

# Continued....

## Part 3: Time and Distance (continued)

6. Add a new command using the plus key at the bottom.



7. Choose Stop. This will stop Sphero from rolling immediately.



8. Move the bar all the way to the right to create a Delay of 255 and tap Create.



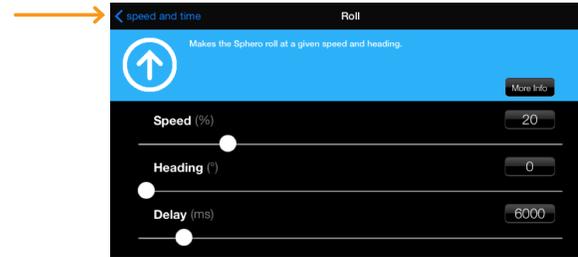
9. You've now written your first program! It tells Sphero to move at 20% speed for 3000 milliseconds, which means 3 seconds, and then stop. You will see a Roll command and a Stop Command. Click the Play button on the bottom.



10. The Sphero will roll slowly for 3 seconds.

Now that we have Sphero going in the right direction, follow these steps for the first experiment:

1. Put a small piece of masking tape on the floor. Place the Sphero on top.
2. On the device, tap Play. The ball will roll for 3 seconds. (If it doesn't roll the path that you want, you can aim Sphero again to be more accurate.)
3. With your tape measure, measure how far it traveled. Write the answer on your worksheet.
4. Now tap on the Roll line and change the delay to 6000. This will make it roll for 6 seconds. (To figure out how many seconds, divide by 1000.) Tap speed and time when you are done.



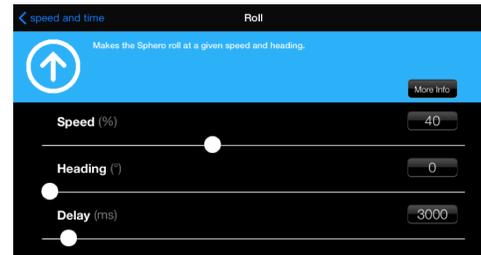
5. Put Sphero back on the tape and tap Play on the device. Measure the distance and write it on your worksheet.
6. Do this one more time with a delay of 9000 (9 seconds). Measure the distance and write it on your worksheet.
7. Either by hand or with a calculator (you can use the one on the iPad), divide the 6 second distance by the 3 second distance. Also divide 9 second distance by the 3 second distance. Write these numbers on the worksheet. (You only have to write one digit after the decimal point – that will be good enough.)

What do you notice about the distances and the time it took for Sphero to go those distances? Discuss this as a class.

## Part 4: Speed and Distance

In our first experiment, we had Sphero move at the same speed, but we changed how long it was moving for. This time, we will have it move for the same amount of time, but we will change how fast it moves. Follow these steps:

1. Tap on Roll and change the delay time back to 3 seconds (a value of 3000.) Tap Play, and measure how far it goes. It should be about the same as the first time you measured it. Write it on your worksheet.
2. Now change the speed to 40%. Again, using the keyboard might be easier than the slider. Play, and measure how far it goes. Write it on your worksheet.



## Part 4: Speed and Distance (continued)

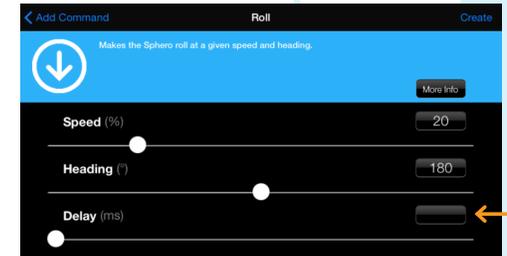
3. Now change the speed to 60%. Play, and measure how far it goes. Write it on your worksheet.
4. Either by hand or with a calculator, divide the 40% distance by the 20% distance. Also divide the 60% distance by the 20% distance. Write these numbers on your worksheet. (You only have to write one digit after the decimal point – that will be good enough.)

What do you notice about the distances and the speed the Sphero used to go those distances? Discuss this as a class.

## Part 5: Challenge

For our challenge, we will have Sphero move a distance out, and then you have to figure out how to move it back at a given speed to have it stop about where it started. Follow these steps:

1. Tap the Roll line and change the speed to 40% and the delay to 5000. This will make it roll at 40% for 5 seconds. Tap the Back button to get back to the speed and time screen.
2. Tap the Add button at the bottom of the screen. Tap Roll. Set the speed to 20% and the heading to 180. This will turn Sphero around 180 degrees and start rolling back at 20% speed.
3. For the delay, put in a number that you think will bring it back to where it started. Tap the Create button up top.
4. Add another Stop command with a Delay of zero.



5. Tap the Play button. Does the Sphero come back about to where it started? If not, adjust the delay number on the second Roll by tapping it. It won't come back exactly, but it should come within a few inches. (If your surface is slippery, it might only be within about a foot.)

What number did you get? Why do you think that's the correct number?

# Continued....

## Assessment of student achievement against goals and standards

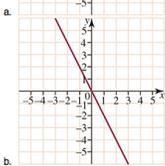
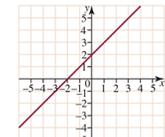
- Successful completion and presentation of the Warrnambool's Longest lunch task.
- Completion of Sphero worksheet
- Successful completion of Linear Graphs test.
- Assessment against the Collaboration Deep Learning Rubric

### Y7 SEALP Linear Graphs test

Name \_\_\_\_\_

Reference – Yr 8 Jacplus Chapter 14.5

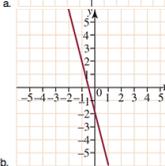
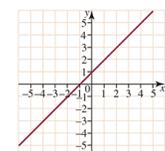
1 For each of the linear graphs shown, find the gradient,  $m$ , the y-intercept,  $c$ , and, using  $m$  and  $c$ , work out the rule.



2

**WE11** For each of the following linear graphs:

- find the gradient,  $m$
- find the y-intercept,  $c$
- using  $m$  and  $c$ , work out the rule.



### Collaboration Deep Learning Progression

Work interdependently and synergistically in teams with strong interpersonal and team-related skills including effective management of team dynamics and challenges, making substantive decisions together, and learning from and contributing to the learning of others.

Dimension	Limited Evidence	Emerging	Developing	Accelerating	Proficient
<b>Working interdependently as a team</b>	Learners either work individually on learning tasks or collaborate informally in pairs or groups but do not really work together as a team. Learners may discuss some issues or content together, but skip over important substantive decisions (such as how the process will be managed), which has significant adverse impacts on how well the collaboration works.	Learners work together in pairs or groups and are responsible for completing a task in order for the group to achieve its work. At this level, tasks may not be well matched to each individual's strengths and expertise, and group members' contributions may not be equitable. Learners are starting to make some decisions together, but may still be leaving the most important substantive decisions to one or two members.	Learners decide together how to match tasks to the individual strengths and expertise of team members, and then work effectively together in pairs or groups. Learners involve all members in making joint decisions about an important issue, problem, or process, and developing a team solution.	Learners can articulate how they work together in a way that is interdependent and uses each person's strengths in the best possible way to make sound substantive decisions and develop ideas and solutions. Interdependent teamwork is clearly evident as that learners' contributions are woven together to communicate an overarching idea and/or create a product.	Learners demonstrate a highly effective and 'energetic' approach to working interdependently in a way that not only leverages each member's strengths but provides opportunities for each to build on those strengths and learn new skills. This includes ensuring that substantive decisions are discussed at a deep level that ensures each team member's strengths and perspectives are infused to come to the best possible decision that benefits all.
<b>Interpersonal and team-related skills</b>	Although learners may help each other on tasks that contribute to a joint work product or outcome, interpersonal and team-related skills are not yet evident. Learners do not yet demonstrate a genuine sense of empathy or a shared purpose for working together.	Learners report and demonstrate a sense of collective ownership of the work and show some interpersonal and team-related skills. The focus is on achieving a common or joint outcome, product, design, response or decision, but at this level the key decisions may be taken or dominated by one or two members.	Learners demonstrate not only good interpersonal skills and collective ownership of the work, an active sense of shared responsibility is also evident. From beginning to end, the team listens effectively, negotiates and agrees on the goals, content, process, design, and conclusions of their work.	Learners can clearly articulate how joint interpersonal skills and collective ownership of the work, an active sense of shared responsibility in listening, facilitation, and effective teamwork ensure that all voices are heard and reflected in the ways of working or work product.	Learners take an active responsibility, both individually and collectively, for ensuring that the collaborative process works as effectively as possible, that each person's ideas and expertise are used to maximum advantage, and that each work product or outcome is of the highest possible quality or value.
<b>Social, emotional, and intercultural skills</b>	Learners have a basic sense of awareness about themselves and how their behavior affects others. They tend to see things only from their own perspective. In some cases, this may impact their ability to form positive relationships.	Learners have a growing awareness of who they are, where they fit in the world, and how their behavior affects other people. This self-awareness is starting to provide a base for better understanding of how other people's emotions and viewpoints differ from their own.	Learners have good awareness of who they are and where their own perspective comes from. Self-awareness and listening skills allow them to better understand and empathize with the emotions and viewpoints of others, moving beyond 'tolerance' or 'acceptance' to genuinely listening perspectives quite different from their own.	Learners have a strong sense of self-understanding where their own perspective comes from and how it differs from others'. They listen carefully, empathize with the emotions and viewpoints of others, and use these to enrich their own learning. As a team member, they work effectively in ways that support, encourage, challenge, and grow not just themselves, but others as well.	Learners have highly developed social and emotional skills grounded in a clear sense of their individual and cultural identity. They communicate well across cultures and disciplines, work effectively in teams, and form positive relationships. The skills they have developed in perspective-taking and empathy, understanding someone else's perspective – and changing their behavior as a result – clearly enhance team functioning.
<b>Leveraging Digital</b>	Although learners use some digital elements for the task, these were very 'surface level' and did not substantially contribute to the quality or output of the collaboration.	Learners used digital opportunities to facilitate shared ways of working, in ways that could not have been done otherwise, although they are unlikely to have significantly deepened the collaborative process.	Learners used digital aspects effectively to encourage interdependent work, speed up feedback, accelerate innovation cycles, and deepen the nature of the collaboration among members.	Learners can clearly articulate how infusing a digital element has facilitated interdependence, deepened the nature of the collaboration, built a deeper sense of shared responsibility, and improved the team's ability to make substantive decisions together.	Learners used digital elements ubiquitously throughout the task in powerful ways to deepen the quality of collaboration and encourage innovation. Learners can articulate in detail about how each digital element has accelerated and enhanced the team's learning and can apply that understanding to new and different contexts.
<b>Managing team dynamics and challenges</b>	Learners mishandle team challenges in one of two ways: (a) They get deeply invested in their own viewpoints, lack the empathy to hear or learn from others, and have difficulty suspending judgment to genuinely listen to others' views or (b) They avoid conflict by deferring to others' views instead of sharing their own or will change their views quickly in the face of inappropriate peer pressure. As a result, the team gets 'stuck' in conflict or may move forward in the wrong direction or one that the team does not share.	At this level, learners still need guidance to forge and maintain positive working relationships and to resist inappropriate peer pressure. They are starting to take a more considered approach to dealing with disagreements, asking each member to share their perspective and discussing any dig beneath those differences to identify what underpins them, which makes it difficult to resolve issues effectively and without unnecessary conflict.	Learners generally work quite effectively in a team, although they are likely to need help with conflict resolution, inappropriate peer pressure, and other challenging issues from time to time. They are developing the ability to identify what underpins their own and others' points of view. They are getting better at clearly and respectfully expressing their own viewpoints, listening to and learning from others. They still need to better 'join their battles' in order to ensure in-depth discussion on challenging issues doesn't hold up team progress.	Learners are more skilled at identifying what underpins their own and others' points of view. They 'join their battles' in deciding what to debate. They are building both courage and clarity to express their own viewpoints, listen to and learn from others. They are becoming skilled at exploring different opinions in ways that contribute to the learning of others without holding up team progress.	Learners have a deep understanding of what underpins their own and others' points of view, the courage and clarity to effectively express their own viewpoints, and the empathy to hear and learn from others. They respectfully explore different opinions in ways that enrich both their own and others' learning and thinking and allow the team to move forward in the direction that the team identifies.



### MacroLab Lesson 1 Time, Speed, and Distance: Worksheet

#### Names:

Part 3 - Time and Distance:

How far did the Sphero travel for Speed: 20% Time: 3000 (3 seconds): 1.33m  
 How far did the Sphero travel for Speed: 20% Time: 6000 (6 seconds): 2.68m  
 How far did the Sphero travel for Speed: 20% Time: 9000 (9 seconds): 4.15m  
 What is the 6 second answer divided by the 3 second answer: approx 2  
 What is the 9 second answer divided by the 3 second answer: approx 3

Part 4 - Speed and Distance:

How far did the Sphero travel for Speed: 20% Time: 3000 (3 seconds): 1.33m  
 How far did the Sphero travel for Speed: 40% Time: 3000 (3 seconds): 5.55m  
 How far did the Sphero travel for Speed: 60% Time: 3000 (3 seconds): 13.20m  
 What is the 40% answer divided by the 20% answer: 4.2m  
 What is the 60% answer divided by the 20% answer: 9.9m

For part 3, graph the relationship between time (t) and distance (d). Create a table of values and determine the rule to the linear graph.

