



Programmable toys

This section is about the ability to develop direct commands and sequences to control programmable toys as part of the IT Control strand. There are several different types of toy available, including Pip, Roamer and the Valiant Floor Turtle. Whatever system you use to program the toy, children should be encouraged to develop a feel for planning their control, recording likely solutions, testing sequences and subsequently altering the sequences to achieve success or make refinements. In this section the term 'turtle' refers to any programmable toy which can be instructed to move.

Suitable hardware

Valiant Turtle
Roamer
Pip



63 Body geometry

Age
5+

Organisation
Whole class

Time
30 minutes

Purpose
To introduce the children to control skills.

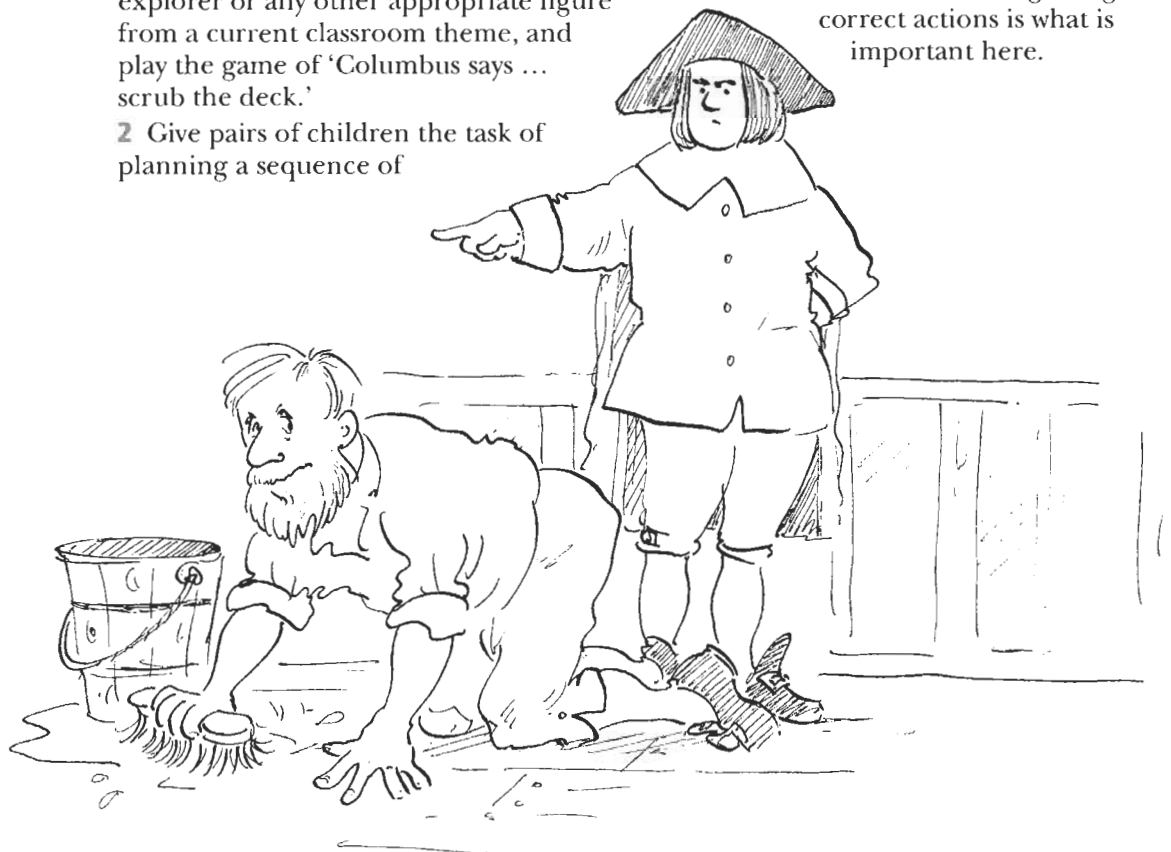
Activity
1 Introduce an activity based on the 'Simon says ...' game in which the children have to listen and carry out various actions depending on the wording of the instruction. Give each child a chance to take the part of a reading scheme character, a New World explorer or any other appropriate figure from a current classroom theme, and play the game of 'Columbus says ... scrub the deck.'

2 Give pairs of children the task of planning a sequence of

instructions for a relatively simple task, such as walking from one side of the classroom to the other, negotiating tables in between.

Watch and listen with the other children while each pair tries their commands.

Talk about what happened, the words the children used, and whether they could improve on them. The relationship between thinking ahead, giving accurate commands and recognising correct actions is what is important here.





64 Control robots

Age
6+

Purpose

To develop planning and control skills.

Organisation
Whole class

Activity

As part of their movement or drama work children can role-play as robots and controllers. In the joint imagination the child-robot can be a remote-controlled submersible on the sea bed or an unmanned exploration vehicle on the moon being controlled by a set of NASA engineers.

Time
20–30 minutes

2 With your children plan sets of instructions and work out possible definitions or rules, such as these:

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If your controller says 'Forward', wait for a number.

If your controller says 'Forward 3', go forward three paces (or three shoe lengths, bunny-hops, etc.).

If your controller says 'Left', wait for a number.

If your controller says 'Left 2', turn left two quarter-turns (or two half-turns, degrees, etc.).

If you reach a wall, STOP and sit down. Your controller has not thought ahead or estimated carefully enough.

3 Give each group the chance to try out their commands, amending them in the light of experience as necessary.

4 Ask the children to record their sets of commands, perhaps first drawing a plan of the hall with an imaginary factory or mine layout, telling the story of the remote-controlled rescue vehicle and writing down in sequence the commands that were used to save the day!

Extensions

With younger children, seat them in a large circle and ask for suggestions to control a robot to a specific goal, perhaps to move around a floor mat or from one piece of apparatus to another. You can then call out the commands to a child who has volunteered to be the robot, and the whole class can discuss the outcome.

▶ With more experienced children, one controller can try to control two robots.

▶ Another variant on the same idea is the game 'Code Patrol', illustrated in pcm 64.

Note

▶ This practical body geometry work is so useful for developing skills which will be needed to control floor turtles and screen turtles that it is worth doing it even with upper Key Stage 2 children if they have not experienced it before.



65 Turtles on parade

Age
6+

Purpose

To introduce children to the rudimentary controls of a programmable toy.

Organisation
Whole class, then groups

Activity

At an early stage it is useful to focus simply on the Forward and Backward commands. You will be asking the children to control the turtle, varying these commands by either estimating or counting. The turtle represents a newly recruited Roman soldier who is collecting the parts of his uniform.

Time
20–30 minutes

Set up a space in which the turtle can move backwards and forwards. Along the edge of its route, place some cards to represent the various pieces of uniform that the soldier will need.

pcm 65 on page 80

Ask children in turn to control the turtle using direct commands so that it

stops at each piece of equipment, and then they can blu-tack the card to it.

4 Encourage the children to estimate distances to later objects by using information gained from the earlier ones.

5 Once fully equipped, the turtle can return to the starting point, or progress to the parade ground.

Extensions

This activity is very closely related to various number-line games, which could also be adapted.

A successful set of direct commands can be turned into a sequence that can be repeated so that the turtle carries out the instructions automatically and stops at the right place for each new piece of uniform.



66 In a spin

Age
6+

Organisation
Groups

Time
10–15 minutes per pair

pcm 66 on page 81



Purpose

To build on the work of the previous activity.

Activity

1 Lay out the cards representing pieces of Roman uniform as before.

2 Use pcm 66 to make a 'spinner', with the design of each card copied into a segment.

3 Get the children to spin the spinner to determine the order in which the items of uniform are to be collected.

They then proceed to instruct the turtle, using direct or sequential commands as before.

Extensions

· Altering the positions of the cards on the floor is one way to bring variety to the activity without using a spinner. Another way is to make a matching set of cards which the children shuffle to determine

the order in which they are to collect the items.

► All sorts of other themes can be used as a focus for this activity. Shopping, posting letters, delivering presents or visiting people who help us are all possible themes that can easily be developed to enable the children to practise their IT control skills within a meaningful context.

Note

► Before the estimation stage, some children find it useful to measure the distances by using a cut-out to represent a set distance, and this helps to keep the focus on the control element. On a piece of card draw a sketch of your turtle of the right size to represent a useful counting unit such as 1 or 10. The children can use this to help them make sensible predictions of how far to go forwards or backwards.



67 Post van

Age
6+

Organisation
Whole class

Time
15–20 minutes

Purposes

To introduce children to a wider range of commands.

· To reinforce the skills of estimating angle and distance.

Activity

With younger children, dress the turtle as a post van.

Sit the children in a circle, and use the turtle yourself to deliver a card to a child whose birthday it is today.

3 Encourage small groups to try to send each other items across the circle by first entering a Turn command to face the turtle in the right direction, and then a Forward command to dispatch the item.

Extensions

· Some programmable toys have accessory packs that can be attached and decorated to help the turtle represent characters and objects from both the imaginary and real worlds.



68 A turtle drama

Age
7+

Organisation
Whole class, then groups

Time
Variable

Purpose

· To practise control skills within a language context.

Activity

· Involve the children in making up a drama in which the turtle can take a starring role. The story should involve a journey that the turtle can make, and the props can be as complex or as simple as you wish. Even the most simple outline can offer a rich source of activities that involve planning, discussing, making, testing, improving and so on.

Collaboration and sharing of the different elements are very important. Organise a group of children to plan the sequence of commands that the turtle will have to execute to enact a 'scene' in the drama.

Younger children can enter a series of direct commands that the turtle will carry out in turn; older children will be able to enter the commands as a sequence which will be carried out on the press of a single button.



69 Snail trails

Age
6–9

Organisation
Whole class, then groups

Time
2 or 3 sessions of 10–15 minutes
per group

Purpose

To help children visualise the track of a turtle.

To develop the ability to create control sequences.

Activity

This activity works best with a turtle that can leave a trail with a fitted pen. Lay out some large sheets of paper to record the trails – old rolls of wallpaper work well if held down with suitable weights. There are plenty of opportunities for making judgements, recording, explaining and identifying cause and effect in this activity.

2 Discuss with the children a simple sequence such as this:

Forward 3	or	F3
Right 2		R2
Forward 2		F2
Right 2		R2
Backward 3		B3

Challenge the children to draw the expected 'trail' that the turtle will leave.

Next, get them to program the turtle with the sequence, and then compare their predictions with what really happened.

Note

► In this activity and the next one, turns of 45° or 1/8th of a circle per unit are assumed, so R2 is the same as Right 90.



70 Plot trails

Age
7–9

Organisation
Pairs

Time
Several 5–10 minute sessions per pair

Purpose

To develop the ability to create control sequences.

Activity

Adapt the following examples to suit your turtle and write them on pcm 70A before copying it for the children to use.

Green trail	Blue trail	Red trail	Orange trail
F4	F4	F4	F2
R2	R2	L4	B1
F2	F2	F2	R2
B4	R2	R2	F1
	F4	F2	L2
	R2	B4	F1
	F2		B2

2 Ask them to mark what they think will happen using appropriately coloured pens and the grid on the sheet.

3 Then they should check their thinking by trying out the sequence with the real turtle.

4 If the turtle leaves a snail trail that is different from that predicted the children should be encouraged to try and work out where they went wrong.


Extensions

The children can try to invent new snail trail sequences for others to try out. They could use the pcm 70A to help plan their ideas. They should test their own sequences and make sure they are successful before presenting them to others. Pcm 70B could be used to help the children focus their ideas, display their sequences and challenge others.

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pcm 70B on page 83

Code Patrol

a	b	c	d
e	f	g	h
i	j	k	l
m	n	o	p
q	r	s	t
u	v	w	x
y	z		 Start here

Cut from card a robot shaped like the one shown here.



Make it the same size and mark it as shown. Use it to spell out words.

This is an example of a code message:

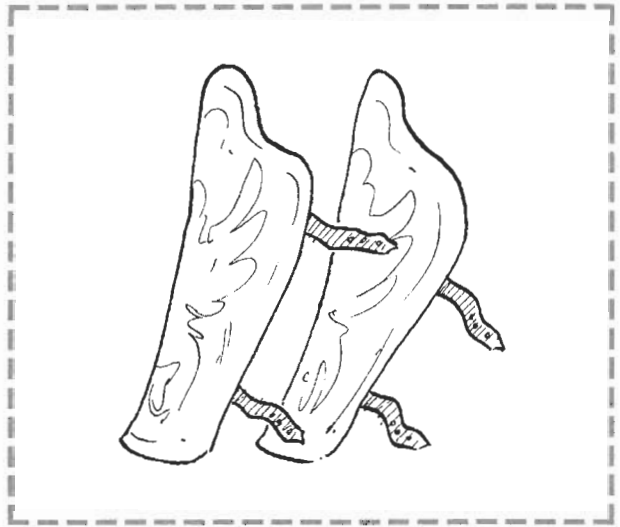
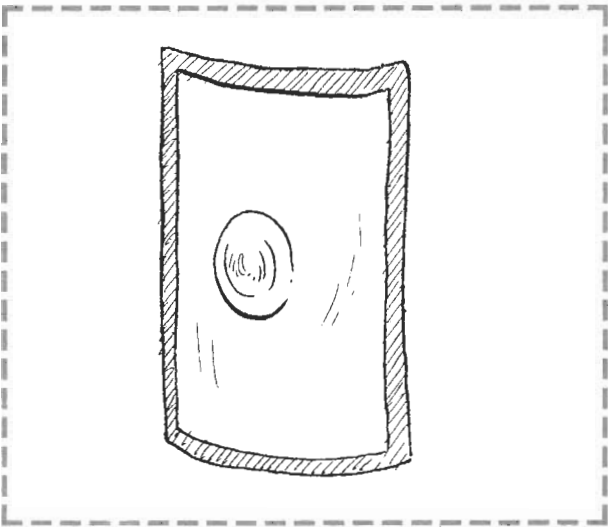
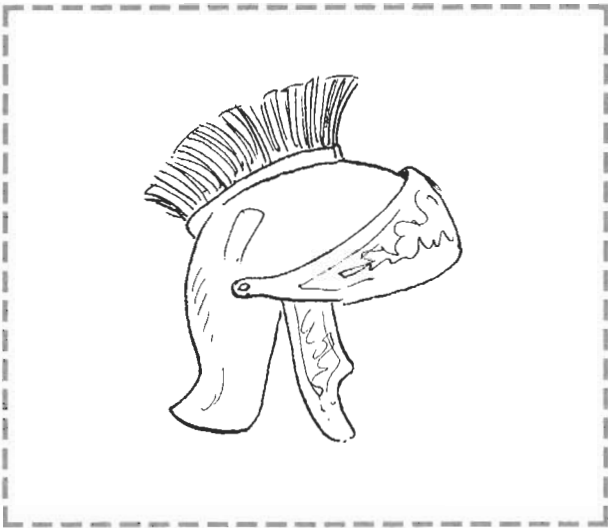
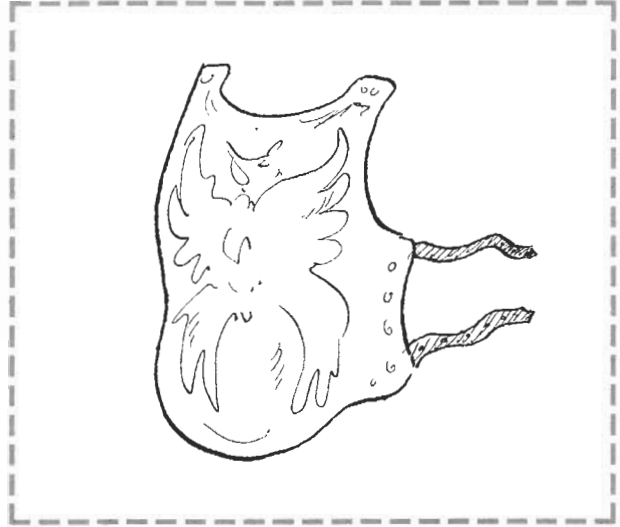
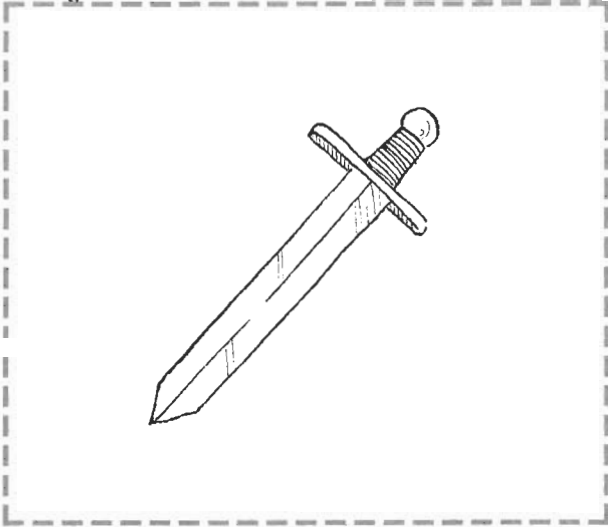
**Forward 2 MARK: Left (90), Forward 3, Left (90), Forward 1 MARK:
Backward 1, Right (90), Backward 1 MARK: Backward 2 MARK:
Right 90, Forward 2 MARK:**

So far this spells most of a type of programmable toy. Check it through and try to finish it. Then try to make up your own coded messages.



On parade

Photocopy onto card and then cut out.

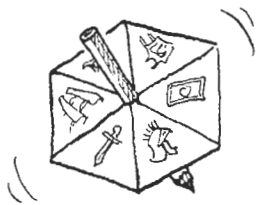
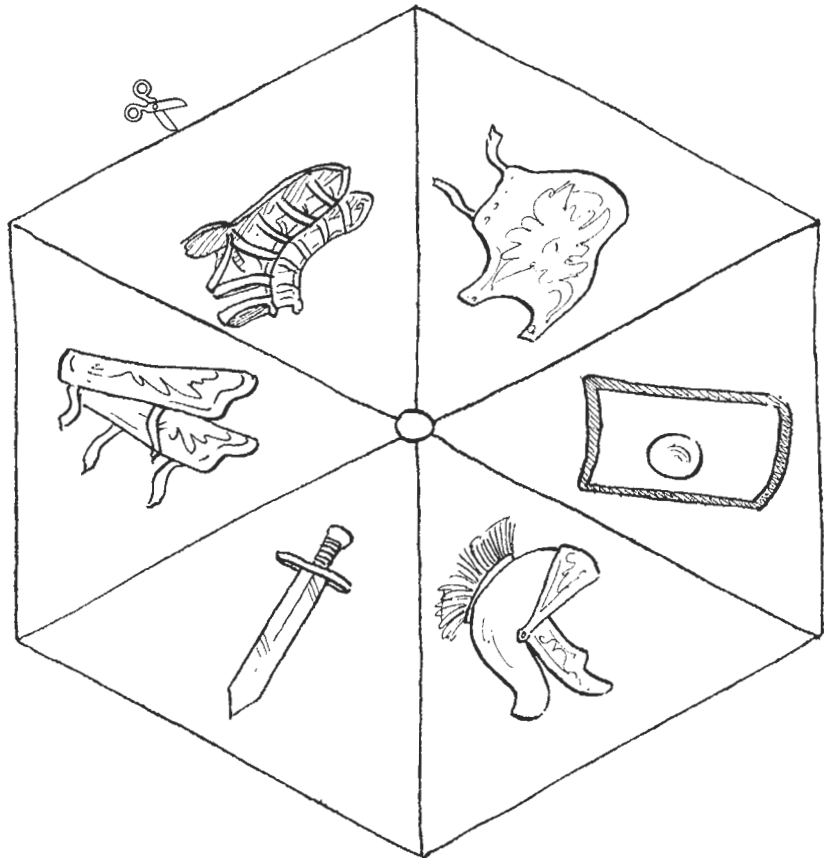


Roman spinner

Photocopy onto card and then cut out.

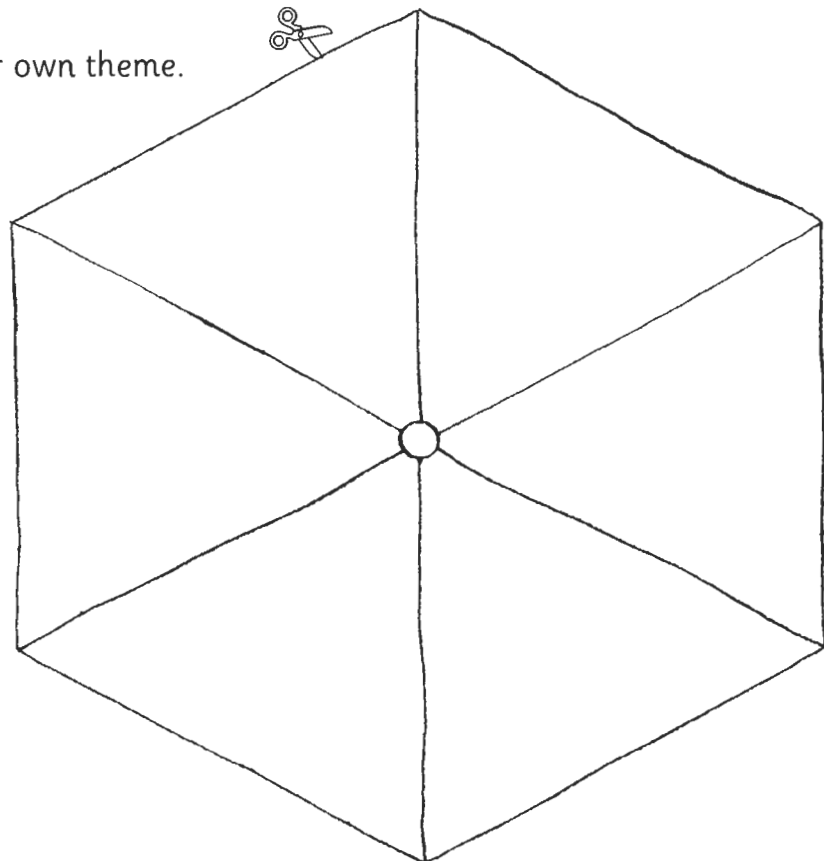
Roman spinner

Spin with a pencil stub through the centre.



Blank spinner

Fill the segments to suit your own theme.

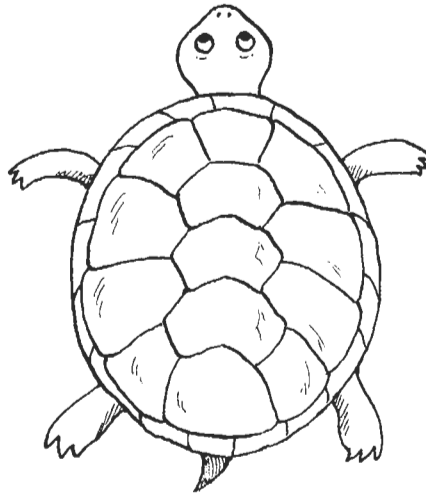




Four trails

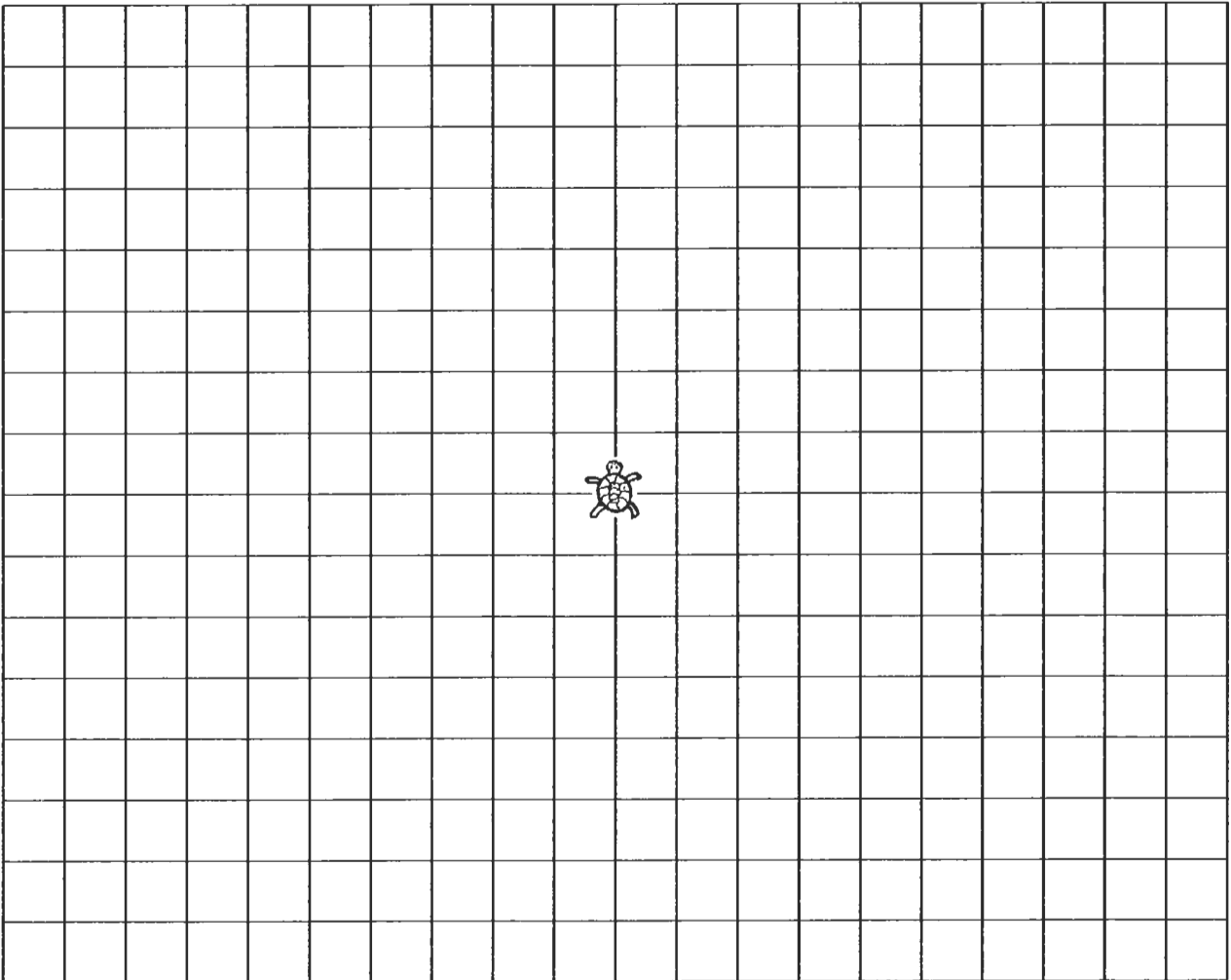
Green Trail

Blue Trail



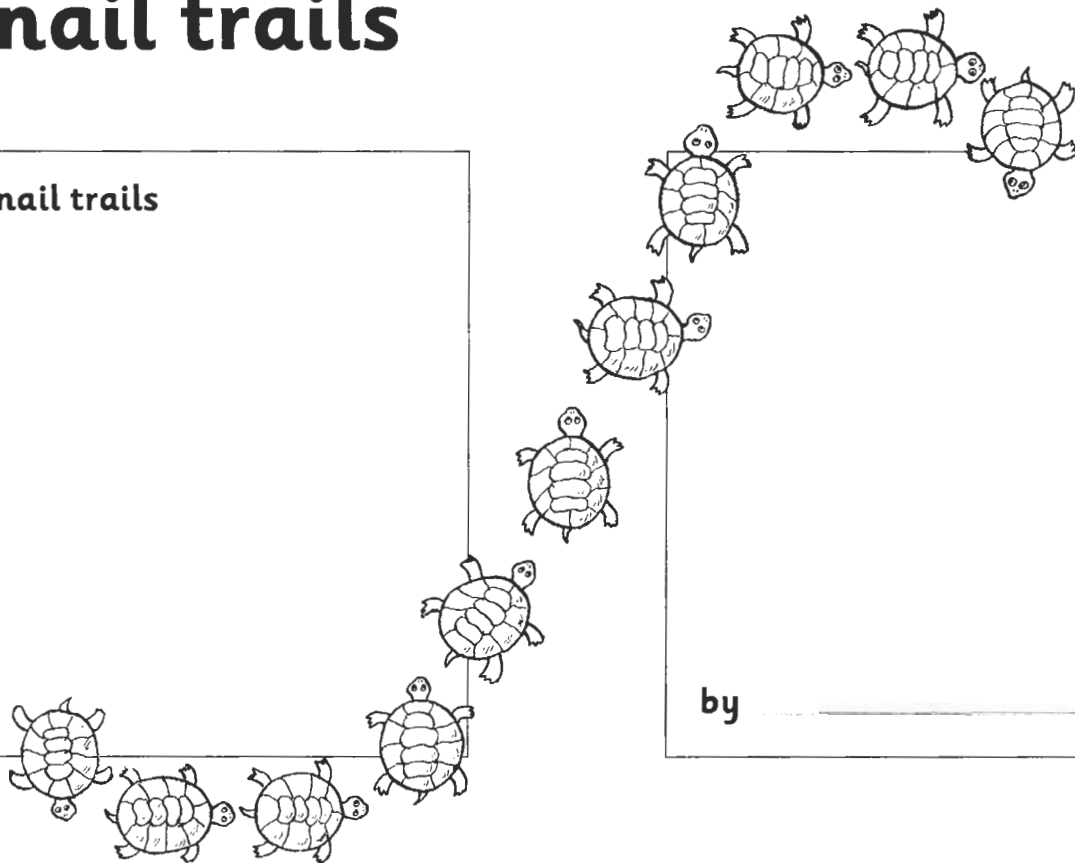
Red Trail

Orange Trail



Snail trails

Snail trails



by _____

