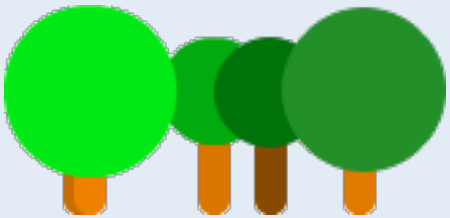
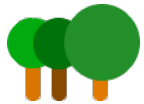
# Beetle Geometry
# Module 2: Investigation 4

## Pen Project:
## Nature Scenes





## ACTIVITY 2.4.1

# Drawing Trees

# MODULE 2: INVESTIGATION 4

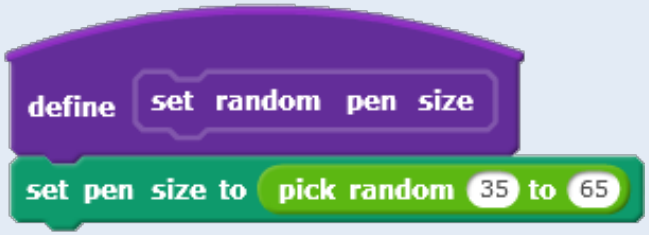
## Activity 2.4.1 – Drawing Trees

Open project **2-Pen Project**, save as a copy and rename.

- ☐ Run the *setup script* and discuss what it does.

- ☐ Build a script to draw a tree with a trunk of length **40** and a tree top that is a randomly sized dot between **35** and **65**.

Hint: use the **set random pen size** block for the tree top.

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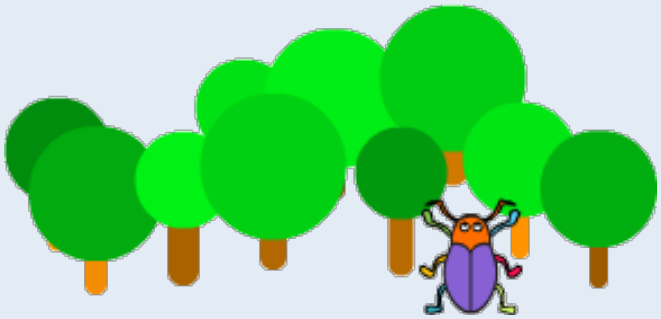
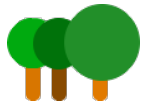
## Activity 2.4.1 – Drawing Trees

- ☐ Define a new **my tree** block with your tree script as the definition.
- ☐ Build a script to draw many trees randomly positioned around the stage.
- ☐ Make your trees more random by adding **set random pen shade** for both the trunk and the tree top.



# Module 2: Investigation 4

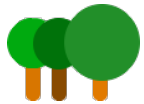
## Activity 2.4.1 – [Extension] Drawing Trees



- ☐ **[Extension]** Change your **tree** script so it has a **random trunk size** and random **trunk length**.
- ☐ **[Extension]** Switch the backdrop to *night horizon* and build a script to draw many trees only in the lower dark green area.

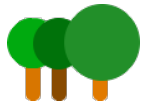
# MODULE 2: INVESTIGATION 4

## Activity 2.4.1 – Drawing Trees



## Discussion Questions

- In the first solution we used the constant **move 40** to draw a trunk then added a randomly sized tree top between 35 and 65. When running this script several times the trunk lengths seemed to vary – why?
- Where did you put your **pen down** and **pen up** blocks when drawing many trees?
- Does the Beetle change direction when drawing your tree?



## ACTIVITY 2.4.2: UNPLUGGED

# Reading Scripts 2

# Module 2: Investigation 4

## Activity 2.4.2 – Unplugged: Reading Scripts 2

☐ Read each script and think about what would happen on the stage when it is clicked.

1. Which **direction** would my Beetle point if I clicked on the block below? (circle the correct picture)


 Up

 Right

 Down

 Left

2. If the Beetle starts pointing in direction 0 (up) and I click the script on the right which **direction** will it end up pointing? (circle correct picture)

 **Starting position**


 Up

 Right

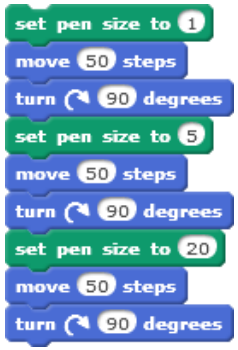
 Down

 Left

# Module 2: Investigation 4

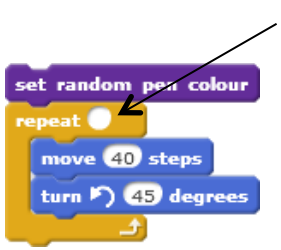
## Activity 2.4.2 – Unplugged: Reading Scripts 2

3. What will the **pen size** of the Beetle be when it completes this script?




Pen size = ☐

4. What is the **lowest number** that I need to put in the **repeat** block to draw a regular polygon?




Repeat number = ☐

5. What **number** do I need to put into the **turn** block to create a hexagon?


Number of degrees = ☐

# MODULE 2: INVESTIGATION 4

## Activity 2.4.2 – Unplugged: Reading Scripts 2

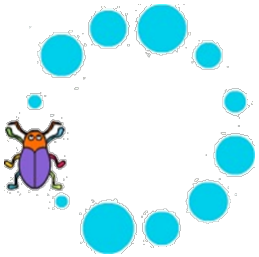
6. The **dot** block draws a dot on the stage each time it is run. If I click on this script **how many dots** will be drawn?


Number of dots = _____

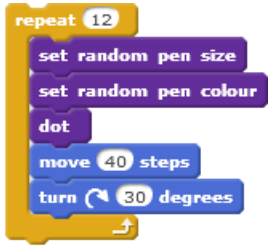
7. What are the possible **pen sizes** the Beetle could have if I click on this block?


Possible pen sizes = _____

8. Circle **the script** that produced the drawing on the right.







# MODULE 2: INVESTIGATION 4

## Activity 2.4.2 – Unplugged: Reading Scripts 2

9. I have made a new block called **square**. **How many steps** will the Beetle move in total if I click on the script on the right?


If I click on this script ↓

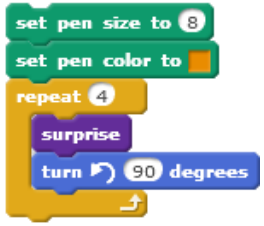


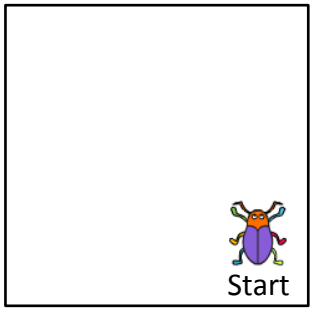

Total number of steps =

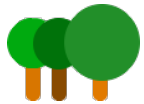
**[Extension]**

10. I have made another new block called **surprise**. In the box **draw** what the Beetle would draw if I clicked on the script on the right?


If I click on this script ↓



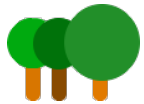


## ACTIVITY 2.4.3 [EXTENSION]

# A Walk in the Woods

# MODULE 2: INVESTIGATION 4

## Activity 2.4.3 – [Extension] A Walk in the Woods



Continue in project **2-Pen Project**,

save as a copy and rename.

- ☐ Change the backdrop to the *forest scene.*
- ☐ Add some stars to the sky (as in Activity 2.3.4).

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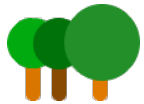
## Activity 2.4.3 – [Extension] A Walk in the Woods

- ☐ Define a block called **cabin** and create a script that draws a house in the same way you did before.
- ☐ Use your **cabin** block to draw some wood cabins by dragging the Beetle.
- ☐ Add some trees using the **tree** block you defined earlier.

# Module 2: Investigation 4

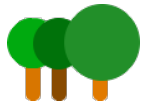
## Activity 2.4.3 – [Extension] A Walk in the Woods

- Build another script by copying the **tree** definition and changing the **set pen size**, **set pen colour** and **move** blocks to create smaller mushrooms.



## Discussion Questions

- How did you draw a forest cabin? Is each cabin drawn with a random pen colour?
- Did you build a script which will draw stars, then cabins and trees (i.e. the whole scene created by a single click)?
- How did you ensure that all the stars were only drawn in the sky? In which direction did you have to restrict/change the values?



## ACTIVITY 2.4.4 [EXTENSION]

# Life's a Beach

# Module 2: Investigation 4

## Activity 2.4.4 – [Extension] Life's a Beach

Continue in project **2-Pen Project**, save as a copy and rename.

- ☐ Run the *setup script.*
- ☐ Change your backdrop to a beach scene (e.g. from Scratch library or create your own).

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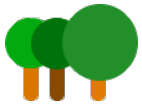
## Activity 2.4.4 – [Extension] Life's a Beach

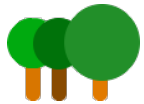
- Create some blocks to draw the sun, seagulls or palm trees (see example below) or think of your own drawings to add.



## Discussion Questions

- What drawings did you add to your beach scene?
- Can you describe how you created these?
- Which of the techniques that you learned during Module 2 have you managed to use in your beach scene?

# MODULE 2: INVESTIGATION 4



**My Investigation 4 check list:**

- ☐ I defined a new block to draw a tree with a randomly sized tree top.
- ☐ I built a script to draw multiple trees randomly across the stage.
- ☐ I edited my tree script to draw trees of random shades.
- ☐ I used what I learned during Module 2 to predict what would happen when different scripts are clicked.
- ☐ I used my knowledge of drawing stars, houses and trees to create a forest scene. **[Extension]**
- ☐ I used what I learned during Module 2 to define multiple new blocks that each draw a different feature of a beach scene. **[Extension]**