature

Mathematics
Number, Operations and Computation
Geometry, Measurement and Transformation
Patterns and Algebra
Statistics and Probability

Science
Science as Inquiry
Physical Science and Technology
Earth and Space Science
Life and Environmental Science
Marine Science

Department of Education
Federated States of Micronesia
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Development and Background of the National Standards and Benchmarks

These standards and benchmarks were developed by the Standards Development Working Group in Pohn¬pei, FSM between January 25 and February 3, 2006. The group consisted of representatives from the FSM Department of Health, Education and Social Services, each of the four state Departments of Education, and Pacific Resources for Education and Learning. BSSP revised and edited the standards and benchmarks prior to publication.

These materials were reviewed at State level and adopted by the FSM Association of Chief State School Officers (FACSSO) in March 2008.

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A National Standards and Benchmarks - English Language Arts

English Language Arts

The group recommends having National Standards for both English Language and the Vernacular Language. If there are only National English Language Standards, it gives the impression to teachers and the community that Vernacular Language Arts is not a priority of the FSM National Government.

The group also recommends having clustered benchmarks in order to allow more flexibility for the States to define, in State standards, more specific grade level benchmarks that will ensure all students meet both National and State Standards.

The group agreed to have four Language Arts Standards and cluster the benchmarks in the following formats:

ECE-3, 4-5, 6, 7, 8, and 9-12 for general education and for those in college preparatory programs.

The recommendations were based on the following:

♦ ECE-3 was clustered because each state approaches language development in the early grades differently. Because of the variety of early language learning approaches, it would be difficult to benchmark by separate grade levels. However the group felt they could agree to language benchmarks that all FSM students could meet by the end of 3rd grade.

♦ Grades 4-5 were clustered because the group recognized that each State has different policies on the introduction of English Language

studies. English is not used as the Medium of Instruction until grade 3 in Kosrae, grade 4 in Chuuk and Pohnpei, and Grade 5 in Yap State. Therefore, the group clustered grades 4-5 and agreed to language benchmarks that all FSM students could meet by the end of 5th grade.

♦ Grades 6, 7, and 8 were benchmarked at each grade level because the group recognized these as the critical grades where students are asked to acquire language proficiency skills in both English and the local language.

Standard 1

Listening/Speaking

Students will become competent speakers, listeners, and viewers, constructing literal and interpretive meaning from what they hear and view, and communicating effectively for a variety of purposes and to a variety of audiences.

Standard 2

Reading

Students will demonstrate competence in reading skills and strategies to comprehend a variety of texts and media for social, academic, and career-related purposes.

Standard 3

Writing

Students will demonstrate competence in writing, applying general skills and strategies and using the writing process to communicate effectively for a variety of purposes and to a variety of audiences.

Standard 4

Literature

Students will study literature (oral and written) from their own culture as well as selected literary works from other cultures. They will develop the ability to understand other cultures and gain insights into their own, relate to others and recognize universal and unique qualities in others.

Grade 3

By the end of grade 3, students will be able to:

1. Listening and Speaking

♦ ELA.1.3.1   Respond to oral and visual communication with groups of words. (For example, students will be able to speak in phrases and sentences to describe events in a picture book.)

♦ ELA.1.3.2   Follow and respond to three step instructions and directions, using verbal and non-verbal cues (For example, students will be able to follow instructions such as, 'Open your book at page 3, find a picture of a cat and color it brown.')

♦ ELA.1.3.3   Demonstrate ability to express ideas, needs, feelings and questions orally and build vocabulary. (For example, students will be able to say why they like or dislike a story, using a wide vocabulary. They may use vocabulary building skills to modify new words to fit their needs, such as by changing 'grateful' to 'ungrateful')

♦ ELA.1.3.4   Ask a range of questions to gather information, using correct question formation. (For example, students will be able to ask questions in class, such as, 'What does 'Once upon a time' mean?' or 'Where can I find how to spell *Pohnpei*?')

2. Reading

♦ ELA.2.3.1   Use a variety of grade appropriate strategies to decode high frequency words. (For example, students will know how to decode words where the medial vowel is altered by the final silent *e*, such as *tap* and *tape* or *bit* and *bite*)

♦ ELA.2.3.2   Use pictures to build vocabulary. (For example, students will be able to correctly guess the meaning of new words by using picture clues.)

♦ ELA.2.3.3   Use tools and techniques to locate information. (For example, students will be able to find words in a dictionary by using alphabetical order or find information in a book by using the index.)

♦ ELA.2.3.4   Read for enjoyment a variety of grade appropriate texts. (For example, students will voluntarily choose to read a favorite story book, picture book, reference book or comic.)

♦ ELA.2.3.5   Comprehend what is read orally. (For example, students will be able to read a text aloud and demonstrate their understanding by retelling or answering questions about the content.)

3. Writing

♦ ELA.3.3.1   Use knowledge of phonics to spell common content words. (For example, students will be able to use knowledge of phonemes and English spelling conventions to spell common words.)

♦ ELA.3.3.2   Illustrate an experience and write a brief description of it using sentences. (For example, students will be able to draw or retell an event and write a description in sequence, describing the setting, characters and events in detail, using correct sentence structure.)

♦ ELA.3.3.3   Build vocabulary using word families. (For example, students will be able to apply common prefixes and suffixes to form the correct words in their writing, such as *walk*, *walked* and *walking* or *lock* and *unlock*)

4. Literature

♦ ELA.4.3.1   Listen to a variety of literary genres and relate them to personal experiences. (For example, students will be able to listen to genres such as fairy tales, poems, fables, short stories and non-fictional accounts and describe how they remind them of their own personal experiences.)

♦ ELA.4.3.2   Illustrate a part of a literary text to show understanding. (For example, students will be able to draw, paint or model, in detail, events and characters from a text and write descriptions, labels and comments)

Grade 5

By the end of grade 5, students will be able to:

1. Listening and Speaking

♦ ELA.1.5.1   Respond to oral and visual com-munications. (For example, students will be able to engage in conversations, discussions and debates and demonstrate understanding of plays, presentations and illustrated talks by comment-ing and discussing and asking and answering questions.)

♦ ELA.1.5.2   Speak appropriately for different audiences and purposes. (For example, students will be able to deliver, with focused organization, clarity and accuracy, descriptions, presentations, narratives and informal talks to peers, adults and others.)

♦ ELA.1.5.3   Demonstrate comprehension through retelling. (For example, students will be able to listen to and accurately recall and analyze information and convey that information to oth-ers in a logical and coherent way.)

♦ ELA.1.5.4   Apply knowledge of verbal and non verbal language to build vocabulary. (For example, students will be able to understand new vocabulary by recognizing roots (such as the root cycl meaning circle or wheel in bicycle, cyclone and cyclical) or interpreting accompanying ges-tures, body language and tone of voice.)

2. Reading

♦ ELA.2.5.1   Identify a variety of word strate-gies to build meaning. (For example, students will be able to show how to determine mean-ing using context clues and knowledge of word roots, prefixes and suffixes.)

♦ ELA.2.5.2   Read and respond to a variety of texts. (For example, students will be able to read a variety of texts including reports, narra-tives, descriptions and explanations and respond appropriately such as by demonstrating under-standing or following instructions.)

♦ ELA.2.5.3   Ask and answer questions at dif-

ferent cognitive levels. (For example, students will be able to compose and answer questions that relate to Bloom's cognitive levels: 1.Knowledge; 2. Comprehension; 3. Application; 4. Analysis; 5. Synthesis; 6. Evaluation.)

♦ ELA.2.5.4   Use appropriate strategies to analyze and summarize information. (For example, students will be able to use strategies such as critical reading and reading beyond the literal to analyze texts and use strategies such as note-taking and using graphic organizers to summarize.)

♦ ELA.2.5.5   Use text structure to read with fluency. (For example, students will be able to read aloud with good expression by following the specific text structure such as line breaks and verses in a poem.)

♦ ELA.2.5.6   Read a variety of level appropriate texts for a variety of purposes. (For example, students will be able to read narratives, reports, descriptions, maps, charts and graphs in order to find information, follow directions, critically analyze or for pleasure.)

3. Writing

♦ ELA.3.5.1   Use grade appropriate pre-writing strategies before writing. (For example, students will be able to identify purpose and audience, brainstorm, plan and organize ideas and use a variety of prompts and organizers.)

♦ ELA.3.5.2   Use reference materials to gather information to support writing. (For example, students will be able to use dictionaries, thesauruses, encyclopedia, non-fiction reference books and the internet to find information relevant to their writing task.)

♦ ELA.3.5.3   Write for specific purposes. (For example, students will be able to write letters, reports, descriptions, accounts and narratives that are appropriate for their purpose.)

♦ ELA.3.5.4   Demonstrate writing skills by revising and editing own writing and those of others. (For example, students will be able to demonstrate the writing process skills of drafting, editing, re-drafting and publishing.)

4. Literature

♦ ELA.4.5.1   Read, listen to or view a variety of children's literature and retell it to peers. (For example, students will be able to read, listen to or view stories, poetry, dramas and other forms of literature and retell with sufficient detail.)

♦ ELA.4.52   Discuss the moral of a story or piece of literature and compare it to their own cultural values. (For example, students will be able to state their point of view and participate in discussions.)

♦ ELA.4.5.3   Illustrate the sequence of key events in a story. (For example, students will be able to identify and sequence elements of plot such as problem, conflict, crisis, climax and resolution.)

♦ ELA.4.5.4   Describe the characteristics of a variety of genres. (For example, students will be able to describe the differences between poetry, legend and non-fiction.)

♦ ELA.4.5.5   Demonstrate comprehension through oral retelling of a simple story, paraphrasing and summarizing orally.

Grade 6

By the end of grade 6, students will be able to:

1. Listening and Speaking

♦ ELA.1.6.1 Listen and critically respond to oral

and visual communication. (For example, students will be able to draw conclusions and comment critically on speeches, reports and dramas.)

♦ ELA.1.6.2   Interact in conversations and discussions of medium complexity. (For example, students will be able to participate in paired and group discussions.)

♦ ELA.1.6.3   Deliver oral presentations on topics of medium complexity. (For example, students will be able to explain, recount, describe and demonstrate.)

♦ ELA.1.6.4   Listen to and use a range of vocabulary to describe or explain something from the local environment.

2. Reading

♦ ELA.2.6.1   Identify and use a variety of word strategies to build meaning. (For example, students will be able to determine meaning using context clues and knowledge of word roots, prefixes, suffixes, synonyms and antonyms.)

♦ ELA.2.6.2   Apply a variety of strategies to build comprehension. (For example, students will be able to activate prior knowledge, predict, visualize and analyze text.)

♦ ELA.2.6.3   Use reference materials to gather information. (For example, students will be able to locate information from library and internet resources.)

♦ ELA.2.6.4   Locate and use features of textbooks such as chapter titles, sub-headings and chapter summaries, to summarize, compare, contrast and draw conclusions.

♦ ELA.2.6.5   Read a variety of grade appropriate texts for a variety of purposes. (For example, students will be able to read narratives, reports, descriptions, maps, charts and graphs in order to

solve problem, find information, follow directions, critically analyze or for pleasure.)

3. Writing

♦ ELA.3.6.1   Use grade appropriate strategies in the writing process. (For example, students will be able to identify purpose and audience, brainstorm, plan and organize ideas.)

♦ ELA.3.6.2   Use reference materials to summarize, paraphrase and take notes. (For example, students will be able to process relevant information from textbooks, magazines and newspapers and write summaries.)

♦ ELA.3.6.3   Write for a specific purpose and audience using correct sentence structure and grammatical conventions.

4. Literature

♦ ELA.4.6.1   Compare and contrast different forms of literature. (For example, students will be able to write book reviews for a range of genres.)

♦ ELA.4.6.2   Demonstrate understanding of a character's behavior and attitudes. (For example, students will be able to explain a character's actions, motives and traits.)

♦ ELA.4.6.3   Write and present a piece of narrative of medium complexity that relates to familiar objects, events, experiences and themes.

Grade 7

By the end of grade 7, students will be able to:

1. Listening and Speaking

♦ ELA.1.7.1   Listen, view, and respond to oral and visual communications. (For example, stu-

dents will be able to identify a speaker's purpose and distinguish between fact and opinion.)

♦ ELA.1.7.2   Speak appropriately for different purposes and audiences. (For example, students will be able to report to peers and talk to a community group or parents at a school event.)

♦ ELA.1.7.3   Demonstrate comprehension through recounting, paraphrasing and summarizing orally.

♦ ELA.1.7.4   Make presentations on topics of medium complexity. (For example, students will be able to express opinions and discuss the probability of future events.)

2. Reading

♦ ELA.2.7.1   Use a variety of grade appropriate strategies to build word meaning. (For example, students will be able to determine meaning using context clues and knowledge of word roots, prefixes, suffixes, synonyms, antonyms and homonyms.)

♦ ELA.2.7.2   Use a variety of strategies to build comprehension. (For example, students will be able to activate prior knowledge, predict, visualize and analyze text, distinguish between literal and figurative meaning and identify main ideas and significant details.)

♦ ELA.2.7.3   Combine ideas from different reading sources to form judgments and opinions.

♦ ELA.2.7.4   Read a variety of grade appropriate texts and materials. (For example, students will be able to read navigation charts, lunar calendars, newspapers, magazines and internet pages.)

3. Writing

♦ ELA.3.7.1   Use grade appropriate strategies to organize thoughts before writing. (For example, students will be able to identify purpose and audience, brainstorm, plan and organize ideas and produce concept maps.)

♦ ELA.3.7.2   Identify and use prewriting strategies to help in the writing process. (For example, students will be able to brainstorm, plan and organize ideas and produce outlines.)

♦ ELA.3.7.3   Apply writing process skills and strategies to compose a piece of writing that builds vocabulary. (For example, students will be able to edit and revise using dictionaries and thesauruses to improve vocabulary.)

♦ ELA.3.7.4   Use reference materials to take notes.

4. Literature

♦ ELA.4.7.1   Listen to, read or view and respond to a variety of grade appropriate genres. (For example, students will be able to critically analyze genres such as poems, dramas, fables, myths, legends, science-fiction and biographies.)

♦ ELA.4.7.2   Describe the effect and function of common types of figurative language. (For example, students will be able to describe the impact of simile, metaphor, personification, imagery, hyperbole, alliteration and onomatopoeia.)

♦ ELA.4.7.3   Describe the cultural differences between a piece of literary text of medium complexity and personal experience.

♦ ELA.4.7.4   Write and present different forms of literary works of medium complexity. (For example, students will be able to write plays, songs, poems, myths and legends.)

Grade 8

By the end of grade 8, students will be able to:

1. Listening and Speaking

◆ ELA.1.8.1   Listen, view and respond to oral and visual communication. (For example, students will be able to summarize, analyze, interpret, evaluate and criticize.)

◆ ELA.1.8.2   Debate topics of medium complexity.

◆ ELA.1.8.3   Evaluate personal effectiveness in group discussions and make corrections as necessary. (For example, students will be able to conduct a self evaluation using criteria or rubrics.)

◆ ELA.1.8.4   Obtain information and maintain exchange by oral questioning and comment on complex topics. (For example, students will be able to conduct questionnaires, surveys or interviews and present, explain and debate complex topics.)

2. Reading

◆ ELA.2.8.1   Identify and use a variety of strategies to extend word meaning. (For example, students will be able to correctly apply prefixes and suffixes in order to adapt words for different purposes.)

◆ ELA.2.8.2   Build comprehension of texts. (For example, students will be able to ask questions, predict, identify main ideas and supporting details, analyze, summarize and draw logical conclusions.)

◆ ELA.2.8.3   Read a variety of printed and media materials for different purposes and discuss opinion of what was read.

3. Writing

◆ ELA.3.8.1   Use grade appropriate strategies to organize thoughts before writing. (For example, students will be able to identify topics, purpose and audience brainstorm and use concept maps and other organizers.)

◆ ELA.3.8.2   Demonstrate competence in writing, using correct grammatical and mechanical conventions of composition appropriate to the purpose for writing. (For example, students will be able to write well-organized and correct research reports, persuasive texts, descriptions and letters that meet their purpose.)

◆ ELA.3.8.3   Use reference materials to research and report. (For example, students will be able to use dictionaries, encyclopedia, newspapers, thesauruses, computers and the internet.)

4. Literature

◆ ELA.4.8.1   Listen to, read or view and respond to a narrative or poem. (For example, students will be able to make a written or oral review of a reading or theatre performance.)

◆ ELA.4.8.2   Recognize and identify the complex elements of plot. (For example, students will be able to recognize and identify foreshadowing (the writer's use of hints or clues about what will happen next) inciting forces (the event that triggers conflict) conflict, crisis, climax and resolution.)

◆ ELA.4.8.3   Dramatize, record and write about the effects of culture and historical periods on literature and vice-versa.

◆ ELA.4.8.4   Write and present an analysis that shows the cultural differences between a piece of complex literary text and personal experiences.

◆ ELA.4.8.5   Apply knowledge of literal and

figurative meanings to build vocabulary. (For example, students will be able to interpret metaphor and allegory to enhance their written vocabulary.)

Benchmarks for All High Schools

By the end of high school, all students will:

♦ ELA.hs.1   Use new grade-appropriate vocabulary, including content area vocabulary, learned through reading and word study.

♦ ELA.hs.2   Read to acquire knowledge and skills to function appropriately in daily life.

♦ ELA.hs.3   Use a variety of strategies and skills to independently conduct research and write a three to five page paper on a topic of interest.

♦ ELA.hs.4   Analyze and evaluate context to see how the author's message was influenced by real-life situations in society and culture.

♦ ELA.hs.5   Demonstrate understanding of those factors that commonly affect the use of language, such as gender, social class, family relationships and ethnicity.

♦ ELA.hs.6   Compare history, form (discourse, word order, grammar), function (purpose, text type, genre), and value of the vernacular language and that of the English language, depending upon States' policies.

♦ ELA.hs.7   Write a composition that demonstrates effective use of descriptive language to clarify and enhance meaning and ideas. (For example, make effective use of adjectives, adverbs, similes and metaphors)

♦ ELA.hs.8   Write with a good command of grammar and mechanical conventions appropriate to high school level.

♦ ELA.hs.9   Use peer-coaching strategies to proof read and improve on the writing of final drafts.

♦ ELA.hs.10   Ask questions as a way to broaden and enrich learning.

♦ ELA.hs.11   Apply skills to participate in real life situations.

♦ ELA.hs.12   View a presentation or show, recall important information and critique from a variety of perspectives including cultural.

♦ ELA.hs.13   Evaluate personal effectiveness in group discussions and make adjustments as necessary to improve.

♦ ELA.hs.14   Use active listening skills to stay engaged and understand what others are saying.

♦ ELA.hs.15   Speak appropriately for different purposes and audiences, summarize and critically respond to alternative perspectives on social issues.

Benchmarks for Students in College Preparatory Programs

In addition to the benchmarks for all students, students who are in the college preparatory programs should meet relevant benchmarks. These are best measured by end of course assessments.

♦ Use new grade-appropriate vocabulary, including higher level content area vocabulary, needed to understand classical literature.

♦ Read to experience a variety of literature, acquire knowledge and learn new skills.

- Effectively use reading strategies such as skimming, scanning and using context clues to find written and implied meanings and confirm predictions.

- Use a variety of skills and strategies to independently gather information from different sources as part of a research project.

- Write a research paper on a given topic, using primary and secondary sources and including an introduction, literature review with citations, research method and summary.

- Write a variety of compositions, such as descriptive, expository, informative or argumentative, that demonstrate effective use of language to clarify and enhance meaning and ideas.

- Write with a good command of grammar and mechanical conventions appropriate for students preparing to enter college.

- Ask higher level, probing questions that elicit synthesis and evaluation as a way to broaden and enrich learning.

- View a presentation or show, recall important information, critique from a variety of perspectives and develop high quality presentations..

- Use active listening skills to understand what others are saying and stay engaged, ask meaningful questions and summarize what has been heard.

- Speak appropriately for different purposes and audiences, such as an address, debate or other oral presentation, presenting coherent arguments and critiques.

B National Standards and Benchmarks - Language Arts: Vernacular

Language Arts: Vernacular

Standard 1

Listening & Speaking

Students will be competent speakers, listeners, and Students will be competent speakers, listeners and viewers in the vernacular, able to construct literal and interpretive meaning from what they hear and view and to communicate effectively for a variety of purposes and to different audiences.

Standard 2

Reading

Students will demonstrate competence in the application of relevant skills and strategies to read a variety of printed materials in the vernacular for social, academic and career-related purposes.

Standard 3

Writing

Students will demonstrate the ability to write, applying the general skills and strategies of the writing process, to communicate effectively for a variety of purposes and to different audiences.

Standard 4

Literature Response

Students will study oral and written literature from their own culture as well as selected literary works from other cultures and will develop the ability to gain insights into their own culture while understanding and relating to others.

Grade 3

By the end of grade 3, students will be able to:

1. Vernacular Listening and Speaking

♦ VLA.1.3.1 Listen and respond to comments and questions with appropriate explanation and ask questions to clarify meanings.

♦ VLA.1.3.2 Listen to and follow instructions and directions.

♦ VLA.1.3.3 Interpret and describe the meaning of posters and signs.

♦ VLA.1.3.4 Listen to and paraphrase the content of brief messages.

♦ VLA.1.3.5 Actively participate in and contribute to group discussions.

♦ VLA.1.3.6 Use information to solve problems..

- VLA.1.3.7   Use oral language in storytelling and counting including honorific language as appropriate.

- VLA.1.3.8   Prepare and present simple oral reports to classmates.

2. Vernacular Reading

- VLA.2.3.1   Read the alphabet and whole numbers in vernacular. (For example, students will be able to distinguish between letter names and phonemes and count up to 1000.)

- VLA.2.3.2   Use a variety of skills to decode vernacular texts.

- VLA.2.3.3   Use vocabulary development skills to build meaning in vernacular. (For example, students will be able to use context clues, word origin and root to understand new words.)

- VLA.2.3.4   Demonstrate and understand the purpose of reading, identifying main ideas and significant details. (For example, students will be able to read for personal enjoyment and enrichment.)

- VLA.2.3.5   Connect information presented in reading with real life experiences and situations.

- VLA.2.3.6   Use tools and techniques to locate information. (For example, students will be able to find words in a dictionary by using alphabetical order or find information in a book by using the index.)

- VLA.2.3.7   Apply different reading strategies to aid transition from 'learn to read' to 'read to learn'.

- VLA.2.3.8   Read a variety of simple texts fluently.

3. Vernacular Writing

- VLA.3.3.1   Write paragraphs of at least 5 sentences or short compositions that show some attempt to use descriptive language to clarify and enhance ideas.

- VLA.3.3.2   Write for an intended audience and purpose.

- VLA.3.3.3   Write with a command of the grammatical and mechanical conventions appropriate to the level.

- VLA.3.3.4   Use revising and editing skills to improve clarity of writing.

- VLA.3.3.5   Demonstrate the ability to use appropriate vocabulary in describing a variety of activities.

4. Vernacular Literature

- VLA.4.3.1   Demonstrate knowledge and understanding of the stories read.

- VLA.4.3.2   Demonstrate understanding that people respond differently to stories read.

- VLA.4.3.3   Demonstrate the ability to compare contents of a story read to personal experience and real life situations.

- VLA.4.3.4   Read fiction and non-fiction from a variety of genres. (For example, students will be able to read fiction and non-fiction including fairy tales, fables, legends, myths, poems, dramas, information books and biographies.)

- VLA.4.3.5   Recognize basic literary elements including setting, characters, plot, dialogue and themes.

- VLA.4.3.6   Make inferences regarding the motives of characters and the consequences of their actions.

◆ VLA.4.3.7   Read and identify specific parts of a story and share responses with peers.

Grade 5

By the end of grade 5, students will be able to:

1. Vernacular Listening and Speaking

◆ VLA.1.5.1   Use information presented orally in the vernacular to solve problems and make decisions.

◆ VLA.1.5.2   Listen and respond to comments and questions with appropriate clarity.

◆ VLA.1.5.3   Prepare and present oral reports to classmates and other audiences.

◆ VLA.1.5.4   Actively participate in and contribute to group discussions.

◆ VLA.1.5.5   Use oral language in storytelling, the counting system and honorific language to strengthen oral traditions.

◆ VLA.1.5.6   Interpret oral communication, such as plays, skits and debates.

2. Vernacular Reading

◆ VLA.2.5.1   Recognize and comprehend words and sentence structures.

◆ VLA.2.5.2   Read a variety of reference materials.

◆ VLA.2.5.3   Identify the elements of a story, including setting, characters, plot, dialogue, theme and use of figurative language.

◆ VLA.2.5.4   Read and interpret information from graphs and charts.

◆ VLA.2.5.5   Make inferences from information read.

3. Vernacular Writing

◆ VLA.3.5.1   Take notes in local languages.

◆ VLA.3.5.2   Write letters and short compositions in local languages.

◆ VLA.3.5.3   Identify and use grammatical patterns of language appropriate to grade level.

◆ VLA.3.5.4   Use precise words to convey meanings.

◆ VLA.3.5.5   Revise and edit their own writing and the writing of others.

4. Vernacular Literature

◆ VLA.4.5.1   Understand that people respond differently to literature.

◆ VLA.4.5.2   Demonstrate knowledge and understanding of the importance of the literature read.

◆ VLA.4.5.3   Identify specific aspects of a piece of literature and relate the actions of characters to their own experience.

◆ VLA.4.5.4   Understand plot development. (For example, students will be able to identify and describe cause and effect and conflict and resolution.)

◆ VLA.4.5.5   Understand the characteristics of a variety of genres. (For example, students will be able to distinguish the characteristics of fiction and non-fiction including fairy tales, fables, legends, myths, poems, dramas, information books and biographies.)

Grade 8

By the end of grade 8, students will be able to:

1. Vernacular Listening and Speaking

- VLA.1.8.1   Prepare and present oral reports, based on collected data, to a variety of audiences.

- VLA.1.8.2   Use oral language in storytelling the counting system and honorific language to strengthen oral traditions at the appropriate place or occasion.

- VLA.1.8.3   Use information for problem solving and decision-making.

- VLA.1.8.4   Perform the role of panelists in panel discussions.

- VLA.1.8.5   Do simple role playing and "student take over".

2. Vernacular Reading

- VLA.2.8.1   Recognize and comprehend words and sentence structure.

- VLA.2.8.2   Read and make inferences from information read from a variety of reference materials.

- VLA.2.8.3   Identify the elements of a complex story, including setting, characters, plot, dialogue, theme and use of figurative language and literary devices such as irony.

- VLA.2.8.4   Read and interpret information from graphs and charts.

- VLA.2.8.5   Conduct research or surveys on assigned topics, using primary and secondary sources of information.

3. Vernacular Writing

- VLA.3.8.1   Take notes in meetings and other important activities in local language.

- VLA.3.8.2   Write compositions and reports in local language.

- VLA.3.8.3   Identify and use grammatical patterns of language appropriate to grade level.

- VLA.3.8.4   Use precise words to convey meanings.

- VLA.3.8.5   Revise and edit their own writing and the writing of others.

- VLA.3.8.6   Conduct research or surveys on assigned topics, using primary and secondary sources of information, and write a report.

4. Vernacular Literature

- VLA.4.8.1   Understand that people respond differently to literature.

- VLA.4.8.2   Identify specific questions from personal experience and seek to answer them through materials written in the vernacular.

- VLA.4.8.3   Explain how the motives of characters in fiction are similar to and different from those in their own life.

- VLA.4.8.4   Understand complex, extended dialogues and how they relate to a story.

- VLA.4.8.5   Recognize cultural similarities and differences between a piece of literature and their own cultural perspective.

- VLA.4.8.6   Recognize complex elements of plot in vernacular literature. (For example, students will be able to identify crisis, conflict, climax and resolution as well as the inciting force and foreshadowing.)

- VLA.4.8.7   Identify the main and subordinate characters in complex vernacular literature.

Benchmarks for All High Schools

By the end of high school, all students will be able to:

1. Vernacular Listening and Speaking

◆ VLA.1.hs.1   Demonstrate the skills needed to participate in real-life situations such as interviews, community activities, panel discussions and negotiations.

◆ VLA.1.hs.2   View a variety of presentations, recall important information and critique from a cultural perspective.

2. Vernacular Reading

◆ VLA.2.hs.1   Read and research to acquire understanding, knowledge and skills.

◆ VLA.2.hs.2   Analyze and evaluate context to see how the author's message was influenced by real-life situations in society and culture.

◆ VLA.2.hs.3   Demonstrate the ability to use skills and strategies for reading and comprehending informational texts.

3. Vernacular Writing

◆ VLA.3.hs.1   Use vocabulary that stimulates the imagination of the reader.

◆ VLA.3.hs.2   Write compositions that use a variety of transitional devices. (For example, students will be able to use words and phrases as connectives to make possible a smooth transition from one idea to the next.)

◆ VLA.3.hs.3 Use technology to collect information through research analyze information and write a composition that demonstrates effective use of descriptive language to clarify and enhance ideas.

4. Vernacular Literature

◆ VLA.4.hs.1   Relate personal response to the text with that intended by the author.

◆ VLA.4.hs.2   Make abstract connections between their own life and the characters, events, motives and causes of conflict in text.

◆ VLA.4.hs.3   Analyze the effectiveness of complex elements of plot. (For example, students will be able to evaluate the effectiveness of crisis, conflict, climax and resolution as well as the inciting force and foreshadowing in a complex plot.)

◆ VLA.4.hs.4   Practice a reader's right and responsibility to bring personal and cultural values to bear on the study of literature.

◆ VLA.4.hs.5   Recognize that cultures view situations from varying perspectives and evolve different patterns of interaction.

◆ VLA.4.hs.6   Identify the simple and complex interactions between main and subordinate characters.

◆ VLA.4.hs.7   Identify and explain literary elements, including alliteration, allusion, characterization, exaggeration, hyperbole and figurative language.

C National Standards and Benchmarks - Mathematics

Mathematics

Standard 1

Number, Operations and Computation

Students understand the number system, the meaning of operations and how they relate to each other and are able to use computational tools and strategies effectively.

Standard 2

Geometry, Measurement and Transformation

Students understand geometry, measurement and spatial relationships including units and systems of measurement and develop and use techniques, tools, and formulas for measuring the properties of objects and relationships among the properties and use transformations and symmetry to analyze mathematical situations.

Standard 3

Patterns and Algebra

Students understand various types of patterns and functional relationships, use symbolic forms to represent, model, and analyze mathematical situations and collect, organize, and represent data to answer questions.

Standard 4

Statistics and Probability

Students understand how to interpret data using methods of exploratory data analysis, develop and evaluate inferences, predictions and arguments that are based on data and understand and apply basic notions of chance and probability.

Grade 3

By the end of grade 3, students will:

1. Number, Operations and Computation

♦ Mth.1.3.1   Use English and local systems to count, read, write and compare whole numbers up to 1,000.

♦ Mth.1.3.2   Understand base-ten by identifying the place value of numbers up to 1,000.

♦ Mth.1.3.3   Demonstrate an understanding of the basic operations $(+, -, x, \div)$, and how they relate to each other.

♦ Mth.1.3.4   Represent whole numbers and operations in a variety of ways using physical models, diagrams, and number expressions.

♦ Mth.1.3.5   Use the basic operations to add and subtract 2- and 3-digit numbers.

♦ Mth.1.3.6   Use the basic operations to multiply and divide 1, 2 and 3-digit numbers by a single digit number.

♦ Mth.1.3.7   Use a variety of strategies including the understanding of number and operations to solve problems and explain the reasoning used to reach the solution.

2. Geometry, Measurement and Transformation

♦ Mth.2.3.1   Recognize, classify, identify, and draw common shapes using English and local language terms.

♦ Mth.2.3.2   Describe similarities and differences between common shapes.

♦ Mth.2.3.3   Demonstrate the understanding of standard & non-standard units of measurement.

♦ Mth.2.3.4   Use common instruments to measure & compare objects. (For example, students will be able to use a ruler, watch or balance with standard and non-standard units of measurement.)

3. Patterns and Algebra

♦ Mth.3.3.1   Describe and create patterns and find the next term using numbers, objects and other materials.

♦ Mth.3.3.2   Identify and use the inverse relationships between operations to solve problems.

4. Statistics and Probability

There are no benchmarks for this standard at this level

Grade 4

By the end of grade 4, students will:

1. Number, Operations and Computation

♦ Mth.1.4.1   Understand base-ten by identifying the place value of whole numbers up to 1,000 and decimal numbers down to 100ths.

♦ Mth.1.4.2   Demonstrate the ability to read, write and compare simple fractions and decimals in English and the local counting system.

♦ Mth.1.4.3   Represent whole numbers, fractions and decimals and operations involving them, in a variety of ways using physical models, diagrams and number expressions.

♦ Mth.1.4.4   Perform the basic operations to add, subtract, multiply and divide whole numbers and decimals and add and subtract fractions with like denominators.

♦ Mth.1.4.5   Use a variety of methods and ways to round and estimate whole numbers, decimals and fractions.

♦ Mth.1.4.6   Use a variety of strategies including the understanding of decimals and fractions to solve problems and explain the reasoning used to reach the solution.

2. Geometry, Measurement and Transformation

♦ Mth.2.4.1   Identify and classify two and three dimensional shapes.

♦ Mth.2.4.2   Describe similarities and differences between one, two and three dimensional geometric figures.

♦ Mth.2.4.3   Demonstrate understanding of

common units in the English and metric systems by choosing appropriate units to measure common objects and quantities.

- Mth.2.4.4   Use standard and non-standard units to determine length, volume and weight and describe the characteristics of each type of measurement.

- Mth.2.4.5   Use the understanding of geometry, measurement and transformation to solve problems and explain the reasoning used to reach the solution.

3. Patterns and Algebra

- Mth.3.4.1   Use patterns and functions to represent and solve real world situations and explain the reasoning used to reach the solution.

4. Statistics and Probability

- Mth.4.4.1   Collect, organize, display and describe data systematically.

- Mth.4.4.2   Read and interpret data using pictographs, tables or charts.

Grade 5

By the end of grade 5, students will:

1. Number, Operations and Computation

- Mth.1.5.1   Demonstrate the ability to read, write and compare more complex decimals and fractions.

- Mth.1.5.2   Represent fractions as proper and improper fractions, mixed numbers and decimals..

- Mth.1.5.3   Continue to develop fluency to do the basic operations to add, subtract, multiply and divide whole numbers, decimals and simple fractions.

- Mth.1.5.4   Use rounding and estimation to solve problems.

- Mth.1.5.5   Choose and use appropriate computational procedures and tools to solve problems. (For example, students will be able to use pencil and paper, mental computation or calculators.)

- Mth.1.5.6   Use a variety of strategies including making a model, working backwards, drawing a diagram or guessing and checking to solve problems and explain the reasoning used to reach the solution.

2. Geometry, Measurement and Transformation

- Mth.2.5.1   Recognize and classify triangles and quadrilaterals based on their properties of angle and side.

- Mth.2.5.2   Use the common units of the English and metric systems and carry out simple unit conversion within the systems. (For example, students will be able to convert centimeters to meters or inches to feet.)

- Mth.2.5.3   Develop and use formulas to determine perimeter and area.

- Mth.2.5.4   Measure length, area, volume and weight accurately using appropriate tools.

- Mth.2.5.5   Use a variety of strategies to solve measurement problems and explain the reasoning used to reach the solution.

3. Patterns and Algebra

◆ Mth.3.5.1 Represent and record patterns using tools such as charts, tables and graphs.

◆ Mth.3.5.2 Use words and simple algebraic expressions to describe quantities and situations.

◆ Mth.3.5.3 Represent and investigate how a change in one variable relates to the change in the second variable. (For example, students will be able to make a graph to show the height of a plant over time.)

◆ Mth.3.5.4 Investigate and describe situations involving inverse relationships. (For example, students will be able to demonstrate that the larger the denominator in a fraction the smaller the quantity.)

4. Statistics and Probability:

◆ Mth.4.5.1 Collect data using observations, measurements, surveys or experiments.

◆ Mth.4.5.2 Organize data using tables and charts and construct pictographs, bar graphs and line graphs.

◆ Mth.4.5.3 Identify events as likely or unlikely and give a description of the degree of likelihood in informal terms. (For example, students will be able to state whether an event is certain, unlikely, very unlikely or impossible.)

◆ Mth.4.5.4 Estimate and describe probabilities in simple experiments involving coins, spinners, dice or objects in a bag.

Grade 6

By the end of grade 6, students will:

1. Number, Operations and Computation

◆ Mth.1.6.1 Compare, order, round and group natural numbers.

◆ Mth.1.6.2 Demonstrate fluency in the basic operations of adding, subtracting, multiplying and dividing whole numbers, fractions and decimals.

◆ Mth.1.6.3 Identify the characteristics of prime numbers and composite numbers and decompose composite numbers into factor pairs and prime factors using exponents.

◆ Mth.1.6.4 Use models and pictures to represent ratio and proportions and solve problems.

2. Geometry, Measurement and Transformation

◆ Mth.2.6.1 Add and subtract customary units of length, mass, capacity and time.

◆ Mth.2.6.2 Perform slides, flips, turns and rotations and indicate the motion, position and direction applied.

◆ Mth.2.6.3 Use formulas to compute the perimeter and area of polygons.

◆ Mth.2.6.4 Describe, compare and classify geometrical figures using mathematical terminology. (For example, students will be able to use terms such as number of edges and faces, number and size of angles and number of vertices.)

3. Patterns and Algebra

♦ Mth.3.6.1 Represent patterns in a variety of ways, (For example, students will be able to represent patterns in numeric, algebraic, pictorial, oral and graphic form.)

♦ Mth.3.6.2   Model and solve real world problems using various representations such as graphs and tables.

♦ Mth.3.6.3   Locate whole numbers, fractions and decimals on a number line.

♦ Mth.3.6.4   Solve simple algebraic expressions.

4. Statistics and Probability

♦ Mth.4.6.1   Analyze and interpret data, including range, median, mode, mean and frequency and present information to an audience.

♦ Mth.4.6.2   Make predictions that are based on experimental or theoretical probabilities and determine their reasonableness.

♦ Mth.4.6.3   Formulate and solve problems that involve collecting and analyzing data to reach conclusions and make generalizations.

Grade 7

By the end of grade 7, students will:

1. Number, Operations and Computation

♦ Mth.1.7.1   Understand and represent integers, adding and subtracting them in real world situations. (For example, students will be able to add and subtract negative and positive numbers to solve problems related to temperature, elevation and accounting.)

♦ Mth.1.7.2   Locate whole numbers, fractions, decimals and integers on a number line.

♦ Mth.1.7.3   Convert between decimals, fractions and percentages.

♦ Mth.1.7.4   Represent numbers in a variety of ways including expanded form and scientific notation.

♦ Mth.1.7.5   Use the properties of numbers including zero, identity, commutative, associative and distributive, to solve problems.

♦ Mth.1.7.6   Use the order of operations to evaluate expressions.

♦ Mth.1.7.7   Round numbers to estimate solutions and check the reasonableness of results.

2. Geometry, Measurement and Transformation

♦ Mth.2.7.1   Identify and draw points, lines, line segments, angles and rays.

♦ Mth.2.7.2   Use pi (π), represented as both a decimal (3.14) and fraction (22/7), to find the circumference and area of circles.

♦ Mth.2.7.3   Use appropriate English and metric units to develop reasonable estimates of measures.

♦ Mth.2.7.4   Describe symmetry, reflections and translations with appropriate notation.

3. Patterns and Algebra

♦ Mth.3.7.1   Describe relationships and functions using word and symbols.

♦ Mth.3.7.2   Write and solve one-step equations.

♦ Mth.3.7.3   Locate points on the coordinate plane.

4. Statistics and Probability

♦ Mth.4.7.1 Propose and support conclusions by summarizing data. (For example, after completing a survey, students will be able to propose and support the conclusion that over half the books students read in a year are read in April and May.)

♦ Mth.4.7.2 Formulate questions or hypotheses based on initial data collection and describe further studies to explore them.

Grade 8

By the end of grade 8, students will:

1. Number, Operations and Computation

♦ Mth.1.8.1 Represent, compare, order and use numbers in a variety of forms, including integer, fraction, decimal, percentage and exponents, in mathematical problem-solving situations.

♦ Mth.1.8.2 Demonstrate fluency in computing with rational numbers, fractions, decimals, percentages and integers.

♦ Mth.1.8.3 Square whole numbers, rational numbers and integers and find square roots of perfect squares. (For example, students will be able to find the square root of 1, 2, 4, 9, etc.)

♦ Mth.1.8.4 Use ratio, proportion, and percentage in problem solving.

2. Geometry, Measurement and Transformation

♦ Mth.2.8.1 Use a compass, protractor and straight edge to draw two-dimensional figures and do constructions (For example, students will be able to bisect an angle or line segment, create a right angle or draw a circle.)

♦ Mth.2.8.2 Identify similar and congruent figures including lines of symmetry and diagonals.

♦ Mth.2.8.3 Use formulas to find areas of quadrilaterals, triangles and circles, and the surface area and volume of cylinders and prisms using appropriate units of measure.

♦ Mth.2.8.4 Use the Pythagorean Theorem to find lengths of sides of right triangles.

♦ Mth.2.8.5 Solve simple problems involving rates and derived measures. (For example, students will be able to solve problems involving miles per hour or cost per yard.)

♦ Mth.2.8.6 Use proportional reasoning and indirect measurements to draw inferences, such as measuring the thickness of a book and dividing by the number of pages to estimate the thickness of one page.

3. Patterns and Algebra

♦ Mth.3.8.1 Write and solve two-step linear equations and one-step inequalities.

♦ Mth.3.8.2 Graph linear functions in two variables using a table of ordered pairs.

♦ Mth.3.8.3 Use symbolic algebra and additional techniques, such as tables, guess and check and diagrams, to represent situations and to solve problems, especially those that involve linear relationships.

♦ Mth.3.8.4 Model and solve real-world problems using various representations, such as graphs and tables and understand the purpose and utility of each representation.

4. Statistics and Probability

◆ Mth.4.8.1   Find, describe, and interpret mean, median, mode and range and determine which measure is best to use in a particular situation.

◆ Mth.4.8.2   Read and interpret tables, charts and graphs and make inferences based on the data.

◆ Mth.4.8.3   Use sampling and other data collection tools to gather and analyze data and make conclusions and predictions.

◆ Mth.4.8.4   Compute simple probabilities using appropriate methods such as lists and tree diagrams or through experimental or simulation activities.

Benchmarks for All High Schools

All high school students will:

(Based on the shared requirement that all students complete at least Algebra I.)

1. Number, Operations and Computation

◆ Mth.1.hs.1   Demonstrate the inverse relationship between square numbers and square roots.

◆ Mth.1.hs.2   Compare and order rational numbers and square roots using a number line.

◆ Mth.1.hs.3   Solve problems with squares and square roots, limited to square roots of square numbers.

◆ Mth.1.hs.4   Represent numbers in a variety of forms including factors, multiples, exponents, primes, composites, fractions, decimals and percentages and change from one form to another.

◆ Mth.1.hs.5   Apply an understanding of addition, subtraction, multiplication, division and the order of operations when calculating with rational numbers.

◆ Mth.1.hs.6   Use ratios, proportions and percent to represent the relationship between two quantities and solve problems.

◆ Mth.1.hs.7   Add, subtract, multiply, and divide numbers with positive and negative exponents.

◆ Mth.1.hs.8   Estimate a reasonable solution to a problem.

◆ Mth.1.hs.9   Use rounding and estimation to solve real-world situations and recognize the limitations.

2. Geometry, Measurement and Transformation

◆ Mth.2.hs.1   Apply an understanding of the English and metric systems of measurement to solve problems.

◆ Mth.2.hs.2   Use formulas, including appropriate units of measure, to determine the surface area and volume of selected prisms, cylinders and pyramids.

◆ Mth.2.hs.3   Apply the Pythagorean Theorem to solve problems involving right triangles.

◆ Mth.2.hs.4   Perform transformations including reflection, rotation and translation and describe the size, position and orientation of the resulting shapes.

3. Patterns and Algebra

◆ Mth.3.hs.1   Represent a variety of patterns, including recursive patterns, with tables, graphs, words and symbolic rules.

◆ Mth.3.hs.2   Represent mathematical situations as algebraic expressions and equations and

describe algebraic expressions using words.

♦ Mth.3.hs.3 Solve single-variable equations and inequalities using rational numbers.

♦ Mth.3.hs.4 Use tables and graphs to represent linear relationships involving equalities and in-equalities with two variables and solve problems.

♦ Mth.3.hs.5 Justify the steps used in simpli-fying expressions and solving equations and inequalities.

♦ Mth.3.hs.6 Identify functions as linear or nonlinear and contrast their properties from tables, graphs or equations.

♦ Mth.3.hs.7 Represent data involving linear relationships from tables as graphs and equa-tions and vice versa.

♦ Mth.3.hs.8 Solve linear equations and inequalities with two variables using algebraic methods, manipulatives or models.

♦ Mth.3.hs.9 Determine the slope of a line when given the graph of a line, two points on the line, or the equation of the line.

♦ Mth.3hs.10 Select and use a variety of strate-gies including concrete modeling, pictorial representation, and algebraic manipulation to add, subtract, multiply, divide and factor first and second degree binomials and trinomials in one variable.

4. Statistics and Probability

♦ Mth.4.hs.1 Analyze and interpret data using mean, median, mode, range and frequency.

♦ Mth.4.hs.2 Design a study, collect data, and select the appropriate representation to make conclusions and generalizations.

♦ Mth.4.hs.3 Judge the validity of reported data, conclusions and generalizations.

♦ Mth.4.hs.4 Calculate probabilities for simple events under different relationships, including independent, dependent, with replacement and without replacement.

Benchmarks for Students in College Preparatory Programs

The earlier benchmarks define the important knowledge and skills in which all young people in FSM should demonstrate proficiency. The following outcomes reflect some of the additional knowledge and skills that students in high school college prepa-ratory programs should demonstrate, as and if they complete the following mathematics courses.

Algebra 2

♦ Apply arithmetic properties to operate on and simplify expressions that include radicals and other real numbers.

♦ Use the complex number system, the notation for complex numbers, and the definition of "i" to solve problems in standard form.

♦ Add, subtract, multiply, and divide complex numbers.

♦ Use the inverse relationship between exponents and logarithms to solve exponential and loga-rithmic problems.

♦ Use advanced formulas or functions to solve problems.

♦ Apply the properties of arithmetic and geomet-ric sequences and series to solve problems.

♦ Use exponential functions to solve problems involving exponential growth and decrease.

- Use the properties of many types of functions including polynomial, absolute value, exponential, and logarithmic, to identify the function's graph.

- Use the appropriate terminology and notation to define functions and their properties, including domain, range, function composition, inverses, zeros and asymptotes.

- Describe the relationship among relations and functions.

- Solve equations and inequalities involving absolute values.

- Solve systems of linear equations and inequalities in two or three variables using a variety of strategies, such as substitution, graphing or matrices.

- Solve equations containing radicals and exponents.

- Factor polynomials representing perfect squares, the difference in squares, perfect square trinomials, the sum and difference of cubes and general trinomials.

- Apply quadratic equations to solve real-world situations and complex number problems.

- Use the binomial theorem to expand binomial expression.

- Use the fundamental counting principles for combinations and permutations to determine probability.

- Calculate probabilities of events under different relationships such as inclusion, disjoint, complementary, independent, and dependent, with replacement and without replacement.

- Use the right triangle relationships of trigonometric ratio, cosine, sine and tangent to solve problems.

Geometry

- Use right triangle trigonometric ratios to determine an unknown length of a side or the measure or an angle.

- Solve problems using the formulas for perimeter, circumference, area and volume of two- and three- dimensional figures and solids and determine the effect of dimension changes to perimeter, area and volume.

- Use reasoning to create and defend geometric conjectures.

- Use the concept of corresponding parts to prove that triangles and other polygons are congruent or similar.

- Explain properties and characteristics of angle bisectors, perpendicular bisectors and parallel lines.

- Use the relationship between pairs of angles (complementary, supplementary, vertical, exterior, interior) to determine unknown angle measures or definitions of properties.

- Apply the concepts of special right triangles to real-world situations.

- Use the relationships among properties of circles (chords, secants, tangents, arcs, circumference, radius, diameter, inscribed polygons) to solve problems.

- Use coordinate geometry to produce formulas and prove theorems for the midpoint of a line segment, the distance formula and forms of equations of lines and circles.

- Describe the concept of rigid motion on figures in the coordinate plane, including rotation, translation and reflection.

- Use concrete objects, pictorial representations, computer software or graphing calculators to solve geometric problems.

Trigonometry

♦ Express complex numbers in standard and polar form and convert from one to another.

♦ Add, subtract, multiply, divide, and find powers of complex numbers in polar form.

♦ Use vector operations, including dot product and cross product, the law of sines and the law of cosines to solve problems.

♦ Calculate linear and angular velocity.

♦ Find the sine, cosine, tangent, cotangent, secant and cosecant of an angle in standard position.

♦ Use the relationship among the six trigonometric functions to translate among them.

♦ Recognize the trigonometric functions of benchmark angles.

♦ Translate between radians and degrees.

♦ Find the value of any trigonometric function and inverse trigonometric function and solve trigonometric equations

♦ Use the fundamental trigonometric identities, including the sum and difference formulas, double-angle formulas and half-angle formulas to solve problems

♦ Verify trigonometric identities.

♦ Solve trigonometric equations and inverse trigonometric equations that include all solutions or solutions with restricted domains

♦ Use the trigonometric functions in the form $y =$ $A\sin(Bx+C) + D$ to determine various properties of the function including domain, range, period, phase shift and amplitude.

♦ Identify real-world phenomena that can be represented by a trigonometric function in the form $y = A\sin(Bx + C) + D$.

♦ Explain the relationship between trigonometric functions and their inverse.

Calculus

♦ Recognize limits from graphs and tables.

♦ Find limits of sums, differences, products, quotients and rational functions.

♦ Understand continuity in terms of limits and functions.

♦ Find the derivatives of functions, including polynomial, rational, trigonometric, logarithmic, inverse, composite and exponential functions.

♦ Find the derivatives of implicitly-defined functions.

♦ Find points of inflection of functions.

♦ Use implicit differentiation to find the derivative of an inverse function.

♦ Use integration by substitution or change of variable to evaluate integrals.

♦ Use Riemann sums, the trapezoidal rule and technology to approximate definite integrals of functions represented algebraically, geometrically or by tables of values.

♦ Find specific antiderivatives using initial conditions, including finding velocity functions from acceleration functions, finding position functions from velocity functions and applications to motion along a line.

♦ Use definite integrals to find the area between a curve and the x-axis, the average value of a function over a closed interval and the volume of a solid with known cross-sectional area.

♦ Apply the intermediate value theorem and extreme value theorem on a function over a closed interval.

- Apply the fundamental theorem of calculus, that is, interpret a definite integral of the rate of change of a quantity over an interval as the change of the quantity over the interval.

- Describe the concept of a derivative geometrically, numerically, analytically and verbally.

- Find second derivatives and derivatives of higher order.

- Prove the mean value theorem.

- Find average and instantaneous rates of change.

- Use first and second derivatives to describe the behavior of functions.

D National Standards and Benchmarks - Science

Science

Standard 1

Science as Inquiry

Students will understand the nature and processes of scientific inquiry and use the modes of scientific inquiry and habits of mind to learn about the world around them.

Standard 2

Physical Science and Technology

Students will understand the structure, properties and changes of matter as well as sources, uses, conservation and changes of energy. They will understand the nature of science and technology and the relationship of science and technology to society.

Standard 3

Earth and Space Science

Students will understand the characteristics and process of earth and space systems.

Standard 4

Life and Environmental Science

Students will understand the development, characteristics, processes and interactions of living things and the natural environment.

Standard 5

Marine Science

Students will understand the importance of protecting marine environments to sustain island life. They will learn about the technological, ecological and societal changes that have a direct impact on the local and global environment.

Grade 3

By then end of grade 3, students will:

1. Science as Inquiry

- ◆ Sci.1.3.1   Make observations about objects and events and share their findings with others.
- ◆ Sci.1.3.2   Compare and group objects by identifying their properties.

- ◆ Sci.1.3.3   Use simple measuring tools and equipment to gather information.
- ◆ Sci.1.3.4   Work individually or in teams to collect, compare and share information, data and ideas.
- ◆ Sci.1.3.5   Identify cause and effect relationships.
- ◆ Sci.1.3.6   Investigate events that interest them both in and out of the classroom.
- ◆ Sci.1.3.7   Use a variety of methods to record information.

2. Physical Science and Technology

- ◆ Sci.2.3.1   Describe the physical properties of objects and how materials undergo physical changes.
- ◆ Sci.2.3.2   Identify things in the environment that show motion.
- ◆ Sci.2.3.3   Identify changes in energy and ways energy can be conserved.
- ◆ Sci.2.3.4   Recognize that matter can exist in different forms or states.
- ◆ Sci.2.3.5   Identify and describe some technological changes in our islands.
- ◆ Sci.2.3.6   Use available materials to build simple measuring tools for measuring length, area, volume, mass, time and temperature.

3. Earth and Space Science

- ◆ Sci.3.3.1   Compare and contrast rocks and the types of soil, mud and sand in the environment.
- ◆ Sci.3.3.2   Identify and give examples of water in three different forms, solid, liquid and gas.

- ◆ Sci.3.3.3   Describe activities in their lives that are affected by changes in the skies.
- ◆ Sci.3.3.4   Recognize the patterns of sunrise, sunset, moonrise and moonset.
- ◆ Sci.3.3.5   Observe and describe objects in the skies such as the phases of the moon.
- ◆ Sci.3.3.6   Use models to represent relative size and distance of the sun, moon and earth.

4. Life and Environmental Science

- ◆ Sci.4.3.1   Explain that humans go through a life cycle of infancy, childhood, adolescence, adulthood and old age and identify differences in external human features such as body size, body shape and color of hair.
- ◆ Sci.4.3.2   Describe obtaining food and deriving energy from it, protecting against injury and reproducing as the basic requirements for life.
- ◆ Sci.4.3.3   List and describe the five senses.
- ◆ Sci.4.3.4   Observe and identify common varieties of plants and animals around the school, home and elsewhere in the local environment, such as a forest, reef or swamp.
- ◆ Sci.4.3.5   Explain how offspring of familiar animals compare to one another and to their parents
- ◆ Sci.4.3.6   Explain that different plants and animals have features that help them survive in different kinds of environments.

5. Marine Science

- ◆ Sci.5.3.1   Name and describe living things that are found in the ocean, reefs and swamps.

Grade 4

By then end of grade 4, students will:

1. Science as Inquiry

♦ Sci.1.4.1 Ask appropriate questions and gather information.

♦ Sci.1.4.2 Use drawings, charts and graphs to communicate experimental information.

♦ Sci.1.4.3 Investigate by using a variety of sources to acquire information.

♦ Sci.1.4.4 Compare and contrast similarities and differences between things they collect and observe.

♦ Sci.1.4.5 Record and communicate data clearly.

2. Physical Science and Technology

♦ Sci.2.4.1 Demonstrate energy by pushing and pulling on different objects.

♦ Sci.2.4.2 Describe the sources of energy including the sun and foods.

♦ Sci.2.4.3 Identify how animals get energy from food chains and food webs.

♦ Sci.2.4.4 Explain how plants get the energy they need to grow.

♦ Sci.2.4.5 Describe ways that advances in technology can improve living standards.

3. Earth and Space Science

♦ Sci.3.4.1 Identify cloud types and describe cloud formation.

♦ Sci.3.4.2 Explain atmospheric phenomena including tropical storms, typhoons and tornados as a result of differences in air pressure and temperature.

♦ Sci.3.4.3 Explain how volcanoes erupt.

♦ Sci.3.4.4 Compare and contrast rocks, minerals and fossils.

♦ Sci.3.4.5 Discuss the characteristics of the Earth's atmosphere and identify some of the instruments scientists use to observe the skies.

♦ Sci.3.4.6 Differentiate between the causes of currents and waves.

4. Life and Environmental Science

♦ Sci.4.4.1 Recognize that cells are the basic structures in both plants and animals.

♦ Sci.4.4.2 Identify causes and kinds of pollution in their environment and suggest ways to prevent such pollution.

♦ Sci.4.4.3 Recognize factors that cause or contribute to rapid changes in the environment and describe the impact of such rapid changes on animal and plant life.

5. Marine Science

♦ Sci.5.4.1 Describe the variety of life forms found in the sea and in fresh water.

♦ Sci.5.4.2 Describe free-swimming animals in tropical oceans, reefs and swamps.

♦ Sci.5.4.3 Compare and contrast ways their ancestors used the oceans to sustain life on islands with ways currently used.

Grade 5

By then end of grade 5, students will:

1. Science as Inquiry

♦ Sci.1.5.1   Compare and contrast different plants and animals across and within kingdoms.

♦ Sci.1.5.2   Explain cause and effect relationships in nature, for example, that a lack of rain results in plants being stressed and sometimes dying).

♦ Sci.1.5.3   Solve simple problems that require manipulation of objects and ideas.

♦ Sci.1.5.4   Demonstrate persistence in solving problems.

♦ Sci.1.5.5   Use replication to determine reliability of information gathered from simple scientific experiments.

2. Physical Science and Technology

♦ Sci.2.5.1   Describe and give examples of the three states of matter.

♦ Sci.2.5.2   Explain that matter can have different physical and chemical properties.

♦ Sci.2.5.3   Identify changes in matter occurring as a result of natural processes.

♦ Sci.2.5.4   Identify and describe ways that energy can be transformed from one form to another.

♦ Sci.2.5.5   Identify ways that society depends on and benefits from advances in technology.

3. Earth and Space Science

♦ Sci.3.5.1   Describe the effect of the sun's and moon's gravity on ocean tides.

♦ Sci.3.5.2   Identify and describe major layers of the earth's atmosphere.

♦ Sci.3.5.3   Name, label and model the relative distance between the planets in the Solar System.

♦ Sci.3.5.4   Identify phases of the moon and describe what causes these phases.

♦ Sci.3.5.5   Identify the major structural components of the earth, such as core, mantle and crust.

♦ Sci.3.5.6   Give examples of how our ancestors used stars, ocean currents and wind to navigate in the open seas.

4. Life and Environmental Science

♦ Sci.4.5.1   Identify the main parts of cells and differentiate between animal and plant cells.

♦ Sci.4.5.2   Classify plants with or without seeds and animals with or without a backbone.

♦ Sci.4.5.3   Describe how animals depend on plants to survive and carry on their life functions and how plants depend on animals for continuation of their life cycles.

♦ Sci.4.5.4   List and explain some of the negative human activities that have long-term effects on plants and animals.

♦ Sci.4.5.5   Differentiate between producers, consumers, herbivores, carnivores, omnivores, scavengers and decomposers and their roles for life cycles to be sustained.

5. Marine Science

♦ Sci.5.5.1   List and describe agencies and programs in the FSM that support the protection of marine environments.

◆ Sci.5.5.2   Identify practices that are contributing to the depletion of ocean resources.

Grade 6

By then end of grade 6, students will:

1. Science as Inquiry

◆ Sci.1.6.1   Solve simple problems that require replication or manipulation of objects and ideas.

◆ Sci.1.6.2   Compare and contrast simple quantitative and qualitative data.

◆ Sci.1.6.3   Identify possible causes of an observed or represented effect.

◆ Sci.1.6.4   Use simple measuring tools and equipment to solve science problems.

◆ Sci.1.6.5   Use drawings, graphs and charts to analyze and communicate experimental information.

2. Physical Science and Technology

◆ Sci.2.6.1   Describe the kinds and properties of metals found locally on the islands and their uses.

◆ Sci.2.6.2   Analyze the simple process of oxidation of metals and methods to minimize rusting.

◆ Sci.2.6.3   Explain the physical and chemical properties of matter.

◆ Sci.2.6.4   Use tools for observing and measuring properties of matter.

◆ Sci.2.6.5   Identify and demonstrate some ways lenses are used in school and the environment.

3. Earth and Space Science

◆ Sci.3.6.1   Describe the conditions in our atmosphere that cause changes in the weather.

◆ Sci.3.6.2   Relate seasonal changes to the Earth's rotation on its axis and revolution around the Sun.

◆ Sci.3.6.3   Describe how wind is generated.

◆ Sci.3.6.4   Describe the water cycle including the processes of evaporation, condensation and precipitation.

◆ Sci.3.6.5   Explain changes in the atmosphere that effect life on Earth.

4. Life and Environmental Science

◆ Sci.4.6.1   Explain and describe the properties and characteristics of microscopic organisms.

◆ Sci.4.6.2   List and classify types of trash in the environment.

◆ Sci.4.6.3   Explore the careers that relate to waste management.

◆ Sci.4.6.4   Identify materials that can be recycled.

5. Marine Science

◆ Sci.5.6.1   Describe food chains and food webs in ocean and shore environments.

◆ Sci.5.6.2   Identify organisms found in different marine areas such as in tidal pools and deep water and describe the body structures that allow them to live in those areas.

◆ Sci.5.6.3   Identify examples of interdependence among organisms in the ocean.

Grade 7

By then end of grade 7, students will:

1. Science as Inquiry

♦ Sci.1.7.1   Communicate experimental results verbally as well as in charts, graphs and drawings.

♦ Sci.1.7.2   Use tools and problem solving strategies to gather, analyze and interpret data.

♦ Sci.1.7.3   Observe and explain that different phenomena (such as fire, flood, typhoon, etc.) could be natural or manmade but natural processes usually allow for ecological recovery.

♦ Sci.1.7.4   Identify actions and outcomes of a controlled experiment.

♦ Sci.1.7.5   Analyze experimental information, draw simple inferences and develop generalizations from scientific data.

2. Physical Science and Technology

♦ Sci.2.7.1   Give examples and contrast renewable and non- renewable sources of energy.

♦ Sci.2.7.2   Describe friction, its affect on motion and the result on moving objects.

♦ Sci.2.7.3   Describe ways to honor traditional technologies, as well as incorporate modern technologies that improve our lives.

♦ Sci.2.7.4   Describe the composition of matter in terms of atoms, molecules, elements and compounds.

♦ Sci.2.7.5   Describe the properties of light and how light reacts when it strikes various surfaces.

3. Earth and Space Science

♦ Sci.3.7.1   Describe the Milky Way Galaxy and identify our Solar System as part of that galaxy.

♦ Sci.3.7.2   Compare and contrast the various theories of the formation of our islands.

♦ Sci.3.7.3   Describe the formation of atolls, coral reefs and lagoons and give examples.

♦ Sci.3.7.4   Distinguish between fringing and barrier reefs.

4. Life and Environmental Science

♦ Sci.4.7.1   Describe ways that can help solve some of the pollution problems throughout the region.

♦ Sci.4.7.2   Give examples and describe different ways living things reproduce.

♦ Sci.4.7.3   List and explain the conditions necessary for life on earth.

♦ Sci.4.7.4   Illustrate and explain the carbon dioxide-oxygen cycle.

♦ Sci4.7.5   Explain how humans can help maintain life on earth.

5. Marine Science

♦ Sci.5.7.1   Identify causes of pollution in local marine environments and suggest ways to minimize or prevent such pollution.

♦ Sci.5.7.2   Participate meaningfully in local practices that encourage conservation of marine resources.

♦ Sci.5.7.3   Describe some of the ways that marine resources are being used to develop the FSM economy.

Grade 8

By then end of grade 8, students will:

1. Science as Inquiry

♦ Sci.1.8.1   Formulate hypothesis based on careful observations and design an investigation that includes controls and variables.

♦ Sci.1.8.2   Conduct checks of reliability of information gathered from observed phenomena and formulate explanations based on data gathered through scientific explorations.

♦ Sci.1.8.3   Report data accurately and without bias, including findings that contradict their hypothesis.

♦ Sci.1.8.4   Ask valid, testable questions about the world around them.

♦ Sci.1.8.5   Create and use models in different contexts.

2. Physical Science and Technology

♦ Sci.2.8.1   Describe matter as composed of small particles in motion and identify some of the properties resulting from this assumption.

♦ Sci.2.8.2   Describe some of the uses of energy in mechanical and living systems and explain the conversion of one form to another.

♦ Sci.2.8.3   Describe the origin of sound in vibrations.

♦ Sci.2.8.4   Identify different kinds of motion and the effect of force on direction and speed.

♦ Sci.28.5   Describe the apparent color of objects as a result of reflection and absorption of different colors of light.

♦ Sci.2.8.6   Describe the effects of gravity on motion of objects.

♦ Sci.2.8.7   Identify everyday applications of electric and magnetic forces such as attractions in electric circuits.

3. Earth and Space Science

♦ Sci.3.8.1   Describe how the earth's movement, properties of water and the differential heating of land, water and air cause weather phenomena.

♦ Sci.3.8.2   Discuss traditional knowledge about moon phases and tides and describe how this influences island life, such as fishing practices and the harvesting of crabs.

♦ Sci.3.8.3   Describe how landforms are worn down and shaped by gravity, water, wind, weather, erosion and living things.

♦ Sci.3.8.4   Describe the composition of rocks as different combinations of minerals and identify different rock types including sedimentary, igneous and metamorphic.

♦ Sci.3.8.5   Describe the life cycle of stars and the sun as a star.

♦ Sci.3.8.6   Describe how the gravitational pull of the sun holds Earth and other planets in their orbits and how the gravitational pull of the planets keeps their moons in orbit around them.

♦ Sci.3.8.7   Describe tides, seasons and lunar phases by using suitable models of the solar system and the motion of objects within it.

4. Life and Environmental Science

♦ Sci.4.8.1   Investigate environmental problems such as water, air and land pollution, deforestation and soil erosion.

♦ Sci.4.8.2   Investigate and implement tradi-

tional practices in one major area of stewardship, such as farming, waste disposal, recycling or food preparation.

- Sci.4.8.3   Classify plants and animals into groups based on similarities and differences.

- Sci.4.8.4   Describe technology's role in selective breeding of certain organisms.

- Sci.4.8.5   Identify the components of cells and describe their functions.

- Sci.4.8.6   Identify examples of interdependence among organisms and flows of energy in food chains and food webs.

5. Marine Science

- Sci.5.8.1   Illustrate a marine ecosystem.

- Sci.5.8.2   Identify and describe the effects on marine life of environmental changes to shorelines.

- Sci.5.8.3   Describe the impact of human activities on marine environments.

- Sci.5.8.4   Explain how human actions have resulted in decreasing populations of marine animals such as turtles.

Benchmarks for All High Schools

All High School students will:

1. Science as Inquiry

- Sci.1.hs.1   Design and safely implement an experiment, including the appropriate use of tools and techniques to organize, analyze and validate data.

- Sci.1.hs.2   Interpret data to validate generalizations.

- Sci.1.hs.3   Describe how a testable hypothesis may need to be revised to guide a scientific investigation.

- Sci.1.hs.4   Report on a scientific research activity using appropriate methodology and format.

- Sci.1.hs.5   Prepare an independent research paper on a scientific problem for public sharing.

- Sci.1.hs.6   Describe examples of major shifts in science's understanding of the world, for example, theories of plate tectonics and the atomic structure of matter.

- Sci.1.hs.7   Describe some of the interactions of science, technology and society.

2. Physical Science and Technology

- Sci.2.hs.1   Describe the basic assumptions of atomic theory and relate the properties of materials to their atomic structure.

- Sci.2.hs.2   Identify and describe properties and classifications of energy and its ability to do work and describe the importance of energy in physical and living systems.

- Sci.2.hs.3   Identify applications of the principles of motion, gravitational and electromagnetic forces in their lives.

- Sci.2.hs.4   Describe some of the positive and negative impacts of modern food production and distribution technologies.

- Sci.2.hs.5   Cite examples of new products made possible by the creation of new materials by technology.

- Sci.2.hs.6   Describe some of the complex relationships between science and technology as they relate to manufacturing.

3. Earth and Space Science

♦ Sci.3.hs.1   Describe the composition of the major layers of the earth.

♦ Sci.3.hs.2   Describe the composition of the major objects in the universe such as stars and planets.

♦ Sci.3.hs.3   Describe the structure and composition of the Earth's atmosphere.

♦ Sci.3.hs.4   Explain factors that determine climate and give examples of types of climate.

4. Life and Environmental Science

♦ Sci.4.hs.1   Describe relationships and the interdependence of organisms within biomass.

♦ Sci.4.hs.2   Describe how species have evolved over time to adapt to change.

♦ Sci.4.hs.3   Describe how the study of DNA can explain kinship among species.

♦ Sci.4.hs.4   Identify the processes used to utilize energy within organisms, such as photosynthesis and respiration.

♦ Sci.4.hs.5   Identify and describe man's use of natural resources and the need to manage and protect them.

5. Marine Science

♦ Sci.5.hs.1   Describe various marine ecosystems and identify similarities between land and marine ecosystems.

♦ Sci.5.hs.2   Identify and describe changes in the marine environment.

♦ Sci.5.hs.3   Use data to describe and design effective ways of managing or sustaining marine resources and the measures taken by the FSM to conserve marine resources.

♦ Sci.5.hs.4   Describe the movements of the earth's plates and the relationship between these movements and changes in the oceans.

The previous benchmarks identify learning expectations for all high school students. Following are benchmarks of learning for students who take college preparatory science classes in high school. The process skills that are to be included in all courses are listed first. These are followed by benchmarks for the specific science courses.

Benchmarks for Students in College Preparatory Programs

Students will:

♦ Describe how a testable hypothesis may need to be revised to guide a scientific investigation.

♦ Design and safely implement an experiment, including the appropriate use of tools and techniques to organize, analyze and validate data.

♦ Defend and support conclusions, explanations and arguments based on logic, scientific knowledge and evidence from data.

♦ Determine the connections among hypotheses, scientific evidence and conclusions.

♦ Communicate the components of a scientific investigation, using appropriate techniques.

♦ Engage in and explain the importance of peer review in science.

♦ Revise, as needed, conclusions and explanations based on new evidence.

♦ Describe the importance of ethics and integrity in scientific investigation.

- Explain how scientific explanations must meet a set of established criteria to be considered valid.

- Explain how scientific advancements and emerging technology have influenced society.

- Compare the risks and benefits of potential solutions to technological issues.

Biology Course Benchmarks

Students will:

- Understand the unity, diversity and interrelationships between organisms, including their relationships to cycles of matter and energy in the environment.

- Describe biogeochemical cycles within ecosystems.

- Explain the chemical reactions that occur in photosynthesis and cellular respiration and that result in cycling of energy.

- Explain how matter and energy flow through living systems and the physical environment.

- Explain dynamic equilibrium in organisms, populations and ecosystems and explain the effect of equilibrium shifts.

- Describe different cell parts, their functions and how they are specialized into different tissue and organs.

- Explain how cells are specialized in different tissues and organs.

- Differentiate between the processes of mitosis and meiosis.

- Describe how homeostatic balance occurs in cells and organisms.

- Describe the components and functions of a variety of macromolecules active in biological systems.

- Explain the organization of life on Earth using the modern classification system.

- Explain the theories of evolution and natural selection and cite evidence that supports these theories.

- Explain the structural properties of DNA and the role of DNA in heredity and protein synthesis.

- Explain how Mendel's laws of heredity can be used to determine the traits of possible offspring.

- Explain chromosomal mutations, their possible causes and their effects on genetic variation.

- Name and describe the components of the human body from cell to system and how they work together.

Chemistry Course Benchmarks

Students will:

- Explain how conservation of energy is applied to various systems.

- Explain how elements are arranged in the periodic table and analyze trends among elemental properties.

- Explain how atoms bond using valence electrons.

- Describe nuclear reactions and how they produce energy.

- Describe the basic assumptions of the atomic theory.

- Relate the properties of materials to their atomic structure.

- Distinguish between physical and chemical properties.

- Describe elements and compounds.

- Distinguish between mixtures and pure sub-

stances.

♦ Relate local technologies, including the utilization and preservation of materials, to either causing or controlling changes in matter.

♦ Relate observed properties and changes in matter to the behavior of molecules and atoms as described in the atomic and kinetic molecular theories.

♦ Discuss atomic mass and its experimental determination.

♦ Explain the mole concept and Avogadro's number.

♦ Describe molar mass.

♦ Convert between moles and mass of a given sample of a chemical compound.

♦ Name and write chemical formulas and balance chemical equations.

♦ Describe endothermic and exothermic reactions.

♦ Describe the basic characteristics of acids, bases, salts and organic and inorganic compounds.

♦ Calculate the efficiency of energy transfer within physical and biological systems.

♦ Find the mass of an element in a given compound.

♦ Describe empirical formulas of compounds.

♦ Calculate empirical formulas.

♦ Calculate the molecular formula of a compound, given its empirical formula and molar mass.

♦ Identify and describe properties and classifications of energy and its ability to do work.

♦ Measure work and heat resulting from energy transformations.

♦ Describe possible ways or uses of technology to increase efficiency of energy transfer.

♦ Trace the energy transformations within physical and biological systems.

Physical Science/Physics Course Benchmarks

Students will:

♦ Explain and provide examples of electromagnetic radiation and sound using a wave model.

♦ Use vectors to explain force and motion.

♦ Provide examples of entropy.

♦ Describe the periodicity of the elements.

♦ Calculate the efficiency of energy transfer within biological and physical systems.

♦ Describe the structure of matter including atoms, protons, neutrons and electrons.

♦ Explain how atoms interact by transferring or sharing electrons.

♦ Describe the nature of solids, liquids and gases by examining molecular structures.

♦ Describe the importance of carbon bonding.

♦ Describe nuclear reactions and how they produce energy.

♦ Explain how atoms bond using valence electrons.

♦ Understand the nature of matter and energy, forms of energy, including waves and energy transformations.

♦ Explain how the law of conservation of energy is applied to various systems.

♦ Compare transverse and longitudinal waves and their properties.

♦ Explain and provide examples of electromagnetic radiation and sound using a wave model.

- Understand the relationship between force, mass and motion of objects and know the major natural forces of gravitational, electric and magnetic.

- Apply the laws of motion to determine the effects of forces on the linear motion of objects.

- Use vectors to explain force and motion.

Marine Science Course Benchmarks

Students will:

- Identify common marine organisms and place them in the scientific classification system for organisms.

- Discuss problems that affect marine environments resulting from human actions.

- Describe some of the technologies used on islands to protect marine resources.

- Discuss the nature of tropical fisheries in the FSM and challenges in their management.

- Compare traditional marine resource management practices to Western practices.

- Describe the relationships between marine plant and animal reproduction with reference to phases of the moon and seasons.

- Identify local poisonous fishes and methods of detecting ciguatera toxin in fish.

- Discuss the benefits of marine resources to local cultures and sustaining life, as well as to the economic development of the nation.

- Identify pollution controls in the FSM and design a plan to support the implementation of these controls.

Earth Science Course Benchmarks

Students will:

- Describe the size and shape of the Earth.

- Describe the different rates at which geological processes occur.

- Distinguish between minerals and rocks.

- Classify rocks.

- Describe the relative distribution of oceans and continents.

- Distinguish between fresh water and ocean water.

- Investigate different kinds of soil and determine their locations in rock layers.

- Determine the properties of lakes, rivers and ground water.

- Investigate how fossils are incorporated into sedimentary rocks.

- Describe the plate tectonics theory.

- Identify basic hydrological properties and processes and see how features of the planet interact.

- Determine that water cycles to and from the oceans, atmosphere and Earth through processes of evaporation, condensation, precipitation, surface run-off and percolation into the soil.

- Describe the processes of weathering, erosion, deposition, and lithification or compaction that shape the surface of the Earth.

- Recognize that on continents surface water is found in lakes, streams and rivers and in the form of ice.

- Describe ground water and investigate how rain, dew, fog and clouds form through the process of evaporation, condensation, and precipitation.

- Investigate how smoke affects cloud, fog and dust formation.

- Relate cloud types to weather.

- Investigate the movement of air.

- Describe the formation of their island and region environment.

- Identify human impact on local and regional environments.

- Explain the formation of weather fronts and how they behave

- Identify and describe global wind patterns.

- Identify and describe changes in their own environment, in the FSM and the world.

- Identify and describe global changes that affect FSM island life.

- Predict how changes on Earth's surface will affect local ecosystems.

- Identify and describe local examples of how living things affect the non-living environment and vice versa.

Notes