Polygon Fireworks Night Skyline

ACTIVITY 5.1.1

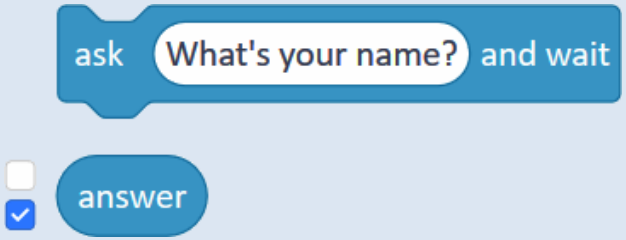
Ask and Answer

Module 5: Investigation 1

Activity 5.1.1 – Ask and Answer

Open project **51-Polygon Firework**.

- Explore the **ask** and **answer** blocks.



- **Where is the text of the answer stored (i.e. the answered value)?**
- **How can you display the answer value on the stage?**

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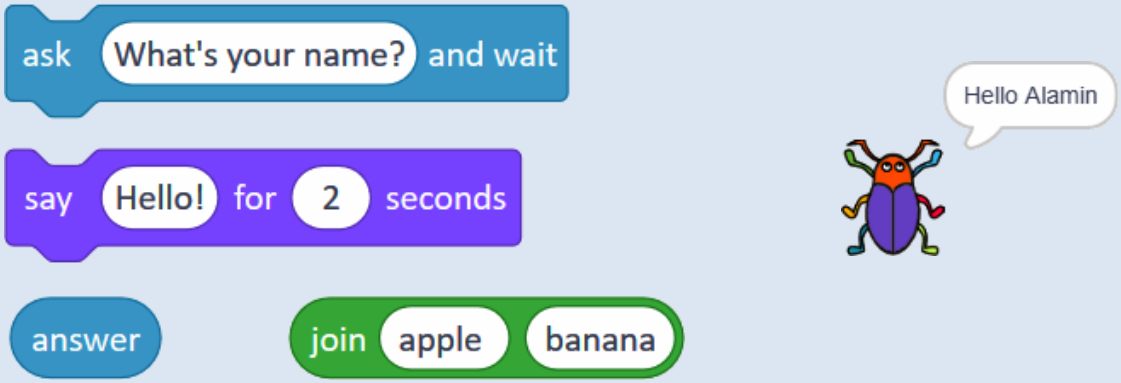
Module 5: Investigation 1

Activity 5.1.1 – Ask and Answer

- Build a script for the **Beetle** sprite to ask for your name.

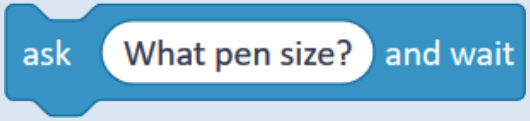
- Next get the **Beetle** to greet you by name after it has asked what your name is.



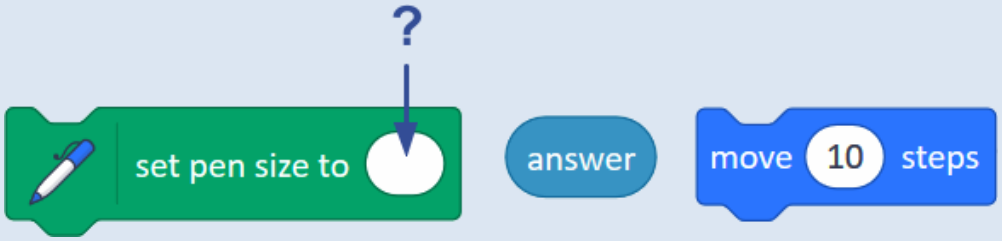
Module 5: Investigation 1

Activity 5.1.1 – Ask and Answer

- Change your **ask** and **answer** script so instead the **Beetle** sprite asks for the **pen size**.



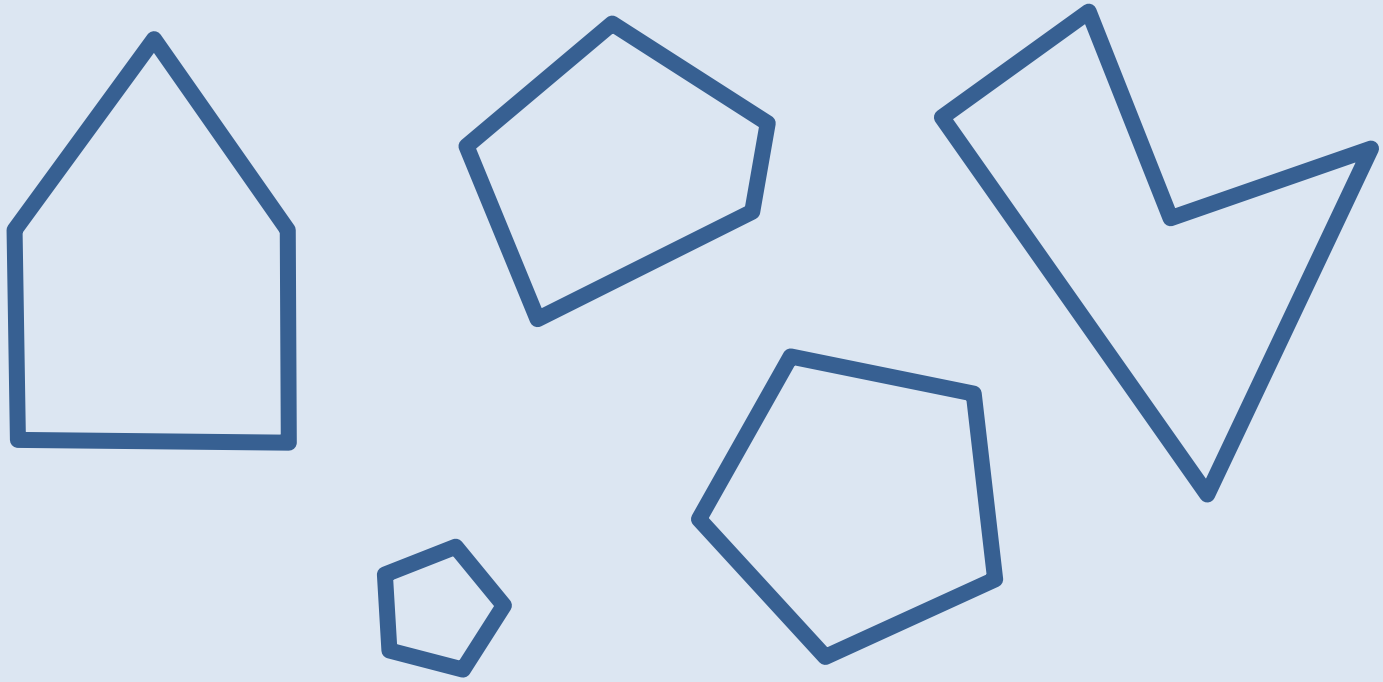
- Use the **answer** to **set the size of the pen tool** and then draw a line.



Module 5: Investigation 1

Activity 5.1.1 – Ask and Answer

Before we use the **ask** and **answer** blocks to help us draw regular polygons, discuss what you already know about them.

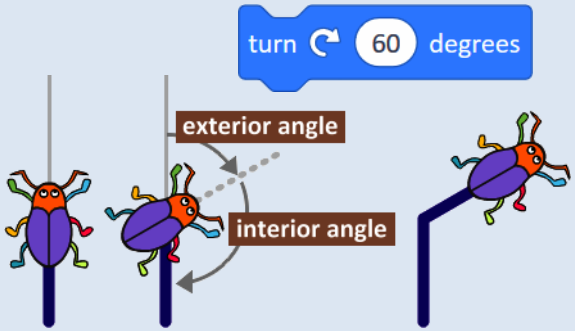


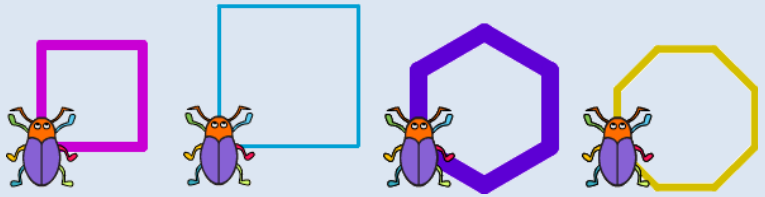
What is the same, what is different in the shapes above? ?

Module 5: Investigation 1

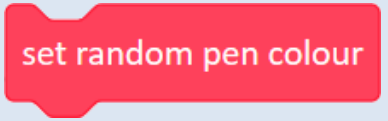
Activity 5.1.1 – Ask and Answer

- Get your **Beetle** to ask about the **pen size**, then set that **pen size** and draw a regular polygon of a random colour.





Use the provided random blocks.



- **What is the length of the side? How can we use this to work out the perimeter?**
- **Why is 360° important when drawing polygons?**

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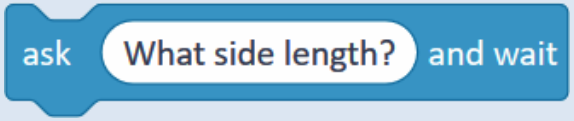
Module 5: Investigation 1

Activity 5.1.1 – Ask and Answer

- Change your **ask** and **answer** script again so it asks **what size the side** of the polygon should be.

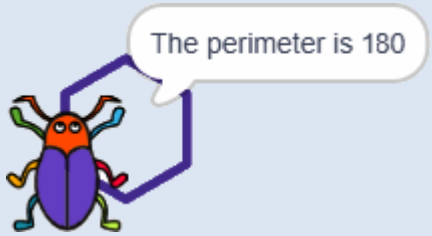
- Use the **answer** within your script to draw a polygon with that length of side.



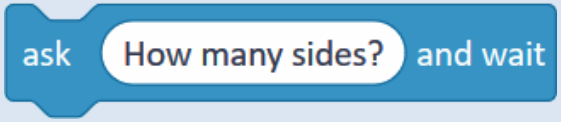
Module 5: Investigation 1

Activity 5.1.1 – Ask and Answer

- **[Extension]** After drawing the polygon add the behaviour: the **Beetle** will **say** what the perimeter of that polygon is.



- Change the question once more: Now the **Beetle** should ask **how many sides** the polygon should have and use the **answer** within the script. **(specify the side length, e.g. 30)**.



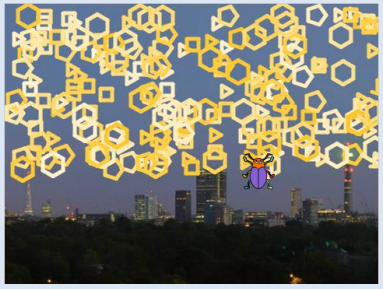
Module 5: Investigation 1

Activity 5.1.1 – Ask and Answer

- Switch the backdrop to the *night skyline*.

- Using your previous script as a guide build a script to:
  - **ask** for the number of sides
  - Draw many small polygons (of that number of sides) scattered across the sky at random
  - Use any of the **set random …** blocks
  - Run the same script several times with different answers

- Make a new block **polygon** which draws a polygon using the **answer**.



ACTIVITY 5.1.2

Unplugged: Polygon Predictions

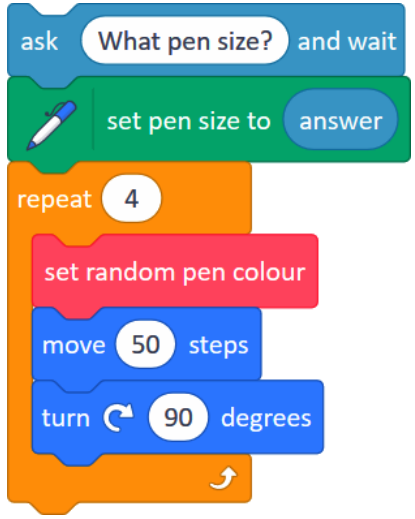
Module 5: Investigation 1

Activity 5.1.2 – Unplugged: Polygon Predictions

- Read each of the scripts. Draw and/or explain in words the picture that it will create.

1

2



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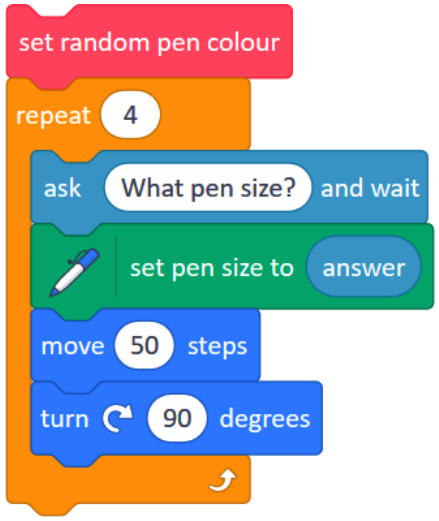

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Module 5: Investigation 1

Activity 5.1.2 – Unplugged: Polygon Predictions

- Read each of the scripts. Draw and/or explain in words the picture that it will create.

1

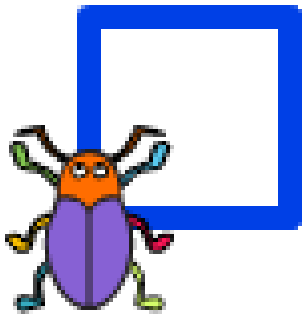
```
ask [What pen size?] and wait
set random pen colour
repeat (4)
    set pen size to (answer)
    move (50) steps
    turn ↻ (90) degrees
```

2

```
ask [What pen size?] and wait
set pen size to (answer)
repeat (4)
    set random pen colour
    move (50) steps
    turn ↻ (90) degrees
```

3

```
set random pen colour
repeat (4)
    ask [What pen size?] and wait
    set pen size to (answer)
    move (50) steps
    turn ↻ (90) degrees
```



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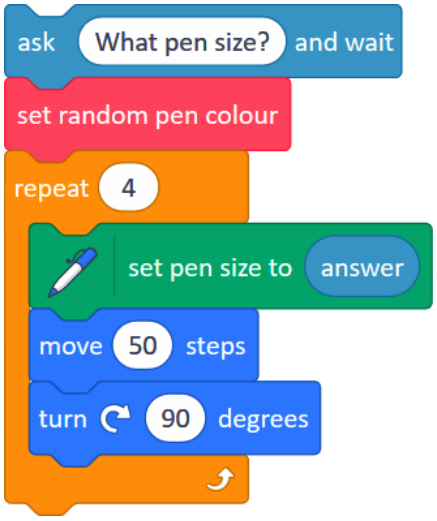
Module 5: Investigation 1

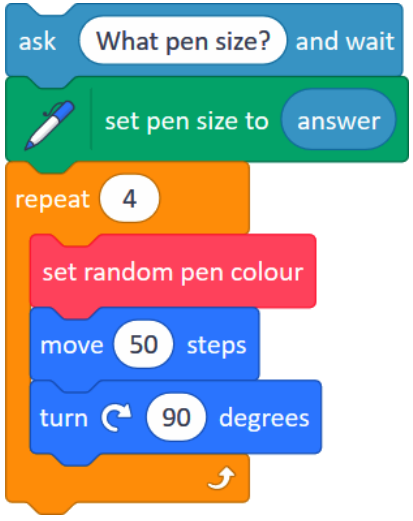
Activity 5.1.2 – Unplugged: Polygon Predictions

- Read each of the scripts. Draw and/or explain in words the picture that it will create.

1



2



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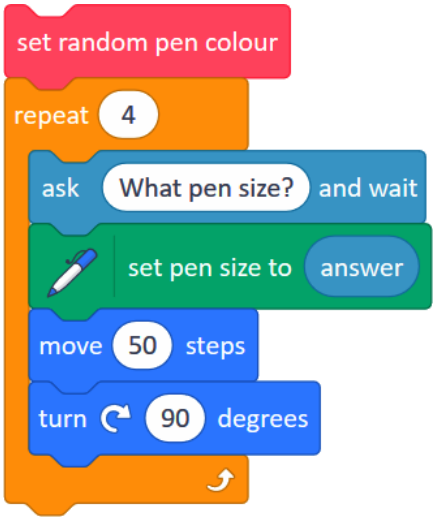

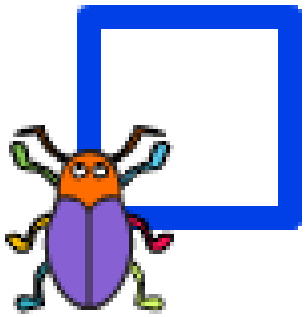

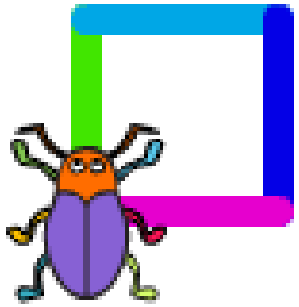

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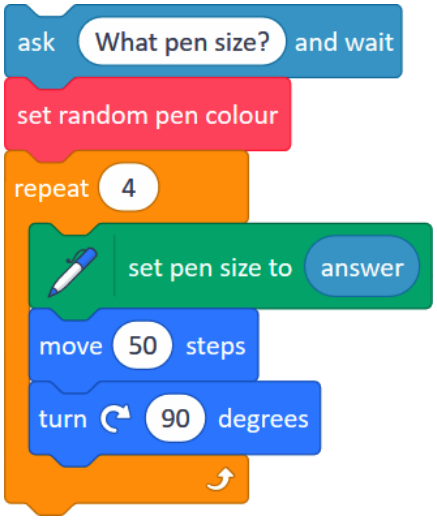
Module 5: Investigation 1

Activity 5.1.2 – Unplugged: Polygon Predictions

- Read each of the scripts. Draw and/or explain in words the picture that it will create.

1



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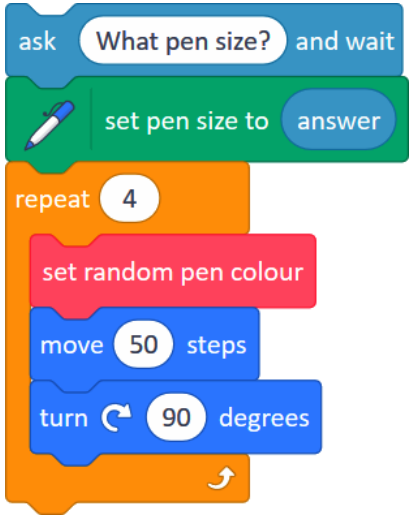
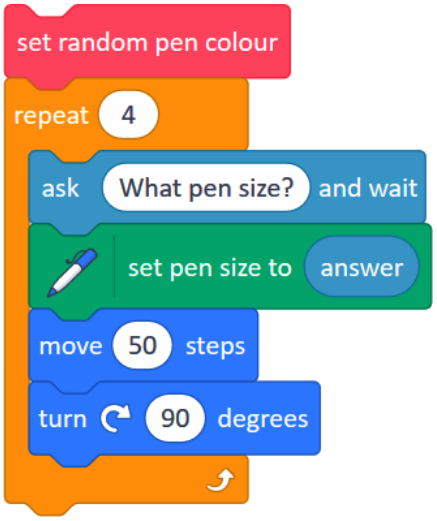
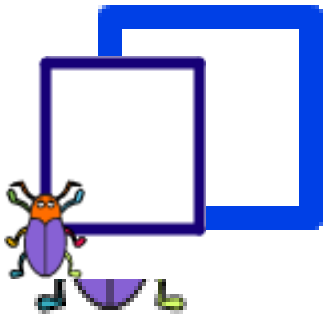
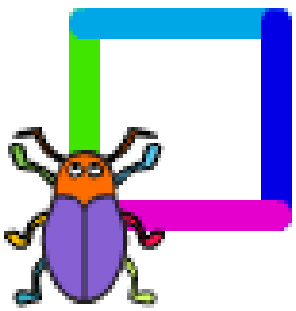
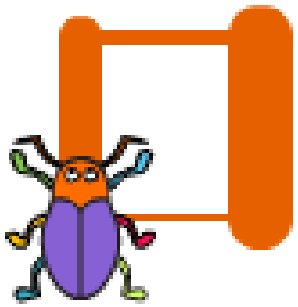


3





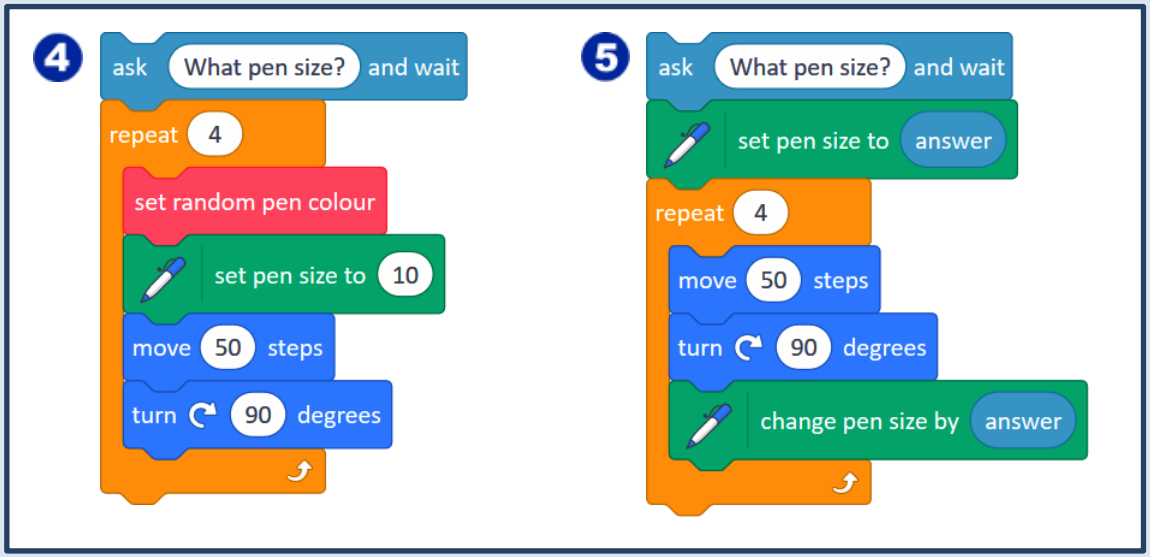




Module 5: Investigation 1

Activity 5.1.2 – Unplugged: Polygon Predictions

- Read each of the scripts. Draw and/or explain in words the picture that it will create.



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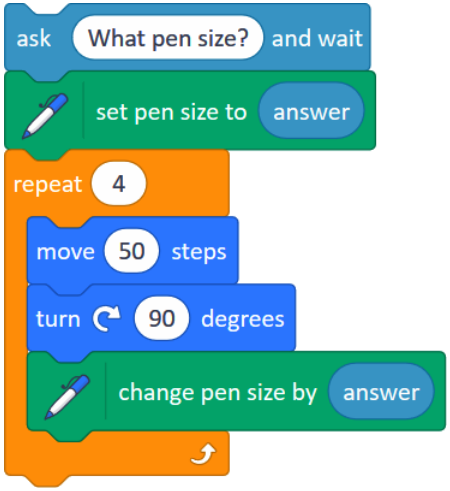
Module 5: Investigation 1

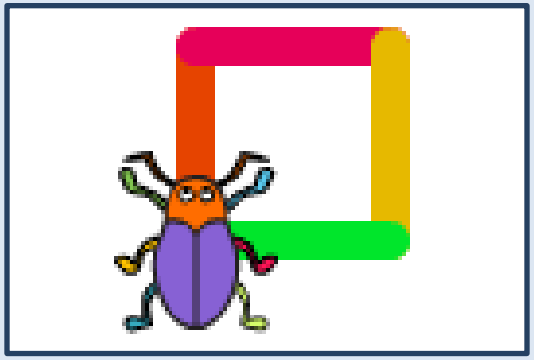
Activity 5.1.2 – Unplugged: Polygon Predictions

- Read each of the scripts. Draw and/or explain in words the picture that it will create.

4

5





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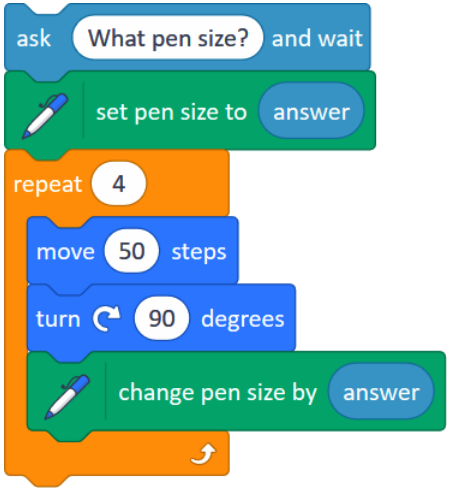
Module 5: Investigation 1

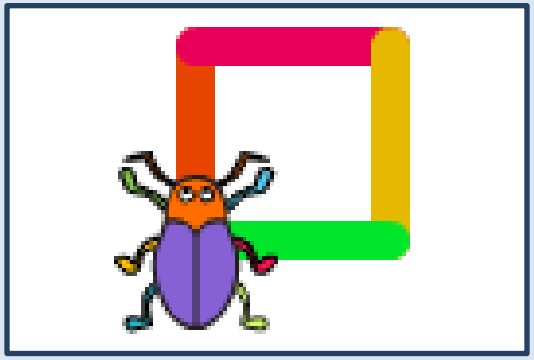
Activity 5.1.2 – Unplugged: Polygon Predictions

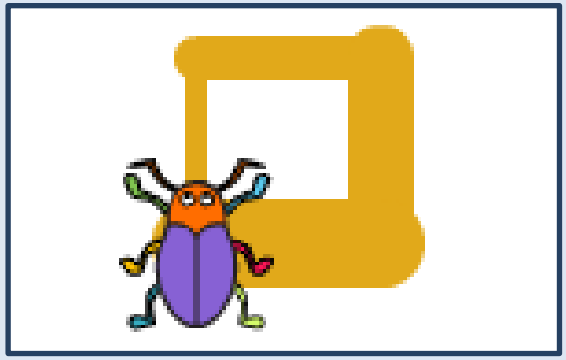
- Read each of the scripts. Draw and/or explain in words the picture that it will create.

4

5







Module 5: Investigation 1

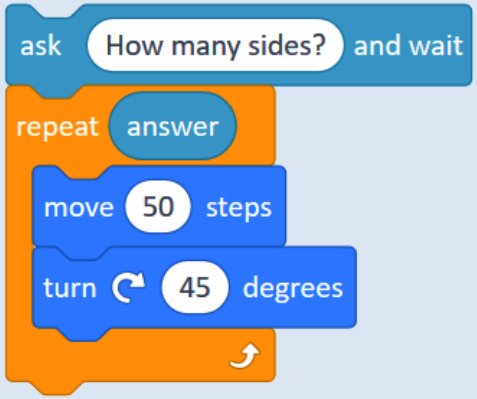
Activity 5.1.2 – [Extension] Unplugged: Polygon Predictions

[Extension] Debug the regular polygon scripts below.

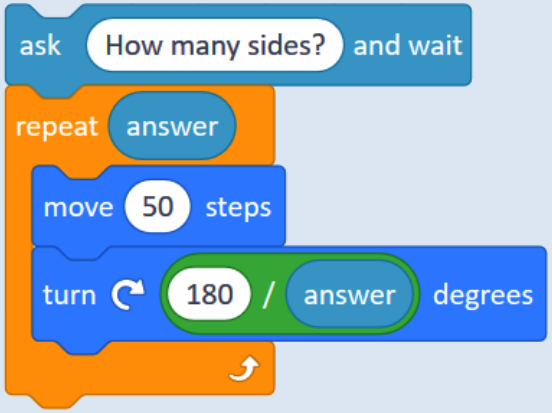
For each script:

- Envisage the intended outcome
- Explain the bug
- Suggest a fix

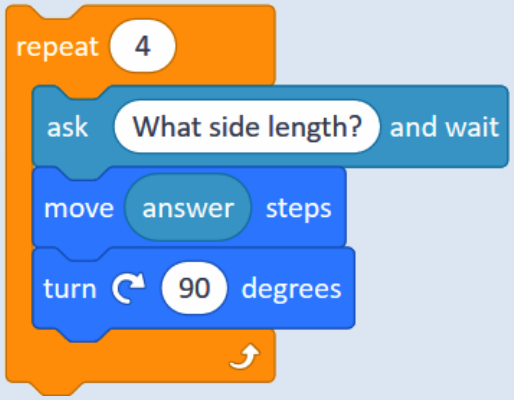
1



2



3



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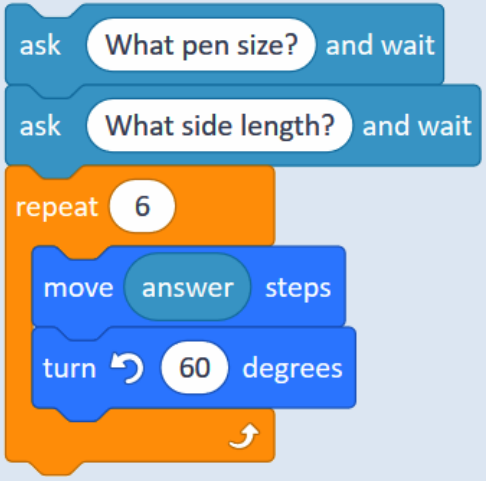


ACTIVITY 4.1.3

Naming Values

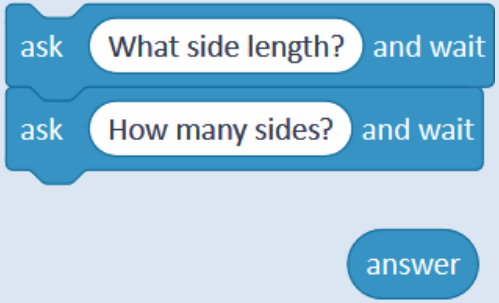
Module 5: Investigation 1

Activity 5.1.3 – Naming Values

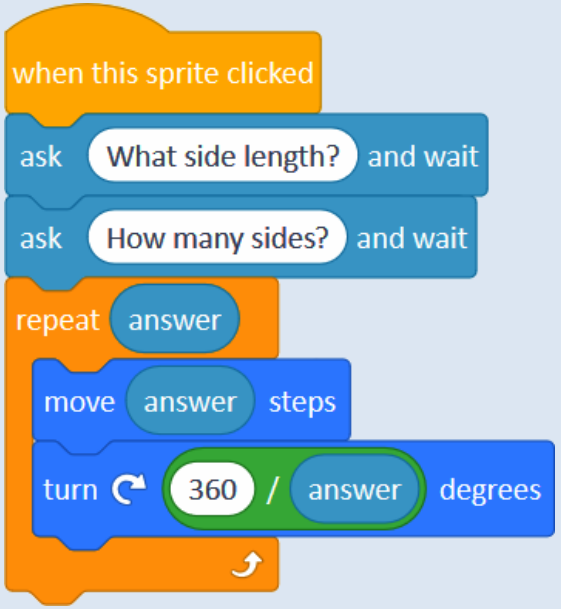
Continue in your project **51-Polygon Firework**.

- Build a script to:

(1) **ask** what side length the polygon should be
(2) **ask** how many sides



Is this a correct solution?



- **What problem do we encounter when using both of these answers to draw our polygon?**
- **How could we solve this problem?**

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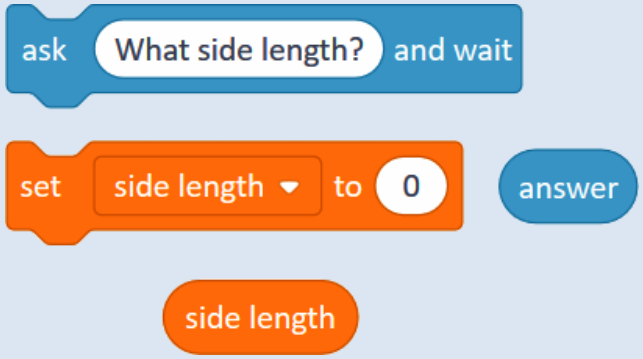
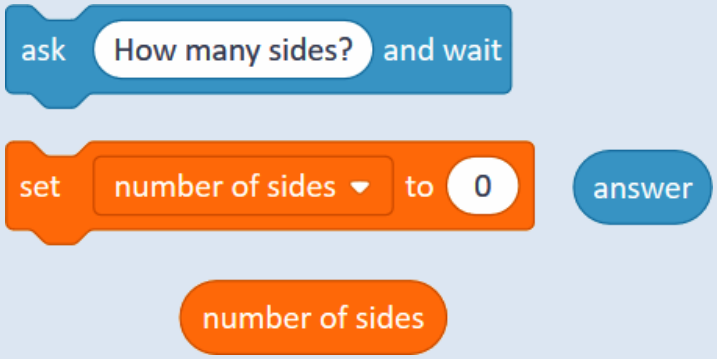
Module 5: Investigation 1

Activity 5.1.3 – Naming Values

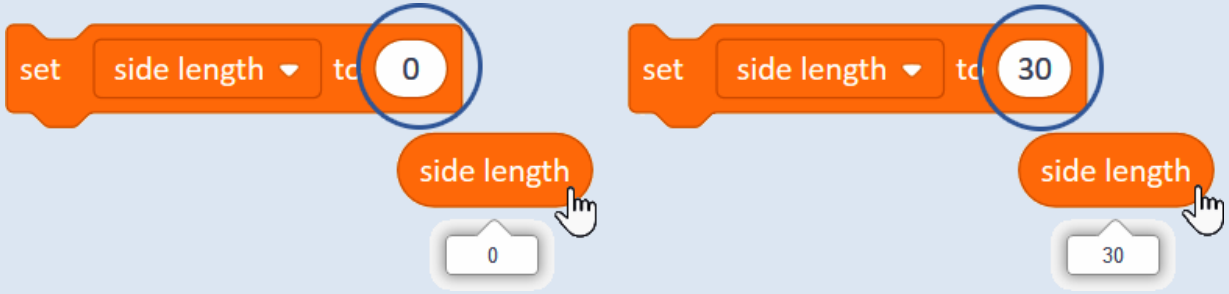
- Make a variable named **side length** to store the **answer** to the first question.



- Make a variable named **number of sides** to store the answer to the 2nd question.



- Explore the **side length** variable by clicking on the blocks.



Module 5: Investigation 1

Activity 5.1.3 – Naming Values

- Rebuild your script to:
  - (1) **Ask** what side length the polygon should be
  - (2) **Ask** how many sides

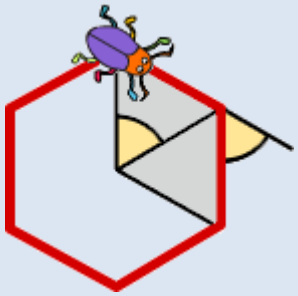
  … use variables to store the answers.

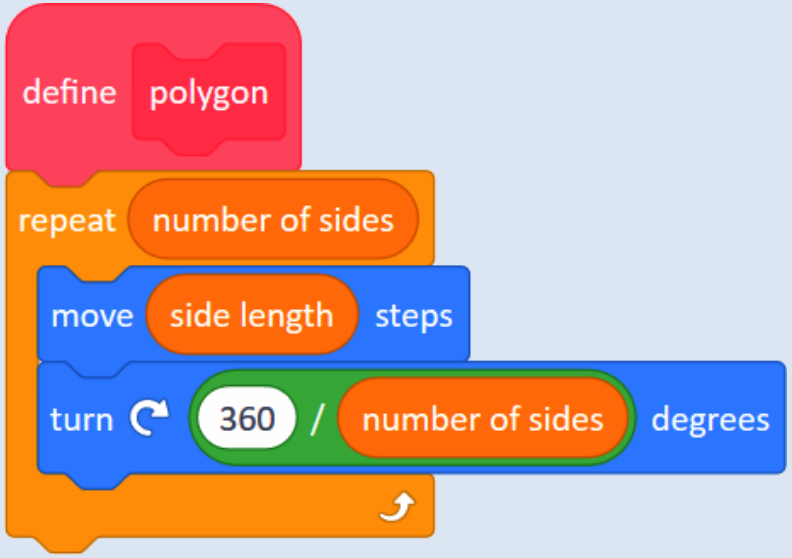
- Change your **polygon** block to use these two new variables instead of the **answer** block.

Module 5: Investigation 1

Activity 5.1.3 – Naming Values

- Is your script similar to the below?
  Discuss any alternative solutions.





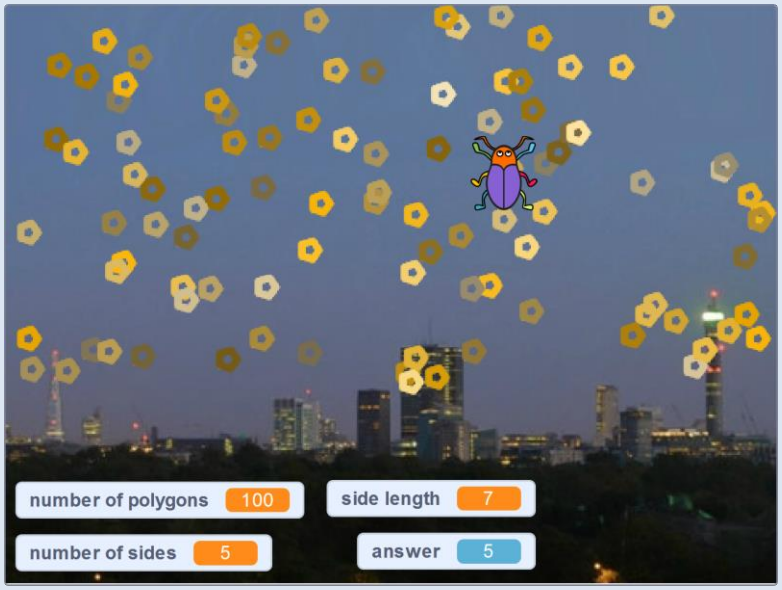
- **What do you notice about the interior and exterior angles of your regular polygons?** ?

Module 5: Investigation 1

Activity 5.1.3 – Naming Values

- Add a third question to your script to **ask** *how many polygons?* Make another **variable** to store the answer to this question.

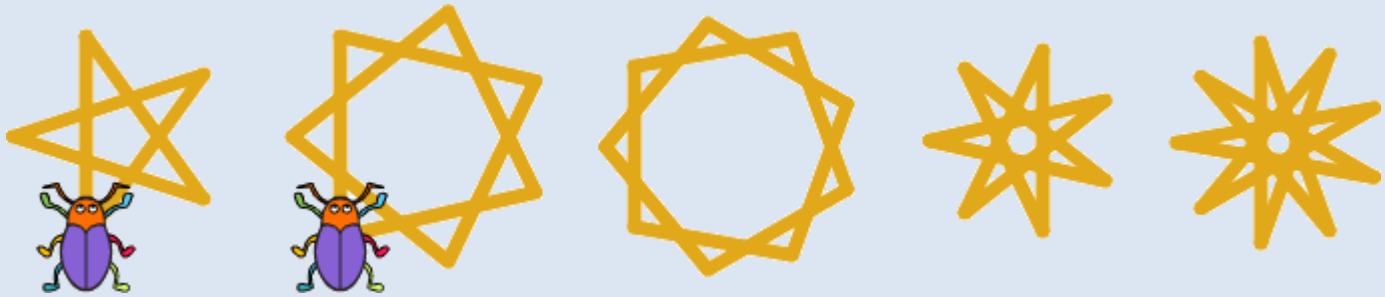
- Make sure your script now does the following:
  - When clicked the Beetle will **ask** all three questions
  - It will draw the **number of polygons** specified
  - The polygons will have the **number** and **side length** specified

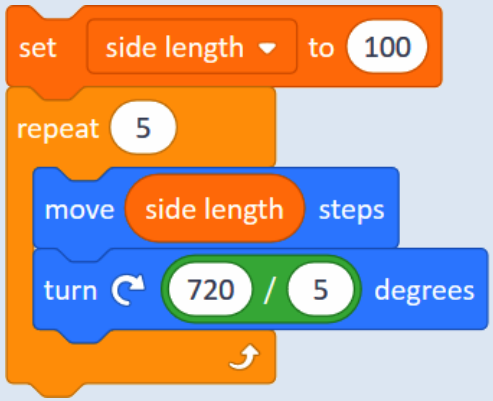


Module 5: Investigation 1

Activity 5.1.3 – [Extension] Naming Values

- **[Extension]** Explore the following **surprising polygons**:





ACTIVITY 5.1.4

The Sky at Night

Module 5: Investigation 1

Activity 5.1.4 – The Sky at Night

Continue in your **51-Polygon Firework** project.

- Make a new block **square** and use the **side length** variable to draw it.

- **After drawing our first square where do we need to move to draw the next floor? What is the algorithm?** ?

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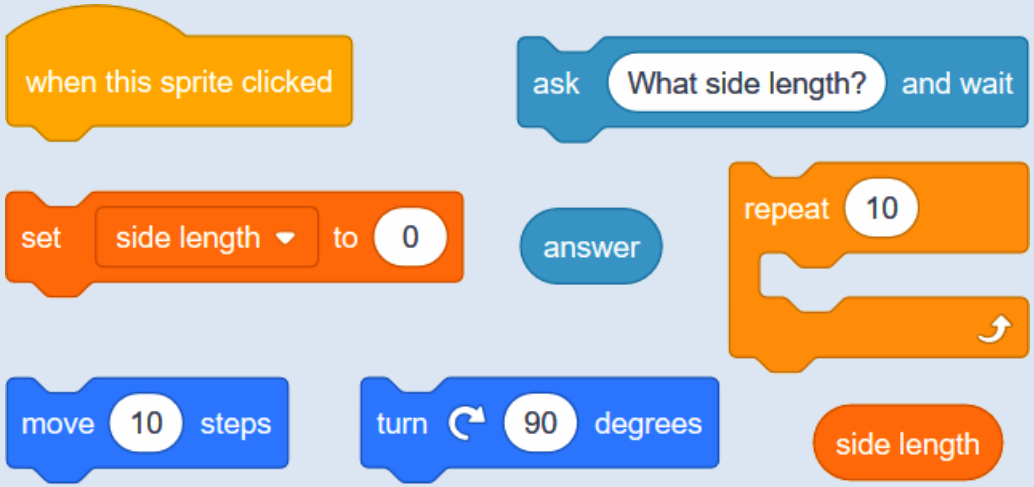
Activity 5.1.4 – The Sky at Night

- Build a script that asks for the **side length** and then draws a **tower of 10 squares** of this size.



- How tall is your tower? What is the formulae for calculating this?
- If a tower is 120 tall, and the side length of the square is 15, how many floors does it have?

?

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Activity 5.1.4 – The Sky at Night

- Make a new variable named **number of floors**.
- Make a new block called **tower** that will draw a tower of identical squares.
- Change your script so it now does the following:
  - Asks for the *number of floors* and saves the answer in a **variable**
  - Asks for the *side length* and saves the answer in a **variable**
  - Draws a tower of the specified number of floors and size

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Activity 5.1.4 – [Extension] The Sky at Night

- **[Extension]** Change your script so that it draws a night skyline including many towers with different numbers of floors and side lengths.

- **[Extension]** Combine the above with drawing a sky full of polygon firework.

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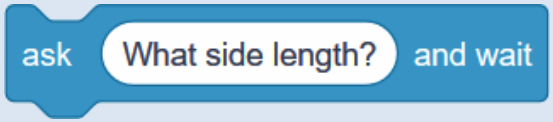
My Investigation 1 check list:

- ☐ I used the **ask** and **answer** blocks to greet someone by name.
- ☐ I used the **ask** and **answer** blocks to set the pen size.
- ☐ I built a script to draw a polygon of a specified **side length** and **number of sides**.
- ☐ I created a night skyline with different coloured and types of polygons.
- ☐ I envisaged the outcomes of different polygon scripts that used **ask** and **answer** blocks.
- ☐ I created and used variables for **side lengths**, **number of sides** and **number of polygons** to draw my polygon fireworks.
- ☐ I built towers of squares of different heights and **[extension]** random positions.

Module 5 Investigation 1: Key Vocabulary

- 

a sensing block which will ask whatever question is typed into the block and display an input text box at the bottom of the screen for an answer to be typed in to

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a sensing and reporter block which stores the most recent text inputted using the ask and wait block

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a reporter block which multiplies two values together and returns the result

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a reporter block which divides the first value by the second value and returns the result

- 

a variables and reporter block which holds its ‘assigned’ variable

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a variables block which sets the specified variables to a given value.