SYMBOLS OF THE ELEMENTS
A MIND-READING GAME

O	P	He	Si
Al	Si	P	N
Na	Ne	Na	Ne
Mg	F	Li	C
Be	N	H	Li
C	P	B	Al
Mg	Al	P	F
Si	B	Na	N

This is a mind-reading game which can be used to stimulate the students' interest when introducing the symbols and atomic numbers of the elements. Construct giant cards out of poster board and print the symbols for the elements on them according to there above grouping. Hold up a card and call on a student to choose an element from it (without communicating it to anyone). Then display the remaining cards, one at a time, and ask the student if the element in mind is found on the card. From the responses, you can "read the mind" of the student and correctly identify the element. The secret lies in adding together the atomic numbers of the elements in the upper left hand corner of the cards on which the chosen element it found. Your ability to read your student's mind will astound him/her.

For example: The cards are displayed in the order shown above. The student chooses Si in the first card. S/he says "yes," when shown the second card and the third, but "no" when shown the fourth. So mentally, add 8 (At. no. of oxygen) + 2 (At. no. of helium) + 4 (At. no. of beryllium) = 14 (At. no. of silicon). The element is silicon.

A variation of this mind-reading trick is to do it by "remote (mind) control." The student can be in another room or in the hallway, with a copy of the handout of the four cards. Label the cards, I, II, III, IV. Or the cards may be of different colors. S/he may start with any of the cards as long as s/he tells you which card it is.

THE MIND-READING TECHNIQUE EXPLAINED

The "mind-reading" technique involves mentally adding the atomic numbers of elements in the upper left corner of each card that contains the element. There are four such elements: H=1, He=2, Be=4, O=8. If the element does not appear on a card, a zero is added. Any combination of these numbers will result in a sum of from 1 to 15. The resultant sum is the atomic number for the element picked. For example, if the element selected mentally was in the set with oxygen (O) in the corner, we mentally add 8. If the element is not in any of the other two cards, but is found in the card with

helium (He) in the corner, we add 8+0+0+2 to get a sum of 10. The element that was picked was Neon.

If desired, the interdisciplinary nature of this mind-reading game can be explored. The arrangement of the symbols on the cards is based on the binary system of numeration. In the binary system, the decimal numbers from 1 to 15 are expressed as sets of 0's and 1's.

1=0	0	0	1	H	-Hydrogen
2=0	0	1	0	He	-Helium
3=0	0	1	1	Li	-Lithium
4=0	1	0	0	Be	-Beryllium
5=0	1	0	1	B	-Boron
6=0	1	1	0	C	-Carbon
7=0	1	1	1	N	-Nitrogen
8=1	0	0	0	O	-Oxygen
9=1	0	0	1	F	-Fluorine
10=1	0	1	0	Ne	-Neon
11=1	0	1	1	Na	-Sodium
12=1	1	0	0	Mg	-Magnesium
13=1	1	0	1	Al	-Aluminum
14=1	1	1	0	Si	-Silicon
15=1	1	1	1	P	-Phosphorus

The vertical columns from right to left represent the powers of two. 2^0, 2^1, 2^2, 2^3. Each card will include the eight elements in the column that shows a "1." For example, Card 1 contains the elements with atomic numbers 8 through 15, randomly arranged except for oxygen (8 or 2^3) which has to be at the upper left corner. Card 2 contains the elements with atomic number 4, 5, 6, 7, 12, 13, 14, 15, with beryllium (4 or 2^3) at the upper left corner. Card 3 contains the elements with atomic numbers 2, 3, 6, 7, 10, 11, 14, 15, with helium (2 or 2^1) at the designated spot, and Card 4 contains the elements with atomic numbers 1, 3, 5, 7, 9, 11, 13, 15, with hydrogen (1 or 2^0) at the upper left corner.

If the students have memorized the symbols of the first 31 elements in the periodic table, the game could be upgraded to 5 cards with sixteen elements on each card following the system shown above. Sulfur (S) would then be the key element in the 5th card.