



MATH

FOR LANGUAGE DEVELOPMENT
BASED ON ALASKA MATH STANDARDS
GRADE 6 • BOOK 1



Sealaska Heritage Institute



*Integrating culturally
responsive place-based content
with language skills development
for curriculum enrichment*

UNIT DEVELOPMENT

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Introduction to the Developmental Language Process in Math

OVER THE YEARS, much has been written about the successes and failures of students in schools. There is no end to the solutions offered, particularly for those students who are struggling with academics. For example, there have been efforts to bring local cultures into the classroom, thus providing the students with familiar points of departure for learning.

While the inclusion of Native concepts, values, and traditions into a curriculum provide a valuable foundation for self-identity and cultural pride, they may not, on their own, fully address improved academic achievement.

Through math lessons, students are exposed to new information and to the key vocabulary that represents that information. While the students may acquire, through various processes, the scientific information, the vocabulary is often left at an exposure level and not internalized by the students. Over time, this leads to language delay that impacts negatively on a student's ongoing achievement.

Due to weak language bases, many Native Alaskan high school students struggle with texts that

are beyond their comprehension levels and writing assignments that call for language they do not have.

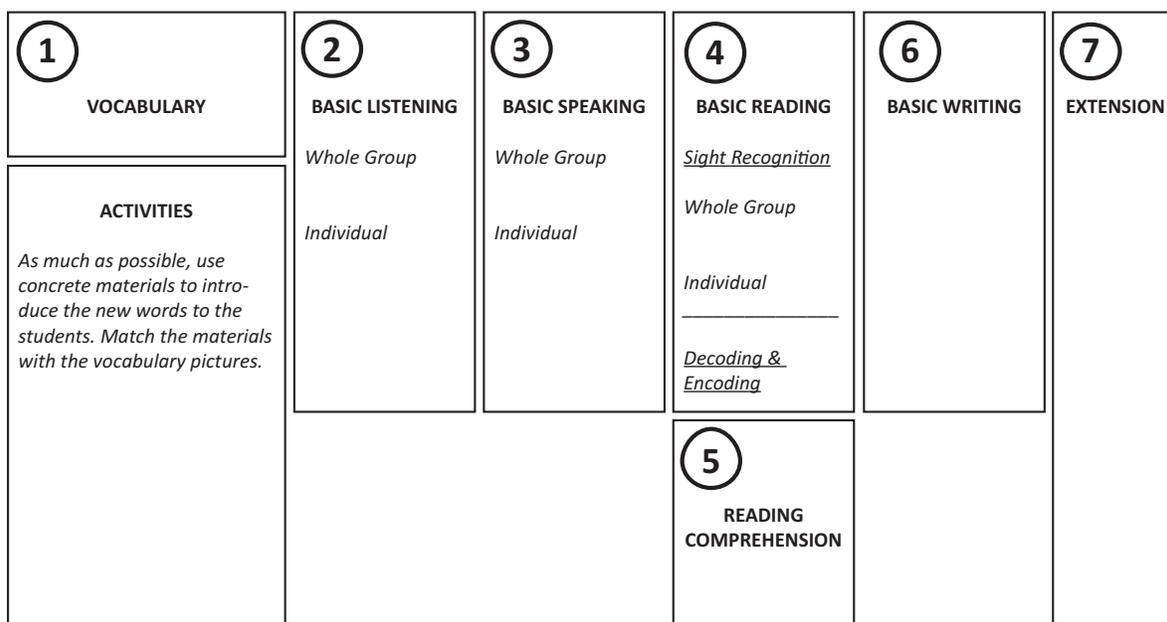
This program is designed to meet the academic realities faced by high school students every day, using a developmental process that integrates culture with skills development.

To this end, each key vocabulary word, in math, is viewed as a concept. The words are introduced concretely, using place-based information and contexts. Whenever possible, the concept is viewed through the Native heritage cultural perspectives. Using this approach, the students have the opportunity to acquire new information in manageable chunks, the sum total of which represent the body of information to be learned in the math program.

When the key vocabulary/concepts have been introduced, the students are then taken through a sequence of listening, speaking, reading, and writing activities designed to instill the vocabulary into their long-term memories.

This is the schema for the Developmental Language Process:

The Developmental Language Process—Math



Introduction to the Developmental Language Process in Math

Finally, at the end of each unit, the students will participate in enrichment activities based on recognized and research-based best practices. By this time, the math information and vocabulary will be familiar, adding to the students' feelings of confidence and success. These activities will include place-based and heritage culture perspectives of the information learned.

This approach is radically different from current practices in most math classes. Historically, little or no formal vocabulary development takes

place. It is assumed that the vocabulary is being internalized during the learning process, which is most often an erroneous assumption.

Increasing the language bases of the students will lead to improved comprehension in listening and reading, and higher levels of production in creative speaking and writing.

This, coupled with the place-based and culturally-responsive content, will provide the students with the foundations necessary for ongoing confidence and achievement.

The Integration of Math Content and Language Development

Introduction of Key Math Vocabulary



Math Vocabulary Development
Listening, Speaking, Reading, & Writing



Math Application
Teacher-Directed, Group, & Individual Activities

Alaska Standards for Math Readiness, Grade 6

M1.1.1 Read, write, order, count, and model one-to-one correspondence with whole numbers to 100.

M1.1.2 Use, model, and identify place value positions of 1s, 10s, and 100s.

M1.1.3 Model and explain the processes of addition and subtraction, describing the relationship between the operations.

M1.1.4 Select and use various representations of ordinal and cardinal numbers.

M1.1.5 Identify, model, and label simple fractions, describing and defining them as equal parts of a whole, a region, or a set.

M1.2.1 Read, write, model, order, and count with positive whole numbers to 1,000,000 and negative whole numbers.

M1.2.2 Use, model, and identify place value positions from 0.001 to 1,000,000.

M1.2.3 Model and explain the processes of multiplication and division. Describe the relationships among the four basic operations.

M1.2.4 Identify and describe different uses for the same numerical representation.

M1.2.5 Model and explain the process of adding and subtracting fractions with common denominators and decimals that represent money.

[3] N-3 using appropriate representations of ordinal or cardinal numbers (M1.1.4)

[4] N-4 identifying, describing with explanations, or illustrating equal parts of a whole, a region, or a set (using models) (M1.2.4)

[4] N-5 identifying, describing with explanations, or illustrating equivalent fractions or mixed numbers