# **Sorting Magic Squares**

with a 4 by 4 Magic Square

A student is given the magic square below. They verify it is a magic square and the magic total is 34. You write 68 on a piece of paper and turn it over on the desk. They are asked to fold the paper forwards or backwards along any horizontal or vertical line. They are then asked to keep doing this until they have the folded the packet into a single square packet. This will take from 4 to 6 folds. You take the packet and cut along the 4 outside edges so that all the squares are separate. Deal out the 16 single squares into two piles. The student's pile will have the numbers facing **down.** Your pile will have their numbers facing up. The student is asked to add the numbers in their pile which you cannot see. When they have the sum you open a paper on the desk and it predicts the total of their squares. It also predicts the total for your squares.

<u>16</u>	3	2	13
5	10	11	8
<u>9</u>	<u>6</u>	7	12
4	15	14	1

### Answer: The total of the face up numbers is 68. The sum of the face down numbers is 68

The total of the face up numbers divided by 2 is the magic sum.

### **Sorting Squares 3**

#### Preparation

Print out the square. Do not use heavy paper or card stock. Cut out the large square. You will need a good scissors to cut the final packet. You may have the student fold along all the vertical and horizontal lines before you start the trick. That makes the packet come out more square. Write the number 68 on a piece of paper and place it folded in half on the desk.

## Presentation

A student is given the large square below. They are asked to fold the paper forwards or backwards along any horizontal or vertical line. They are then asked to keep doing this until they have the folded the packet into a single square. This will take from 4 to 6 folds.

You take the packet and cut along the 4 outside edges so that all the squares are separate. Be sure to cut far enough inside the edges to ensure the small squares are separate. There is space along the edges so that you can cut off the edges and still have the numbers show.

You now start dealing the 16 single squares into two piles on the desk. The student's pile will have the numbers facing **down**. Your pile will have their numbers facing up. The student is asked to add the numbers in their pile, which you cannot see. When they have the sum you open a paper on the desk and it predicts the total. The students squares will total 68.

**Note:** Do not tell them in advance what you are going to do. When they total the numbers on the their squares have then open the paper and see your prediction was correct.

Why does this work.

face	face	face	face
up	down	up	down
face	face	face	face
down	up	down	up
face	face	face	face
up	down	up	down

The trick Sorting Squares 1 proved that after folding and dealing the squares as described above the squares in **white will face in one direction** and the the squares in **yellow will face in the other direction**.

> You can know in advance that one set of squares will face up and one set of squares will face down but you can't know which is which

#### 16 3 2 13 5 10 11 8 9 6 7 12 4 15 14 1

**Sorting Magic Squares** 

Sorting Squares with a magic square shown puts the numbers the in the yellow squares in one pile and numbers the in the whits squares in another pile. The total of each pile is 68.