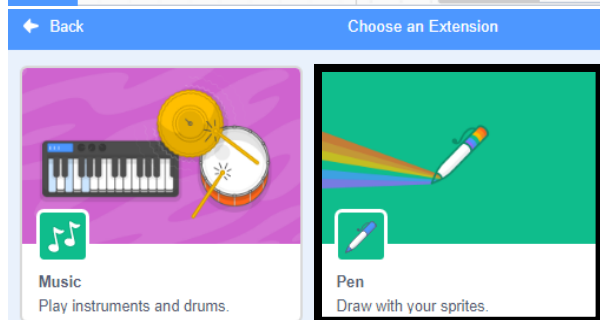
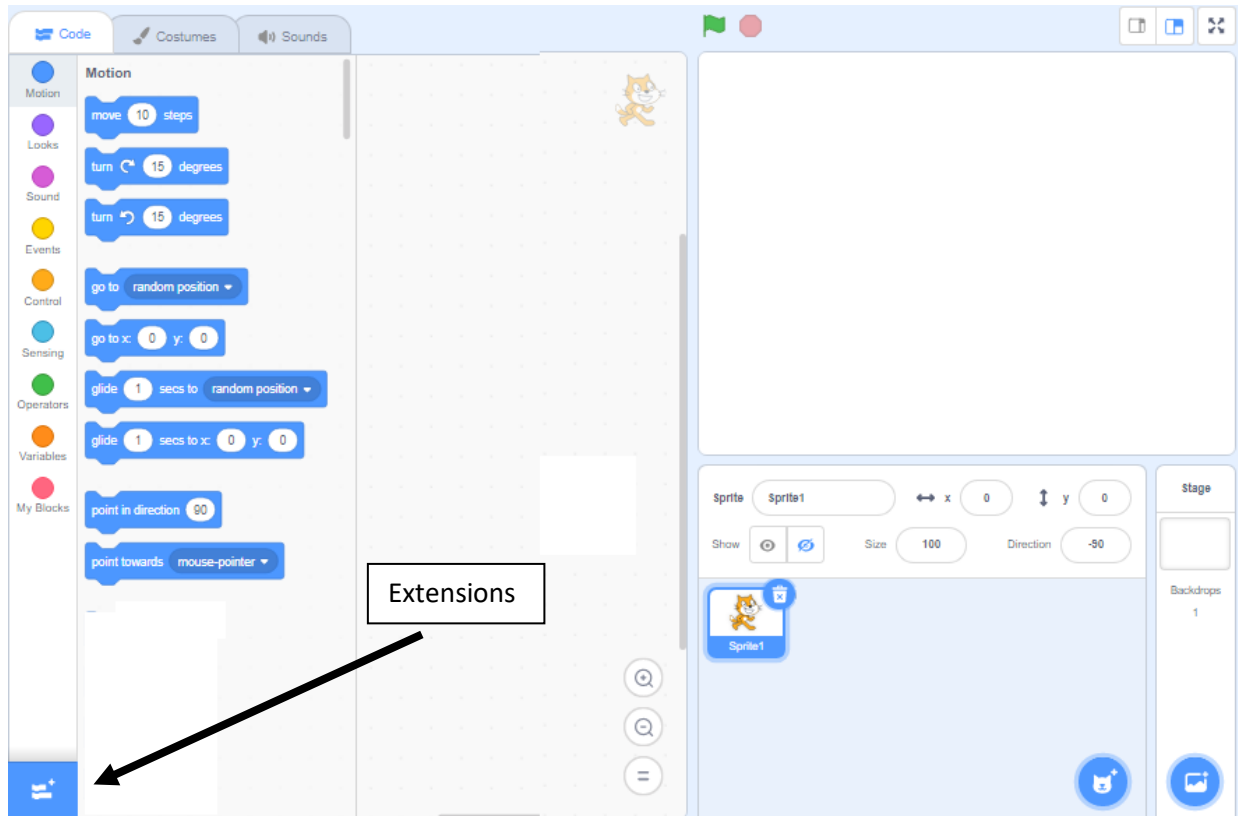


## Coding Using Scratch – Geometric Designs – Triangles

1) In this lesson you will use the basic Motion blocks, Pen blocks, and some Control blocks to create a series of triangles which will create geometric designs.

A) Go to the Extensions and click to add the Pen blocks menu.



Resize your sprite to about the size of a nickel.

Click the Events blocks menu. Add Event when green flag clicked.

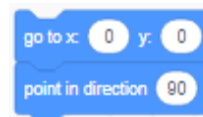


B) Add the following start up blocks. [Start up blocks get the program ready so that the action blocks can do what they need to do.]

Click the Motion blocks menu.

Add Motion go to x: 0 y: 0.

Add Motion point in direction 90 (right).



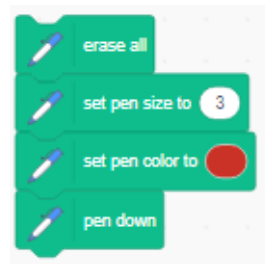
Click the Pen blocks menu.

Add Pen erase all block.

Add Pen block set pen size to 3.

Add Pen block set pen color. [You choose the colour.]

Add Pen block pen down.



C) Add the following action blocks.

Click the Control blocks menu.

Add Control block repeat 10. [This will be an outer loop.]

Inside the repeat 10 block

add Control block repeat 3. [This will form an inner loop.]

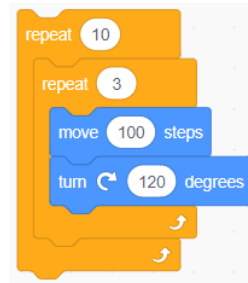
Click the Motion blocks menu.

Add Motion move 100 steps within the repeat 3 block.

Add Motion turn 120 degrees within the repeat 3 block.

[This is the last block of the inner loop.]

[All coding blocks that follow will be below the repeat 3 block.]



Click the Motion blocks menu.

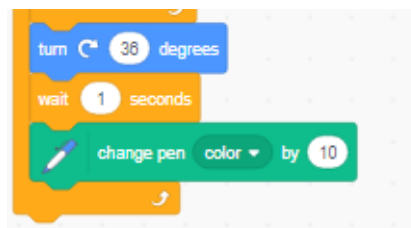
Add Motion turn 36 degrees.

Click the Control blocks menu.

Add Control wait 1 seconds.

Click the Pen blocks menu.

Add Pen block change pen color by 10.

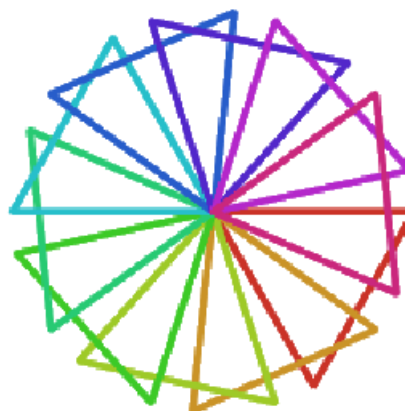


D) This is what your program should look like.



Click the green flag to test your program.

Show Mr. Desmond what you have done.

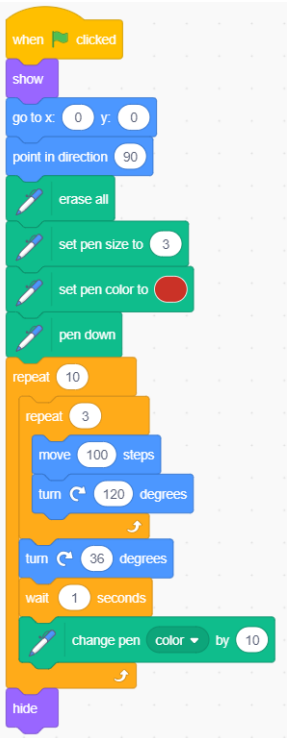


2) Try the following changes to see how they affect the program.

A) Click the Looks blocks menu.

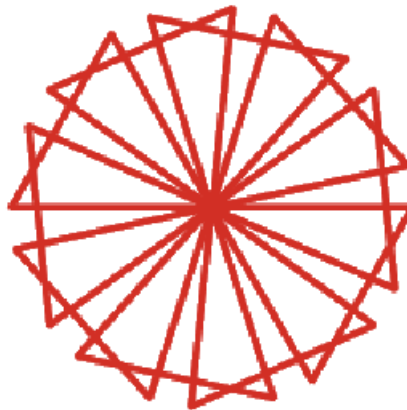
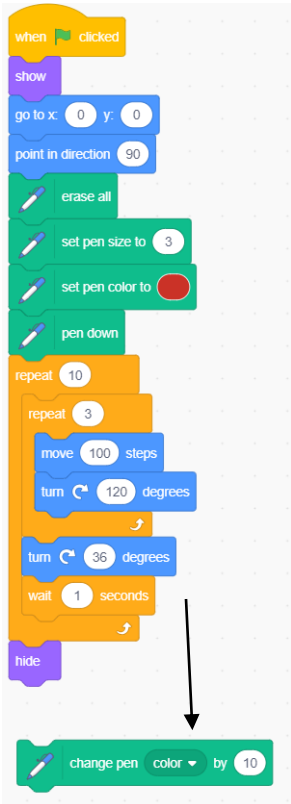
Add Looks block show at the beginning of the program (below the Event block).

Add Looks block hide at the end of the program (below the Control block repeat 10).



Test your program again.

B) Remove the Pen block change pen color by 10 from the outer loop.



Test your program again.

C) Remove the Control block wait 1 second from the outer loop.



Test your program again.

Moving forward you can decide whether or not to use these changes as part of your code for your geometric designs.

3) Notice that multiplying the outer loop repeat and loop turn equals 360.

*repeat 10 and turn 36 degrees*  $\Rightarrow 10 \times 36 = 360$

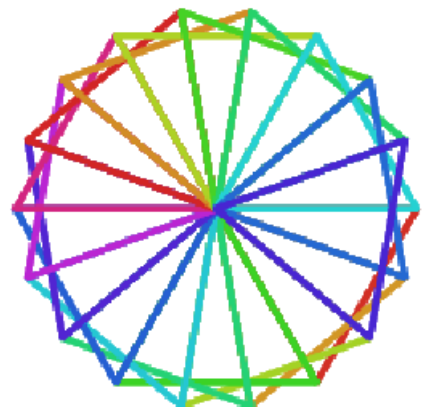
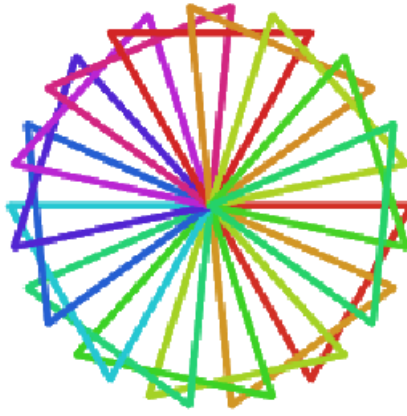
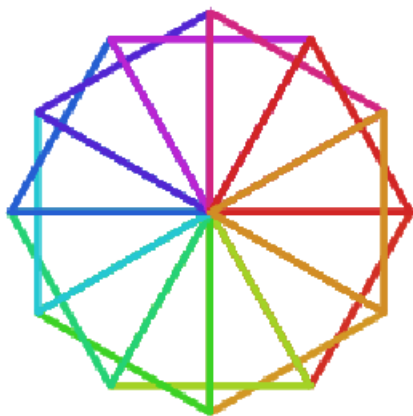
A) Why do we want this to equal 360?

B) Multiplying to get 360 is almost exactly the same as multiplying to get 36.

What are some numbers that when multiplied equal 36?

C) Experiment with different outer loop repeat and turn values that equal 360.

Show Mr. Desmond three different equilateral triangle based geometric designs.

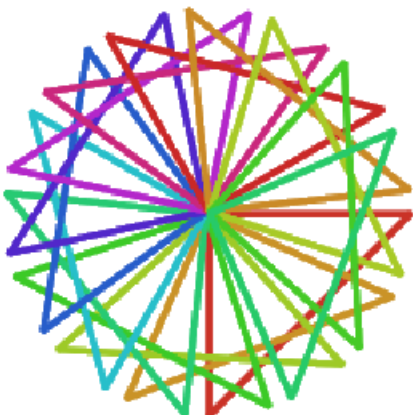


- 4) In this lesson you will use an isosceles triangle to create geometric patterns and designs.
- A) Use the same blocks as you used above to create your equilateral triangle designs, but change the inner loop to repeat 1 and create an isosceles triangle instead of an equilateral triangle.
  - B) Change the outer loop to repeat 12 and turn 30 degrees.
  - C) Click the green flag to test your program.
- Show Mr. Desmond what you have done.



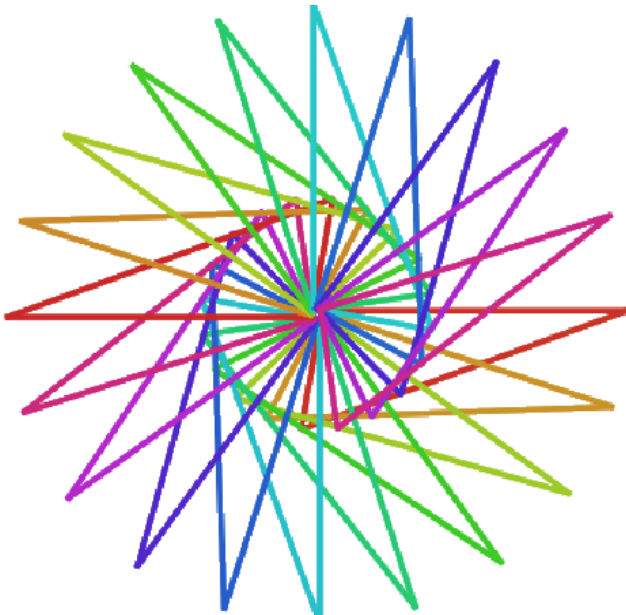
- D) Notice that multiplying the outer loop repeat and loop values equals 360. Experiment with different outer loop repeat and turn values that equal 360. Try five different isosceles triangle based geometric designs.
- E) Show Mr. Desmond your three favourite isosceles triangle based geometric designs.

- 5) In this lesson you will use right angle triangles to create geometric patterns and designs.
- A) Use the same blocks as you used above to create your equilateral triangle designs, but change the inner loop to repeat 1 and create a right angle triangle instead of an equilateral triangle.
  - B) Change the outer loop to repeat 15 and turn 24 degrees.
  - C) Click the green flag to test your program.
- Show Mr. Desmond what you have done.



D) Notice that multiplying the outer loop repeat and loop values equals 360.  
Experiment with different outer loop repeat and turn values that equal 360.  
Try five different right angle triangle based geometric designs.  
E) Show Mr. Desmond your three favourite right angle triangle based geometric designs.

- 6) In this lesson you will use obtuse angle triangles to create geometric patterns and designs.
- A) Use the same blocks as you used above to create your equilateral triangle designs, but change the inner loop to repeat 1 and create an obtuse triangle instead of an equilateral triangle.
  - B) Change the outer loop to repeat 20 and turn 18 degrees.
- Choose whether to use a set pen color block or continue to use the change pen color block.
- C) Click the green flag to test your program.
- Show Mr. Desmond what you have done.



D) Notice that multiplying the outer loop repeat and loop values equals 360.  
Experiment with different outer loop repeat and turn values that equal 360.  
Try five different obtuse triangle based geometric designs.  
E) Show Mr. Desmond your three favourite obtuse triangle based geometric designs.