Topsy-Turvy Triangles

Arrange 10 pennies on your desk as shown in the diagram below. The challenge in this puzzle is to change the direction of that the triangle is pointing by moving only **three** pennies.

Once you get a solution draw it below, showing which three pennies you moved and where you moved them to.

**My Solution:**

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**Extra Challenge:** Add one more row of pennies to the triangle above (15 pennies total) and determine the minimum number of pennies you have to move in order to change the direction it is facing.
Place ten pennies in two rows of five as shown below. Now, rearrange the pennies to make five rows, each with four pennies. While this might not seem possible, there are several solutions. Sketch your solutions below.

Before introducing this puzzle to your students, you might want them to do a related Puzzle Corner activity, Are All Sides Equal?
Using the sides of this paper, place ten pennies (or other small objects) so that there are an equal number along each side. Sketch your solution(s) below. Now, do the same with nine pennies, and then with eleven. Sketch your solutions below.

Look at the above solutions. What do you notice? What did you learn when doing this activity?
Place 16 pennies (or some other small objects) in the circles below. Remove six pennies to leave an even number of pennies in each row and column. There are multiple solutions — try to find as many as you can.

Record each of your solutions in the spaces below by coloring in the ten circles showing where the pennies remain in your solution.
Place nine pennies in the above figure leaving space six empty. Jump coins as you would in checkers (over one coin into an empty space directly beyond), removing the coin jumped. Can you continue to jump and remove coins until you end up with only one coin on the board? The spaces are numbered so that you can record your solutions.

**Extension:** Leave a different space blank and try and end up with just one coin. Is it possible to solve this puzzle by leaving a different space empty each time? Explain your answer.
To do these puzzles you will need four small objects. Place the first object at any point of the star. Slide the object along one of the lines to an opposite point and leave it there. Repeat this process with the next three objects, one at a time. When you have successfully placed all four objects, make a record of your solution. For example, if your first move starts at point 3 and slides to point 1, record that move as 3-1. The first star should be easy, but the second may prove more difficult. Be persistent! Try to find more than one solution for each star. Can you see any patterns in your solutions?
The challenge in this puzzle is to arrange seven pennies so that they form five straight lines of three pennies each. When you have solved the puzzle, record your solution in the space below.
A sequence is an ordered list of related items. Two common sequences are the letters of the alphabet and the odd numbers. Some sequences are finite and have only a certain number of items, while others are infinite and go on forever. Which of the just mentioned sequences is finite and which is infinite?

Each of the following lists of letters represents a common sequence. Only the first letter of each item in the sequence is given. For each sequence, determine what the letters represent and fill in the missing letters. Then, write out the first few items in each sequence in the space provided. Note that the finite sequences end with a period will the infinite sequences end with an ellipsis (...).

1. S, M, T, W, T, _________, __________…

2. O, T, T, F, F, S, S, __________, __________, __________...


5. F, S, T, F, F, S, S, __________, __________, __________...

6. Make up your own sequence puzzle and write it below.
Place the appropriate coins on top of their pictures in the grid below. The object of the game is to switch the positions of the nickel and the dime. A coin can move by sliding into an empty space that is to the left, right, above or below. Coins cannot move diagonally. Try to switch the coins in the fewest number of moves possible. Once you get a solution, see if you can get another that uses fewer moves. Continue to improve upon each solution until you cannot solve the puzzle in any fewer moves.

My original solution took me ____________ moves.
My best solution took me ___________ moves.
I improved by ____________ moves.
Begin by placing a penny at any of the numbered points on the star. Move that penny two points along a straight line to another empty point. For example, you could begin by placing a penny at 9 and moving it to either 7 or 3. Repeat this process until you can't get any more pennies on the star. Pennies may jump over the other pennies, if necessary, as long as they begin and end on an empty point. The ultimate challenge is to get nine pennies on the star, but if you can get seven or eight, you've done pretty well. Try to get as many different solutions as possible. Record each solution that gets at least seven pennies on the star.