

Keyboarding Methodology Instructional Guide for Teachers and Administrators



Commonwealth of Virginia
Department of Education
Office of Career and Technical Education
Richmond, Virginia 23218-2120

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Developed by
Business Education Center,
California State Polytechnic University
and the
CTE Resource Center

for
Office of Career and Technical Education Services
Department of Education
Richmond, Virginia

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The Center is a grant project of the Virginia Department of Education, Office of Career and Technical Education Services, and is administered by Henrico County Public Schools, Office of Technical and Continuing Education.

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Catalog #1.05.03

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Acknowledgments

A number of activities have been completed in the initiative to introduce keyboarding into the public schools. The Virginia Department of Education has provided direction to the public schools and prepared a position paper and recommendations. As early as 1983, the State Superintendent of Public Instruction sent an official memo making recommendations regarding keyboarding at the middle school level. During 1984, recommendations on offering keyboarding were sent to middle and high school principals as well as all business educators.

In the 1990s, the Business Education Center, California State Polytechnic University, in cooperation with the California State Department of Education, prepared extensive materials for trainers and elementary teachers of keyboarding. They based their materials on experiences in preparing trainers for California schools. This material has been the basis for similar workshops in Virginia since 1990. Many of the materials from California have been incorporated into the guide.

Also, in the 1990s, Gordon Creasy and Anne Rowe worked with a task force representing general education, career and technical education, instructional technology, and school administration to develop a position paper on elementary and middle school keyboarding. Some excerpts from that study and position paper are included in this guide.

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Contents

Introduction	1
Definition.....	1
Importance of Keyboarding	2
Current Status.....	2
Recommended Implementation Models for Keyboarding Instruction.....	5
Program Planning for Keyboarding.....	7
Units of Keyboarding Instruction	7
Keyboarding Courses.....	7
Differences Between Instruction to Develop a Basic Touch Typing Skill and Keyboarding Courses	8
Course Structure.....	9
Teaching Personnel.....	9
Overview of Competencies Needed by a Keyboarding Instructor.....	10
Essential Teacher Competencies in Keyboarding Learning	11
Basic Principles of Keyboarding Instruction.....	13
Teaching Techniques.....	16
Teaching Reinforcement.....	17
Letter Introduction.....	18
Strategies for Building Speed.....	18
Technique for Determining Words Per Minute	22
Teaching Strategies and Activities	23
Classroom Activities	23
The Writing Process	25
Materials on Writing	26
Support Materials.....	28
Grading	29
Technique Guide Sheet	31
Keyboarding Test Guidelines.....	33
Teaching of Early Adolescents	34
Selection and Organization of Hardware and Instructional Materials.....	37
Furniture	37
Equipment: Computers and Printers.....	37
Room Arrangement.....	38
Keyboarding Instructional Materials	41
Selection of Software and Networks for Keyboarding	43
Software Selection	43
Networks.....	44
Appendix A: Computer/Technology Standards of Learning (Grades 1–12).....	47
Appendix B: Research and Related Literature about Keyboarding Instruction.....	53

Appendix C: Keyboarding Software Evaluation Form..... 59

Appendix D: Keyboarding Activities/Resources..... 63

Appendix E: PowerPoint Slides for K–12 Keyboarding: A Model Workshop for
Teaching Keyboarding..... 69

Appendix F: Works Cited..... 115

Introduction

The purpose of this publication is to provide assistance to teachers of keyboarding and administrators implementing keyboarding instruction. Because individuals begin the task of teaching keyboarding with different levels of experience, materials presented are intended to help set up the program, to discuss teaching strategies for the program, to identify the location of competencies and curriculum frameworks, to provide direction for the selection of software instructional materials, and to identify ways in which the program may be structured.

Developing keyboarding skills is an integral part of an effective computer literacy program. The keyboard is an important tool for communicating and entering data into all kinds of technological systems that are microprocessor-controlled. Keyboarding is becoming a necessary personal, academic, and professional skill. Projections indicate that most of today's students will use keyboarding when they enter the work world—no matter what the field.

In Virginia schools, students have increasing opportunities to apply keyboarding in the writing process, using software that assists pre-writing, composition, correction of mechanics, and style checking. Good keyboarding skills help students concentrate on the task of communicating effectively rather than on the task of entering data. Language arts and computer-based activities contribute to further development and maintenance of keyboarding skills.

The information in this publication is primarily directed to individuals who teach keyboarding at the middle school level; however, it will also be helpful for those who are involved with keyboarding at other levels. It is recognized that from the perspective of teachers at the middle school, there is already a great deal of pressure to work within a crowded curriculum. Emphasis is given to coordinating keyboarding instruction with language arts activities in the area of writing. If keyboarding equipment is available for students at that level, there is an opportunity to enhance and improve writing activities.

Research and experience have shown that students who have completed a keyboarding program have increased the volume of their writing and have significantly increased the amount of time they will spend on a writing activity at any one time. The results benefit both students and their teachers.

The Policies Commission for Business and Economic Education addressed the need for keyboarding in their Policy Statement 35. The position was stated in this way: "We believe that keyboarding should be required of all students. With the rapid expansion of computer usage, primarily microcomputers, educational institutions should require that all students develop keyboarding skills. Keyboarding skills allow students to interface more efficiently with microcomputers in educational, personal, and future employment settings."

Definition

Keyboarding, as used in this publication, refers to the input of data using the touch method on a standard alphanumeric keyboard such as the QWERTY keyboard. The goal of keyboarding instruction is to develop a touch skill that will enable an individual to enter alphanumeric information at a speed that is faster than handwriting.

The **touch technique** is the striking of the correct keys without looking at the fingers. Automaticity is the desired level of performance. Once the keyboard has been taught, students

should use keyboarding in the development of writing skills as part of their language arts instruction or other related activity. Students use **word processing**—the use of automated equipment and standardized procedures for producing written communications the most in their keyboarding experience.

Importance of Keyboarding

The introduction of the microcomputer caused a major change during the decade of the 80s. Individuals, systems, processes, equipment, and procedures were affected. The microprocessor, which serves as the operational center of the microcomputer, has likewise brought about great changes. It has provided the opportunity to process all kinds of data. A primary source of input has been the keyboard. Although there are other means of input, the use of the keyboard is important as a way of inputting data by individuals in almost every occupation or career.

It has been projected that most individuals currently entering the labor force will use computers. Virginia was one of the states that recognized this and established computer/technology literacy standards during the 1980s for all students enrolled in public schools. (See Appendix A.)

By learning a keyboarding skill, students expand their opportunities for success in all of their classes. Teachers have recognized that students develop work habits in keyboarding that enable them to be more successful in planning and carrying out projects for all of their classes. The online Standards of Learning (SOL) and other tests are more successful if students have touch keyboarding skills.

Current Status

Keyboarding is currently taught in almost every public school system in Virginia. There is a move to teach keyboarding to all students at lower grade levels. The keyboarding initiative has been spurred by the introduction of microcomputers into classrooms at every level.

It is recommended that the teaching of keyboarding at lower grade levels be tied closely to the writing process. Research has shown that this skill can greatly enhance the development of the writing skill.

It is recommended that students who are required to spend more than one hour a week entering data on the computer receive formal keyboarding instruction just prior to the time they will be expected to use the skills frequently. If the computer is used on an occasional basis, it may not be worthwhile to teach the keyboard. The skill will not be retained if it is not used.

Keyboarding is a psychomotor skill. Thus, when a student practices the skill on a regular basis, instruction should emphasize the touch method and correct techniques. If the student is forced into a computerized writing process using two or three fingers, it will be frustrating for the student to enter his/her thoughts and difficult to change the habits to correct the techniques at a later time.

This is true of any psychomotor skill. For example, if a beginning tennis player develops incorrect methods for handling the racquet, it will be difficult at a later time to go back and learn the correct techniques. And without correct techniques, it is always difficult to make improvement beyond a certain point.

Students who are 9 to 12 years of age may be at an appropriate time of their development to learn keyboarding. This is the time when muscular coordination is developed for both the larger and smaller muscles. It is also a time when students are healthier and in school on a more regular basis—they have passed the time of major communicable childhood diseases.

Students entering the middle school are also at an age when they have developed learning styles that enable them to deal with learning new ideas and to organize new information. It is a time when they have become aware of the role of work in life and how individuals prepare for that role. They are at an age when they can explore careers and the work modes of different types of occupations. Keyboarding can be tied to most careers—this is a motivator for the teacher.

Recommended Implementation Models for Keyboarding Instruction

(excerpt from "K–12 Keyboarding: A Position Paper" by the Virginia Department of Education)

A. Grades K–2

- ▶ Keyboarding by touch is not recommended for this age group because of small hand size, weaker hand-eye coordination, and shorter attention span.
- ▶ For a child to be "ready" to learn to type by touch, his/her maturity level should be at least that of an average third grader. The level of an individual's concentration is a limiting factor.
- ▶ Keyboarding familiarity activities can be conducted to include locating keys, using correct fingers, and learning the position of home keys.

B. Grades 3–8 Implementation Models of Less Than 18 Weeks

- ▶ Suggested time frames to meet the minimum of 20 hours of instruction or more
- ▶ When offering fewer than 18-week units of instruction, the following chart provides models from which to choose a plan for initial keyboarding instruction.

NOTE: *The planning process should include not only the time frame for the unit, but also must include plans for monitoring and reinforcing keyboarding techniques throughout the year and subsequent years.*

Grade Levels	Minimum Minutes Per Day	Total Weeks	Total Hours
3-4	20	12	20.0
3-4	25	10	20.8
4-5	30	8	20.0
4-5	30	9	22.5
4-5	30	10	25.0
5-6	35	7	20.4
5-6	35	9	26.2
6-8	40	6	20.0
6-8	40	9	30.0
6-8	45	6	22.5
6-8	45	9	33.7

C. Grades 6–8 Implementation Model for 18 Weeks

- ▶ As the opportunity for semester courses is available at the junior high/middle school level, school divisions should consider the option of offering the 18-week course, Keyboarding (6150 or 6151). An 18-week course will offer an opportunity for the greatest percentage of students to obtain a sustained skill.

The course should be

- ▶ made available to all students for the purpose of developing the skill of keyboarding in a more comprehensive fashion
- ▶ taught by an endorsed Business and Information Technology education teacher (Keyboarding in grades 6–12 can be taught by teachers with one of the following business education endorsements: 6000, 6200, 6500, 6600, 6650, 6700, or 6900.)
- ▶ taught in a fashion that supports language arts writing process goals as well as writing across the curriculum activities, i.e., keyboarding skill building and follow-up applications to include reports, term papers, class assignments, and other activities that promote the use of the computer as a communication tool
- ▶ taught on microcomputers to allow the integration of word processing and/or computer literacy activities
- ▶ offered for the duration of a regular class session and scheduled five times per week
- ▶ considered for the first semester of the secondary level course, Keyboarding Applications (6152).

D. Grades 9-12 Keyboarding

- ▶ The 36-week course, Keyboarding Applications (6152), and the 18-week courses, Keyboarding 6151 and/or 6153 (formatting), should be available in high school for students who did not have the opportunity to complete training at earlier grade levels. These courses are also prerequisites to a number of career and technical education programs in the Business and Information Technology area.

Program Planning for Keyboarding

(6150, 6151, 6152, and 6153)

When planning a program for keyboarding, it is most important to determine when it is appropriate to initiate the instruction and to plan the scope and sequence of the instruction. Keyboarding instruction should be implemented when the following elements are available: instructional staff trained in the methodology of teaching a touch keyboarding system, hardware and age-appropriate software, and an instructional follow-up plan that includes language arts and other instructional activities for practice, application, and reinforcement.

Units of Keyboarding Instruction

If the elements mentioned above are not in place, a keyboarding program should not be initiated. Research shows that even though keyboarding instruction has been experimented with as early as kindergarten, a dramatic increase in student success rates is reported in grades four and above. If a school division is ready to initiate the program in these early grade levels, school personnel will most likely introduce the skill as a unit of instruction with practice, application, and reinforcement as a part of the follow-up activities. This introductory unit should be at least 20 hours in length, offered daily, and divided into time periods appropriate to the age level. The shorter the time period of the offering, the more important it is for students to follow up the instruction with keyboarding applications to build and sustain their skills.

Keyboarding Courses

School divisions that implement keyboarding at the middle school level should offer the instruction through the keyboarding courses (codes 6150, 6151, 6152, and 6153) that are approved for grades 6 through 12. The length may vary depending upon the purpose of the offering. To achieve a touch skill at a minimum level, at least nine weeks of daily instruction is recommended. This includes both a system for touch keyboarding and follow-up instructional activities for reinforcement.

Differences Between Instruction to Develop a Basic Touch Typing Skill and Keyboarding Courses

(excerpt from "K-12 Keyboarding: A Position Paper" by the Virginia Department of Education)

Keyboarding instructional units, dealing primarily with developing a minimal touch typing skill, and instructional goals found in courses such as Keyboarding Application (6152) and Keyboarding (6151), are not the same. The following chart shows some major differences.

Keyboarding Instructional Units	Keyboarding Courses
Develop touch typing skills without watching fingers, using correct fingering, posture, and hand position.	Gain a high degree of proficiency with the alphabetic keyboard using correct fingering, posture, and hand position.
Emphasize practice of rapid motions and correct stroking technique with goals of obtaining automaticity and a wpm rate that is faster than a student's handwriting speed.	Emphasize correct techniques and forced speed with accuracy coming later as speed cuts back. Students average 25-30 wpm on a 3-minute timing after an 18-week course.
Develop the ability to produce simple documents such as friendly letters and stories.	Develop skill in formatting sophisticated documents, including reports, term papers, class assignments, business letters and memos, and other activities that promote the use of the computer as a communication tool.
Does not introduce numeric row or keypad.	Develop skill with numeric row or keypad.
Emphasize input of initial thoughts: obtaining and communicating information.	Emphasize output: composing and producing documents (hard copy) in final form.

Course Structure

The keyboarding course 6150 or 6151 (for credit) is taught in a lab with computers. A workstation with a computer should be available for each student. Students may be taught for a period of 6, 9, 12, or 18 weeks. The 18-week program is the most desirable if students are to learn keyboarding and then work on written communication skills and other applications. The writing process should not begin until students have completed learning all of the alphabet keys. See the section *The Writing Process* for specific steps in the writing process.

The middle school keyboarding teacher will want to work cooperatively with other teachers if the course is offered for more than 9 weeks so that some student work may be related to instruction in other classes.

The program is articulated with experiences on the keyboard that will follow in the middle school and upper grades as students enroll in other Business and Information Technology courses. Continued application of the keyboarding skill is essential for retention of an automaticity (touch technique) level. A reinforcement and follow-up plan should be designed locally to help students sustain keyboarding skills through computer-related activities in the regular educational program. These activities at the elementary and middle school level should come primarily through word processing and language arts activities. Business and Information Technology courses and other Career and Technical programs in the middle and high schools provide additional opportunities for such follow-up activities. In such courses, provision should be made to permit students to move ahead as quickly as possible without having to spend unnecessary time repeating skill development where skills already exist. For example, students may test out of the first semester of the Keyboarding Applications course. The competencies and frameworks for all of the available keyboarding courses may be found on the Business and Information Technology Web site, <http://www.doe.virginia.gov/VDOE/Instruction/CTE/be> or may be obtained within the middle school keyboarding framework available through VERSO on the CTE Web site, <http://CTEresource.org>.

Teaching Personnel

The keyboarding course should be taught by fully certified and endorsed Business and Information Technology teachers or teachers who have the keyboarding add-on endorsement. These teachers have been trained in the methods of teaching the skill. They will apply the principles of skill development and provide appropriate instruction on proper techniques to assure maximum achievement by the student. Keyboarding units, which do not require professional certification or endorsement, may be taught by those who possess touch keyboarding skill and have been trained in touch keyboarding methodology. Such teachers are encouraged to work with business educators as a team or for instructional guidance.

If keyboarding instruction is offered using the courses Keyboarding (6150 or 6151) or Keyboarding Applications (6152), a business teacher must have one of the following endorsements: 6000, 6200, 6500, 6650, 6600, 6700, 6900, or the add-on keyboarding endorsement.

Business and Information Technology teachers should be familiar with students of middle school age so that the program is aligned with their unique characteristics. A variety of activities and the opportunity for physical movement by students will contribute to progress in achieving the goals of the program. The section *The Writing Process* provides information on the characteristics of early adolescents. See pages 34–35.

A school system may find it necessary to select non-Business/Information Technology teachers with keyboarding skill to teach keyboarding units of instruction. If so, one or more endorsed Business/Information Technology teachers should be trained to provide a workshop for these teachers. The Business/Information Technology teachers should also follow up in the classroom on a periodic basis to assure the most profitable experience for students. While this is not the preferred approach, it results in a better program than one in which the teacher has no preparation in keyboarding instruction.

The following suggestions are made in an attempt to give direction to the most desirable teaching environment for keyboarding. It is recognized, however, that there may be other teaching situations that offer effective keyboarding instruction.

Instructional possibilities, listed in order from greatest to least opportunity for success:

1. **Business and Information Technology educators.** Since most of these educators are already trained in the psychomotor and psychological principles of keyboarding, their expertise should be used. School divisions may find that a middle or high school Business/Information Technology education teacher's schedule may be adjusted to allow him or her to teach keyboarding instructional units on a regular basis. Another solution may be to have a Business/Information Technology educator dedicated to grades 3–8 keyboarding, and may include travel to more than one school.
2. **Team teaching (Business and Information Technology educator/non-Business and Information Technology educator).** In this situation, a Business/Information Technology teacher initiates the keyboarding instruction but trains the non-business teacher to conduct follow-up activities, including technique checkups.
3. **Non-Business and Information Technology teachers with training (already possess a touch keyboarding skill).** Teachers who possess the touch keyboarding skill may be trained in the basic methodologies of teaching keyboarding. Materials are available that support this type of training in a one-day workshop.
4. **Non-Business and Information Technology teachers with training (do NOT possess a keyboarding skill).** Teachers who do not possess a touch keyboarding skill should be given instruction in obtaining touch keyboarding as well as the methods of teaching keyboarding. Time frames for this type of training need to be tested, but current information indicates that 10-12 hours are necessary for adults to obtain a minimal keyboarding skill.

Overview of Competencies Needed by a Keyboarding Instructor

Most authors of keyboarding methodology agree that keyboarding is a complex skill made up of finely discriminated movement patterns that depend upon interrelated sensory, perceptual, mental, and motor inputs and outputs which must occur close together in time. (Sherron, 1984)

Keyboarding is a **psychomotor** skill. Its learning and performance involve mental processes as well as finely coordinated muscular movements. Keyboarding consists of making responses to situations or stimuli. Keyboarding is a perceptual motor skill in that stimuli to sensory receptors (eyes, ears, fingertips, muscles, tendons, and joints) are screened, transformed, and organized into modified mental "images" of the original stimuli which trigger muscular responses. (Boyce and Sherron)

Keyboarding is also a cumulative skill. If students learn by using only two or three fingers, they will quickly develop incorrect stroking patterns that will become habits. These bad habits are extremely difficult to break when they have become ingrained. (Boyce)

Essential Teacher Competencies in Keyboarding Learning

(excerpt from "K–12 Keyboarding: A Position Paper" by the Virginia Department of Education)

Keyboarding instructors must

- ▶ provide instruction that allows students to develop touch keyboard fingering techniques required for rapid, accurate entry of data, and for future improvement in skill
- ▶ strive for student achievement of minimum levels of skill required to encourage future use and maintain skill over time
- ▶ possess operational skill of the fingering and keyboard manipulation techniques to
 - ▷ model for instructional leadership
 - ▷ analyze learner behavior for remediation
 - ▷ design appropriate practice
 - ▷ sequence learning experiences
 - ▷ select learning materials
 - ▷ evaluate programs
- ▶ know the principles of psychological learning—stimulus-response and cognitive theories that are the basis of all keyboarding lesson designs
- ▶ possess the ability to guide students in the procedures for
 - ▷ developing effective stroking and manipulation techniques through
 - modeling, demonstrating rhythms, fingering patterns, and hand-arm alignments
 - response reinforcement—providing maximum amount of immediate performance feedback
 - practice sequencing
 - ▷ developing maximum response speed in keyboard stroking and manipulation through
 - pacing techniques for forcing rate of response and for developing response chaining
 - massing and distributing practice for maximum gain effect
 - establishing individual, intermediate response rate goals
 - selecting appropriate copy
 - ▷ developing response accuracy in keyboard stroking and manipulation through
 - response (stroke) differentiation
 - speed response to copy difficulty
 - focusing concentration on a specific technique
 - ▷ entering numeric data from top row and keypad
 - ▷ developing document (simple to sophisticated) formatting skills
- ▶ integrate and sequence technique, speed, and accuracy goals
- ▶ schedule keyboard technique, speed, and accuracy reinforcement activities after achieving intensive initial stroking goals
- ▶ integrate keyboarding with other academic activities to reinforce keyboarding skills
- ▶ measure and evaluate keyboarding skills.

Basic Principles of Keyboarding Instruction—————

The psychological principles of learning and skill building are important in teaching keyboarding. Because keyboarding is a psychomotor skill, proper instruction from the very beginning assures that students develop correct skills. Instructional materials provide an accepted sequence and method of keyboarding instruction and practice and are appropriate for the maturity level of the student.

All keyboarding teachers should be familiar with the following basic principles.

1. Materials used for keyboarding presentation and practice should be normal prose in word and sentence format.

Students will progress more rapidly if they use words and sentences in their beginning practice materials. The skill used at the beginning should be based on what students will be expected to do after acquiring the skill. Evaluation of student progress is recommended. Assignment of a grade is optional.

Curriculum materials should be reviewed to be sure that this approach is used. There are a number of software packages that feature the extensive use of nonsense (fff frf..) material. These do not contribute significantly to the building of keyboarding skill. However, word processing software may be the primary software instructional tool if it is used with printed instructional materials. It should provide a blank screen for instruction, text-editing features, screen formatting capabilities, and printing procedures appropriate for the grade level.

2. The keyboard is presented in an order that allows for early keying of words and sentences.

Keys can be introduced so that students will use words on the first day of instruction. While nonsense material may be used to learn reaches and to learn the feel of typing a new key, the use of each key in words and sentences is important at the beginning.

3. Introducing the home row first, followed by the “skip around” method to introduce other keys, is the best way to teach keyboarding.

Effective instructional materials will introduce keys using different fingers in each lesson. The text will not introduce at one time all of the keys typed by one finger.

4. At least 20 lessons should be used to present the keyboard.

Keyboard introduction includes all of the letters, numbers, and symbols. Students at the middle school level have short attention spans. Lessons will typically last from 30 to 35 minutes. Students should not be introduced to so much material that they cannot remember the keys. This will inhibit the learning of the touch method.

Keyboarding materials for adults introduce more keys in each lesson, because it has been found that adults can learn keyboarding more rapidly than children.

5. Students should not be kept from looking at their hands when initially learning a new key.

Students must be able to see, reach for, and touch the key when learning it. While looking at the key may be all right while learning to strike the key, it should be discouraged after the initial stage. Students should visually locate the key being introduced. The teacher should be sure that each student is using the correct finger.

The next step is for the teacher to demonstrate the key stroking. The introduction will include the teacher dictating the keystroke as students watch their hands. This will be followed by dictating the home row key and then the key which is to be learned (assuming at this point that home row has been taught). With this assurance, the teacher will have the students strike the home row key, the new key, and the home row key with a space following to be sure they learn the feel of the reach. The students will check their screen or copy to be sure that they are striking the correct keys. Materials from the student text related to this new key can be used by the teacher for individual and dedicated practice.

6. Vocalization increases the intensity of the stimulus, leads to better stroking and quicker responses, focuses the students' attention on keying, and contributes to more effective learning.

When the keys are first introduced, it is recommended that the teacher call (dictate) the keys in the practice material in a crisp and paced manner so that students will learn to strike the key with a staccato touch. The teacher can set the pace in the initial learning stage by dictating the initial practice material letter by letter. This will also force quick stroking and a development of a pattern for stroking similar to the skilled individual.

It should be noted that kinesthetic feedback develops slowly; therefore, outside reinforcement by the teacher is necessary during the early stages of motor skill development. The student should develop the feel of the reaches. Early errors and awkward key stroking techniques should be ignored. Everyone makes mistakes when first learning a new skill. However, this should not be confused with such incorrect techniques as "flying" elbows or poor positioning of hands.

7. Research has shown that a speed approach to keyboarding is superior to an accuracy approach.

Let the student learn the correct movement first and get the feel of keying data. Do not be overly concerned about errors as long as the student is in control. Slow the student down if the error rate is very high.

After the student has learned correct keying techniques, then accuracy can be emphasized. If accuracy is emphasized at the start, students will use a "stop-and-look" approach rather than a fluent approach that promotes an automatic response to the keyboard.

8. Speed and accuracy should be developed separately.

Students cannot develop speed and accuracy at the same time. Force the students to develop speed. The student must get the feel of keying at a faster speed, and the fingers should have a snappy movement. After this type of practice, the teacher should have students reduce the keying speed to a comfortable level (control rate) at which errors are reduced. Do not try to develop speed and accuracy in the same lesson.

However, when conducting speed development exercises, the teacher may sometimes deliberately slow students to achieve control.

9. Pacing or speed forcing is desirable for developing speed, improving keying motions, and decreasing students' dependence on sight.

Speed is developed through short bursts of speed—usually 30 seconds to 2 minutes. Pacing can be used with marked materials that give the number of words at intervals, e.g., every four words. This will allow the student to set a goal for each 15 seconds. The

teacher, using a stop watch, can call the 15-second intervals, at which time the student will know whether to key faster or slower to achieve the desired goal.

10. Accuracy consists of keying at the correct speed.

Once students have been forced to a new level of speed, the teacher should help them work for control and accuracy. If the student continues to make errors, the teacher should set a speed. Then, using marked copy, the student should determine where in the copy to be at each 15-second call from the teacher. If the student is ahead of the word mark, then keying should be slowed.

The procedure for gaining control will be similar to that of speed building, except the goal will be to key at a slower rate with greater control. Remember, that even experts make about two errors per minute.

11. All keying tasks should be based on goals that are appropriate for each student.

Students will progress at different speeds. After being introduced to the entire keyboard, it will be necessary for students to be helped in setting their personal goals. It is not appropriate for students to try to key at speeds beyond their ability.

A minimum goal for keyboarding skill is automaticity with approximately 20 wpm from provided copy.

12. Modeling is an effective strategy for presenting proper keying techniques and key reaches.

Students must see how a skill is to be executed. The teacher should use a keyboard that is located in a place so that students may see the correct response.

Modeling is an effective technique. Individuals who coach others use this technique all the time—demonstrating what is correct and how to do something.

13. Students should always know the goals of the lesson or practice.

The teacher will explain the procedure for each new item being introduced and taught. In addition, the student is told what should be accomplished as a result of the activity.

14. In order for practice to help the student, it must be a directed activity with a specific goal.

Students must be given directed practice if it is to be helpful. This is a basic principle used in any kind of coaching activity. Unless this is done, there will be little or no progress.

15. Observe students closely in the beginning stages for use of proper technique and to be sure they are learning the keyboard.

If a student has not learned the location of keys in the beginning lessons, it is important that the teacher not continue to introduce new keys and techniques. Remedial work with computer software may allow the student to review the beginning keys and those not learned before proceeding. The student will be more successful in learning to key if this is done.

16. Unlike music, typing does not have equal time between strokes.

Therefore, do not have students type to music or any other rhythmic beat.

Teaching Techniques

It is essential to give attention to learning keyboarding techniques. They will enable the students to improve as the instruction progresses. It is important to note that good textbooks and software have pictures and ideas to demonstrate the following techniques.

Hand and Arm Position

The keyboard should be located on a desk that allows the student to have arms from shoulder to elbows in a vertical position. The forearm should reach up at a slight angle with hands over the keyboard. Fingers are pointed down from the hand as they are held in a curved position over the home keys. The hands should not be allowed to rest on the keyboard or desk—the palms of the hands should be held up in a position that is at the same angle as the forearms. Correct positioning allows for correct reaches in learning the keyboard.

Posture, Legs, and Feet

The chair should allow the student to sit up straight with feet flat on the floor. One foot is placed slightly in front of the other for balance. Provision should be made for adaptations of the furniture and chair so that the student may sit comfortably. Balance is necessary for good key stroking techniques.

Stroking

The student should be taught to strike the key as if it were hot. Lingering on a key may cause it to repeat on some keyboards. A keystroke is a staccato movement. As the student keys faster, it may appear that the fingers do not remain on the home row. Arms and hands should not move around when striking keys. They are described as being “quiet.”

Space Bar

When learning the use of the space bar, students should be asked to try tapping it separately with each thumb to determine which is the most comfortable. The student should be taught to strike the space bar correctly with the thumb that is chosen. A quick strike and release of the space bar is critical so that extra space will not appear in the copy. Teach the technique of spacing after each word as a part of the word. Students should operate the space bar by touch.

Shifting

The use of the shift key with the little finger should be taught as a three-phase operation of 1) shift, 2) type, and 3) release. Learning to shift in this sequence will assure that all letters that are to be capitalized are in upper case. Students must be taught to use the shift key on the opposite side of the keyboard from the key that is being capitalized. Drills should be given to ensure that the operation of the shift key becomes automatic. This keying technique is by touch. Do not allow students to press “shift lock.” It will break their concentration and fluency, cause them to look at their hands, and add an extra stroke in the operation.

Return or Enter Key

The student should be taught to reach quickly for the return or enter key with the little finger on the right hand and then quickly return the finger to the semicolon key. This must be an automatic response.

Tab Key

Teach the student to reach quickly to the tab key with the little finger on the left hand and then return quickly to the “a” key. Students will need to practice to make this reach easily and to automatize the reach. This is an important key for students as they begin to write material that is organized into indented paragraphs.

Technique Reinforcement

Business and Information Technology teachers have found that repetition is important in technique reinforcement. Teachers may use the following review before keyboarding activities:

- ▶ Sit up straight.
- ▶ Move your keyboard flush with the edge of the desk.
- ▶ Curve your fingers over the home row.
- ▶ Hold your wrists up and even (not resting on the equipment).
- ▶ Keep your eyes on the copy.
- ▶ Keep your feet flat on the floor.

This may quickly go to abbreviated reminders as follows:

- ▶ Sit straight
- ▶ Keyboard forward
- ▶ Fingers curved
- ▶ Wrist up
- ▶ Eyes on copy
- ▶ Feet flat

Letter Introduction

The steps in teaching a new key are enumerated below. Because keyboarding is a psychomotor skill, the more senses involved in the learning process, the more effective the learning.

1. Students locate the key on their keyboard by looking.
2. Teacher asks them to hold up and point to or call out the name of the finger to be used.
3. Teacher demonstrates the key stroking technique to be used.
4. Teacher dictates the new letter and directs students to strike the key only as it is called.
5. Teacher dictates the letter, and the students strike the key as they watch their finger make the reach and return to home row keys.
6. Teacher dictates the letter again, and students strike the key as they watch their finger make the reach and return to home row keys.
7. Teacher directs students to look toward the front of the room and dictates the letter again. Students strike the key without looking either at their finger or the machine.
8. Teacher has the student check the copy to confirm the accuracy of the response made without looking.
9. Teacher dictates a tryout line as students follow the copy in the textbook and type each letter, combination, or word on cue. Follow the above steps each time a new key is taught.

Strategies for Building Speed

Reading/typing responses patterns

In all keyboarding, there seems to be a basic rhythm. Some words are typed slower (at a letter level of response) than this basic rhythm; some words are typed faster (word level of response). The following examples indicate normal key-stroking patterns for different kinds of copy.

- ▶ **One-hand words:** *You set up my tax case only after you saw my card.*
 - ▷ The words in the above sentence, even though short, are typed letter by letter and sound metronomic.
- ▶ **Balanced-hand words:** *She did lend a hand when they did the work for me.*
 - ▷ The above words are easier and are typed with so little time between strokes that they are heard as word responses.
- ▶ **Balanced-and one-hand words:** *If you do go into the city, get the six tax forms.*
 - ▷ A mixture of balanced-hand and one-hand words requires a combination of the first two response patterns.

Follow these procedures for building speed:

1. Dictate and type the first word in a line of short balanced-hand words to students. Have them watch and listen. Be sure to point out that the space bar stroke is made as a part of the word. (Students should not pause before they hit the space bar). Have students say and type the word in the same way. Continue this procedure throughout the line of practice.
2. Next have students say and type the line with you as you set the pace at a comfortable rate. Remind students not to let their hands bounce (“quiet” hands and arms) as they quicken their pace.
3. Repeat the above steps when typing two-and three-word phrases. Dictate the words as phrases—not as individual words.
4. Repeat at a slightly slower pace.
5. Repeat at an in-between rate.
6. Administer a half-minute timed writing on each of the lines of practice, watching for proper space bar timing and finger action.
7. Have students compare their rates on balanced-hand words with their rates when typing phrases or combinations of balanced-hand words and phrases.

The above procedures should be repeated periodically. Use of exercises increasing speed and complexity will encourage variable rhythm and will help students adjust to the various kinds of key-stroking patterns.

In using this type of practice, encourage students to read and think the word and to give careful attention to the sequence of letters within the word. Explain that as one finger is completing its reach stroke, another finger should be prepared and on its way to the next key. Demonstrate and have students practice the variable response patterns often. Be sure students hear the differences in the sounds of each response pattern. If they do, rhythm develops rapidly and their typing speed increases.

Skill-comparison writings—sentences and paragraphs

Skill-comparison writings are consecutive timed writings on two or more similar selections of different difficulty. Examples of copy follow:

- ▶ **Balanced hand:** *Did the bugle corps toot with the usual vigor for the queen?*
- ▶ **Combination:** *We may also work on the stage sets when the case is through.*
- ▶ **Third row:** *Speed is sure to result if you keep typing at a steady rate.*
- ▶ **Adjacent keys:** *Cass tried various copiers to find one that suits her needs.*
- ▶ **One-hand:** *As oil reserves get scarce, we draw upon a vast pool at sea.*
- ▶ **Direct reaches:** *My group collected a large sum for her musical concert fund.*

Administer skill-comparison writings as follows:

1. Give a 1-minute speed writing on a fairly easy line of practice. Have students compute their gross words a minute.
2. Give a 1-minute speed writing on each of several lines of practice that are more difficult than the one previously used.
3. Have students compare their gross words a minute on each of the lines of practice.
4. Administer a series of 1-minute timed writings. Have each student first retype the sentence with the lowest gross words a minute. In the second minute, have students type their next slowest, and so on, until all sentences have been retyped for one minute each.
5. Repeat steps one and two and measure any skill growth that may have occurred.

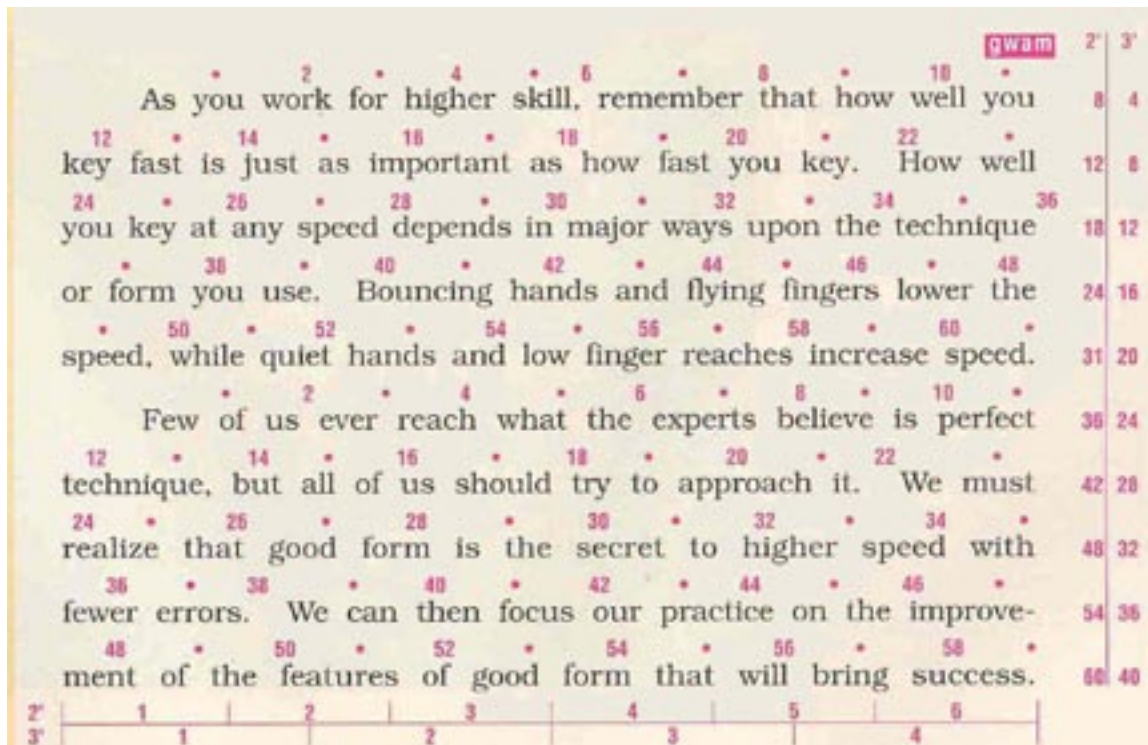
To do skill-comparison paragraphs, follow the same procedures listed above, using short paragraphs instead of sentences.

The importance of the comparison of scores lies in its effects on students. They analyze both the copy and their practice behavior and then direct their practice efforts toward overcoming the challenges found in the progressively more difficult copy. Skill-comparison typing allows for individual goal setting. Each student competes with personal past performances.

Guided-Paragraph Writing

In developing keyboarding skill, students must learn to control the pace of typing at specific speeds—15, 18, 20, 22, and so on. As soon as they know they can control their hands and fingers at a specified speed, they are ready to push a higher goal. Guided (paced) -paragraph writing was designed to help students in reaching for the next higher level of speed.

On the following page is an example of a guided-paragraph writing with markings for 1-minute, 2-minute, and 3-minute timings.



(Copied with permission from *Century 21 Computer Applications & Keyboarding*. South-Western Thomson Learning, 2002, p. 66.)

1. Administer a 1-minute timed writing on a paragraph. Help students compute their gross words a minute to establish a base rate.
2. Have each student add four gross words a minute to his/her base rate to determine a goal for the next writing.
3. Have students choose a quarter-minute checkpoint using a table such as the one provided above.
4. Have students note the word-count dots and numbers above the lines in the paragraph at each quarter-minute checkpoint for their goal rate.
5. Demonstrate the sound of the various rates students have selected.
6. Administer two or more 1-minute writings on the paragraph with each student trying to reach each checkpoint exactly as you call each quarter minute.
7. Offer suggestions for improvement between timed writings.

Goal-Typing Paragraphs

This strategy is intended to be used beginning with the sixth to eighth week of instruction.

1. Administer a 1-minute timed writing on a paragraph. Have students determine gross words a minute. This will be their base rate for the exercise.
2. Have each student add three or four gross words a minute to their base rate to determine a goal for the next writing.

3. Administer two or three 1-minute timed writings during which students try to reach or exceed their goal rates. If they reach the goal rate, they can set a new one and push for that. In pushing for speed, students should not think about accuracy.
4. Administer a 1-minute timed writing in which students drop back two or three words below their highest rate on the previous timed writings. Their accuracy should improve on this timed writing.

When using goal-typing activities, a student should not be permitted to type always in the 15 to 20 gross words a minute speed range in order to maintain a high degree of accuracy. Also, a student should not be permitted to push for speed continuously with an error rate of 5 to 10 errors a minute. The first student will never reach potential speed with acceptable control; the second student will never reach potential control with acceptable speed. The concept of “push for speed/drop back for control” grew out of research related to guided-writing and goal-typing procedures. These procedures are excellent for helping students push for speed until they discover their error threshold (the speed at which their error rate increases drastically) and then drop back slightly in rate (two or four gross words a minute) to regain acceptable control.

Sustained Speed-writing

Because speed built in 30-second and 1-minute intervals does not transfer completely to longer writings, students need to learn to cope with the progressively lower rates they will type on 2-, 3- and 5-minute writings. Practice in pushing for speed for longer periods of time will help students sustain higher rates. This strategy should probably be used after the 9-week instruction program and after students have developed a good rate of speed (25–30 gross words a minute).

Time will probably allow you to use only two or three of the strategies.

When to Emphasize Accuracy

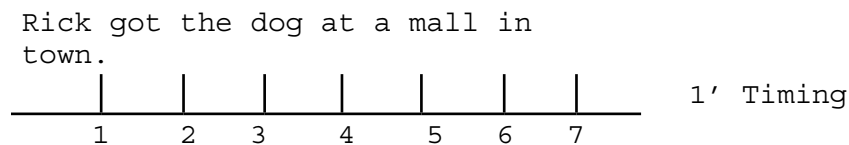
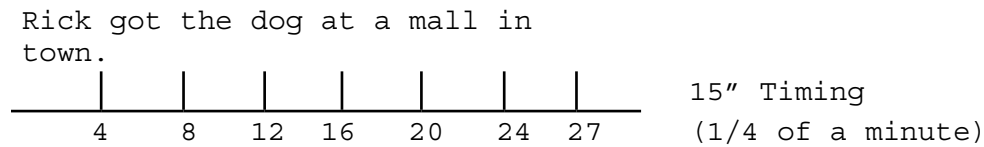
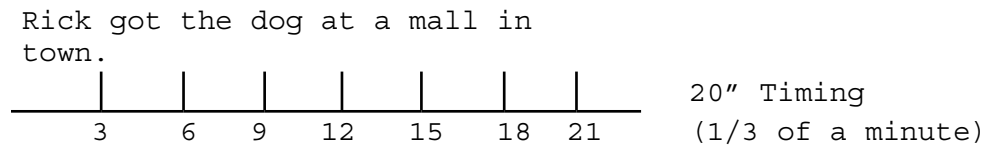
So far, all our emphasis has been on proper technique and speed building. This is because students with proper technique and reasonable speed usually develop accuracy with little effort. The major exceptions are students with reading disorders. An early emphasis on accuracy is a negative approach to keyboarding instruction and will delay student learning.

It is important to know how to determine the rate of speed the students are typing to help them improve their keyboarding skills. On the next page is a chart to help measure the words per minute the students are typing on a timed writing.

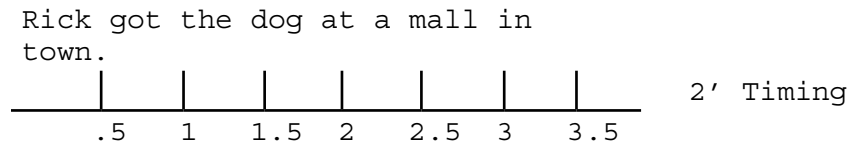
Technique for Determining Words Per Minute

Count every five keystrokes (words, numbers, spaces, and symbols/ punctuation marks) as one word.

For speeds less than one minute, multiply by the fraction of the minute:



For speeds more than one minute, divide by the fraction of the minute:



For quick 12" timings, count up all keystrokes (letters, numbers, symbols, spaces). That will equal the equivalent of words per minute. (Five strokes equal one word and 12" equals 1/5 of a minute).

Rick got the dog at a mall in town. 35 words per minute for 12" timing

Teaching Strategies and Activities

Classroom Activities

Variety in classroom activities is needed to keep students motivated and interested. The inclusion of writing in the middle school instructional program offers many opportunities for teachers.

1. Always be prepared for each day's instruction. A number of distracting things can happen in the computer and network environment. The teacher will be in a better position to keep the class moving along if proper preparation is done EACH day.
2. Break up lessons into small parts, and vary the activities. The attention span of the middle school child requires a variety of activities. Look for opportunities for the students to move around during the class period.

Develop each activity so that maximum progress can be made. Students will have a procedure at the beginning of the period which will get them on the computer and into the warm-up activity. New techniques, new material, review of things learned and practiced, and skill building are then pursued as appropriate.

3. Include the development of personal skills essential for being effective learners in any class. These include teaching students to listen to and follow instructions.
4. Teach students to make judgments as they work on their assignments. They should do this in the context of the objectives of the lesson. The prepared teacher keeps students on target with the objectives for the day.
5. Give students the opportunity to share items they have written with fellow students. The use of the group technique to share and critique each other's work is suggested. Students should be encouraged to work on items that are classified as "share items."
6. Recognize students for their accomplishments. Display work on the bulletin board, or find other ways to give recognition to students.
7. The keyboarding lab should always be neat and orderly. Operational procedures require that students work in and recognize the value of being neat, orderly, and organized.
8. Teachers should know thoroughly the software being used in the class. This advance preparation will be helpful in dealing with unforeseen problems. Software documentation usually does not cover all of the software malfunctions and problems that will be encountered.
9. At the beginning, use a software package that provides an open screen for work. This can be part of a tutorial program or a simple word processing package. This software should be preloaded, or students in the first period class can be taught the procedure for loading software if a network is not used. Preloading assures the maximum time on the task for learning keyboarding.
10. Each student should have a personal data disk on which work is saved. They can be kept in a disk box at the computer.

11. If printers are not available for each computer, students can be assigned to print on a rotation basis so that not all students are printing their work. This will save paper, avoid confusion, and add to the efficiency of the class operation.
12. Cue cards may be used in helping students to automatize simple words. The teacher may develop a series of cards that can help vary instruction during the early stages of learning the keyboard and the beginning of speed development. Noted keyboarding authorities suggest this activity be used only in the early stages.
13. During skill building instruction, teachers should point out to students the varying rhythm of keying information. Words that are keyed with one hand have an entirely different rhythm from words that are made up of letters that alternate from one side of the keyboard to the other. Some materials will have a combination of one-hand and balance-hand words. Some words can be chained, or keyed automatically (the) while others, because of their letter combinations are keyed on a letter by letter basis (pizza).
14. Guided writings are an effective way to force-speed or slow students down for accuracy. Most instructional material will provide paragraphs or sentences that have words marked in four or five word intervals. This will allow the student to set a goal for 1- or 2-minute timings during which the teacher will call the time every 15 seconds. Short timings should be used in developing skills. Five-minute timed writings and longer writings do not develop skill. During the skill building, longer amounts of time can be used such as 2-, 3-, or 5-minute writings to help the students see the result of longer writings and to begin helping them sustain their speed for a longer period of time.

The Writing Process

Pre-writing Activities

These are activities that focus on the identification of a topic that will be explored. This is the first step in the writing process. Once the topic has been identified, the student gives consideration to all of the ideas to be included about the topic. The questions of *who, what, why, when, how, and where* must be answered. A variety of activities can be included in the pre-writing stage such as brainstorming, free writing, and improvisation. This helps to identify such ideas as the setting, situations, characters to be involved, special circumstances, and emotions to be conveyed. In addition, the student must decide the style of writing that will best convey these ideas.

Writing the First Draft

Now that the student has a topic and a decision on whether to proceed in writing prose, poetry, or a play, the writing process continues. Putting down the ideas and beginning to format them into a setting is the most difficult part of the process. The goal is to put the ideas into settings and situations that create interest. At this point, the focus is “getting it down.” Form and correct style are not important at this point—capturing all of the ideas is the key. Because a computer is used, the preparation of numerous drafts and updates is not a problem. Students must realize that this is just the first attempt to capture mental images and ideas in writing. With the use of the computer, it is easy to adjust, change, add, and delete from the first draft.

Editing The Draft

Refining what has been written, identifying improvements and changes, and organizing and reorganizing one’s thinking are activities in the process of editing. Consider the ways in which the material can be made more interesting, how to make the situations come to life, and how to convey one’s thinking and inner feelings. Use groups in order for students to share and critique each others’ writing. Encourage students to work together to identify ideas and improve the written work. The writing process should not be rushed.

With the ability to store the information and then retrieve it at a later time, the student will have the opportunity to think and rethink what is being presented. Using the computer makes the process of editing and rewriting easier.

Preparing A Final Product

When this stage is reached, the student should carefully check to be sure that grammar, spelling, punctuation, and writing technique are correct. The piece of writing should be in the best form possible. The teacher may also encourage group collaboration at this point.

Selecting Illustrations

The student should now consider what can be done to make the writing come alive. What illustrations, pictures, or other graphics can be inserted or attached that will give further meaning to the piece of writing? The student should be encouraged to use creative abilities to illustrate the points in the writing. This is another way for the student to enhance his/her thinking skills.

Writing Journal

Teachers of keyboarding who incorporate the writing approach have found the use of a journal to record writing activities to be helpful. After the keyboard has been introduced and the touch method has been taught, the writing process begins. At that point, the student should be given some time each day to work on writing at the keyboard. A log or journal of each day's activities is recommended. In this way, the teacher may set a requirement that a certain amount of writing be done.

In the beginning, the journal may be handwritten. Students should be given samples of journals. After students have become more proficient, the journal should be kept on the computer.

Writing Activities

Teachers who include writing activities have suggested that a textbook focusing on writing can be used. Some of the activities that might be included in lessons are the following:

- ▶ Lists of topics for writing
- ▶ Types of writing—prose and poetry
- ▶ Selection of the context for the topic
- ▶ Use of narration
- ▶ Leads, similes, colorful words, punctuation, word problems, organization of ideas, focus on theme, and refinement of details
- ▶ Writing procedures such as drafts, revisions, and topic selection

Materials on Writing

At all levels, but especially in upper elementary grades and at the middle school level, it is recommended that the keyboarding course include instruction on writing and composition at the keyboard. Many demands are made on teachers at those levels to complete a full curriculum. Thus, some keyboarding time away from the traditional language arts program can improve instructional efficiency as well as student writing skills.

The Manual Portable Typewriter as a Tool of Learning with Fifth-Grade Elementary School Pupils, by Lawrence Erickson, was a research study conducted in 1959 over a period of five school months with a group of fifth-grade students to determine the educational values that could be achieved by using manual portable typewriters. The research focused not only on the students' reactions, but also on the feedback of the teachers and parents. Some of the findings of the experiment follow:

- ▶ After 31-2/3 hours of formal typewriting instruction and use of the typewriter for regular classroom written work, rates for these fifth-grade pupils on a 1-minute practiced sentence varied from 20 to 80 gross words a minute with a mean rate of 40 gross words a minute. An average of two errors were made on the 1-minute writing. Rates on a 3-minute timed writing on a practiced paragraph ranged from 18 to 56 gross words a minute. An average of less than one error (.875) a minute was made on the 3-minute writing.
- ▶ When expressed in equivalent 5-stroke standard typewriting words, the copying handwriting speeds of the experimental pupils as measured by the Ayres Handwriting Scale varied from lows of 5 to 10 words a minute to highs of 15 to 18 words a minute.

The mean rates varied from 9 to 14 words a minute. In all cases, the experimental pupils learned to typewrite at rates which exceeded their handwriting rates. In most cases, these rates were approximately two to three times their handwriting rates.

- ▶ The reaction of the fifth-grade pupils to the use of the typewriter for their written work was one of enthusiastic acceptance. After they had learned to typewrite, they used the typewriter for their written work in preference to handwriting. Some of the pupils came to school early for extra typewriting practice; others did extra typewriting practice during the lunch hour. There were frequent requests to take typewriters home for extra practice work.
- ▶ After an initial period of caution and skepticism, the experimental classroom teacher became enthusiastic about the classroom use of the typewriter. She willingly incorporated pupil use of the typewriter into her planning of the classroom activities. She was favorably impressed with (1) the increased quality of written work, (2) the neatness of work, and (3) the "easier-to-read" typewritten papers. She did express concern, however, that if typewriters were to be introduced into the elementary school classroom, there probably would be a need for skilled typewriting instruction.
- ▶ All parents whose children were involved in the experimental program had a highly favorable attitude toward the use of the typewriter at the elementary school level. Most of the parents believed that their children had shown an increased interest in school because of the experimental program in which these children learned to use the typewriter.

Therefore, Erickson recommended the following suggestions about the use of the typewriter:

- ▶ Elementary school pupils need typewriting instruction if they are to learn to use the typewriter properly and avoid the development of bad habit patterns, which may seriously inhibit skill growth. The development of a pattern of proper basic techniques in operating the typewriter seems to be of special importance.
- ▶ The typewriter may lead to an increase in creative writing, since elementary school pupils find handwriting laborious and time consuming. Fifth-grade pupils tend to avoid activities involving handwriting and when they do write, they write less than they otherwise might write were a more effective tool of written communication, such as the typewriter, available for use.
- ▶ The typewriter can be used effectively and has educational value in:
 - ▷ improving work habits
 - ▷ developing skill in the mechanics of English
 - ▷ improving composition skills
 - ▷ improving the speed and quality of handwriting
 - ▷ decreasing the time needed for writing reports in various subject matter areas or in increasing the quantity of written work produced in these areas.
- ▶ Regular typewriting instructional materials as found in published typewriting textbooks which are designed for teaching beginning typewriting can be used effectively with fifth-grade pupils. The teacher may, however, need to make some interpretation of textbook direction because of the vocabulary limitations of some of the pupils at this level. (Erickson, 1959)

Although this study was conducted in 1959, the evidence still applies to keyboarding today. By teaching the proper keyboarding skill and using the support materials and tools available, the students' learning will be enhanced.

Support Materials

The instructional materials and strategies should support the effective development of writing skills. The writing process may direct students to a number of materials that will give them different types of creative writing that has been prepared by middle school students. Publications that exhibit students' work should be made available.

Keyboarding teachers should secure or prepare materials to support and facilitate the instructional program. The following should be considered:

Charts, Transparencies, Black/White Boards, and Bulletin Boards

Check with publishers for materials that emphasize proper procedures and techniques in the classroom. Suggested items include

- ▶ a keyboarding chart transparency or a presentation screen
- ▶ posters with illustrations of correct posture (These may be in the form of posters, transparencies, or other illustrations of arms, hands, feet, back.)
- ▶ posters with illustrations of correct techniques and procedures including the following: stroking, handling disks (including inserting the disk, not writing on disks, not bending disks, keeping magnets or food away from disks or computer), and organizing work area
- ▶ displayed list of start-up and shut-down procedures
- ▶ exhibits organized so that student work can be featured
- ▶ student progress chart showing accomplishments (This could be competencies achieved, lessons completed, keyboarding speed, for example.)
- ▶ wall charts showing various models of reports or focusing on other keyboarding topics.

Transparency Masters and Teacher Demonstration Software

Teacher's guides for keyboarding instructional texts and software packages should be reviewed to identify transparency masters, presentation software, and other helpful teaching tools that may be available.

Flash Cards

In the early stages of moving from letter response to chained response on the keyboard, the teacher may use flash cards with common words that should be typed at the **chained response** level. (The term *chained response* refers to the ability of the typist to key two or more letters automatically. For example, the word *the* is often typed at the chained response level by experienced typists.)

Grading

Grading methods vary from one school to another, depending on the philosophy of instruction at the level where keyboarding is taught. Students should be given goals to work toward, and they should be evaluated based on their progress in meeting these goals.

During the beginning stages, developing proper techniques is critical. Most teacher manuals for keyboarding include technique checklists. The teacher should continually emphasize correct stroking techniques during the early stages. The use of the technique activities described on pages 16–17 will assist the teacher and student to focus on techniques on a regular basis. The purpose of these timings is to help the student become aware of the technique and to see that it is an activity in which everyone can be successful.

Speed and then accuracy will be developed in the course. The goal is to develop a minimum skill of 20 to 30 words a minute. Most students will be able to do more than this if the teacher uses the “coaching model” for working with students and regularly monitors and provides feedback while students are working at the keyboard. Timed writing for speed and accuracy can be graded. The teacher and student should be aware that this speed is much different from the speed when preparing an assignment or writing on the computer. Copying material word for word does not reflect the way that the skill will be ultimately used. Standards will have to vary according to grade level and the length of the keyboarding program.

Grades can also be based on the writing activities in the class. Consider the amount of writing done by the student, the presentation of the written material, and the types of writing projects attempted by the student. Writing can be coordinated with other teachers in the middle school so that output for other classes becomes the focus of some of the writing activities.

An examination of the grading structures in selected schools in Virginia at the middle school level reflects a very traditional approach that mirrors what is done at the secondary level. This section has not been specific because it is hoped that teachers will take advantage of the opportunities for coordinating instruction with other teachers in the middle school program. The introductory statement to this guide also pointed out that the program should complement the language arts program.

Name: _____

Technique Guide Sheet

	Needs Improvement
Correct Body Position	
1. Fingers curved and upright lightly on the home keys	
2. Body centered in front of the keyboard (center of body directly in front of the "B" key)	
3. Forearms nearly parallel with the slant of the keyboard	
4. Elbows hanging naturally near the sides of the body	
5. Eyes focused on textbook	
6. Feet on the floor, slightly apart	
Correct Keystroking	
1. Curved fingers	
2. Upright fingers (not leaning over onto the little fingers)	
3. Quick, snappy keystrokes (fingertip snaps toward the palm)	
4. Low, relaxed wrists	
5. Still hands (almost motionless—fingers do the reaching)	
Correct Spacing Technique	
1. Use of the right thumb	
2. Strike of the space bar with a short, low, down-and—in motion of the thumb	
Correct Shift–Key Technique	
1. Use of the appropriate little finger (other fingers, especially the index fingers, stay on home keys)	
2. Use of a 3–step procedure: (1) shift, (2) strike key, (3) release both	
Correct Return Operation	

	Needs Improvement
1. Use of the little finger of the right hand (other fingers stay on home row keys)	
2. A quick reach from home key to RETURN (or ENTER) key and back to home key	
3. No pause before or after RETURN motion	
4. Eyes kept on screen (or textbook) copy as the RETURN is made	

* Place a check mark in the block in the first column (for the first evaluation) opposite the technique items that need improvement. Use the second and subsequent columns for later evaluations.

Keyboarding Test Guidelines

For Use in Determining Students' Success in Meeting the Keyboarding Prerequisite

Keyboarding is a prerequisite for many courses in Business and Information Technology. However, it may be possible for many students to waive the keyboarding prerequisite if there is a successful program at the middle school or earlier level. This program would allow students to acquire a system of typing on a keyboard using the QWERTY method of type by touch and without looking at their hands to enter alpha and numeric data. Demonstration of mastery of the essential (bulleted) competencies listed for the Keyboarding (Middle School), 6150–9 weeks, are a MINIMUM for this waiver of the keyboarding prerequisite to be acceptable and for students to be able to enter higher-level courses at the high school and perform successfully. In most instances, a minimum of 18 weeks of keyboarding instruction by a teacher trained in keyboarding methodology will be needed not only to obtain the keyboarding skill but also to maintain that skill.

There are a variety of ways that a school division may implement a waiver or “test out” process:

- ▶ Business and Information Technology teachers (middle and high school teachers collaborate) may develop a performance test that allows students to demonstrate proficiency in the competencies mentioned above. If this method is used, the test should be given just prior to students entering a higher-level Business and Information course.
- ▶ The performance test may combine competencies to be tested. A major requirement will be observation of the student entering data to determine if a student has a touch method of typing. This is the most essential skill needed.
- ▶ It is not necessary to test for advanced formatting skills that will be developed in subsequent courses.
- ▶ A keyboarding “test” may be used by students in middle school courses where they learn keyboarding skills or by students who claim to possess keyboarding skills learned in other educational settings.
- ▶ Course competencies and student competency records may be found on the Business and Information Technology Web site, <http://www.doe.virginia.gov/VDOE/Instruction/CTE/be>, or may be obtained within the middle school keyboarding resources available through VERSO on the CTE Web site, <http://CTEresource.org>.
- ▶ The competencies tested should be documented using the student competency records mentioned in the above item and should be filed with the students' records.
- ▶ If students take the 36-week Digital Information Technology course and successfully meet the essential competencies, they will have met the keyboarding prerequisite.
- ▶ If students take approved keyboarding courses and successfully meet the essential course requirements, they will have met the keyboarding prerequisite. Again, students must meet the essential competencies in the 9-week, 6150 Keyboarding course at a minimum. The 6-week option in middle school is only listed for schools that offer rotating career information wheels. The 6-week course rarely provides the opportunity for students to obtain and retain a touch skill of keyboarding.
- ▶ High school teachers and administrators must be included in the process to determine what is acceptable for a waiver of the keyboarding prerequisite.

For questions, contact the Business and Information Technology program specialist at the Virginia Department of Education, 804–225–2838.

Teaching of Early Adolescents

(excerpt from "Business Computer Software Curriculum Series Keyboarding" by the Virginia Department of Education)

Between the ages of 11 and 14, the average gain in height is 2 to 4 inches per year; weight, 8 to 10 pounds every year. Early adolescents can vary in physical stature from the petite child weighing 70 pounds to the tall muscular child tipping the scales at 150. The rate and ability to cope with that growth is unique for each youngster.

What are the physical changes that have implications for instruction of the middle school student?

- ▶ As bones form, sitting on hard chairs can be uncomfortable; thus, the wiggling and squirming in class.
- ▶ Glands produce an excess of hormones and adrenalin, so that a middle school student may feel like running the length of the football field while actually sitting in class.
- ▶ Adolescents crave food. If they have poor nutritional habits, acne and other skin defects may appear, causing embarrassment and poor self-image.
- ▶ Development of a healthy sense of self is vitally important to early adolescents. Self-concept as a learner accounts for up to 50 percent of school achievement.
- ▶ Some students may be so involved in their personal concerns, they may tune out classroom activities.
- ▶ Intellectually, early adolescents are usually in transition between thinking based on concrete physical objects to be manipulated and that based on operations in abstract logic. Therefore, classes with concrete operations that lead to abstract reasoning are a sound practice.
- ▶ The formal reasoning process will vary with each student. For example, some students will be able to think abstractly in one subject area but not in another.
- ▶ Early adolescents are aware of their thoughts; they know when they do not understand and often dwell on their inability to comprehend what they do not understand.
- ▶ Imagination is extremely active at the early adolescent stage.
- ▶ Students respond to tasks that are well defined and that result in rewards when accomplished—badges, stars, prizes.
- ▶ Early adolescents want to feel a part of the adult world, and they will establish close relationships with adults outside their families—scout leaders, coaches, teachers.
- ▶ Early adolescents need help in developing a conscious morality and a set of values that will be carried into adulthood.
- ▶ Early adolescents want to learn correct social behavior; they need to know the importance of proper hygiene, how to dress, and how to manage hair and makeup.
- ▶ Emotions are intense; they can lose themselves in the emotions of anger, love, and fear.

- ▶ This age group is idealistic, and they are frustrated when their ideals do not materialize.
- ▶ Early adolescents need security, success, and support.

Teachers should help students understand that they are at the stage of their life when differences between them and their peers are the greatest. When teachers make it clear that they are interested in the individual student, middle school teaching will be rewarding.

Selection and Organization of Hardware and Instructional Materials

Following is a discussion of furniture, equipment, and materials that support the keyboarding program. (Software and networks appear in the next section.) General guidelines are included here to provide a basis for setting up the laboratory for ease of management and maximum learning.

Furniture

The desks for computers should be at a height that will allow the students to use the keyboard with forearms reaching upward slightly and fingers curved over the keyboard. The chairs should allow the student to place feet flat on the floor while sitting in an upright position. Because there is a great variety in sizes of students at the middle school level, adjustable desks and chairs or a variety of heights of desks and chairs are recommended for the laboratory. Chairs should support the seated student's back.

Correct posture is considered to be essential for the most effective development of the keyboarding skill. Therefore, the teacher at the middle school level may find it necessary to make adjustments so that students can sit properly. Such things as boxes under the desks so that feet are flat, cushions in the chair, or standard tables and chairs at varying heights may be necessary so that students can use the keyboard properly.

Realistically, the teacher may not be able to achieve the ideal situation immediately for all the students in the class. However, it is a worthy goal. The teacher should handle each situation in the best way possible.

Equipment: Computers and Printers

Computers are recommended for teaching keyboarding. Every student should have a computer. A printer for every four computers with a switch box for accessing the printer is the minimum requirement. It is not necessary for students to print out all of their work on the computer. Only an occasional printout is needed from time to time to document what the student has done. Some software that may be used for the keyboarding program has a documentation program that keeps up with student progress and records speed and accuracy levels at certain points.

When teaching keyboarding, the following can be used:

Microcomputers

There should be one workstation for each student. The teacher may use these in several ways.

- ▶ Use an open screen from a simple word processing software package and printed keyboarding instructional materials with direction from the keyboarding teacher. This method has had documented success in Virginia. Supplementary instruction may be provided by software instructional programs. (See Software Criteria in Appendix C.)
- ▶ Use keyboarding software with directed instruction from the teacher. This is usually more successful if printed instructions accompany the software.

It is possible that a keyboarding teacher may have to use a combination of equipment. A workstation is needed for each student. The use of a variety of equipment makes instruction and classroom management more difficult.

Room Arrangement

There are several ways to arrange the room for the keyboarding class. The room itself may govern some of the arrangements. Such features as windows, the availability of power to be supplied at workstations, and counters all have an effect on the final arrangement.

The following arrangements are most commonly suggested in the literature on keyboarding:

Regular Classroom Style

This is a traditional arrangement with desks arranged in rows facing the front. There are problems when this is used for computers because the teacher has difficulty seeing the monitors.

Slanted Style

This is an arrangement with a center aisle and tables or desks arranged with rows on each side slanted toward the front of the room so that the instructor can see monitors from the center aisle.

The slanted arrangement is better for teachers as they check on students' problems. They will have easier access to students with problems. Teachers can see the monitors easily from the back of the room and the center aisle. This arrangement allows the teacher to see the techniques being used by the students and to see more easily how the students are using their hands on the keyboard.

U-shaped Style

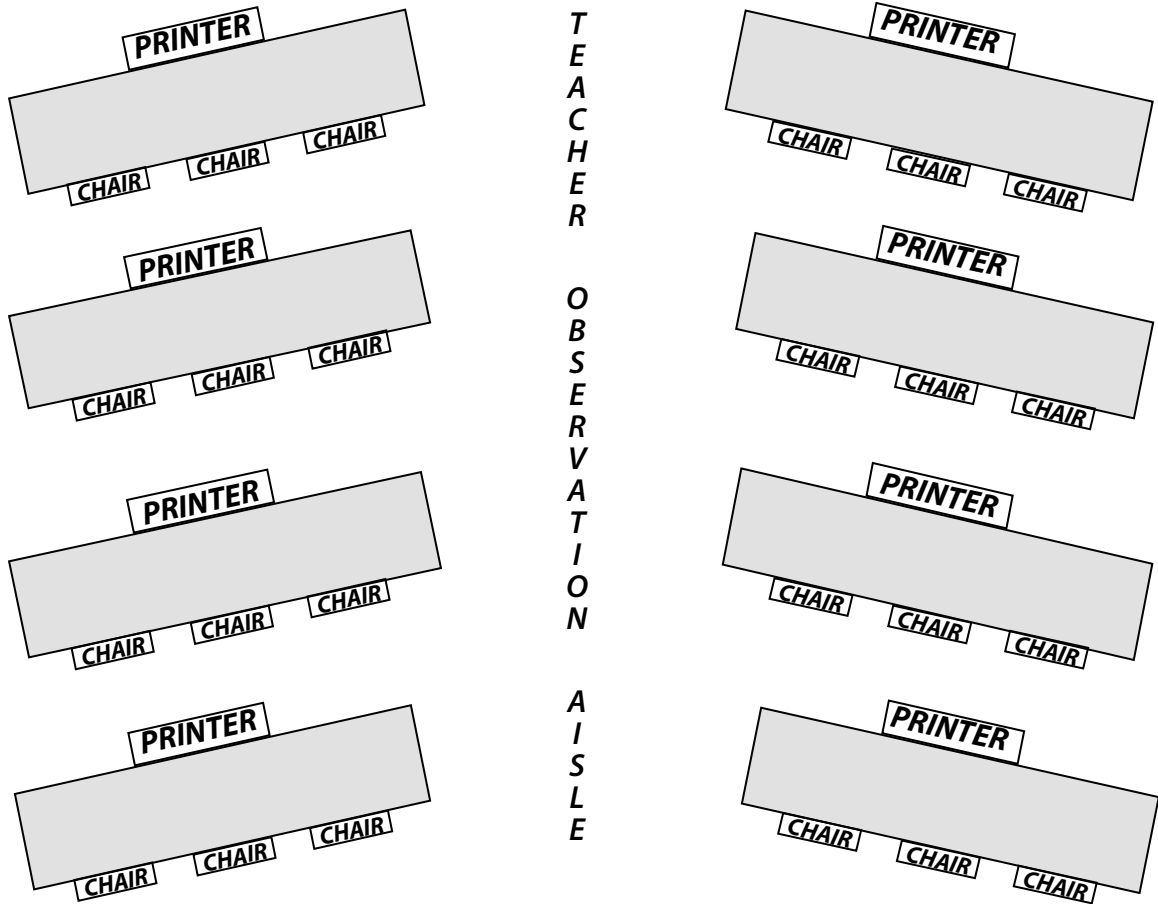
Student desks face the walls. An extra row may be placed facing the back wall. The teacher can see what is being done by students. It is difficult for students to turn around to see the teacher in front of the room and to observe the teacher demonstrating techniques. This arrangement is forced in some situations because of the problems in providing wiring to the student stations. This style is recommended after initial keyboarding instruction takes place. Students do not need to observe the teacher at that point; the teacher needs to observe students.

Cluster Style

Groups of four desks with a common printer can be placed in checkerboard manner in the classroom. This arrangement is appropriate when the teacher will be giving group assignments or a type of activity to let students work according to their level or type of activity being assigned.

The above arrangements are illustrated on the next pages. The slanted style is the most recommended style to use.

**Teacher Demonstration
Station**



Slanted Style

Diagram accommodates 25 student workstations.

May be adapted to tables of 2 or 4 stations for varying class size needs.

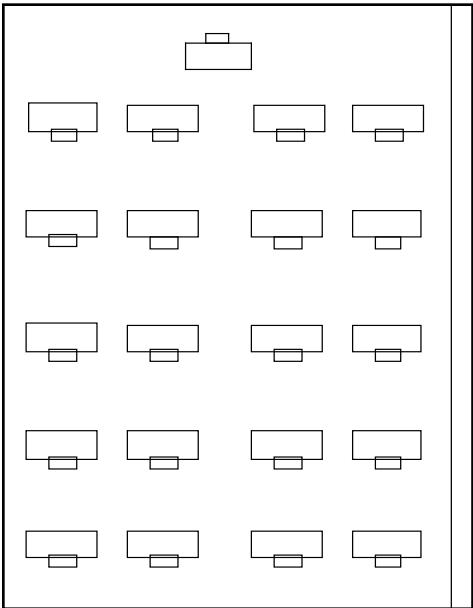
Advantages

- 1. Tables are slightly angled so that teacher may walk back down observation aisle and look at each computer screen.
- 2. Students face front for teacher directions, instruction, and demonstration.

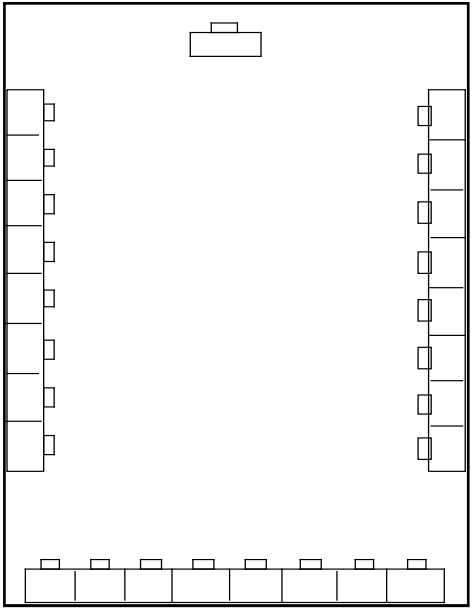
Notes

- 1. If tables cannot be angled, slightly angle computer screens for similar effect.
- 2. Wiring should be available on the tables to reduce hazardous wiring situations.
- 3. This room arrangement has been tested by Business/Information Technology teachers.

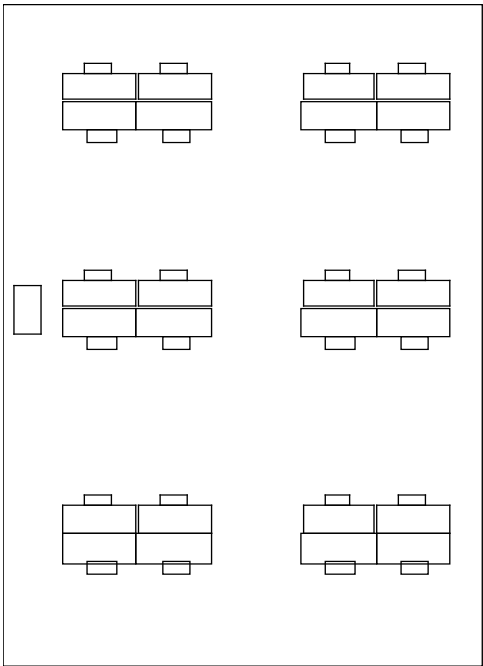
Other Types of Room Arrangements



Classroom Style



U-Shaped Style



Cluster Style

Keyboarding Instructional Materials

Delivery Options

Before selecting instructional materials for keyboarding, the following delivery options should be considered:

Option 1. Use microcomputers and word processing software with a keyboarding textbook and teacher direction. (Most success in Virginia has been reported from schools using this option.)

Option 2. In addition to Option 1, use keyboarding instructional software for supplementary and remedial instruction. This software must have a mini word processor.

Option 3. Use keyboarding software with directed instruction from the teacher. Teacher guidance is the key to success for this option.

When reviewing materials to use in the instructional program, there are several factors to consider. The items listed here can be used on a check sheet for reviewing materials:

- ▶ The reading level is appropriate for the students who will be in the class.
- ▶ The lessons introduce the keyboard with whole words and sentences in the beginning lessons. Nonsense material is kept to a minimum in the keyboard introduction.
- ▶ After the introduction of the home keys, the lessons usually introduce two keys in a lesson. Each lesson will have an appropriate amount of practice material—usually about 20 to 25 minutes of practice, depending upon the age and grade level of students.
- ▶ Twenty or more lessons are used to introduce the keyboard. After the home row is taught, the keys are introduced in a “skip around” method rather than all of the keys typed by one finger.
- ▶ Lessons provide appropriate material for review of what has been learned in previous lessons.
- ▶ The instructional materials allow an approach that emphasizes, in this order, technique, speed, and accuracy.
- ▶ There are schematics, keyboard charts, and drawings that illustrate fingering at the keyboard, proper techniques for reaches at the keyboard, and posture.
- ▶ Materials for skill building are appropriately marked for calculating speed and accuracy.
- ▶ Materials are easy for students to read—it is easy to understand illustrations, directions, and material to be copied.
- ▶ Review and reinforcement lessons are presented frequently.
- ▶ The instructional materials make provision for the student to set goals and to measure progress on a regular basis.

Selection of Software and Networks for Keyboarding

Software and networks are important to the teacher who uses computers to teach keyboarding. Basic considerations are presented in this section for each of these topics. Preparation and review are important elements as one prepares to handle instruction using computer software and a network.

A teacher must understand that even with careful preparation, computers and networks will not always operate smoothly. A teacher can help students to be confident in their experience by working out any difficulty that may arise without exhibiting frustration or anxiety. With a systematic, organized approach to solving problems, the teacher will model a real-life way of working with new technology.

Software Selection

Keyboarding software may be used to complement instruction given by the teacher in the beginning stages. Keyboarding instructional software that includes a mini word processor may also be a primary instructional tool; however, it should reflect sound methods of instruction and be used in a teacher-directed fashion. Self-teaching packages, or packages that emphasize game techniques, are not recommended for instruction of touch techniques. Keyboarding teachers report that the software can enhance instruction. (See the discussion on delivery options, page 41.)

Many software packages have written instructional material to accompany them. Proper documentation of the software is also important so that the teacher can get set up and begin using the software.

The teacher should ask the following when considering keyboarding software:

- ▶ Can the software be loaded into more than one machine or is the user limited to one machine at a time?
- ▶ Does the software introduction of keys and initial exercises conform to psychological principles of learning and correspond to textbooks?
- ▶ Is the software affordable?
- ▶ Does the software check errors according to the rules of keyboarding authorities, or does it do a literal space-by-space check of the material which requires keyed data to be in the exact location as the model?
- ▶ Does the software provide an open screen, a "scratchpad," mini word processor, or some similar way of entering data onto the screen?
- ▶ Does the software contain graphics or videos that demonstrate correct posture, fingering, and techniques?
- ▶ Are the supporting print materials of such a nature that they will be durable? Can they be used without any special apparatus to hold the materials?
- ▶ Does the software allow students to progress at their own speed and set their own goals?

- ▶ Does the software provide a system for checking and recording electronically the progress of the student? Can this be printed out by the teacher? Are there controls that prevent the student from making any changes on their progress documentation?
- ▶ Does the software provide immediate feedback to students as they learn the keyboard?
- ▶ Is it possible to prevent error correction by using the delete key or type-over feature in the early stages of keyboard instruction; is it possible to turn word wrap on and off; and does the software offer the capability of using 40 or 80 columns on the screen?
- ▶ Can students easily exit and enter a lesson at any point without having to start over again?
- ▶ Does the software use different types of activities to vary the presentation on the computer?
- ▶ Is the documentation adequate for the teacher to start up the program and manage the record keeping system?
- ▶ Does the software have a management system that allows the teacher to set variable achievement requirements for each student?
- ▶ Does the software emphasize key stroking speed early without undue attention to accuracy?

Answers of “yes” to the foregoing questions indicate a positive evaluation of the product.

A rating form which can be used for evaluating keyboarding software appears in **Appendix C**.

Networks

Keyboarding can be taught in a laboratory that has a computer network. Basic information about local area networks is included in this section.

Local Area Network

A local area network (LAN) is a hardware and software system that makes it possible to link microcomputers.

Network technology has many advantages. It simplifies the handling of software, which can be loaded on the “server” for the LAN. The system also has controls that enable the operator of the LAN to limit the access of each individual station to selected items on the server. The system allows the microcomputer operator to have access by a unique user code to an individual storage area and to access the software that is needed in the student’s instructional program. The LAN administrator or teacher can have access to information entered into the LAN by each student.

The LAN also simplifies the use of peripherals such as printers. With the use of laser printers, the number of devices can be reduced without interfering with the instruction in the classroom. Items to be printed can be “spooled” to the appropriate printer. Spooling is sending data to the printer to be stored until printed in the order received. The LAN also makes it easy to transmit data between workstations.

Advantages of Using a Network

The long-range cost factor is one of the primary reasons for considering a network. It may allow for the most efficient use of software and peripherals. It has advantages in the classroom of providing control of activities for individual workstations and reducing software handling.

In the work place, networks improve communication and the handling of data. Electronic mail systems can be used in organizations having computer networks. The ability to introduce students to the network environment and the use of electronic communications is an advantage. There is often increased efficiency as a result of the network in the classroom and in the work environment. Students spend more time on task rather than on operational setup and ending activities. Network systems can also have enhancements for the teacher that include grade book, attendance, and test generation options.

The controls on the network may also allow for better management in the classroom. The types of software and information accessed through the network can be identified by different colors on the screen so that the teacher can be immediately aware if the student is not on task.

Appendix A

Computer/Technology Standards of Learning (Grades 1–12)



Computer/Technology Standards of Learning

Computer/Technology Standards by the End of Grade Five

Computer/Technology skills are essential components of every student's education. In order to maximize opportunities for students to acquire necessary skills for academic success, the teaching of these skills should be the shared responsibility of teachers of all disciplines.

Minimum skills that students should acquire by the end of Grade 5 include the following:

- C/T5.1 The student will demonstrate a basic understanding of computer theory including bits, bytes, and binary logic.
- C/T5.2 The student will develop basic technology skills.
- Develop a basic technology vocabulary that includes cursor, software, memory, disk drive, hard drive, and CD-ROM.
 - Select and use technology appropriate to tasks.
 - Develop basic keyboarding skills.
 - Operate peripheral devices.
 - Apply technologies to strategies for problem solving and critical thinking.
- C/T5.3 The student will process, store, retrieve, and transmit electronic information.
- Use search strategies to retrieve electronic information using databases, CD-ROMs, videodiscs, and telecommunications.
 - Use electronic encyclopedias, almanacs, indexes, and catalogs.
 - Use local and wide area networks and modem-delivered services to access information from electronic databases.
 - Describe advantages and disadvantages of various computer processing, storage, retrieval, and transmission techniques.
- C/T5.4 The student will communicate through application software.
- Create a 1–2 page document using word processing skills, writing process steps, and publishing programs.
 - Use simple computer graphics and integrate graphics into word-processed documents.
 - Create simple databases and spreadsheets to manage information and create reports.
 - Use local and worldwide network communication systems.

Minimum skills that students should acquire by the end of Grade 8 include the following:

- C/T8.1 The student will communicate through application software.
- Compose and edit a multi page document at the keyboard, using word processing skills and writing process steps.
 - Communicate with spreadsheets by entering data and setting up formulas, analyzing data, and creating graphs or charts to visually represent data.
 - Communicate with databases by defining fields and entering data, sorting, and producing reports in various forms.
 - Use advanced publishing software, graphics programs, and scanners to produce page layouts.
 - Integrate databases, graphics, and spreadsheets into word-processed documents.
- C/T8.2 The student will communicate through networks and telecommunication.
- Use local and worldwide network communication systems.
 - Develop hypermedia "homepage" documents that can be accessed by worldwide networks.

C/T8.3 The student will have a basic understanding of computer processing, storing, retrieval and transmission technologies and a practical appreciation of the relevant advantages and disadvantages of various processing, storage, retrieval, and transmission technologies.

C/T8.4 The student will process, store, retrieve, and transmit electronic information.

- Use search strategies to retrieve electronic information.
- Use electronic encyclopedias, almanacs, indexes, and catalogs to retrieve and select relevant information.
- Use laser discs with a computer in an interactive mode.
- Use local and wide area networks and modem–delivered services to access and retrieve information from electronic databases.
- Use databases to perform research.

The Computer/Technology Standards by the End of Grades Five and Eight identify technology skills for improving student learning through the integration of technology across the curriculum. Mastery of these skills results in students who are both computer literate and competent in the application of technology tools to support their learning needs.

In grades nine through twelve, technology continues to be integrated across the curriculum. The goal is that students in these grades achieve a higher level of mastery in the application of technology in their learning. The following standards identify essential skills for the student’s appropriate use of existing and emerging technology tools for communication, productivity, management, research, problem–solving, and decision making.

C/T12.1 The student will demonstrate a basic understanding of fundamental computer operations and concepts.

- Successfully operate a multimedia computer system with related peripheral devices.
- Demonstrate touch–typing skills in computer use.
- Use terminology related to computers and technology appropriately in written and oral communications.
- Describe how imaging devices may be used with computer systems.
- Describe how computers may be connected to form a telecommunication network.
- Analyze and solve simple hardware and software problems.
- Identify new and emerging technologies.

C/T12.2 The student will use application software to accomplish a variety of learning tasks.

- Use advanced features of word processing, desktop publishing, graphics programs, and utilities in learning activities.
- Use spreadsheets for analyzing, organizing and displaying numeric data graphically.
- Design and manipulate databases and generate customized reports.
- Use features of applications that integrate word processing, database, spreadsheet, telecommunication, and graphics.
- Identify, select, and integrate video and digital images in varying formats for creating multi–media presentations, publications and/or other products.
- Select, evaluate, and use appropriate technology for research and data collection.
- Apply specific–purpose electronic devices (such as, a graphing calculator, scientific probeware, or multi–function keyboards) in appropriate content areas.

- C/T12.3 The student will develop skills in the use of telecommunication networks.
- Use local, wide area and worldwide network communication systems to access, analyze, interpret, and synthesize information.
 - Compare and contrast the use of local area networks, wide area networks and worldwide networks.
 - Access and use telecommunications tools and resources for information sharing, remote information access and retrieval, and multi-media/hypermedia publishing.
 - Demonstrate an understanding of the concepts of broadcast instruction, audio/video conferencing, and other distance learning applications.
 - Explain legal, personal safety, network etiquette, and ethical behaviors regarding the use of technology and information.
- C/T12.4 The student will demonstrate skill in the selection and use of appropriate technologies to gather, process and analyze data and to report information related to an investigation.
- Design and use a wide range of effective search strategies to acquire information.
 - Use a wide variety of electronic media and databases to search for and retrieve information.
 - Evaluate the usefulness, appropriateness, currency, and reliability of acquired information.
 - Select appropriate technology for communicating information for an intended purpose and audience.
 - Utilize a variety of media and resources in collaboration with peers, experts, and others to design a learning activity and/or presentation.
 - Appropriately cite electronic resources in gathering information.
 - Apply Copyright and Fair Use Guidelines in reporting information.

Appendix B

Research and Related Literature about Keyboarding Instruction



"But typing isn't going away, any more than cursor keys went away with the arrival of the mouse. For one thing, there are sociological questions that are unanswered about sitting in an office environment talking to your computer. Even behind the privacy of an office door, people are likely to write rather than speak when accuracy is critical." – Bill Gates

Research Findings

- ▶ Keyboarding is a cumulative psychomotor skill involving the touch method of input to a keyboard. (Keyboarding Instruction, 1999)
- ▶ Psychomotor requirements of typing are simpler than handwriting, especially at beginning stages. (Balajthy, 1988)
- ▶ Becoming confident and competent at using these computer skills builds self-esteem. It also aids organization and work study skills, as the computer permits verbal and linear information to be displayed in graphic mode which is suitable for those students with non-verbal and visual-spatial learning strengths. (Sladden, 2004)
- ▶ Learning how to type properly is critical for several reasons. While most kids and adults can learn to hunt and peck on their own, real typing speed depends on proper technique. And speed is important because youngsters should learn how to think and compose at the keyboard. (Himowitz, 2003)
- ▶ As recently as 20 years ago, typing was usually thought of as a vocational skill and was offered only as an elective in high school. Now many school districts are teaching all children to type—or keyboard, as it's often called these days—in elementary school. (Zehr, 1999)
- ▶ At their core, typing programs rely on standard teaching techniques that have been developed during the past hundred years, taking you from beginner to advanced levels with a series of drills and timed typing tests. What makes the difference is how they analyze and track your progress. (Himowitz, 2003)
- ▶ Business educators also should be involved in training teachers within their school systems, Ms. Rowe said, and teachers who are teaching typing ought to know how to type themselves. 'Teachers need to be able to demonstrate and model it,' she said. 'We encourage a teacher-directed approach.' (Zehr, 1999)
- ▶ In the computer age, keyboarding "is not something that only some people do," said Lynn Schrum, the president of the Eugene, Oregon-Based ISTE. 'Keyboarding is something that we all do. It is seen as pretty important that [children] get it in an intense, organized way.' (Zehr, 1999)
- ▶ The suggested age for effective keyboard instruction is 10 to 12 years of age. (Elementary/Middle School Keyboarding Strategies Guide, 1992)
- ▶ The ideal level for effective keyboarding instruction would seem to be the upper elementary school (ages 10-12). Students at this level can develop outstanding keyboarding skills in relatively short periods of time, and they can readily transfer their keyboarding skills to improvement of their writing or composition skills. (Learning, 1986)
- ▶ Erickson addresses the controversy of when keyboarding should be taught and states that all students, ages 8 and up, can learn keyboarding skills, but the ideal age for effective keyboarding instruction and learning is the upper elementary school level (ages 10–12). (Erickson, 1993)
- ▶ Third, fourth, and fifth graders will need 20-30 hours of instruction if they are to type as quickly as they can write by pencil. However, these students will regress in their touch typing skills if they do not utilize their touch typing at intervals throughout the year. (Wetzel, 1985)

- ▶ Keyboarding experts have indicated that students retain more of touch typing skills once they reach the plateau of 20 wpm. (Wetzel, 1985)
- ▶ If correct techniques are taught with initial computer use and progressively added each year, the level of keyboarding ability is continually strengthened. (Davidson and Kochmann, 1996)
- ▶ The goal for elementary keyboarding is a rate that is faster than average handwriting speed (7-10 wpm for grades 4-6). (Wetzel, 1985; Cameron, 1986)
- ▶ A knowledgeable teacher is needed to help students develop appropriate techniques, as well as provide motivation and reinforcement. (Nieman, 1996)
- ▶ When first learning to touch type, students need about 30 hours of keyboarding instruction to acquire the ability to use the correct fingers. (McLean, 1994)
- ▶ Insufficient time allotted to keyboarding instruction will lead to failure to achieve automaticity. For touch typing to be useful, the process must become automatic and students must reach a speed at least equivalent to their handwriting speed. If time allotted to keyboarding instruction and follow-up is minimal, skills learned will rapidly disappear after instruction ends. (Balajthy, 1988)
- ▶ Anne Rowe, the business-program specialist for the Virginia Department of Education, stated, 'I'm hearing [in Virginia] that students are coming up to the middle school and needing more instruction—and have very bad habits. There needs to be more of a commitment to the proper instruction of keyboarding methodology.' (Zehr, 1999)
- ▶ The kind of keyboard learning materials has a dramatic effect on the overall keyboarding skill developed by students. Also, the teaching approach used affects keyboarding skill development. (Learning, 1986)
- ▶ The role that software plays can enhance keyboarding skills. However, software cannot take the place of a qualified teacher. (McLean, 1994)
- ▶ Software programs are becoming popular to assist elementary classroom teachers in teaching keyboarding. While software programs have many advantages, the main disadvantage is confirming that children are actually using correct techniques as they complete each lesson. Observation is essential by a knowledgeable instructor in requiring children to use the touch method of inputting. (Rogers, 2003)
- ▶ Keyboarding skills are no longer vocational in nature, but necessary to communicate, extract, and disseminate information. (Erthal, 2003)
- ▶ Our society has become one that is geared toward technology. More than fifty percent of the workforce uses a computer in its daily job. Students of today need to know how to keyboard properly and effectively if they are to be successful in the future. (Bartholome, 1996)
- ▶ It appears that there is more than one benefit to learn touch-typing keyboarding. Students are more enthusiastic about using the computer for their writing. (Texas Guidelines, 1987)
- ▶ Students who were able to type showed greater progress in spelling than non-typing students. Third and fourth grade students also increased their reading comprehension by four months and vocabulary by seven months. (Hoot, 1986)
- ▶ A weekly review lesson is suggested after formal lessons have been completed. (Instructional Resource Branch, 1991)

- ▶ School districts are realizing the importance of keyboarding skills for elementary children. Learning an efficient inputting skill is as basic as learning handwriting in today's technology-driven world. (Rogers, 2003)
- ▶ Without keyboarding instruction, upper elementary students will write at the keyboard at half the rate (5 wpm) they write with pencil (7-10 wpm). (Wetzel, 1985)
- ▶ The purpose of keyboarding instruction at the elementary level is to familiarize students with keyboard layout and provide at least a minimal level of proficiency in touch typing. (Balajthy, 1988)
- ▶ Studies indicate a dramatic increase in language arts skills as a result of children inputting words and sentences frequently using a computer. Keyboarding and language arts are a dynamic duo. Keyboarding should be integrated with language arts and other subject areas, such as social studies and science. Word processing of projects in academic subjects is easier when children possess a usable keyboarding skill. (Rogers, 2003)
- ▶ Students should be able to demonstrate the correct touch method of keyboarding after successfully completing 25 to 45 hours of instruction. (Policies Commission for Business and Economic Education, 1997)
- ▶ Research shows that children with keying skills are able to compose faster, are prouder of their work, produce documents with a neater appearance, have better motivation, and demonstrate improved language arts skills. (Nieman, 1996)
- ▶ The bulk of continued follow-up in keyboarding should be in language-oriented tasks making use of word processors with instructors personally supervising students to monitor appropriate techniques—students will start to look at the keyboard while typing unless encouraged to maintain their touch typing skills. (Balajthy, 1988)

Appendix C

Keyboarding Software Evaluation Form



Keyboarding Software Evaluation

Name of Software: _____

Suggestions for Using This Evaluation Instrument

- ▶ Use the ratings only as a guide in reviewing software.
- ▶ Give emphasis to those rating points which are of highest priority for your desired outcomes.
- ▶ Use the ratings to compare alternative software.
- ▶ Do not expect all high ratings for the software you adopt.
- ▶ Do not try to quantify these ratings—they obviously do not all have the same value.
- ▶ Answer the software questions, below, first. Then complete the software ratings that begin on the next page.

Software Questions

1. How much time does it take to complete a lesson?
2. How much time does it take to complete the entire software package?
3. Is the software a keyboarding game, or is it a program for psychomotor training?
4. What is the expected word-per-minute goal?
5. How often are timed writings included in the program?
6. How is the user made knowledgeable of the timed test results—immediately with visual prompt or on a separate screen?
7. Can a user intentionally or unintentionally skip exercises?
8. How are the goals set for timed writings—by the program, the instructor, or the user?
9. Can the student use the correction key?
10. What is the format of the practice material?
11. How many keys are introduced in each lesson?
12. Is a manual included with the software package?
13. Does the manual suggest weekly hours to be spent on the exercises?
14. Do you have the necessary hardware requirements to support this software, i.e., type of computer, memory capabilities, disk drive size, monitor and printer requirements?

Software Ratings

SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree

1. The software provides adequate instruction without undue verbal or written instructions by the teacher.	SA	A	U	D	SD
2. The touch method is reinforced.	SA	A	U	D	SD
3. The program is designed for individualized instruction.	SA	A	U	D	SD
4. Software includes effective activities to introduce numeric keys.	SA	A	U	D	SD
5. Software includes sufficient instructions for deciding margins and proper spacing.	SA	A	U	D	SD
6. Exercises are included to reinforce proofreading of keyed copy.	SA	A	U	D	SD
7. Sufficient operating instructions are given in the program or supporting documentation.	SA	A	U	D	SD
8. Software reinforces proper keyboarding posture.	SA	A	U	D	SD
9. Software reinforces correct fingering while keyboarding.	SA	A	U	D	SD
10. Software has easily understood exiting procedures.	SA	A	U	D	SD
11. The instructor can identify the progress of the student.	SA	A	U	D	SD
12. Previous lessons are reinforced.	SA	A	U	D	SD
13. Error messages are evident and easily understood.	SA	A	U	D	SD
14. Appropriate spacing rules are followed.	SA	A	U	D	SD
15. After introduction of new keys, there is reinforcement of correct finger placement.	SA	A	U	D	SD
16. When new keys are introduced, there is sufficient instruction for proper fingering.	SA	A	U	D	SD
17. Students can practice a lesson until a goal is met.	SA	A	U	D	SD
18. Software package has effective motivational tools.	SA	A	U	D	SD
19. Software has flexibility to alter the program for individual needs, i.e., alter speeds or defaults.	SA	A	U	D	SD
20. Use of correction key or keys is reinforced.	SA	A	U	D	SD
21. Errors are accounted for in student's work.	SA	A	U	D	SD
22. Directions in manual are easy to follow.	SA	A	U	D	SD
23. Practice exercises emphasize punctuation.	SA	A	U	D	SD
24. Cost of the software is reasonable.	SA	A	U	D	SD

Appendix D

Keyboarding Activities/Resources



Activities

There are many different types of activities that you can incorporate into the teaching of keyboarding. These activities help to review what the students have been taught and to practice the skills in a creative way.

Baseball

This activity is for speed development. The class is divided into two teams and each team selects a name. Students are timed for 1 minute on a selected line or sentence. They are to key the line as many times as they can during the timing. Each line is equal to one base; four bases (lines) equal a run. Scoring: Each team counts the number of lines each team member completes during the timing and records the runs on the board. For example: if a team gets 10 total bases (lines), it scores two runs and has a runner on second for the start of the next inning. The number of innings is based on the amount of time available.

Football

Create a simple illustration of a football field on the board or a piece of poster paper. The class is divided into two groups. Each group keys in a certain line for a 30-second time period. At the end of that time, one person from each team counts the total number of words typed for his/her entire group. The difference in number of words typed between the two groups is the amount of yardage the leading team advances. There are penalties: five-yard penalty for any improper technique, including wrong fingering, looking at the keyboard, or hunting and pecking; ten yards for illegal use of the voice (talking during the game).

Continuous Story

Working in small groups, each student keys in the same beginning sentence at his/her keyboard. For instance, "Once upon a time." Then they continue to create a story for approximately 3–5 minutes. At that time, the teacher says, "switch," and the students go to the next computer and continue the story on that computer. Keep doing this until each student gets through his/her group. Let students know that some stories may be selected to be read out loud.

Simon Says

The teacher acts as Simon calling out things for the students to do. Students should not complete the action unless the teacher first says, Simon says. If students do not follow directions, they must stop. Try the following examples, but remember to add a few non-Simon directions also.

1. Simon says to key Line 1 on page 22.
2. Simon says to return and begin typing on Line 2.
3. Simon says to look at your neighbor while you type.
4. Simon says to sing while you type.
5. Simon says to stand while you type.
6. Simon says to shake your head while you type.
7. Simon says to say the ABCs while you type.

Technique Tag

The purpose of technique tag is to work on proper technique at the keyboard. One person is selected to walk around the room looking for someone with excellent technique. When the person finds someone with great technique, he/she tags or taps that person and the tagged person becomes the new person to search for another person with great technique.

Tortoise and the Hare

The class is divided into two equal teams, the Hares and the Tortoises. The Hares' goal is to type for speed and the Tortoises' goal is to type for accuracy. Scoring goes as follows and can be adjusted to reflect skill levels of individual classes:

Hares

1. 5 yards for 15 wpm gain
2. 3 yards for 12 wpm gain
3. 1 yard for 10 wpm gain

Tortoises

1. 5 yards for no errors
2. 3 yards for 1 error
3. 1 yard for 2 or more errors

The 10 animals who earn the greatest distance are the winners. Switch the students' roles so they work at both, building speed and accuracy.

Poems and Mad Libs

Poems Original/Copy

Discuss various types of poetry. Read examples. Then let students either create their own or copy an example, using their keyboarding skills.

Mad Libs

Give students Mad Libs to copy and fill in. Go over the parts of speech they will need as they type the information in.

Recipes

Each student brings in a copy of a favorite recipe. Create a class cookbook. As an extension, students can switch or add at least one ingredient to the recipe.

Letters

- ▶ Each student types a letter to a distant grandparent, friend, relative, sports figure, heroine, or politician.
- ▶ Each student types a letter to the editor of a school or local newspaper.
- ▶ Each student types a thank you letter to a recent guest or benefactor at his/her school.

Movie, Music, and Art Reviews

Students become professional critics. They type a critique of one or more of the following:

- ▶ a contemporary song
- ▶ a movie they just saw

- ▶ musical pieces played for them by the teacher (Mix it up: classical, hard rock, folk)
- ▶ three art pieces on the wall

The critique should include a short description, an opinion, and a recommendation.

Resources

There are also many keyboarding activities and resources offered electronically. Here are a few sources to aid teachers in teaching keyboarding.

<http://danenet.wicup.org/mmsd-it/Keyboarding/activities.htm> – A lot of ideas for adding variety in instruction

<http://www.ccsdschools.com/schoolpages/mornmid/teacherresources.htm> – Good source with links and a brief description of what each site contains

<http://ci.coe.uni.edu/facstaff/zeitze/web/general/keyboardingresearch.html> – Good resources listed including software

<http://www.mavisbeacon.com/ergolink.htm> – Teacher Lounge listed with activities, handouts, and ordering online

<http://jeffcoweb.jeffco.k12.co.us/isu/itech/keybo/keydx.htm> – Use of White Paper Research model

<http://www.risd.org/schools/rle/keyboard/keybrd.htm> – Lesson plans with links included

<http://www.doe.virginia.gov/VDOE/Instruction/CTE/be> – Keyboarding frameworks, course competencies, and student competency records

<http://CTEresource.org> – Middle school keyboarding resources available through VERSO

Appendix E

PowerPoint Slides

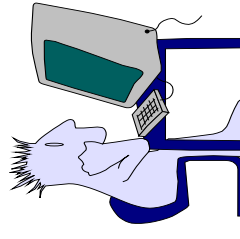


***K–12 Keyboarding: A Model Workshop for
Teaching Keyboarding***

K-12 Keyboarding

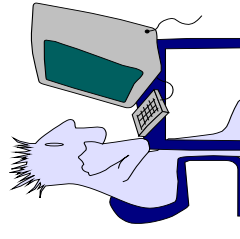
A Model Workshop for Teaching Keyboarding

Virginia Department of Education



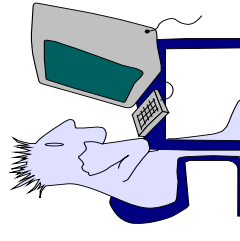
Workshop Goals

- ◆ To enhance keyboarding instructional skills
- ◆ To obtain methods and techniques for teaching keyboarding at the elementary/middle school levels
- ◆ To observe a model keyboarding workshop to develop skills to train other teachers



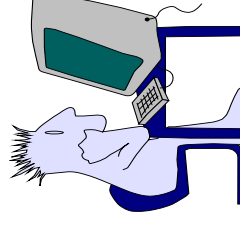
Workshop Agenda

- ◆ Introduction, Workshop Objectives, and Review of Handouts
- ◆ Foundations of Keyboarding Instruction
- ◆ Overview of Keyboarding Software
- ◆ Sample Lessons
 - Demonstration of techniques
 - Modeling of instruction
 - Review Day Model
 - Skill Building
- ◆ Transfer of Learning
- ◆ Closing activities



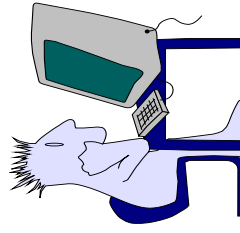
Foundations of Keyboarding Instruction

- ◆ **Appropriate Textbook**
- ◆ **Proven Lesson Structure**
- ◆ **Teacher-Guided Instruction**
- ◆ **Guiding Beliefs**
- ◆ **Follow up**
- ◆ **Software**
- ◆ **Hardware Choices**



Instructional Emphases

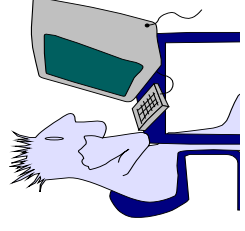
- ◆ Proper Techniques
- ◆ Speed Building
- ◆ Accuracy



Instructional Emphases

Lesson Plans—Days 1–2

- ◆ Position of
 - Body and Hands
 - Feet
 - Elbows
 - Fingers
 - Torso



Correct Position of Body and Hands

Feet, Elbows, Fingers, Torso



Incorrect Position of Body and Hands

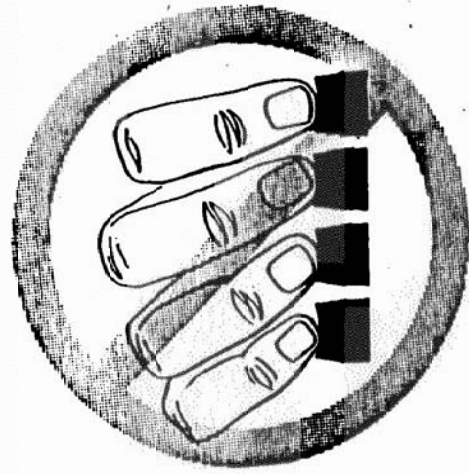
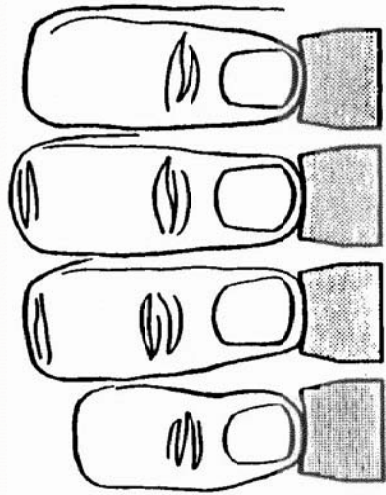
Feet, Elbows, Fingers, Torso

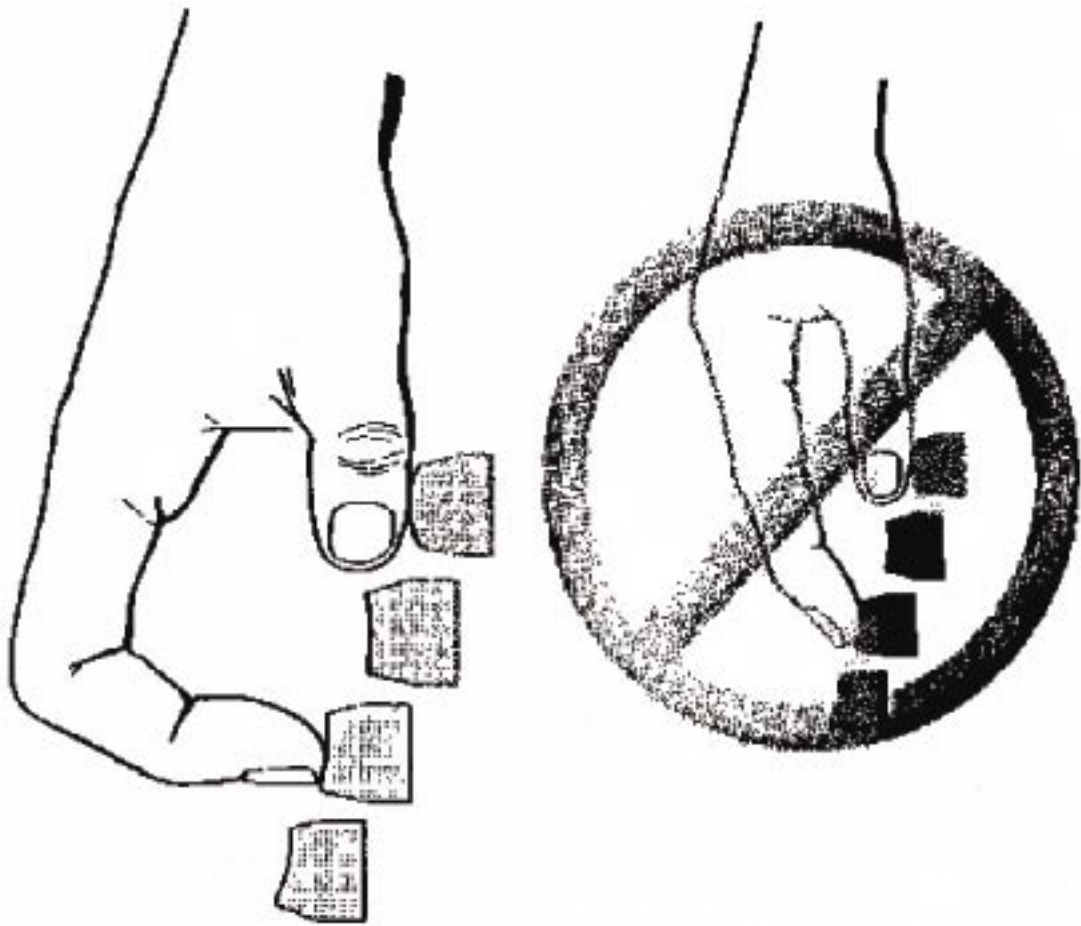


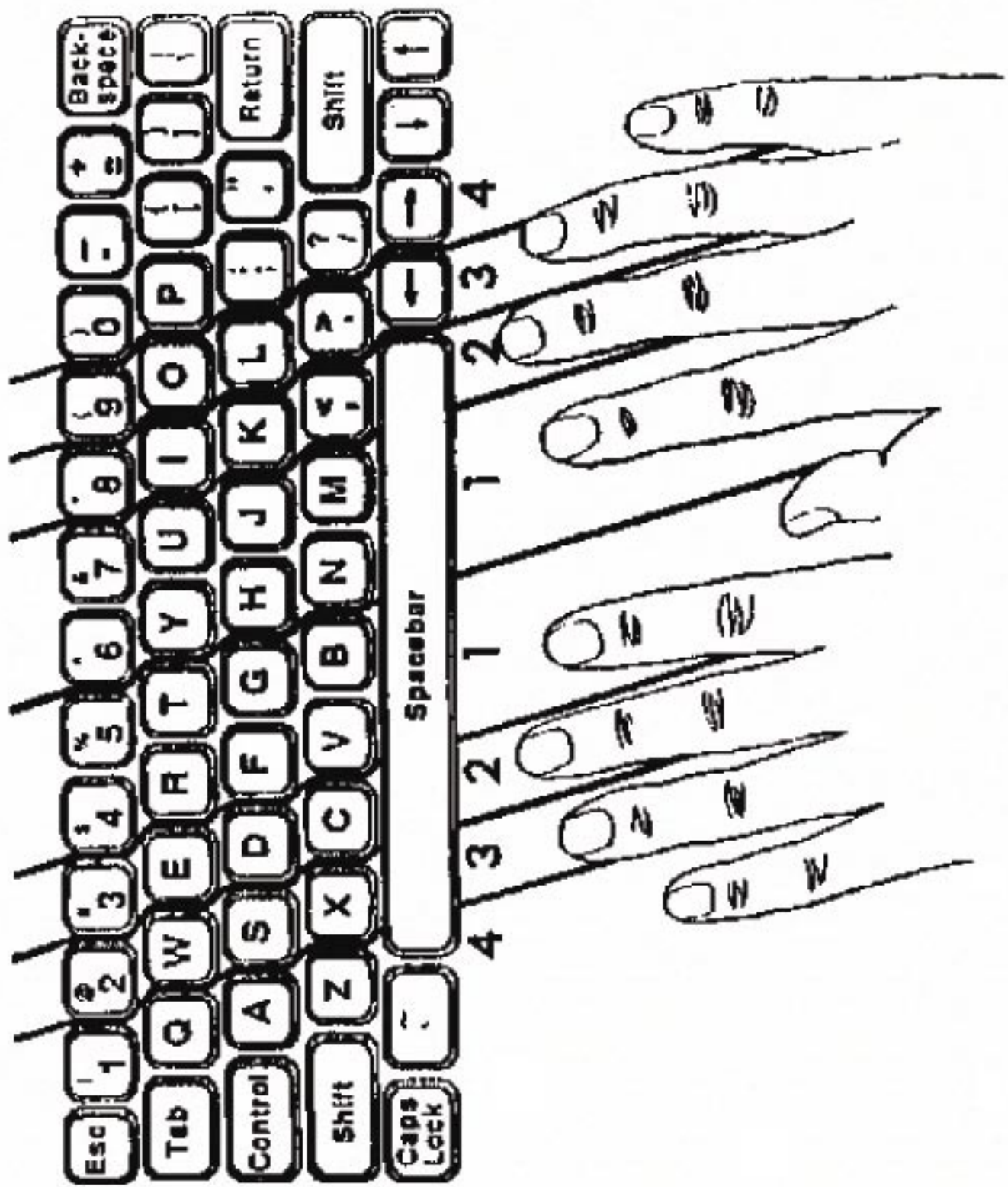
Good Striking Means

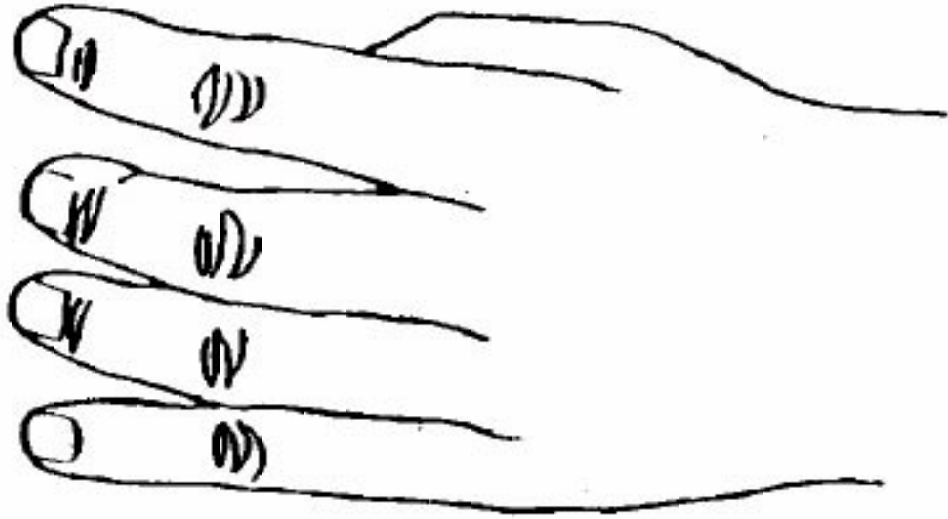
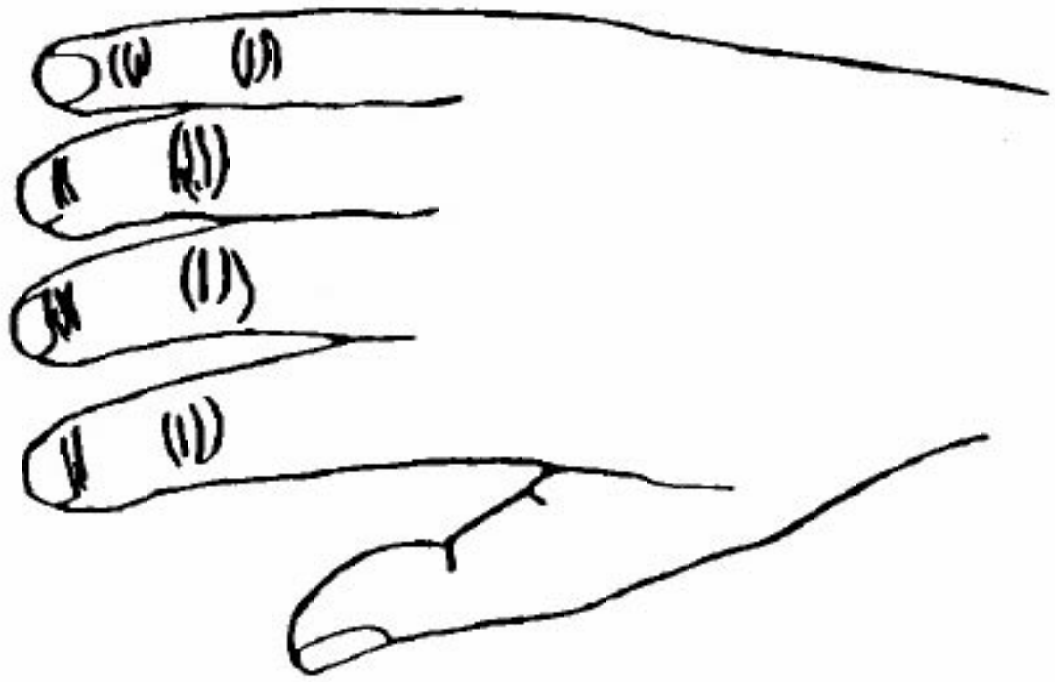
Lesson Plans—Days 1–2

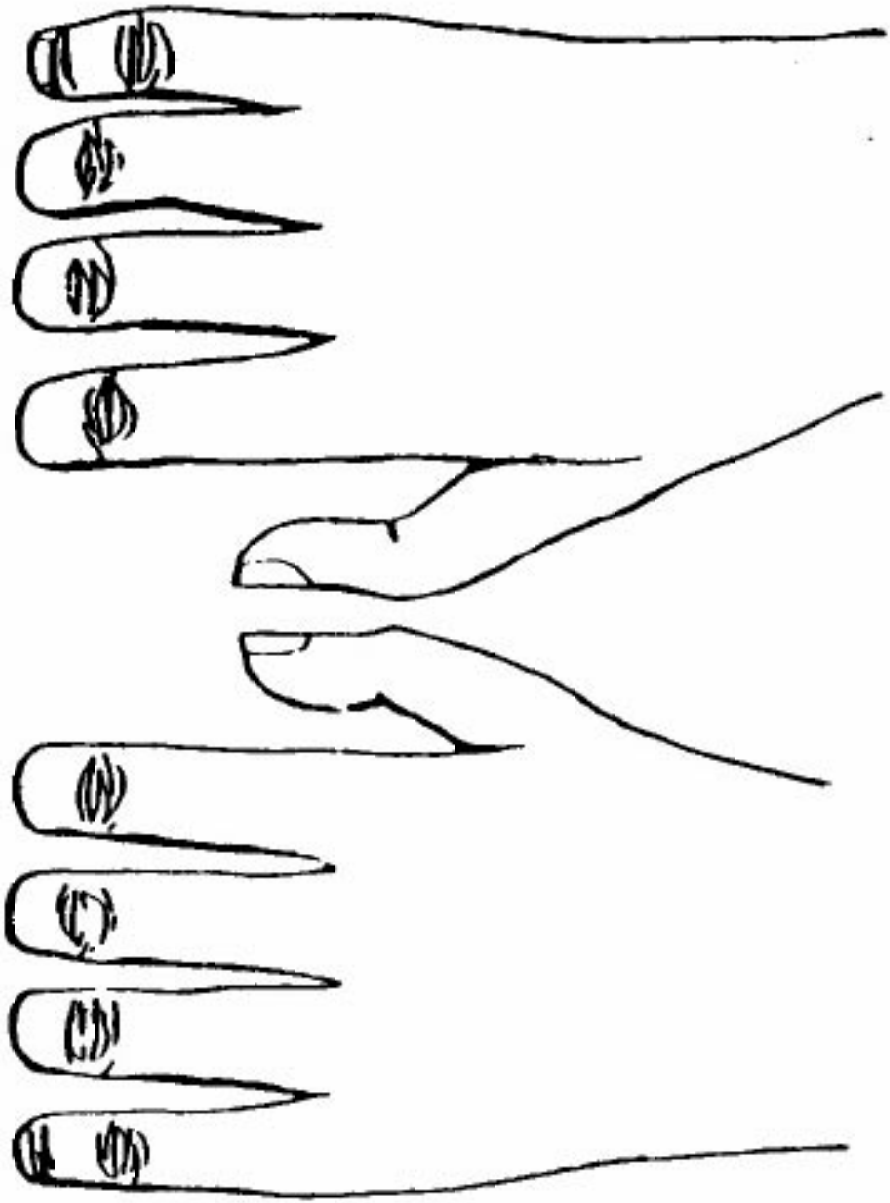
- ◆ Fingers curved over the homerow keys
- ◆ Fingers in upright position
- ◆ Quick, snappy strokes when striking a key
- ◆ Low (even) wrists
- ◆ “Quiet” (almost motionless) hands and arms

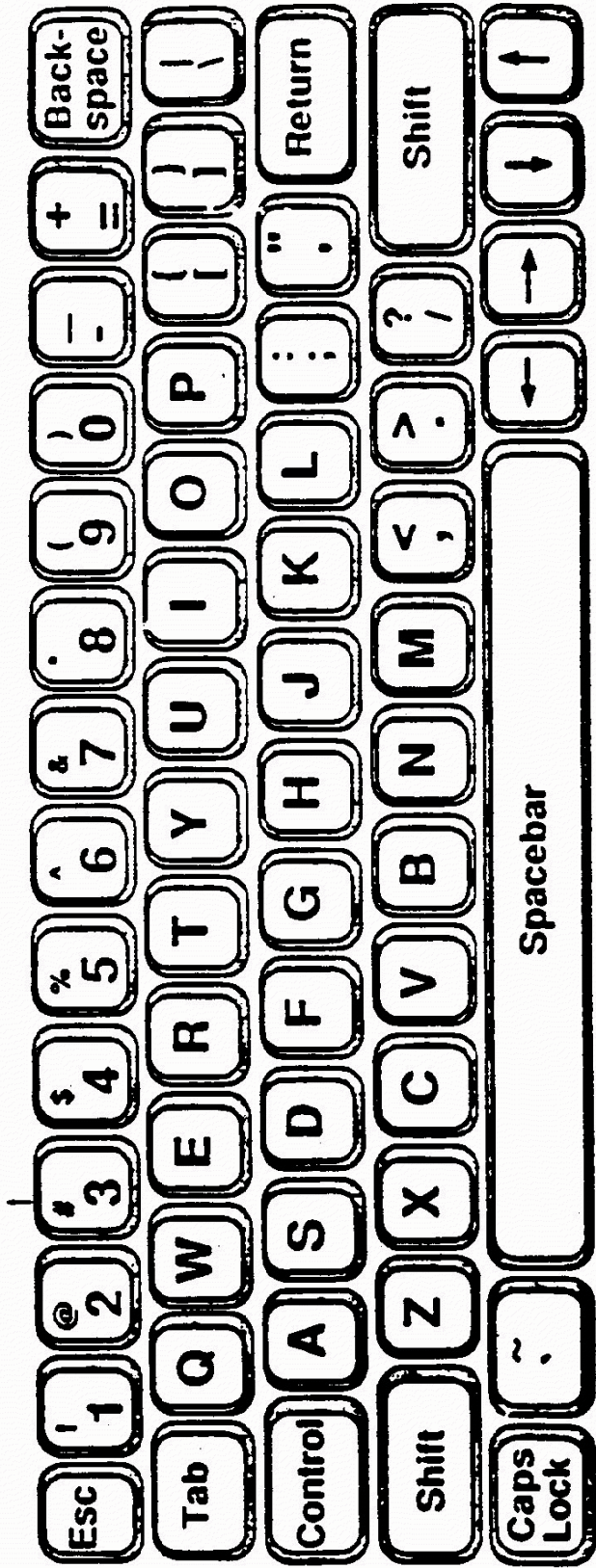






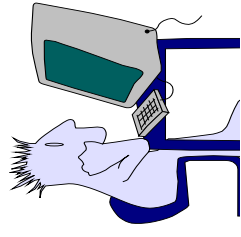






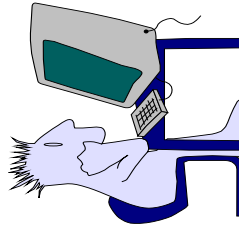
Lesson Plans

- ◆ **Instructional Days 3-20 (approximately)**
 - Page 17 of “Keyboarding and Computer Applications”
 - Drill material, page 18 of “Keyboarding and Computer Applications”



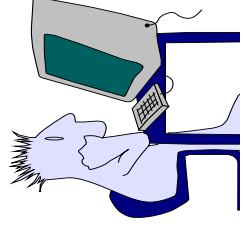
Class Warm Up

- ◆ Page 17 (lines 1-3) of “Keyboarding and Computer Applications”
- ◆ Practice typing lines. Type each line twice, the second time at a faster rate than the first time.
- ◆ If you finish all four sets of lines, start over until time is called.



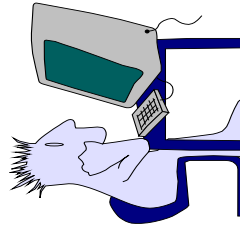
Methods of Instruction

- ◆ Demonstrating (Modeling)
- ◆ Observing, Confirming, and Correcting
- ◆ Pacing and Feedback



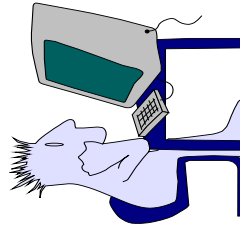
Introducing Letters

- ◆ Students locate the key on their keyboards by looking.
- ◆ Teacher asks them to hold up and point to the finger to be used (age appropriate).
- ◆ Teacher demonstrates the keystroking technique to be used.
- ◆ Teacher dictates the new letter and directs students to strike the key only as it is called.



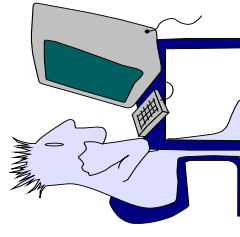
Introducing Letters

- ◆ Teacher dictates the letter, and the students strike the key as they watch the finger make th reach and return to home key position.
- ◆ Teacher dictates the letter again, and students strike the key as they watch the copy to confirm the accuracy of the response.



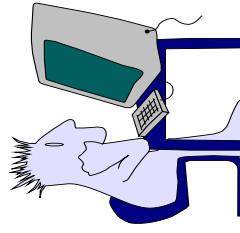
Introducing Letters

- ◆ Teacher directs students to look up toward the front of the room as he or she dictates the letter once more and students strike the key without looking either at their fingers or the machine.
- ◆ Teacher has the students check the copy to confirm the accuracy of the response made without looking.



Introducing Letters

- ◆ Teacher dictates a tryout line as students follow the copy in the textbook and type each letter, combination, or word on cue.



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