



Teacher Notes for Flipper

Compatibility: TI-83+/83+SE/84+/84+SE

Run The Program Called: **FLIPPER**

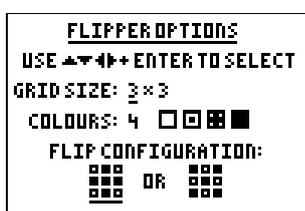
► Summary

This program, based upon the program “Fiver” by Mazeworks, provides a logical challenge when turning over counters arranged in a grid.

The objective is to turn all the white counters in a rectangular grid over to give black counters.

► Features

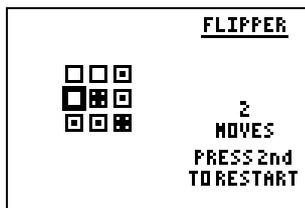
There are a variety of options available on the second screen - use the **ARROW** keys and **ENTER** to alter and select.



The grid size has a minimum of 3x3 and a maximum of 7x7, with all rectangular arrangements possible.

The user can choose the counters to show from 2 to 4 “colours”. With 2 colours, they flip from white to black and back again. With 3 or 4 colours, the counters cycle through the displayed shadings in turn, going at the end from black back to white.

The flip configuration always affects 5 counters, either in a **+** or **x** configuration.



On the game screen the user controls the highlighted square (centre-left in screen shot on left) using the **ARROW** keys, pressing **ENTER** to flip the counters in the chosen configuration.

With each flip, the number of moves counter increases by one.

► Suggestions

- An initial challenge for students is to solve a 4x4 grid with 2 colours and with a **+** flip configuration. This can be done in 4 moves - but don't tell them this from the outset, merely encourage them to do it in as few moves as possible.
- This approach of seeking to solve the problems in the fewest number of moves is the most profitable use of the program, as it embeds the notion of any old answer is not as good as the best answer.
- It is worth noting that some configurations of grid size, numbers of colours and flip configurations are impossible to solve. The next challenge can be for students to find such a configuration and (much more difficult) prove that it cannot be done. This introduces the notion of the parity of the start and end grid and whether their parity is indeed the same.
- It is recommended that the teacher coordinate the class direction using this program, by restricting their choice of grids to, say, 3 by n grids. They should keep the number of colours and type of flip configuration constant throughout this process. This helps students appreciate the idea of “change one variable at a time” when investigating new concepts.