Wandsworth CLC Key Stage 1 Computing

Scheme Overview

In this scheme the pupils will be introduced to the programmable BeeBots. They will learn to program the robots to move, record instructions by using program cards, follow program instructions and create their own algorithms using the cards. They will explore more complicated algorithms and programs to solve real world problems.

Lesson 1: Introduction to BeeBots, moving, turning and the memory

I Can Statement: I can press the buttons in the correct order to make my robot do what I want.

Success Criteria:	Key words:
- Use arrow buttons to make BeeBot move - Clear the memory. - Use multiple instructions to achieve a task	BeeBot, move, turn, press, Go, forward, green, backwards, instruction, memory, clear, cross

Overview:
In this step pupils will explore moving the BeeBots by using the arrow and go buttons. They will explore the memory attribute of the Beebot and start to formalise their programming by using multiple instructions to achieve a task.

Starter: Talk about whether computers are clever or stupid. Explain that computers only do exactly what we tell them. Pretend to be a robot who can only understand move and a number and turn and a number. Challenge the pupils to try to move you around the room. Be VERY pedantic!

Teacher Input: 1
Show the pupils the BeeBots and how to turn them on. Explain that the robot will only do what we tell it, and that we tell it what to do by pressing the buttons on the top.

Model turning the robot on and pressing the forward button (don't press the go). See if the pupils can explain why the Robot doesn't go.

After discussion model pressing the go to get the robot to move.

Model using all the other instruction buttons.

Student task: Timer 8 mins
Students to explore moving the BeeBot around the activity area.

Teacher Input: 2
Model turning the Beebot On and pressing the forward arrow. Get the pupils to tell you what you need to do next to get the BeeBot to move.

Model pressing the forward arrow for a second time. Ask the pupils to predict what will happen now.

Show how the Beebot moves forward twice. Explain that this is because the BeeBot has a very good memory and it remembers everything we have told it to do.

Student task: Timer 5 mins
Students to explore moving the BeeBots 1 instruction at a time pressing go each time to build up 5 instructions in the memory.

Teacher Input 3:
Explain that sometimes we don't want the BeeBot to remember and we have to clear the memory.
Model using the cross button to clear the memory and pressing 'go' to show the BeeBot has no instructions and won't move.

Student task: Timer 5 mins
Students to explore getting the BeeBot to follow one instruction each time by using the clear button before adding a new instruction.

Teacher Input 5:
Model how to get the BeeBot to move forward 5 times by pressing the forward button 5 times.

Model clearing the memory and getting the BeeBot to repeat the 5 forward.

Student task: Timer 8 mins
Students to explore getting the BeeBot to repeat 5 and only 5 instructions each time.

Review:
Get pupils to describe what they made the BeeBot do and how they did it emphasise the use of the word instruction

Thinking Question:
What other things can you make move with instructions using buttons.

Sample Answer: remote control toys, remote controls for the TV.

Lesson 2: Turning corners and moving in the direction facing

I Can Statements: I can press the buttons in the correct order to make my robot   do what I want.
I can give instructions to my friend and follow their instructions to move around.

Success Criteria: - Turn a corner with 1 'go'. - Begin to understand about facing direction.	Key words: facing, move, turn, go.

Overview: In this step the pupils will learn how to get the BeeBot to turn a corner in 1 'go' and begin to understand that forward is in the direction that the BeeBot is facing.

Starter: Timer 5 mins
Pretend you are the stupid robot. Remind the pupils that you only understand move and turn. Get the pupils to give you move and turn instructions to move around the room. As you are moving explain after each turn that you are now facing this way and point in the direction you will move.

Teacher Input 1:
Model which way the Beebot is facing and ask the children which way it will move.

Physically turn the robot and get the children to predict the direction of movement.

Use a turn instruction and get the the children to predict the direction of movement.

Student task: Timer 5 mins
Students in pairs, one to turn the BeeBot using turn instructions and the other to predict the direction of movement.

Teacher Input 2:
Model getting the BeeBot to move turn and move to go around a corner such as a wooden block. Make sure the the 'go' is only pressed once to start the program.

Student task: Timer 15 mins
Students to explore moving around obstacles in one 'go'.

Review: What instructions did we need in our program to make the BeeBot go around the block?

Thinking Question:
How could you make your BeeBot go all the way around a block?

Lesson 3: Creating programs using individual instruction cards

I Can Statement: I can give instructions to my friend and follow their instructions to move around.
I can begin to predict what will happen for a short sequence of instructions.

Success Criteria:	Key words:
- Create unique programs by putting individual program cards in a sequence.	Instruction card, program, order, sequence.

Overview: In the step the pupils will use individual instructions to create their own programs and input them into the Beebots.

Starter: Revise the stupid robot game but this time give 4 different children instruction cards (move forwards, turn left, move backwards, turn right. Get the children to line up in any order and then give you the instructions one at a time in order. Explain to the children that all their instructions put together are a program.

Teacher Input 1:
Model putting two cards together one after another to make a program (emphasise the label program) and then inputting the instructions into the Beebot. Make sure you have a 'go' instruction to finish.

Student task: Timer 5 mins
Students to explore using two instruction cards and a 'go' to create simple 2 step programs.

Teacher Input 2:
Model adding more instructions cards to the programs to create longer programs.
Model changing the order of the instruction cards to create new programs.

Student task: Timer 8 mins
Get the pupils to work in pairs. The first pupil creates the program and the partner then inputs the program into the Beebot.

Review: See if the pupils can recall the longest program they managed to create.

Thinking Question: How could we pass our program on to somebody else?

Sample answer: Take a picture, write it down on paper.

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Lesson 4: Getting the Beebot to move in a square.

I Can Statement: I can use the word **debug** when I correct mistakes when I program.

Success Criteria:	Key words:
- Create a program to make a square. - Record their programs	Square, repeat, record, debug

Overview: In this step the pupils will work out how to get the Beebots to move in a square and record the instructions in a program. They will talk about changing their instructions to make them work and how this is called debugging.

Starter: Timer 5 mins
Talk about whether computers are clever or stupid. Explain that computers only do exactly what we tell them. Pretend to be a robot who can only understand move and a number and turn and a number. Challenge the pupils to make you move in a square. Emphasise that every time the instruction doesn't work and you try again you are <u>debugging</u>. If necessary place rods, rulers or tape on the floor to make the shape.

Teacher Input 1:
Model physically moving the Beebot around a square shape. Get the pupils to choose a instruction card for each move. Show the program created by putting the instruction cards together. Input the instructions into the Beebot to show the program works.

Student task: Timer 5 mins
Students to create programs to move the Beebots in squares. If finished challenge them to try a rectangle or 2 squares joined together. Remind the children that when they change their program to make it work they are debugging.

Teacher Input 2:
Explain that sometimes we want to record the programs to share with other people who don't have the instruction cards. Model using a whiteboard to record the Beebot instructions for the square.
Repeat and get a pupil to record the instructions.

Student task: Timer 5 mins
In pairs get the pupils to create programs for the Beebots and record them using a whiteboard and pen. The first pupil records a program on the whiteboard and their partner then inputs the program into the Beebot.

Review:
Share some of the completed programs

Thinking Question:
How could we share our programs with somebody in another country?

Lesson 5: Writing a program for a real world problem

I Can Statement: I can describe what actions I will need to do to make something happen and begin to use the word **algorithm**.

Success Criteria:	Key words:
- Program a Beebot to follow a simple algorithm. - Program a Beebot to solve a real world problem.	Algorithm, program, wait.

Overview: In this step the pupils will learn how to turn an algorithm into a program by solving a real world problem.

Starter: Timer 5 mins
Explain to the pupils that a set of instructions such how to make a cup of tea can be called an algorithm. It is not a program until it is turned into a set of instructions that a computer can understand.
Model creating the instructions for making a cup of tea. Emphasise that this is an algorithm.

Teacher Input 1:
Create a simple road with one building using building blocks or any suitable construction toys. Explain to the pupils that we want the Beebot to pick up some shopping from the shop and bring it home. W

Model thinking about what the Beebot has to do
        Drive to the shop
        Pick up the shopping
        Drive home
Point out that this is an algorithm and we need to change it into instructions for the Beebots

Student task: Timer 5 mins
Students in pairs write the instructions to get the Beebot to drive to the shops and record it on whiteboard.

Teacher Input 2:
Get the pupils to demonstrate their programs for driving to the shops.
        (They should be just a number of move instructions to get the Beebot from the
        start to the Shop building.)
If the programs don't quite work model adding or taking away instructions and use the term debugging to introduce it to the children.

Show the children the wait instruction (puase ||) on the Beebot and explain to them that the Beebot will have to wait while it picks up the shopping.

Student task: Timer 15 mins
Students to add instructions to get the Beebot to complete the shopping algorithm.
    Drive to the shop
    Pick up the shopping
    Drive back home

Review: Get the pupils to match the parts of the algorithm to the instructions in the program.

Thinking Question:
What other algorithms have the pupils used in the class?

Sample Answer:
Recipes for cakes or playdough.

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Lesson 6: Extend the shopping algorithm for multiple stops and program the Beebot

I Can Statement: I can describe what actions I will need to do to make something happen and begin to use the word **algorithm**.

Success Criteria:	Key words:
- Program a Beebot to follow a simple algorithm. - Program a Beebot to solve a real world problem.	Algorithm, program, wait.

Overview: In this step the pupils will extend the Beebot shopping algorithm to multiple stops and turn it into a program for the Beebots to complete.

Starter: Remind the pupils about the cup of tea algorithm. This time get everyone to pretend to be the Beebot driving to the shops. The pupils should all follow you as you drive to the shops stop to get the shopping and then drive home.

Explain that for the next shopping trip we need to go to 2 stops to get all the shopping. Have everyone follow you as you drive to the first shop stop and pick up the shopping and then drive around the corner to the 2nd shop to pick up the next bit of shopping. Then drive back home.

Write the algorithm on a whiteboard and add pictures for the different parts.

Teacher Input 1:
Create a shop using suitable construction toys, with 2 streets at right angles to create a corner and 2 buildings one on each street.

Revise creating the algorithm for driving to the first shop, modelling the steps with the Beebot, but explain that the Beebot needs to go to the next shop to pick up some more shopping as we did in the starter.

      E.G. Drive to shop1
          Pick up shopping
          Drive to shop 2
          Pick up shopping
          Drive home.

Student task: Timer 5 mins
Students to program the Beebot to drive to both shops, pick up the shopping at each and then drive home.

Teacher Input 2:
Model adding more shops and streets to the town and then creating more complicated algorithms.

Student task: Timer 5 mins
Students explore creating a bigger town and programming the Beebot to complete different shopping tasks around the town.

Review: Share the different programs the children have created for the Beebots

Thinking Question: Can the children think of any shopping programs that they might see in real life?

Sample Answer: Home shopping deliveries will have algorithms and programs like the ones they have created.