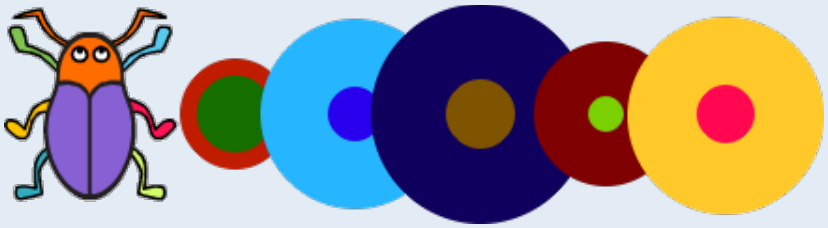
Beetle Geometry
Module 2: Investigation 3

Discovering Dots



ACTIVITY 2.3.1

Dots and Dashes

Module 2: Investigation 3

Activity 2.3.1 – Dots and Dashes

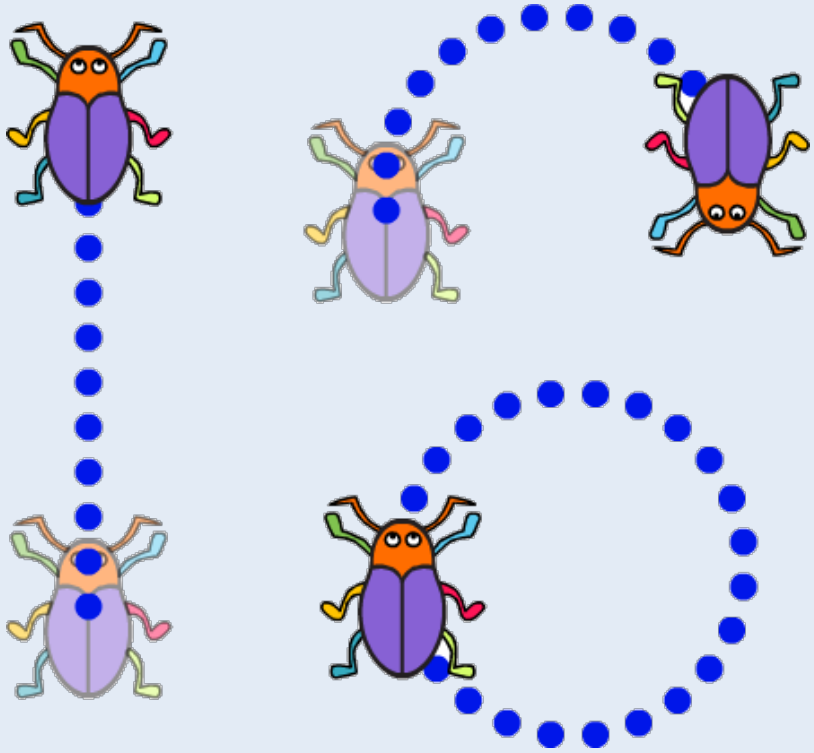
Open project **2-Dots and Dashes**, save as a copy and rename.

- ☐ Run the *setup script*.
- ☐ Experiment with the **pen down** and **pen up** blocks to find out how the Beetle can draw a dot.
- ☐ Now make your own new block called **dot** which draws a single dot.

Module 2: Investigation 3

Activity 2.3.1 – Dots and Dashes

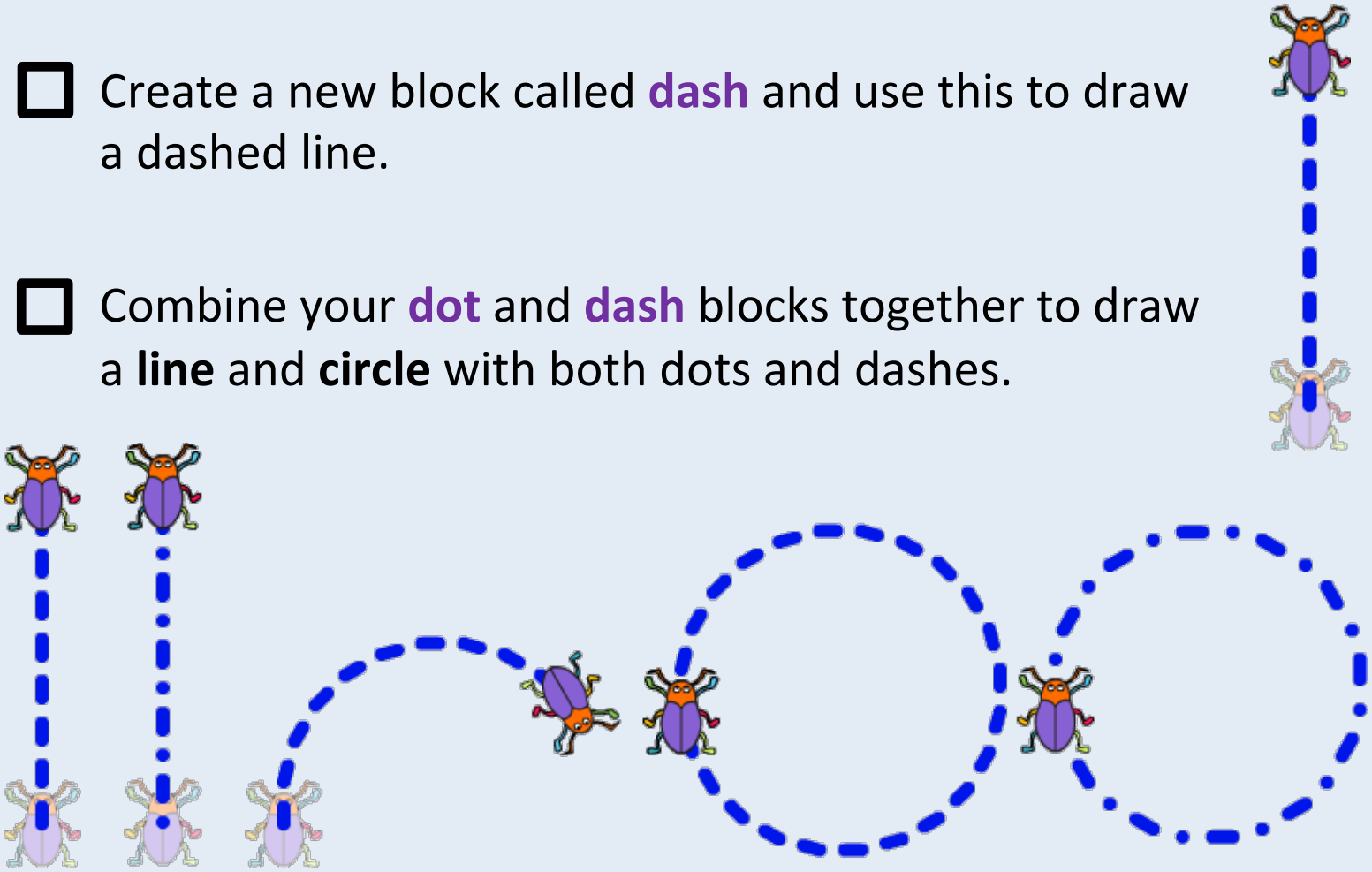
- Explore using your new **dot** block in scripts that draw a dotted **line** and a dotted **circle**.



Module 2: Investigation 3

Activity 2.3.1 – Dots and Dashes

- ☐ Create a new block called **dash** and use this to draw a dashed line.
- ☐ Combine your **dot** and **dash** blocks together to draw a **line** and **circle** with both dots and dashes.

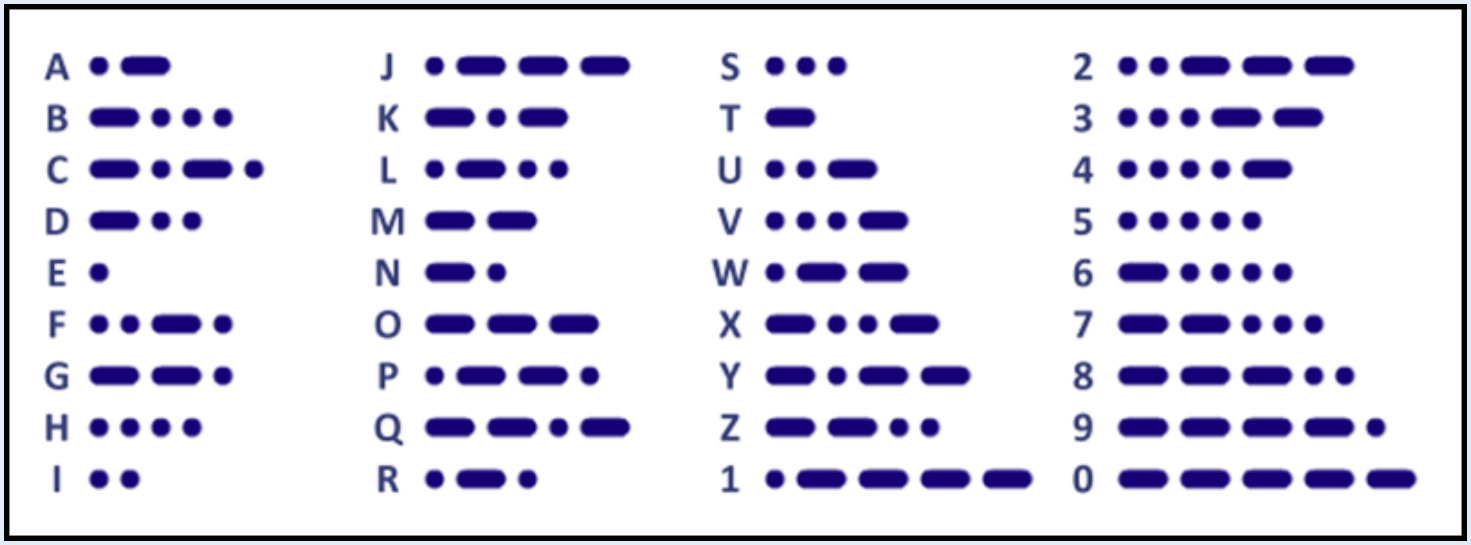


Module 2: Investigation 3

Activity 2.3.1 – [Extension] Dots and Dashes

- [ ] **[Extension]** Modify the *setup script* so that Beetle starts drawing closer to the **left** of the stage and points in **direction 90**.

- [ ] **[Extension]** Use the chart below to build several short scripts to draw the Morse code for each letter of your name.



Discussion Questions

- How did you draw a dot?
- What was the difference between drawing a dot and a dash?
- How did you ensure you had a space between your dots and dashes?
- Where did you place the block to create this space? Could you place it in the definitions of the dot and dash blocks?

ACTIVITY 2.3.2: UNPLUGGED

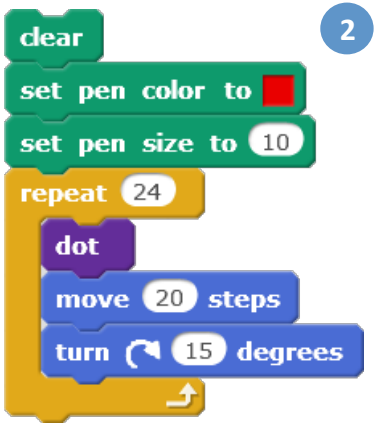
Picture Predictions

Module 2: Investigation 3

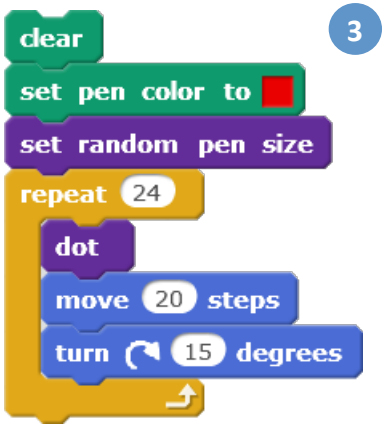
Activity 2.3.2 – Unplugged: Picture Predictions

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

1

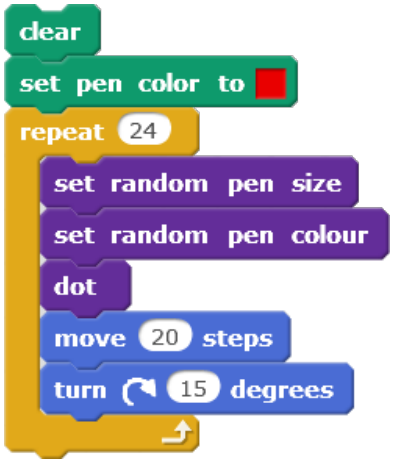


2



3

4



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Module 2: Investigation 3

Activity 2.3.2 – Unplugged: Picture Predictions

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

1

```
clear
set pen color to
set pen size to 10
repeat 24
    dot
    move 20 steps
    turn 15 degrees
```

2

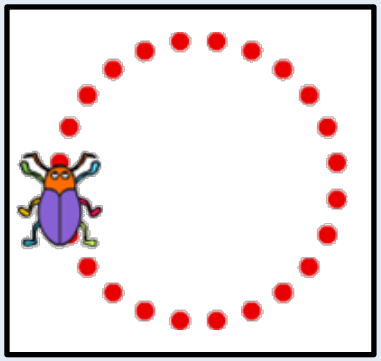
```
clear
set pen color to
set random pen size
repeat 24
    dot
    move 20 steps
    turn 15 degrees
```

3

```
clear
set pen color to
repeat 24
    set random pen size
    dot
    move 20 steps
    turn 15 degrees
```

4

```
clear
set pen color to
repeat 24
    set random pen size
    set random pen colour
    dot
    move 20 steps
    turn 15 degrees
```



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Module 2: Investigation 3

Activity 2.3.2 – Unplugged: Picture Predictions

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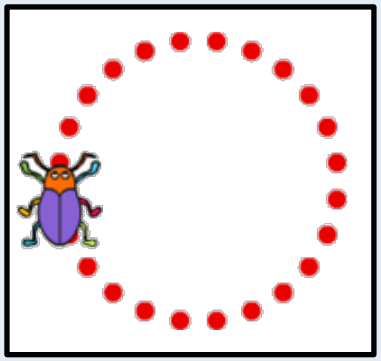

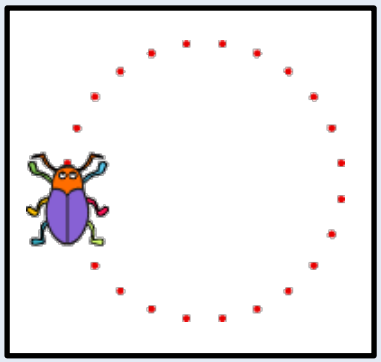

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Module 2: Investigation 3

Activity 2.3.2 – Unplugged: Picture Predictions

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    set random pen colour
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    turn 15 degrees
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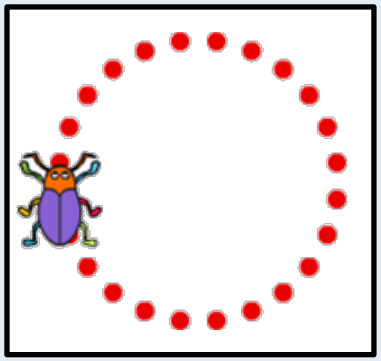

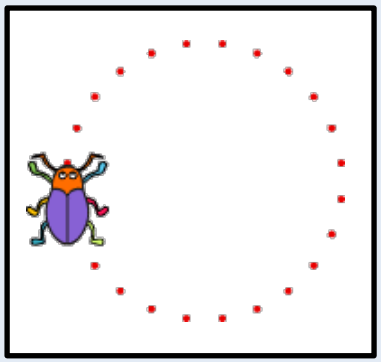

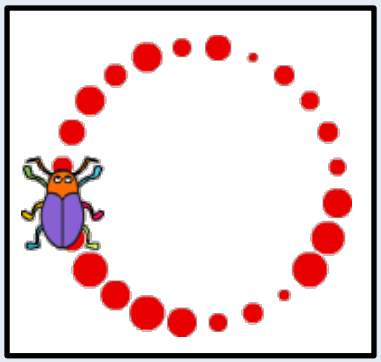

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Module 2: Investigation 3

Activity 2.3.2 – Unplugged: Picture Predictions

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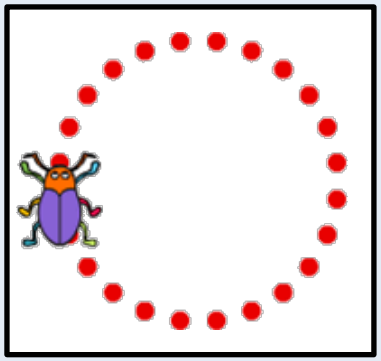
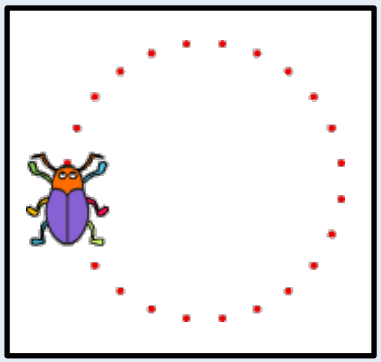
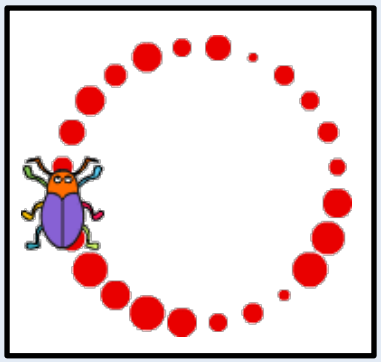
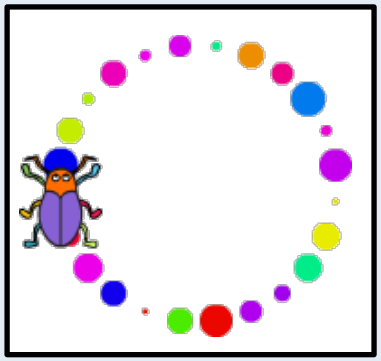
    set random pen colour
    dot
    move 20 steps
    turn 15 degrees
```









ACTIVITY 2.3.3

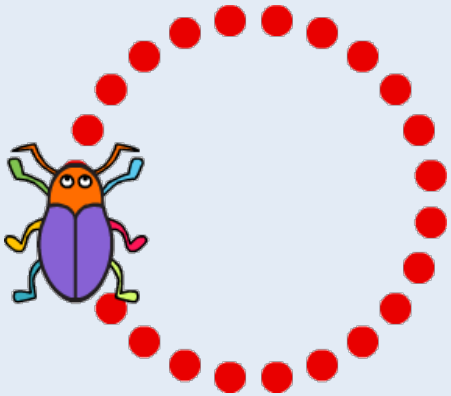
Swarming Dots

Module 2: Investigation 3

Activity 2.3.3 – Swarming Dots

Open project **2-Swarming Dots**, save as a copy and rename.

- ☐ Run the *setup script*.
- ☐ Recreate your **dot** block and build a script to draw a circle of dots.

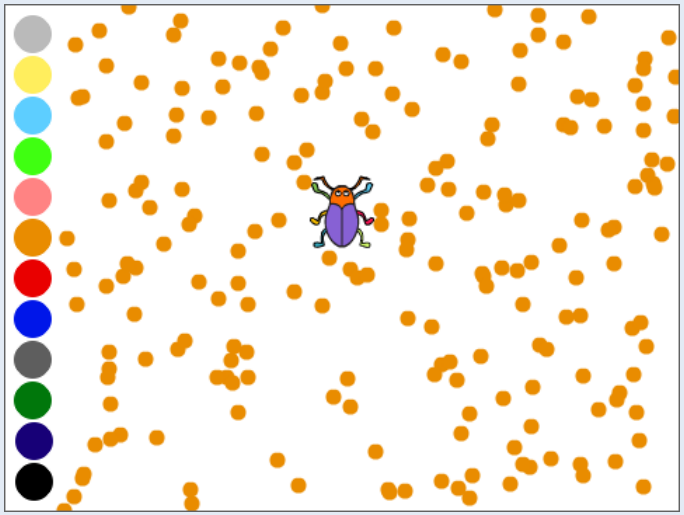


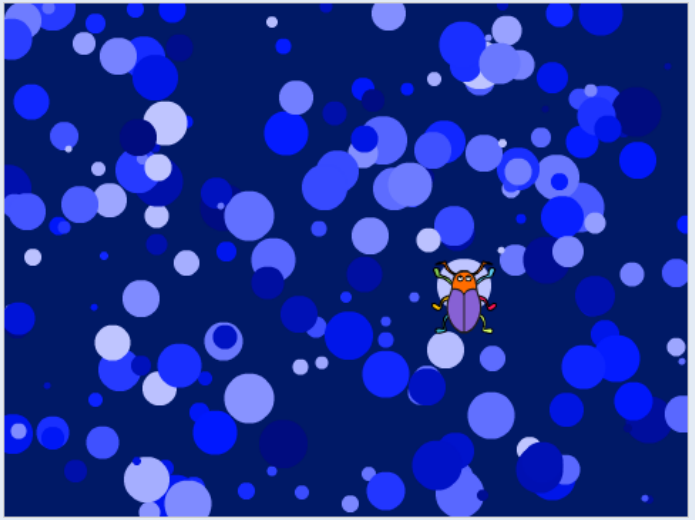
Module 2: Investigation 3

Activity 2.3.3 – Swarming Dots

- Replace the **move** and **turn** blocks in your script with the **jump to random position** block from the **More Blocks** group and run the script.

- Try switching the backdrop to *night* or *day* by using the **switch backdrop to …** block.

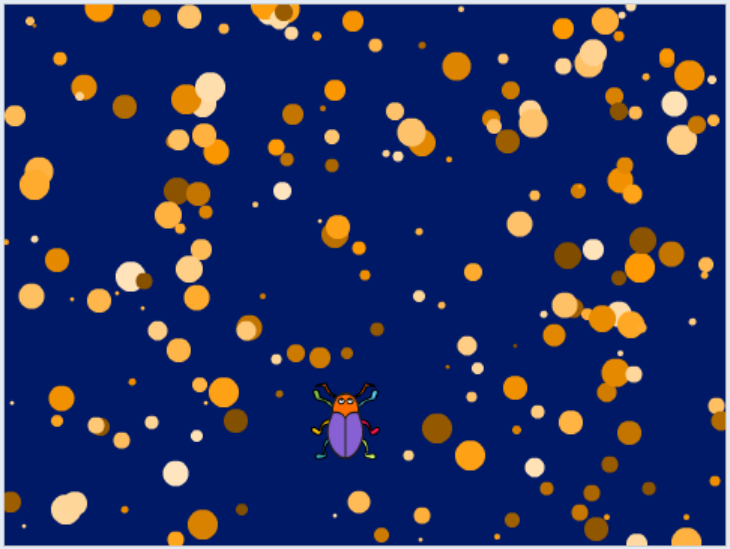




MODULE 2: INVESTIGATION 3

Activity 2.3.3 – [Extension] Swarming Dots

- [ ] **[Extension]** Add the blocks **set random pen size** and **set random pen colour** or **set random pen shade** to your script to change the size and colour of the dots.



Discussion Questions

- Where did you place the **jump to random position** block within the **repeat** block?
- How can you change the backdrop of the stage?
- What number did you put in the **repeat** block? What happened when you decreased or increased this number?
- What does jumping to a random position mean? Do you know the position the dot will be drawn beforehand?

ACTIVITY 2.3.4

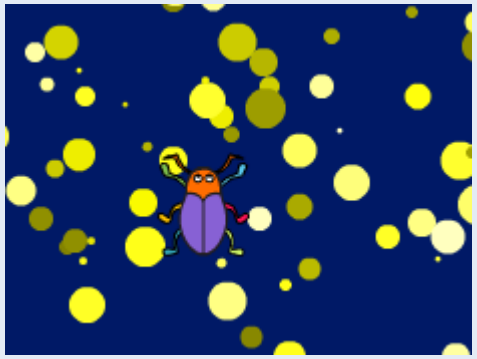
A Sky Full of Stars

MODULE 2: INVESTIGATION 3

Activity 2.3.4 – A Sky Full of Stars

Continue in **2-Swarming Dots**, save as a copy and rename.

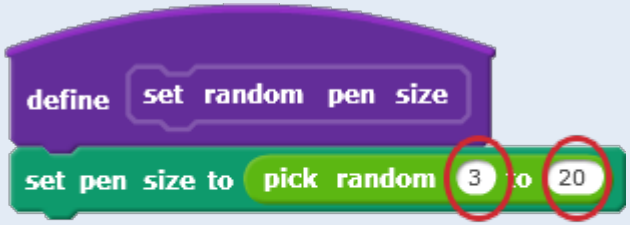
- ☐ Run the *setup script* and change the backdrop to *night*.
- ☐ Duplicate one of your swarming dots scripts that includes the block **set random pen shade**.
- ☐ Set the initial pen colour to *yellow* and run the script.



MODULE 2: INVESTIGATION 3

Activity 2.3.4 – A Sky Full of Stars

- Try changing the sizes of the stars - find the definition script for the **set random pen size** block (on the far right of the scripts area) and look at how the **minimum** and **maximum** size is defined.

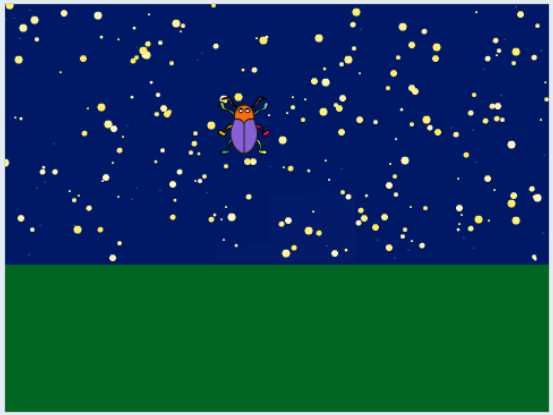


- Change the **minimum** and **maximum** values to ensure the stars are an appropriate size.

Module 2: Investigation 3

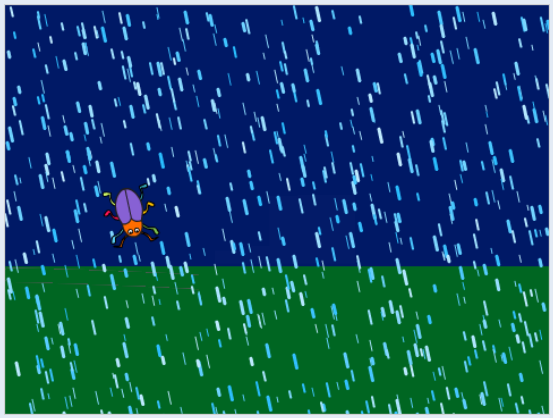
Activity 2.3.4 – [Extension] A Sky Full of Stars

- ☐ **[Extension]** Change the backdrop to *night horizon.*



- ☐ **[Extension]** Edit your script so stars only appear in the sky.

- ☐ **[Extension]** Instead of stars try to make it rain.



Discussion Questions

- How did you know there must be a definition of the **set random pen size**?
- What did you choose your minimum and maximum pen sizes to be? Why?
- What do we mean by a minimum and maximum size?
- If our minimum size is 2 and our maximum size is 7, what would the possible sizes of our pen be?

MODULE 2: INVESTIGATION 3

My Investigation 3 check list:

- ☐ I created new blocks to draw a **dot** and a **dash**
- ☐ I used my **dot** and **dash** blocks in a script to draw lines/circles
- ☐ I used my **dot** and **dash** blocks to write a word or message in Morse code **[Extension]**
- ☐ I envisaged the differences between several scripts for drawing a circle of dots
- ☐ I built a script to draw dots of random sizes, colours and positions across the whole stage
- ☐ I switched the backdrop of the stage
- ☐ I changed the minimum and maximum size of the dots
- ☐ I edited my script so dots were only drawn on the top half of the stage **[Extension]**

MODULE 2 INVESTIGATION 3: Key Vocabulary

☐ **pen up**	stops the sprite from continuously drawing a trail wherever it moves (if the **pen down** block has previously been used)
☐ **backdrop**	the background of the stage: there can be multiple backdrops and the stage can changes its look to display any of its backdrops