Digital Technologies: Data, robots and computational thinking

*To implement this activity, materials and equipment that will allow students to identify and practically apply Australian Curriculum: Digital Technologies key concepts, key ideas and related ways of thinking are required. Teachers are advised to research available options before purchasing**.*

Target years: Year 2, Years 3–4

Description: This classroom resource comprises four worksheets to accompany a lesson on data and computational thinking. These materials are designed for teachers to use simple line-following robots (Ozobots**) to engage students in thinking and working with data and computational thinking.

Australian Curriculum: Digital Technologies

The following table shows key concepts and content descriptions from the Australia Curriculum: Digital Technologies https://www.australiancurriculum.edu.au/f-10-curriculum/technologies/digital-technologies/

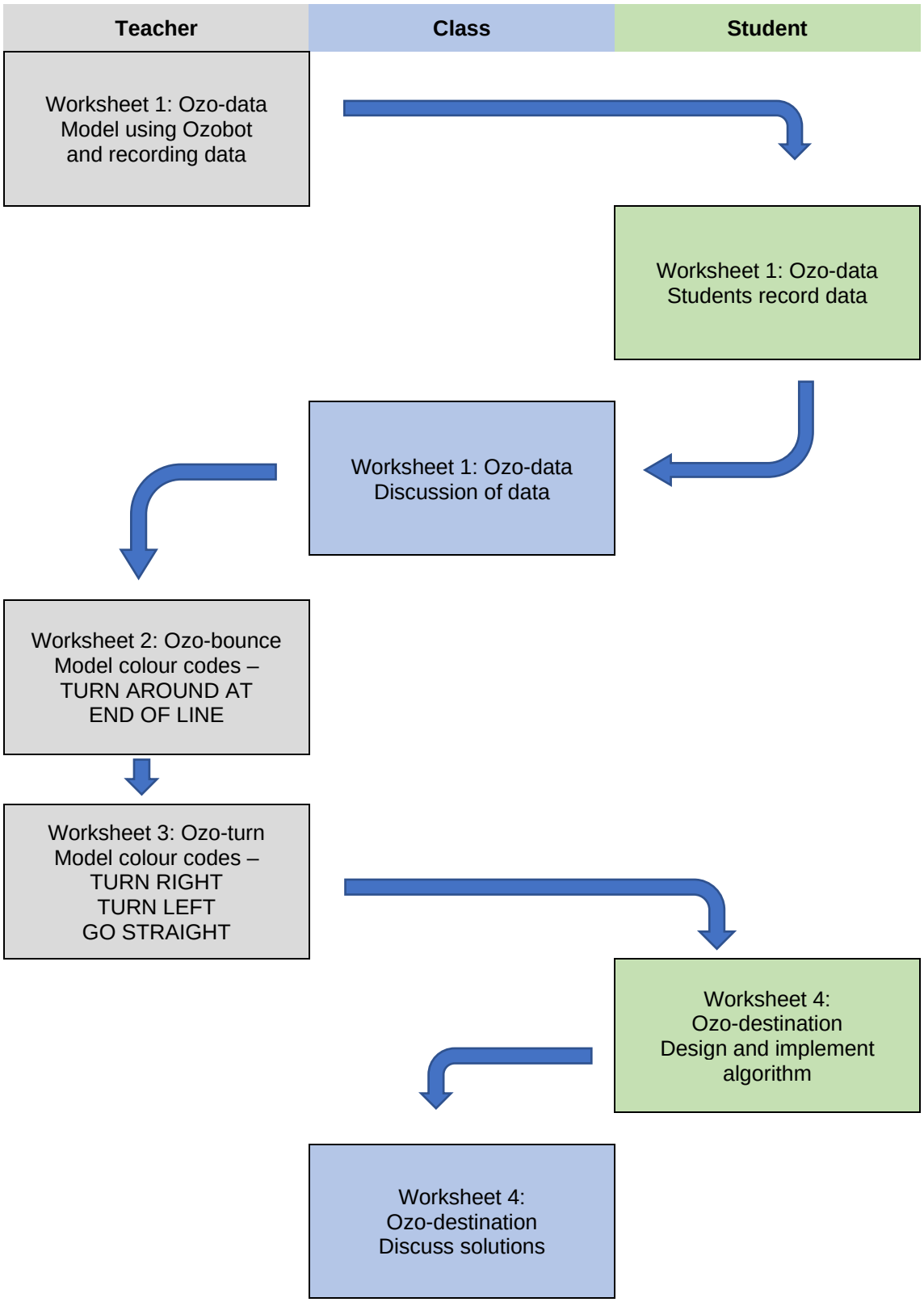
*	Key concept	F–2 content description	3–4 content description
	Data representation	Recognise and explore patterns in data and represent data as pictures, symbols and diagrams (ACTDIK002)	Recognise different types of data and explore how the same data can be represented in different ways (ACTDIK008)
	Data collection	Collect, explore and sort data, and use digital systems to present the data creatively (ACTDIP003)	Collect, access and present different types of data using simple software to create information and solve problems (ACTDIP009)
	Data interpretation		
	Algorithms	Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (ACTDIP004)	Define simple problems, and describe and follow a sequence of steps and decisions (algorithms) needed to solve them (ACTDIP010)
	Implementation	*The content descriptions do not explicitly address Implementation in F–2.*	Implement simple digital solutions as visual programs with algorithms involving branching (decisions) and user input (ACTDIP011)

*Colour coding based on Australian Computing Academy Unpack the Curriculum materials https://aca.edu.au/curriculum/

Resources required

- Ozobot (one per student/group of students) 
- Print resources
  - For each student/group of students:
    - Worksheet 1: Ozo-data
    - Worksheet 4: Ozo-destination
  - For teacher:
    - Worksheet 1
    - Worksheet 2: Ozo-bounce x 1
    - Worksheet 3: Ozo-turn x 3
- Set of coloured markers (red, green, blue, black) per student/group of students.

Flow of activities



Worksheet 1 instructions (Teacher/Student)

- Students investigate the unpredictability of an Ozobot when it encounters a crossroad.
- Using tallies, they record what happens each time the Ozobot runs on a black line.
- They discuss what data they have collected.

Worksheet 1: OZO-DATA

1.  PLACE YOUR OZOBOT ON 'START'.
2.  WATCH WHICH WAY IT TURNS.
3.  PUT A TALLY MARK NEXT TO CLOUD, SUN OR GECKO.
4.  REPEAT STEPS 1–3 (TOTAL 20 TIMES).
5.  ADD UP THE TALLY MARKS FOR EACH OF SUN, CLOUD AND GECKO.
6.  COMPARE YOUR TALLY WITH YOUR CLASS.

Worksheets 2 and 3 instructions (Teacher)

- Teacher models how adding colour codes to the black line changes movement of the Ozobot including turning at the end of the line. Teacher may print several worksheets to model several colour codes.

Worksheets 2 and 3: OZO-DATA

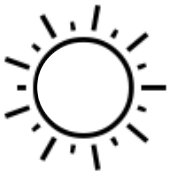
1.  PLACE YOUR OZOBOT ON 'START'.
2.  ADD COLOUR CODES TO TEMPLATE AND WATCH MOVEMENT OF THE OZOBOT.
3.  DISCUSS THE WAY THE SENSOR ON THE DEVICE READS AND EXECUTES THE COLOURED CODES.

Worksheet 4 instructions (Student)

- Students design an algorithm for navigating a maze, and then use colour codes to program the Ozobot.

Worksheet 4: OZO-DESTINATION

1.  PLACE YOUR OZOBOT ON 'START'.
2.  YOUR OZOBOT MUST VISIT THE SUN, CLOUD AND GECKO *ONCE* (IN ANY ORDER).
3. COLOUR THE SQUARES TO CODE YOUR OZOBOT.
4.  HOW MANY DIFFERENT SOLUTIONS ARE THERE? COMPARE WITH YOUR CLASS.



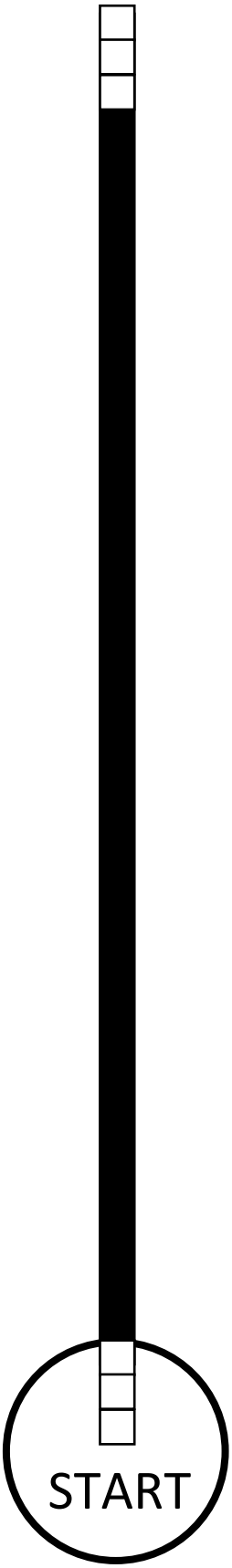
Sun tally
Total

Gecko tally
Total

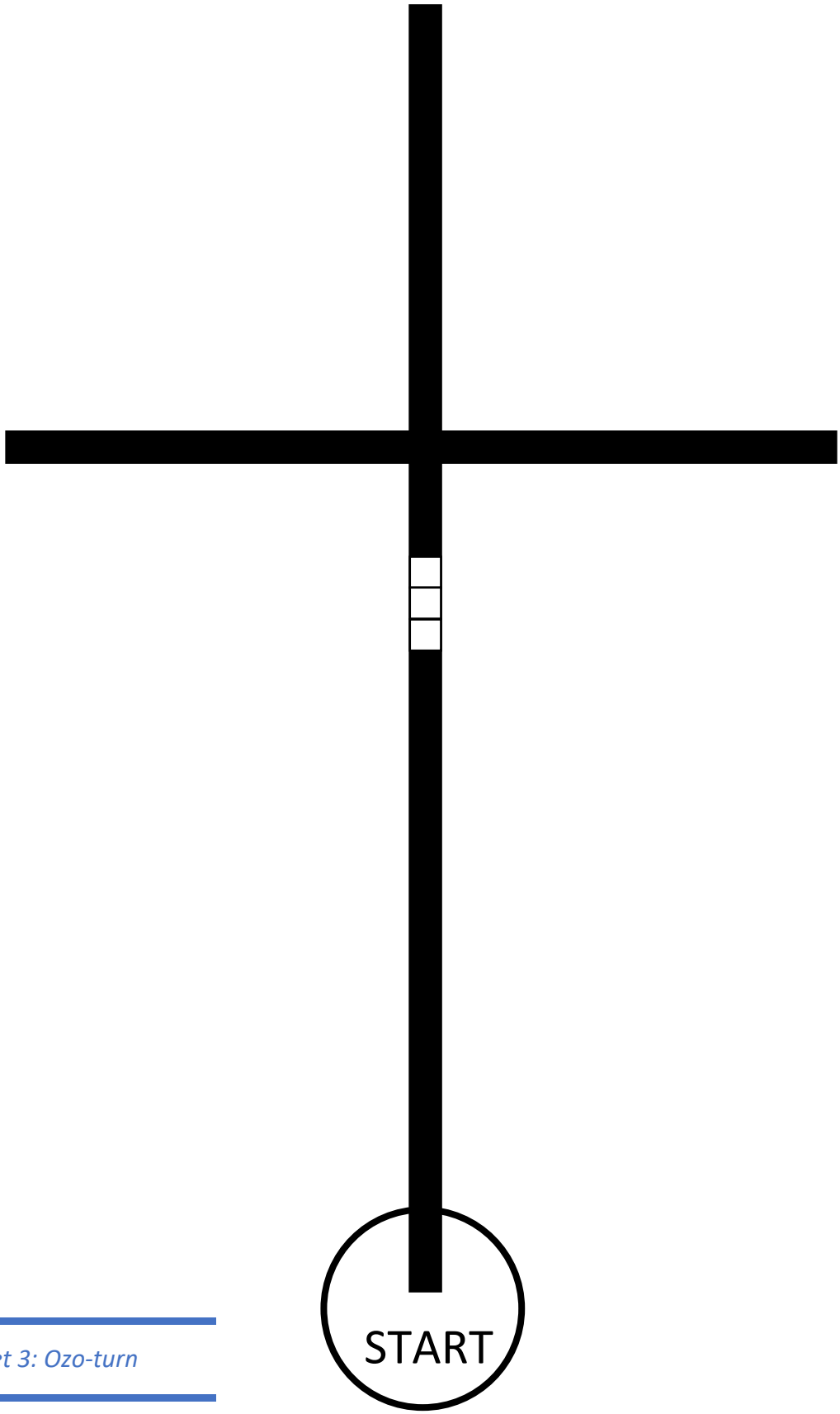
Cloud tally
Total

START

Worksheet 1: Ozo-data



Worksheet 2: Ozo-bounce



Worksheet 3: Ozo-turn

START

Worksheet 4: Ozo-destination