Alphametics
by Jon Hess

I started the presentation out by introducing alphametics to the audience. I then proceeded to show the following slides and explain a little about each one.

For this slide, I basically read the slide and explained the rules for the use of alphametics.

What is Alphametics?

- Letters replace individual digits in numbers
- One letter for each digit
- There is only one combination of letters that can work
- The letters used form logical phrases

Next, I explained why alphametics should be utilized in the classroom. I also quoted the NCTM standards in that, "problem solving play(s) an essential role in students' learning of mathematical content and in helping students make connections across mathematical content areas. Much of school mathematics can be seen as the codification of answers to sets of interesting problems."

Why use Alphametics?

•Alphametics encourages students to use logic and reasoning to deduce a final solution.
•Alphametics encourages students to discuss and defend their own strategies and ideas for formulating answers to the problems.
•Alphametics also challenges students, no matter what level they are at.

I next gave reasons why alphametics can be beneficial so teachers can combine the fun of alphametics with the formal reasons why alphametics should be used.

How is Alphametics Beneficial?

ØSomething different
ØSomething challenging
ØStudents must use concepts and show higher understanding and abilities of logic and reasoning
ØAlphametics can be fun. Some phrases are fun to play with. Ex.

```
  SEND
+ MORE
 MONEY
```

I then took them through an example and showed them how to work the problem out the way I would expect students would be able to.

Example

```
    DOS
    DOS
+  TRES
  SIETE
```

how should students
figure this out?

S=1 because there is no number in the ten thousands column

```
    DO1
    DO1
+  TRE1
  1IETE
```

E=3 because 1+1+1=3

```
    DO1
    DO1
+  TR31
  1I3T3
```

T=8 or 9 because whatever is carried over from D+D+R (1 or 2) plus T must equal 10 or 11. Therefore, I=1 or 0, and since S=1, I=0.

```
    DO1
    DO1
+  TR31
  103T3
```

T=8 or 9, by elimination, O=8, which implies T=9

O cannot = 0,1,3

O=?	2	4	5	6	7	**8**	9
T=?	7	1	3	5	7	**9**	1

D81
D81
+ 9R31
10393

D+D+R+1=13, so 2D+R=12

Available #'s…
2,4,5,6,7

D=?	2	4	**5**	6	7
R=?	8	4	**2**	0	-2

581
581
+ 9231
10393

So therefore, D=5, O=8, S=1, T=9, R=2, E=3, I=0

After the example, I gave the audience suggestions of how to make alphametics a little easier for their students in case problems should arise.

- Use Alphametics with higher track students
- Create "stuck" suggestions.

Ex. DOS
DOS
+ TRES
SIETE

You can tell them the order to find the numbers. Find S, E, I, T and O, D and then R

- Use Alphametics as a weekly problem or extra credit after a test or quiz.

Finally, I summarized the presentation and gave the audience a few websites where alphametics is available.

- Alphametics is a fun and different way to challenge students and keep them amused.
- Students must tap on their reasoning skills and be able to own mastership of reasoning concepts in order to complete the puzzle.
- You can find many Alphametics at
  http://www.cut-the-knot.com/cryptarithms/st_crypto.html
  http://users.aol.com/s6sj7gt/mikealp.htm