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Alphabet Adventures

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Logo LinX

Alphabet Adventures by Judi Harris

Some classroom activities are methodological staples, like the quart of milk, loaf of bread and laundry detergent that my aunt Esther always asked us to bring her when we went to the grocery store. These lesson formats survive, while educational fads come and go, because they are simple, philosophically non-partisan, and intrinsically engaging.

As the November and/or December school holidays approach, perhaps many of you will decide to carry on the pedagogical tradition by giving your students hidden word matrices, lotto games, crossword puzzles, or similar classic learning activities to do. One such popular pursuit is what has been called an *alphabit*; a word from which smaller words can be formed by rearranging component letters.

Perhaps you remember being asked to do this with the words THANKSGIVING or CHRISTMAS when you were a student. The goal is usually to form as many subwords as possible from the letters in the alphabit, making sure that the words constructed do appear in the dictionary. As a teacher, you may now notice that this is an effective way to encourage spelling practice, vocabulary exploration, and collaborative student efforts. Some simple Logo tools may assist this time-tested educational activity, so that your students can concentrate fully upon forming and researching words, instead of dividing their attention between such exploration and the mechanics of playing this sort of educational game.

Choosing Challenges

One easily-amended Logo tool procedure can store alphabits with which to work.

```
TO WORDS
OUTPUT [JURISDICTION QUALIFICATION
        HEMOGLOBIN ENIGMATIC NEVERTHELESS
        SEDENTARY HORSERADISH UNEMPLOYMENT
        SATISFACTION ADVENTURE COMPLEXITY
        DANDELIONS]
END
```

Another tool, used in tandem with WORDS, can direct the computer to choose an alphabit with which to challenge the student. The well-known PICK procedure will do this nicely.

```
TO PICK :OBJECT
OUTPUT ITEM ( 1 + RANDOM COUNT
            :OBJECT ) :OBJECT
END
```

These two tools can be combined in a number of ways, such as

```
PRINT PICK WORDS
```

to which the computer may respond

```
SATISFACTION,
```

```
or
```

```
MAKE "ALPHABIT PICK WORDS
```

if the choice should be retained as the value of the global variable ALPHABIT.

Lexicographic Requests

To facilitate experimentation with the letters of an alphabit, the computer can check to see that subwords that a user forms are indeed only comprised of letters contained in the alphabit itself, and keep a record of all such subwords formed.

The superprocedure BEGIN randomly chooses an alphabit challenge. (Please note that all procedures are written in *LogoWriter 2.0*, but can easily be adapted to function with any full-featured Logo).

```
TO BEGIN
CC
MAKE "ALPHABIT PICK WORDS
MAKE "SUBWORDS [ ]
SOLUTIONS
HT
CT
PRINT SENTENCE [Please spell a word
                using some of the letters in:]
                :ALPHABIT
CD
MAKE.WORDS.FROM :ALPHABIT
COMPARE.WITH.LIST.FOR :ALPHABIT
END
```

The subprocedures MAKE.WORDS.FROM and TEST.LETTERS.IN prompt the alphabetic explorer to form words, automatically checking them against the alphabit's component letters before committing user-generated subwords to a list of successes.

```
TO MAKE.WORDS.FROM :WORD
TYPE [YOUR WORD?]
MAKE "SMALLWORD FIRST READLISTCC
IF :SMALLWORD = "q [STOP]
TEST.LETTERS.IN :SMALLWORD :WORD
MAKE.WORDS.FROM :WORD
END
```

Logo Lix--continued

```

TO TEST.LETTERS.IN :SUBWORD :WORD
IF EMPTY? :SUBWORD [MAKE "SUBWORDS
  SENTENCE :SUBWORDS :SMALLWORD
  STOP]
IFELSE MEMBER? (FIRST :SUBWORD) :WORD
  [MAKE "WORD REMOVE (FIRST :SUB-
  WORD) :WORD] [TRY.AGAIN (FIRST
  :SUBWORD ) STOP]
TEST.LETTERS.IN (BUTFIRST :SUBWORD)
:WORD
END

```

The Letter of the Lexicographic Law

As you can see, both of these procedures are written using tail-recursive structures, one nested within the other. MAKE.WORDS.FROM prompts the user repeatedly for subwords; TEST.LETTERS.IN checks their entries against the letters from the original alphabit. Allison Birch's REMOVE tool is especially helpful in this application for making sure that students use only the letters contained in the alphabit.

```

TO REMOVE :ITEM :OBJECT
IF EMPTY? :OBJECT [OUTPUT :OBJECT]
IF :ITEM = (FIRST :OBJECT ) [OUTPUT
  BUTFIRST :OBJECT]
IF LIST? :OBJECT [OUTPUT FPUT (FIRST
  :OBJECT ) REMOVE :ITEM BUTFIRST
  :OBJECT]
OUTPUT WORD (FIRST :OBJECT ) REMOVE
  :ITEM BUTFIRST :OBJECT
END

```

If an error of this type is made, TRY.AGAIN gives the user specific feedback on the nature of his/her lexicographic transgression.

```

TO TRY.AGAIN :LETTER
PRINT (SENTENCE [Sorry! There aren't
  enough] WORD :LETTER "'s [in]
  :ALPHABIT [to spell] :SMALLWORD )
CD
END

```

Monitored Musing

Once the user decides that they would like to stop entering subwords, they can type 'q', which is recognized in MAKE.WORDS.FROM as the cue to return to the last line of BEGIN, and execute COMPARE.WITH.LIST.FOR :WORD, which provides feedback on how many subwords were correctly formed during the session.

```

TO COMPARE.WITH.LIST.FOR :WORD
CT
PRINT (SENTENCE [You have formed]
  COUNT :SUBWORDS [words from] WORD
  :ALPHABIT ". )
CD
PRINT (SENTENCE [There are] THING
  :ALPHABIT [words with four or more
  letters that can be made from the
  word] WORD :ALPHABIT ". )
CD
PRINT SENTENCE [To see a list of
  these subwords, type CT LOADTEXT]
WORD "" :ALPHABIT
CD
PRINT [To see a list of your words,
  type CT PRINT WORD :SUBWORDS]
END

```

The words themselves can act as global variable names, each storing the current number of component words that have been correctly formed from alphabit letters. In this case, these values are assigned in a SOLUTIONS procedure (called in BEGIN), and refer only to subwords of four or more letters.

```

TO SOLUTIONS
MAKE "JURISDICTION 78
MAKE "QUALIFICATION 81
MAKE "HEMOGLOBIN 60
MAKE "ENIGMATIC 48
MAKE "NEVERTHELESS 73
MAKE "SEDENTARY 80
MAKE "HORSERADISH 79
MAKE "UNEMPLOYMENT 79
MAKE "SATISFACTION 57
MAKE "ADVENTURE 76
MAKE "COMPLEXITY 61
MAKE "DANDELIONS 79
END

```

The number of user-generated subwords can therefore be compared with current across-user totals. If the student would like to see a list of their words, or a screen of possible subwords, they can access these by following on-screen directions printed with lines 7 and 9 of COMPARE.WITH.LIST.FOR :WORD. To conserve memory space and expedite tool execution time, lists of possible subwords are stored in separate text files formed with a word processor and accessed with the LOADTEXT command.

Alphabits in Action

It is a testament to the power of a good idea and the versatility of Logo text primitives that rich spelling and vocabulary exploration such as this can be structured and supported with just 9 tool procedures. The explorative environment that they can create for users is reflected in the following sample session.

-----ALPHABITS-----

Please spell a word using some of the letters in: QUALIFICATION

Type BEGIN to start game; Q to quit.

YOUR WORD? aqua
YOUR WORD? coin
YOUR WORD? facial
YOUR WORD? flaunt
YOUR WORD? tail
YOUR WORD? uncoil

-----ALPHABITS-----

Please spell a word using some of the letters in: QUALIFICATION

Sorry! There aren't enough l's in QUALIFICATION to spell quill

Type BEGIN to start game; Q to quit.

YOUR WORD? quill
YOUR WORD? q

-----ALPHABITS-----

You have formed 3 words from QUALIFICATION.

There are 81 words with four or more letters that can be made from the word QUALIFICATION.

To see a list of these subwords, type CT LOADTEXT "QUALIFICATION

To see a list of your words, type CT PRINT :SUBWORDS

CT

LOADTEXT "QUALIFICATION

-----ALPHABITS-----

QUALIFICATION

acquaint	coil	finical	natal
acquit	coin	flat	nautical
alit	cola	flaunt	quail
aloft	colt	flint	quaint
anal	count	flit	quilt
anil	cult	foal	quint
antic	facial	font	quintal
aqua	fact	foul	quit
atonal	faction	fount	quoit
aunt	factional	incult	quota
caftan	factual	into	tail
canal	fail	laic	talc
cant	fain	licit	talon
cation	faint	lift	toil
clia	fatal	lint	tonal
clan	fault	lion	tonic
clout	fiat	loci	tuna
coal	fiction	loft	tunic
coat	fictional	loin	uncial
coati	finial	nail	uncoil
unfatal			

The 12 text files and tool procedures that were used to develop this language arts Logo application can be obtained in diskette form from the author. If this is your preference, please send her a self-addressed, sufficiently stamped diskette mailer with a 5.25" diskette inside.

References

- Birch, A. (1986). *The Logo project book: Exploring words and lists*. Cambridge, MA: Terrapin, Inc.
Manchester, R. B. (1978). *The 2nd mammoth book of word games*. New York: Hart Publishing Company.

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