**GENERAL COURSE GOALS:** The NCTM (National Council of Teachers of Mathematics) states, “A major goal of mathematics is to help children develop the belief that they have the power to do mathematics. This autonomy develops and grows as children gain confidence and learn that mathematics is not simply memorizing rules and procedures but that mathematics makes sense, is logical, and is enjoyable.” Knowing mathematics involves doing mathematics. The goal of this course is to provide opportunities for preservice teachers to develop knowledge, skills and dispositions that will enable them to pass along an enjoyment and confidence in mathematics to their elementary students.

### Expected Outcomes:

1. Candidates will be able to demonstrate understanding and the ability to teach to the state-adopted academic content standards reflecting the current California Mathematics Framework.
2. Candidates will be able to recognize and teach logical connections across major concepts and principles in the state adopted content standards for students in Mathematics.
3. Candidates will be able to understand and effectively use materials, methods, and strategies for all students (i.e. ELD, special needs, gifted), providing them access to the core curriculum and beyond.
4. Candidates will be able to help students solve real-world problems using mathematical reasoning and concrete, verbal, symbolic, and graphic representations.
5. Candidates will be introduced to and create a mathematical teaching/learning environment that uses a variety of teaching strategies which address access, equity and the importance of the student’s family and cultural backgrounds and experiences in relation to mathematics education in California.
6. Candidates will be able to select and integrate the appropriate technological resources for their relevance, effectiveness, alignment with mathematics content standards, and value added to all student learning.
7. Candidates will be able to build self-confidence so that they can become successful math teachers who develop a philosophy of mathematics education linked to on-going professional development.
8. Candidates will be able to acquire a set of mathematics activities and resources to work with students of diverse abilities.
9. Candidates will become familiar with the concepts of lesson pacing, level of student involvement, checking for understanding, mastery versus performance learning, and general classroom management of mathematics instruction.
10. Candidates will demonstrate the ability to select, administer, and interpret informal and formal assessment tool(s) to assess student's understanding of mathematics, including appropriate measures for initial, progress monitoring, and summative assessment of English learners for math content knowledge in the core curriculum.
11. Candidates will be able to understand and effectively use systematic instructional strategies designed to make grade-appropriate or advanced math curriculum content comprehensible to English learners.

### Course Requirements:

1. The student will attend all class sessions and participate seriously and spontaneously in class discussions and microteaching labs. **Absences (excused or not) may result in a lowered course grade. (Promptness is expected. Tardiness will result in a lowered grade.) Two and one/half missed classes (7.5 hours of classtime) may result in an incomplete grade for the course. Alternate assignments (paper, tutoring etc.) may be assigned to students who have been absent.**
2. The student will prepare a detailed, labeled binder of mathematics teaching philosophies, activities, strategies, projects, games etc. which will serve as a mathematics teaching resource.

### Required Texts:

*available in the CSUS student bookstore

1. Required: SECOND EDITION- Teaching Mathematics to All Children: Designing and Adapting Instruction to Meet the Needs of Diverse Learners, 2/e; Author : Tucker, Benny; ISBN : 0-13-027021-0*
4. Required: Student Packet by Dr. Johnson

### Class Times:

1. Special Ed EDS 123A/B:  **Monday 4 -6:50** On campus, Eureka 313E (14 week class)
2. Folsom Cordova (14 week program)  **Friday 8-12** Off campus Rancho Cordova

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## Fall 2006 Calendar

<table>
<thead>
<tr>
<th>Week No.</th>
<th>Date</th>
<th>Topics</th>
<th>Due this week:</th>
<th>Lab Time:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9/11</td>
<td>Introduction: Grouping/Patterns/Logic/Counting/Problem Solving</td>
<td></td>
<td>microteaching and getting started</td>
</tr>
<tr>
<td>2</td>
<td>9/18</td>
<td>Place Value; Whole number: Add. and Subtraction; <em>We will also organize your binder in class.</em></td>
<td>Bring LARGE binder, course packet &amp; 19 dividers</td>
<td>Organizing binder &amp; discussion</td>
</tr>
<tr>
<td>3</td>
<td>9/25</td>
<td>Whole number: Multiplication (primes/factors)</td>
<td></td>
<td>discussion</td>
</tr>
<tr>
<td>4</td>
<td>10/2</td>
<td>Whole number : Division</td>
<td></td>
<td>Speaker</td>
</tr>
<tr>
<td>5</td>
<td>10/9</td>
<td>Fractions: definition, order &amp; equivalents (GCF/LCM)</td>
<td></td>
<td>discussion</td>
</tr>
<tr>
<td>6</td>
<td>10/16</td>
<td>Fractions: addition and subtraction</td>
<td>Assignment 1 Student Assess.</td>
<td>Discussion of assignment</td>
</tr>
<tr>
<td>7</td>
<td>10/23</td>
<td>Fraction: multiplication and division</td>
<td></td>
<td>Discussion</td>
</tr>
<tr>
<td>8</td>
<td>10/30</td>
<td>Decimals and Percents</td>
<td>Class, then Midterm.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>11/6</td>
<td>Integers/Assessment</td>
<td></td>
<td>video/teaching/ discussion</td>
</tr>
<tr>
<td>10</td>
<td>11/13</td>
<td>Measurement; Circles; Area and Perimeter</td>
<td></td>
<td>Discussion</td>
</tr>
<tr>
<td>11</td>
<td>11/27</td>
<td>Geometry: Toothpicks, Shapes, &amp; Volume, Algebra</td>
<td></td>
<td>Speaker</td>
</tr>
<tr>
<td>12</td>
<td>12/4</td>
<td>Statistics, Probability, Graphing</td>
<td>Assignment 2 Sig. Assign.</td>
<td>Begin sig. assign. presentations</td>
</tr>
<tr>
<td>13</td>
<td>12/11</td>
<td>Individual Written Final and Binders Due</td>
<td>Binders</td>
<td>Continue sig. assign. presentations</td>
</tr>
<tr>
<td>14</td>
<td>12/18</td>
<td>Presentation of Signature Assignment—wrap-up</td>
<td></td>
<td>Finish sig. assign. presentations</td>
</tr>
</tbody>
</table>

### Assignment/Grading

<table>
<thead>
<tr>
<th>Assignment/Grading</th>
<th>Points *</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Student Assessment:</td>
<td>8 pts.</td>
</tr>
<tr>
<td>2. Signature Assignment: Teaching and Evaluating a Math Lesson</td>
<td>10 pts.</td>
</tr>
<tr>
<td>3. Book chapter presentation (your contribution)</td>
<td>5 pts.</td>
</tr>
<tr>
<td>5. Notebook &amp; Microteaching Form: (due 13th week)</td>
<td>14 pts.</td>
</tr>
<tr>
<td>6. On-Time/Participation: (classes wk. 1-12; 0-3 pts. * per class)</td>
<td>36 pts.</td>
</tr>
</tbody>
</table>

*1 pt. for on-time, 1 pt. for attendance, 1 pt. for active participation*

**Extra credit:** perfect attendance (+.5 pt.); no tardies (-.5 pts.) (if both: +2); exemplary binder (extra activ. etc.) = (+ .5 - 1 pts.)

### Letter Grade:

- 94-100 = A  
- 90-93 = A-  
- 88-89 = B+  
- 84-87 = B  
- 80-83 = B-  
- 78-79 = C+  
- 74-77 = C  
- 70-73 = C-  
- 68-69 = D+  
- etc.

### Late Work

Late Work is not accepted, however, I reserve the right to make an exception based upon compelling reasons, however a 50% reduction in grade will be assessed. If the quality of the work is not up to graduate level or in accordance with the class instructions, the student may one opportunity to redo the assignment with a 50% reduction in grade.

### Notification of Special Needs

Consistent with University policy, students must file a form with the Students and Disabilities Office and provide the instructor of all classes with a copy of the form by the end of the 2nd week of classes. In this way, we can accommodate the needs of students with disabilities.

### Incompletes

Please note that a grade of Incomplete must be awarded in accordance with University policy-there must be a specific, identifiable course requirement that needs to be met due to unforeseen but fully justified reasons, and that there is still a possibility of earning credit. Students have two semesters to complete the work. (Fall 2005 inc. due by Dec 18, 2006).
Assignment 1: Student Informal Assessment 8 points Due: Week 6

If you need help, talk to me EARLY (before week 3) in the semester!!

A. Select a student who is having problems in a class or who has special needs. Ask your CT!! It doesn’t have to be a student who is in a special education placement just someone who needs help. (Please include a school/teacher contact number in case I need to confirm details of the assignment.)

B. Develop a brief, informal assessment activity involving (shape/color sorting, patterning, number recognition, place value, addition/subtraction facts, multiplication/division facts, or fraction recognition/etc.) See pages 8 & 9 of the syllabus.

C. Complete the assessment, being sure to include a student response sheet.

D. Outline a plan for a “treatment” to help the student.

FORMAT: Your report must be typewritten and graduate level quality of work. Be sure to address all of the issues below. It should be 3-4 pages in length, generally, not including the copies of the assessment.

1. A description of the student and why the level of assessment you selected was appropriate.
2. The framework citation for the concept you are working on. It may be a lower grade level concept!
3. A description of the assessment you selected and a copy of it with the student responses).
4. A write-up of the procedure you followed in giving the assessment, including the student’s reactions/comments.
5. Your evaluation of the student performance.
6. Your concrete suggestions for assistance/intervention.

Note: if you assess a student and they pass with “flying colors”, you will need to find a different concept to assess or a different student!

Assignment 2: Signature Assignment 10 (8 plus 2 for presentation) points Due Week 12

Take an existing textbook and select a three-day sequence of instruction that you believe can be improved upon using SDAIE and Diverse Learner strategies. Teach at least two days of the sequence. Fill out the reflection form after you have completed teaching the lessons. Use the organizational sequence below. The final product must include:

1. A three day sequence using the format below. THIS IS BASED ON THE TUCKER TEXTBOOK EXAMPLES!
2. Photocopy of the lesson plans from the Teacher’s Edition of the textbook you used.
3. Copy of any additional pages you may have created to augment the lessons.
4. A 2-3 page reflection, following your teaching at least two days of the sequence. The reflection should cover the following points: First, note changes, if any, you made “on the spot,” and tell why you made them. What was good? What needed improvement? What would you change, if you taught this lesson again? How was your monitoring of student involvement? How was your assessment?
5. Your presentation of the Sig. Assignment during week 12, 13 or 14 should include a 3-5 minute overview of changes you made and a one—two page (front and back) handout for your classmates describing the topic/T. Ed. Textbook section, your basic changes/ideas, description of any activities, worksheets etc. you created.

Reminders:
Adapting Lessons for Diverse Learners (Expand development; Increase visual input; Increase kinesthetic activity; Increase student communication; Monitor learning continually) See your textbook for the details!

SDAIE Strategies *See handout with excerpts from Dr. Sadek for the details!

1. Emphasis on the Academic Language
2. Active Learning: Students must be constantly giving the teacher EVIDENCE OF LEARNING.
3. Assessing/Tapping Prior Knowledge: become very familiar with the background knowledge that students bring to the learning situation.
4. Building New Knowledge: Each and every lesson must result in the acquisition of new knowledge by students.
5. Collaborative Problem-Solving: Cooperative and Other Groupings: Teachers need to plan instruction through educational activities that provide for flexible groupings of students to meet specific purposes.
6. Cultural Affirmation/Multicultural Perspectives.
8. Demonstration and Modeling.
9. Integrating Listening, Speaking, Reading and Writing Across the Curriculum.
10. Developing Higher Order Thinking Skills.
11. Using effective questioning techniques.
12. Facilitate learning through visual aids, manipulatives, verbal and non-verbal cues.
Assignment 3: Math Resource Notebook   Due: Week 13

1. Get a VERY large 3-ring binder, several smaller 3-ring binders, or a big box of labeled files and bring to the second week of class.

Suggested Format (minimum 19 dividers)   Section Labels
(If something else works better for your situation, talk to me!!)

Extra Sections at beginning:
A. Syllabus
B. Assignments
C. Assessment/Curriculum Ideas/general handouts

Divide up my course packet into the sections below and add 1 activity (minimum) to each section below:

1. Grouping/Patterns/Logic/Problem Solving
2. Counting and Place Value
3. Whole Number Add. and Sub.
4. Whole Number Multiplication
5. Whole Number Division
6. Fractions naming parts & equiv.
7. Fractions add. and sub.
8. Fractions mult and division
9. Decimals
10. Percents
11. Integers
12. Measurement, Perimeter, Circum., Area, Volume (inc. time, angles, etc.)
13. Geometry, Spatial Relationships
15. Graphing
16. Algebra

Additional activities added to sections 1-16.

The activities should come from a variety of areas:
- Check out books that I have!! (I have over 200, some at CSUS in my office, and some in my car!)
- Ask the teachers at your school or other friends.
- Go on the Internet! Use a variety of sources.
- Good website to start with: http://archives.math.utk.edu/k12.html
- Choose any grade level or ability for your activities, whatever appeals to you! Ok to mix grade levels.
- Note: many activities overlap a number of content areas, for example a perimeter activity could include geometry, or even fractions. Choose whichever category you want. If you have questions, see me.

Although you may share some activities with other students - MAKE SURE YOUR NOTEBOOK IS UNIQUE!!

Notebook Grading: 9-12 points notebook, and 0-2 points microteaching sheet

Basic notebook, dividers, my packet divided up, 1 additional quality activity per section: 9 points (C)

Basic notebook, dividers, my packet divided up, 2 or 3 additional quality activities per section: 10 points (B-)

Creative notebook, dividers, my packet divided up, 3 additional quality activities per section: 11 points (B+)

Creative notebook, dividers, my packet divided up, 4 additional quality activities per section: 12 points (A)

Exceptionally creative, 5 or more additional activities per section, lots of other goodies: 12.5—13 pts. (ex. cr.)

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Partners will share the responsibility of presenting key points and some activities from the class textbooks to their fellow classmates and give 1-2 page (total from all partners!) handout/summary (Link to book pages!) to be given to each classmate. 10–15 min, allowed for presentation. (Practice & time yourself!) All students will be expected to bring textbooks to follow along to highlight and take notes.

### Week 1: 11/27
- **Chap. 1**: Tucker
- **Chap. 2**: Tucker
- **Chap. 3**: Tucker

**Presented by Instructor:**
- Key Points: What are students learning? Overview of Developmental, practice, application and assessment activities. Level of Involvement!! Diversity in the classroom. Lesson Design: adapting for diverse learners

### Week 2: 11/13
- **Week 2: 9/18**
  - **Tucker**: Chap. 4
  - **Hammeken**: Chap. 7

**Presented by students:**
- **Chap. 4 Key points**: Tucker: Common Misconception; About Young Children; Overview of Classification, Comparison, Seriation, Geometric Concepts—relative position; Major points from adapted (revised) lesson Mention a couple of interesting “activities” which are in the chapter. Hammeken: Brief highlights of Chap. 7.

### Week 3: 9/25
- **Week 3: 9/25**
  - **Tucker**: Chap. 5
  - **Hammeken**: Chap. 3

**Presented by students:**
- **Chap. 5 Key points**: Tucker: Number Sense; Foundations of Algebra; Building on What Children Already Know; The Big Picture; Development of Numbers & Numeration; One-Digit numbers; rounding: Major points from adapted (revised) lesson Mention a couple of interesting “activities” which are in the chapter. Hammeken: Brief highlights of Chap. 3.

### Week 4: 10/2
- **Week 4: 10/2**
  - **Tucker**: Chap. 6
  - **Hammeken**: Chap. 4

**Presented by students:**
- **Chap. 6 Key points**: Tucker: Meaning of the operation; Basic Facts; Algorithms; Developing the meaning of addition; Making the process more efficient; Discovering relationships among the facts; Memorization of the Easy Basic Addition Facts; Thinking Strategies for hard basic addition facts; Summary of the developmental sequence for addition; Developing the meaning of subtraction; Developing the easy and hard subtraction facts; Summary of the developmental sequence for subtraction; Major points from adapted (revised) lesson Mention a couple of interesting “activities” which are in the chapter. Hammeken: Brief highlights of Chap. 4.

### Week 5: 10/9
- **Week 5: 10/9**
  - **Tucker**: Chap. 7
  - **Hammeken**: Chap. 5

**Presented by students:**
- **Chap. 7 Key points**: Tucker: Developing the meaning of multiplication; Developing and memorizing the easy multiplication facts; Developing and memorizing the hard multiplication facts; Teaching the Multiplication Algorithm—briefly mention two big ideas; Summary of the developmental sequence for Multiplication; Developing the meaning of Division—measurement and partition; Teaching easy and hard division facts; Big ideas for division; Teaching problem solving using multiplication and division; Major points from adapted (revised) division lesson Mention a couple of interesting “activities” which are in the chapter. Hammeken: Brief highlights of Chap. 5.

### Week 6: 10/16
- **Week 6: 10/16**
  - **Tucker**: Chap. 8 start
  - **Hammeken**: Chap. 6

**Presented by students:**
- **Chap 8 part 1 Key points**: Tucker: Three sides of fractions; Fractional units; Beyond unit fractions; fractions of a set; equivalent fractions; Using the laboratory approach; comparison of fractions. Least Common denominators; Improper fractions and mixed numbers; Common error/remediation note; Mention a couple of interesting “activities” which are in the chapter. Hammeken: Brief highlights of Chap. 6.

### Week 7: 10/23
- **Week 7: 10/23**
  - **Tucker**: Chap. 8 cont
  - **Hammeken**: Chap. 8

**Presented by students:**
- **Chap 8 part 2 Key points**: Tucker: Briefly describe 3 approaches to multiplying fractions, listing why only 2 are considered usable. Dividing fractions; Describe some multiplication and division activities for fractions; Major points from adapted (revised) division lesson; Solving problems using fractions; Problem solving strategies. Hammeken: Brief highlights of Chap. 8.

### Week 8: 10/30
- **Week 8: 10/30**
  - **Tucker**: Chap. 9
  - **Hammeken**: Chap. 9

**Presented by students:**
- **Chap. 9 Key points**: Tucker: Decimal models; place value; symmetry!; Reading decimal numbers; Comparing decimals; Remediation note for addition of decimals; Defining percent; Using decimals to solve problems; Major points from adapted (revised) lesson Mention a couple of interesting “activities” which are in the chapter. Hammeken: Brief highlights of Chap. 9.

### Week 9: 11/6
- **Week 9: 11/6**
  - **Tucker**: Chap. 10
  - **Hammeken**: Chap. 10

**Presented by students:**
- **Chap. 10 Key points**: Tucker: Defining measurement; Standardization of units; Five steps to teach measurement; Teaching area measurement; Four main ideas for teaching area; Big idea for developing area formulas; Teaching volume measurement; Volume of pyramids and prisms; Measuring angles; Direct and indirect units; Measuring time, weight, and temperature; Major points from adapted (revised) lesson Mention a couple of interesting “activities” which are in the chapter. Hammeken: Brief highlights of Chap. 10.

### Week 10: 11/13
- **Week 10: 11/13**
  - **Tucker**: Chap. 11
  - **Hammeken**: Chap. 11

**Presented by students:**
- **Chap. 11 Key points**: Tucker: The six big ideas of elementary school geometry; Teaching rectangles, circles, angles, and prisms in K–8 grades; Using geometry to solve problems; Major points from adapted (revised) lesson Mention a couple of interesting “activities” which are in the chapter. Hammeken: Brief highlights of Chap. 11.

### Week 11: 11/27
- **Week 11: 11/27**
  - **Tucker**: Chap. 12
  - **Hammeken**: Chap. 12

**Presented by students:**
- **Chap. 12 Key points**: Tucker: Distinguish between statistics and probability—how different and how related; Data Analysis—big ideas: Data analysis in K-1: 2-3, 4-5, and 6-8; Probability—big ideas: Probability in K-1: 2-3, 4-5, and 6-8; Major points from adapted (revised) lesson Mention a couple of interesting “activities” which are in the chapter. Hammeken: Brief highlights of Chap. 12.
"All students are ELL (English Language Learners)!" All students are LEP (Limited English Proficient) at some point in their education (especially when faced with a new concept and vocabulary). What procedures and ideas can you provide that will help all students in the classroom as well as ESOL students? Good teaching strategies are good for everyone.

Indeed, good teaching strategies are good for everyone! This question in particular refers to "Specially Designed Academic Instruction in English" or SDAIE, that is, the academic classes taught by qualified teachers who are "endorsed" or "certified" in teaching methods for content area classes in which English Language Learners or ELL’s participate. In SDAIE classes ALL students can participate: English-only speakers and ELL’s at all stages of language acquisition: ELL’s at Pre-Production, Early Production, Speech Emergence and Intermediate Fluency levels, and former ELL’s now re-designated as Fluent English Proficient (FEP) students. What are the methods, techniques or strategies that a teacher can use to successfully promote content area concept development with such a heterogeneous group of students?

Here they are!!!

**STRATEGIES USED IN SDAIE:**

1. **Emphasis on the Academic Language:** This is the key instructional component in SDAIE. It is NOT to develop general English language skills, but to develop the use of, and proficiency in, the academic language of the content areas. This key component of SDAIE is the same for ALL students, English-only speakers and English Language Learners. Teachers must make sure that the academic language is mastered, otherwise teachers cannot obtain evidence of learning. To facilitate mastery teachers must implement two essential "best instructional practices:"

   - Posting the academic language: ALL words, not just a few key words. Words need to be organized by meaning categories, for example, "clean, tidy, neat, spotless, immaculate, impeccable, scrubbed, disinfected, sterilized, pristine, etc." THEN POST THE CATEGORY!!!!
   - Consciously using the academic language constantly, and requiring that all students express themselves using the academic language, too. That is why all academic language words must be posted: For teacher and students TO ALWAYS REMEMBER to use them!

2. **Active Learning:** Students must be constantly giving the teacher EVIDENCE OF LEARNING. To provide the teacher with evidence of learning, students must DO some observable action or behavior that the teacher has requested. Throughout the lesson, the teacher must plan educational activities that give students opportunities to:

   - **Observe, Recognize, Locate, Identify, Classify, Practice, Collect, Distinguish, Categorize, Repeat, Match, Show, Select, Construct, Assemble, Arrange, Put Things In Order, Etc.**
   - **Name, Recall, Give Examples, Draw, Organize, Decide, Describe, Tell, Imagine, Restate, Create, Appraise, Dramatize, Contrast, Compare, Question, Map, Discriminate, Etc.**

   All of the above are observable actions that help teachers obtain EVIDENCE OF LEARNING.

3. **Assessing/Tapping Prior Knowledge:** Teachers must become very familiar with the background knowledge that students bring to the learning situation so they can ALWAYS emphasize what students already know, have experienced, are familiar with, and build on those bases that prior knowledge, experience and familiarity provide. Visuals, realia, posted academic language from previous lessons, all kinds of connections to prior knowledge, experience and familiarity need to become essential components of all lessons.

4. **Building New Knowledge:** Each and every lesson must result in the acquisition of new knowledge by students. To determine if new knowledge has been acquired as the result of a lesson, it is only necessary to check on the acquisition of new academic language. EACH WORD IS A CONCEPT. A student who has acquired and begins to use appropriately new academic language at the end of each lesson is a student who has acquired new knowledge.

   If at the end of an instructional day the students go home without mastery of at least one new academic word, no new knowledge has been provided or mastered during that entire instructional day. It was a nice school day for reviewing what students already knew. But it was a day when students did not BUILD any new knowledge.

5. **Collaborative Problem-Solving; Cooperative and Other Groupings:** Teachers need to plan instruction through educational activities that provide for flexible groupings of students to meet specific purposes. In SDAIE there are many levels of language proficiency. ELL’s may be at different stages of language acquisition: Pre-Production, Early-Production, Speech Emergence, Intermediate Fluency. Fluent English speakers may be English-only speakers or former ELL’s now redesignated Fluent English Proficiency (FEP) students. Teachers need to implement varied instructional activities where heterogeneous students can work productively.

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6. **Cultural Affirmation / Multicultural Perspectives:** English Language Learners (ELL’s) and English-only students all bring to each and every lesson their prior knowledge, their own experiences, their cultural backgrounds. ELL’s may come from many different countries and English-only students may come from many parts of the United States or the English-speaking areas of the world. Each and every student brings something unique to the learning situation. SDAIE content area teachers need to acknowledge that, and need to affirm the value of each student to the cooperative effort of the lesson by acknowledging the individual contributions of each student. SDAIE content area teachers also need to expand the limited experiences and knowledge of each student to include the contributions of many individuals from many backgrounds to the advancement of knowledge.

7. **Demonstration and Modeling:** Here is the most crucial instructional component in ALL lessons, but particularly in SDAIE lessons. The key role of the teacher is to demonstrate and model all the behaviors to be learned in the lesson, ESPECIALLY THE VERBAL BEHAVIORS EXPECTED TO BE MASTERS BY THE STUDENTS, that is, the language of the content areas. ALL teachers must remember that for most students, and especially for ALL English Language Learners, TEACHERS are the ONLY role models that students will ever come in contact with for the language of the content areas. In today’s world, few parents have the time or the energy—or the knowledge—to discuss the concepts of the content areas using the language of the content areas at home. ONLY TEACHERS can provide that.

8. **Graphic Organizers:** The language of the content areas, the language of a new reading selection students are about to begin reading, all words students DO NOT KNOW that are used in what students are about to listen or read, all those words MUST BE UNDERSTOOD BEFORE students listen or read. Thus, the SDAIE and the ESL/ELD teachers, cooperatively, must help students acquire, practice, develop, learn, and master 95-100% of the new vocabulary BEFORE they listen or read. Instructional activities that, through visuals, manipulatives, realia, dramatization, or any other means, help students master the new academic vocabulary BEFORE the content area lesson begins, are very important. Graphic organizers can be used to help students become aware of what they know and the new words they are about to learn. Graphic organizers that group words in categories by MEANING are the most effective means to introduce new words. WORD DEFINITIONS, or looking up the meaning of words in a dictionary, ARE NOT the most effective means to introduce new words.

For younger ELL’s and for ALL young learners, graphic organizers can be used with pictures instead of printed words.

9. **Integrating Listening, Speaking, Reading and Writing Across the Curriculum:** If all instructional strategies described above (1-8) for the implementation of effective practices in Specially Designed Academic Instruction in English (SDAIE) for ALL students, both English-only and English Language Learners, have indeed been implemented, then it follows that students would have had ample opportunities: (I) to listen to the new academic language of the lesson as the teacher uses visuals, manipulatives, realia, and other means to physically convey the meaning of the academic language, (II) to speak the new academic language through active learning instructional activities, (III) to see —in graphic organizers or categories—the new academic language.

Now students are ready to read the textbook or parts of the textbook or reading selection, and they will do so with 100% understanding the first time around! And then students can write about what they have learned —expressive writing—or answer the textbook questions IN THEIR VERY OWN WORDS. Only when students have been provided fully integrated visual, listening, speaking, reading and writing instructional activities would they be able to provide ample evidence of learning the language of the content areas.

10. **Higher Order Thinking Skills:** In SDAIE Strategy Number 2, above, we indicated that students must be engaged in Active Learning and suggested a series of observable behaviors that students can perform to give evidence of learning. That series of observable behaviors, (listed in 2 above) describe simple to complex or higher order thinking skills. Students who can perform these observable behaviors are giving evidence that they are operating and developing from simple to complex or higher order thinking skills.

11. **Questioning techniques:** The most effective tool a teacher has to promote all of the above SDAIE Strategies is the question. Every time a teacher asks a question the student must actively respond – active learning. Through questions, teachers can monitor student use of the language of the content areas. Questions help assess prior knowledge and provide the most effective tool to obtain evidence of learning. Through questions teachers can provide new information to students while demonstrating and modeling the use of the academic language. Questions can be asked at the lowest —knowledge— and the highest —evaluation— levels of thinking skills. Questions give teachers the best opportunity to provide opportunities for students to listen and to speak.

In fact, questioning techniques allow a teacher to keep control of (h)is/her classroom while helping students succeed. How? By controlling the level of LANGUAGE difficulty of the questions. The following four questions all have the exact same answer. Thus, a teacher can choose which question to ask a student depending on how much knowledge the student has. By choosing the right question appropriate for each student, teachers can promote learning while at the same time allow students to experience success.

1. Who was the 22nd President of the United States?
2. Who was the 22nd President, was it Nixon, Cleveland, John Quincy Adams or Zachary Taylor?
3. Who was the 22nd President, was it Abraham Lincoln, Reagan, John Adams or Cleveland?
4. Cleveland was the 22nd President of the United States, right?

12. **The Teacher is a Facilitator of Learning:** Because a teacher must be constantly interacting with students, teachers in SDAIE content area classes have a primary role of facilitators. Through visual aids and manipulatives, verbal and non-verbal cues, teachers guided students into practicing the academic language as they acquire the concepts represented by the words.

These twelve instructional strategies characterize effective lessons in Specially Designed Academic Instruction in English for ALL learners.
From Assessment of Exceptional Students, 7th ed. by Ronald L. Taylor

FIGURE 13.1 Examples of Math Errors

<table>
<thead>
<tr>
<th>Error (Column)</th>
<th>Example 1</th>
<th>Example 2</th>
<th>Example 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition</td>
<td>18 + 32 = 40</td>
<td>18 + 32 = 49</td>
<td>18 + 32 = 48</td>
</tr>
<tr>
<td>Subtraction</td>
<td>64 - 18 = 46</td>
<td>64 - 18 = 47</td>
<td>64 - 18 = 46</td>
</tr>
<tr>
<td>Multiplication</td>
<td>12 x 4 = 48</td>
<td>12 x 4 = 48</td>
<td>12 x 4 = 48</td>
</tr>
<tr>
<td>Division</td>
<td>96 ÷ 8 = 12</td>
<td>96 ÷ 8 = 12</td>
<td>96 ÷ 8 = 12</td>
</tr>
</tbody>
</table>

Errors in Problem Solving and Computation

Error Analysis:

- **Addition Error**: 18 + 32 = 40 (Correct: 40)
  - The student added 18 and 32 correctly but then added 4 more to the total.
- **Subtraction Error**: 64 - 18 = 46 (Correct: 46)
  - The student subtracted 18 from 64 correctly but then added 8 more to the difference.
- **Multiplication Error**: 12 x 4 = 48 (Correct: 48)
  - The student multiplied 12 and 4 correctly.
- **Division Error**: 96 ÷ 8 = 12 (Correct: 12)
  - The student divided 96 by 8 correctly.

**Tips for Identifying Errors**

- **Addition and Subtraction**: Check the numbers and operations used.
- **Multiplication and Division**: Check the numbers and operations used.

**Strategies for Correcting Errors**

- **Addition**: Remind the student to check the total by subtracting the addends from the sum.
- **Subtraction**: Remind the student to check the difference by adding the subtrahend to the minuend.
- **Multiplication**: Remind the student to check the product by dividing it by one of the factors.
- **Division**: Remind the student to check the quotient by multiplying it by the divisor.

**Examples of Math Errors**

- **Addition Error**: 18 + 32 = 40 (Correct: 40)
- **Subtraction Error**: 64 - 18 = 46 (Correct: 46)
- **Multiplication Error**: 12 x 4 = 48 (Correct: 48)
- **Division Error**: 96 ÷ 8 = 12 (Correct: 12)