SASTA OLIPHANT SCIENCE AWARDS

SOUTH AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

Highly Commended

Scientific Inquiry

Year R-2

Frankie Egan
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Unley Primary School

Operation Left Foot Mastery

By Frankie Egan and Van Scholz

We are both soccer players. We both prefer to pass, dribble, shoot and juggle with our right foot because it is stronger and feels more comfortable than our left.

Professional soccer players like Kevin De Bruyne are really good at using both their left and right feet. This helps them play faster, make more passes and shots, and trick defenders.

In an interview (Man City, 2022), Kevin De Bruyne, who is naturally right-footed, said he has been practicing with his left foot since he was young. He said, “whenever I get an opportunity to shoot with either left or right, I just take it…I’m confident enough to do that".

Question:

If we practice regularly on our left foot like De Bruyne, will it become stronger and more comfortable to use?

Background:

The many books and videos that we researched shared the same message, that when you practice something new, your brain changes and grows (DK 2020; Drew 2021; George 2022; Howell 2019; Halo Neuroscience 2019, Sentis 2012). This is a process called neuroplasticity.

The brain is the control centre for your body (Halo Neuroscience 2019). It is full of billions of neurons. Neurons are cells that transmit information to other neurons. They send messages between the brain and muscles to control movement (George, 2018). These messages travel through synapses, which are like a pathway, or a road between the neurons. Some of these pathways are well used, these are our habits, like brushing our teeth or tying our shoelaces (Sentis 2012). When we learn a new skill, like using our left foot to shoot a soccer goal, we are building a new pathway. At first, our movements will feel slow and uncoordinated, but with practice, our brain begins to use this pathway more, and this new skill starts to feel more natural.

Planning and Conducting:

We brainstormed what activity was easily measurable, safe and needed the least materials, and decided that juggling a soccer ball was the best activity to test.

Our experiment will run for four weeks and will investigate whether regular practice will improve our left-foot juggling skills.

Hypothesis:

We predict, that with regular practice, we will increase the number of times we can juggle a soccer ball with our left foot.

Equipment and Materials:

- 2 participants, Frankie and Van (CV)

- Calendar for scheduling our practice

- Size 4 soccer ball, inflated (CV)

- Sneakers (CV)

- Pen and paper

- Flat, clear ground (CV)

Note: We have marked our controlled variables above with the letters CV. Each time we do our test, we must keep these things the same so that we know that the changes we see are because of what we are testing and not something else.

Method:

1. Baseline Test : Test how many times we can juggle a soccer ball using only our left foot. Each person will have five attempts. Record the number of juggles for each try and calculate the average number of juggles from the five attempts.

2. After the baseline test, we will follow a left-foot juggling practice schedule. This will mean practising juggling on our left foot for 15 minutes every second day, over four weeks.

3. At the end of each week (Friday's at 8.30am), we will repeat the juggling test using the same method as in the baseline test. We will record our results to check for any changes.

4. At the end of the four weeks, we will compare the average number of juggles from the first test with the average from the final test to measure the changes.

Independent and Dependent Variables:

Our left foot juggling practice is our independent variable. Our dependent variable is the number of times we can juggle the soccer ball on our left foot.

Processing and analysing data and information:

We have recorded our juggling results for our baseline test in **Table 1** below. The baseline test was done before we started our practice schedule. To calculate the average, we have added the number of juggles for each attempt together and divided the total by the number of attempts (5).

Baseline Test - Friday, 16th May 2025						
	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Frankie	1	2	4	2	5	2.8
Van	3	3	1	4	3	2.8

Table 1

Juggling results after doing one week of our left-foot juggle practice schedule are recorded in **Table 2** below.

Friday, 23rd May 2025						
	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Frankie	4	2	3	7	3	3.8
Van	0	0	0	0	0	0

Table 2 Note: Van hurt his left foot during PE class on Monday May 19th, so he could not practice this week or do the test.

Juggling results after 2 weeks of our left-foot juggle practice schedule are recorded in **Table 3** below.

Friday 30th May 2025						
	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Frankie	4	6	3	5	5	4.6
Van	4	5	4	2	2	3.4

Table 3

Juggling results after 3 weeks of our left-foot juggle practice schedule are recorded in **Table 4** below.

Friday, June 6 2025						
	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Frankie	6	5	5	4	6	5.2
Van	2	5	3	4	3	3.4

Table 4

Juggling results after 4 weeks of our left-foot juggle practice schedule are recorded in **Table 5** below. This was our final test.

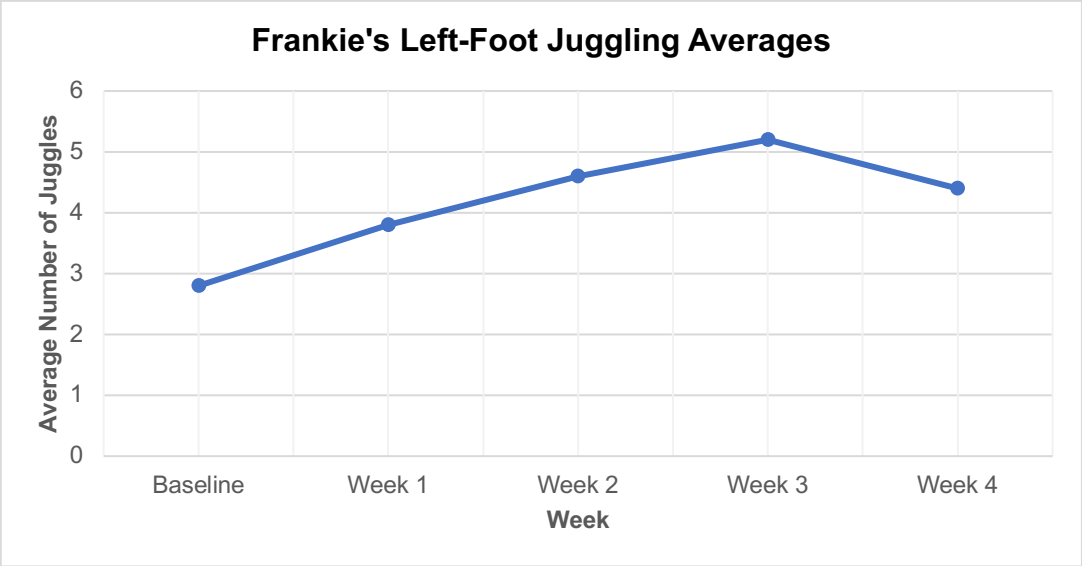
Friday, June 13th 2025						
	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Frankie	4	5	5	3	5	4.4
Van	3	4	7	4	4	4.4

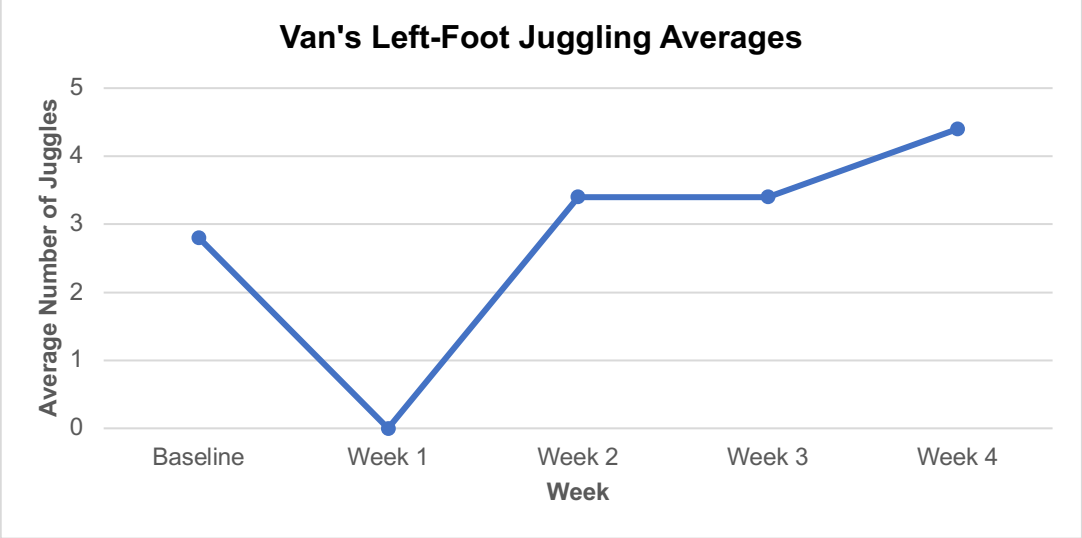
Table 5 Note: In this week, Frankie missed two days of school and two practices because he was unwell.

The table below shows the average number of left-foot juggles across the four weeks. We have used this information to create a line graph for each participant using Excel to see how our left-foot juggling has changed over the weeks.

Average Number of Left-Foot Juggles					
	Baseline	Week 1	Week 2	Week 3	Week 4
Frankie	2.8	3.8	4.6	5.2	4.4
Van	2.8	0	3.4	3.4	4.4

Table 6





Overall, the number of juggles we could do on our left foot increased. Before starting our left-foot juggle practice schedule, the average number of left-foot juggles was just 2.8. After four weeks of the practice schedule, our average increased to 4.4 juggles. This is 1.6 more juggles than was recorded in our baseline test. This is a 57% increase, calculated as (4.4 minus 2.8) divided by 2.8, multiplied by 100.

Evaluating:

Our findings support our hypothesis - that regular practice would increase the number of times we can juggle a soccer ball with our left foot. We experienced neuroplasticity in action – the more we practiced, the stronger and more comfortable our left foot became. When we stopped training because of injury and illness, our progress slowed. This also shows how important consistent practice is for strengthening the brain's pathways and improving skills over time.

We can apply this same practice principle for improving our left-foot dribbling, shooting and passing skills and work toward becoming all-round players just like Kevin De Bruyne.

By sharing what we have learned about the power of practice with our soccer team mates, we can encourage them to train harder, and practice at home so we can all build our skills and improve as a team.

Word Count: 1002

References:

Drew, Liam, 2020, *How the Brain Works*, London, Dorling Kindersley Limited

Drew, Liam 2021, The Brain Book, London, Dorling Kindersley Limited

George, Alison, 2022, The Brain, Everything You Need to Know, USA, Nicholas Brealey Publishing

Halo Neuroscience (2019), The Neuroscience of Learning, Available at https://www.youtube.com/watch?v=_nWMP68DqHE (Accessed 21 June 2025)

Howell, Izzi, 2019, The Brain and Nervous System, UK, White Thomas Publishing Ltd

Man City (2022) KEVIN DE BRUYNE, I Practiced With My Left Foot Since I Was Young, Available at https://www.youtube.com/watch?v=PNeXj_LYsww&t=116s (Accessed 9 June 2025).

Sentis (2012) Neuroplasticity, Available at https://www.youtube.com/watch?v=ELpfYCZa87g (Accessed 9 June 2025).

Thanks to Van's dad, Adelaide City FC coach, for helping us to brainstorm soccer activities for testing.

Thanks to Frankie's mum for helping us with Excel, Word and referencing.

OSA RISK ASSESSMENT FORM

for all entries in (✓) ☐ Models & Inventions and ☐ Scientific Inquiry

This must be included with your report, log book or entry. One form per entry.

STUDENT(S) NAME: FRANKIE EGAN & VAN SCHOLZ ID:

SCHOOL: UNLEY PRIMARY SCHOOL

Activity: Give a brief outline of what you are planning to do.

We will investigate Whether regular practice will ~~improve~~ Improve our left foot(LF) juggling skills. We will test the number of our LF juggles ~~of~~ we can do, then for four weeks we will practice LF juggling for 15 mins every second Day. at the end of 4 weeks, we will see if the number of juggles we can do has increased

Are there possible risks? Consider the following:

- Chemical risks: Are you using chemicals? If so, check with your teacher that any chemicals to be used are on the approved list for schools. Check the safety requirements for their use, such as eye protection and eyewash facilities, availability of running water, use of gloves, a well-ventilated area or fume cupboard.
- Thermal risks: Are you heating things? Could you be burnt?
- Biological risks: Are you working with micro-organisms such as mould and bacteria?
- Sharps risks: Are you cutting things, and is there a risk of injury from sharp objects?
- Electrical risks: Are you using mains (240 volt) electricity? How will you make sure that this is safe? Could you use a battery instead? **Only batteries can be used for Models & Inventions entries*
- Radiation risks: Does your entry use potentially harmful radiation such as UV or lasers?
- Other hazards.

Also, if you are using other people as subjects in an investigation you must get them to sign a note consenting to be part of your experiment.

Risks	How I will control/manage the risk
Hitting someone with the ball while testing/practicing	do Practice and testing in a clear Space before School starts.

(Attach another sheet if needed.)

Risk Assessment indicates that this activity can be safely carried out

RISK ASSESSMENT COMPLETED BY (student name(s)): Frankie Egan, Van Scholz

SIGNATURE(S): F.E V.S

☑ By ticking this box, I/we state that my/our project adheres to the listed criteria for this Category.

TEACHER'S NAME: Miriam Doull

SIGNATURE: DATE: 19 June 2025

Operation Left Foot Mastery

Log Book

15-5-2025

Research - the brain send's singnal to each other. practising - it's because neurons repeatedly spike at the same time form stronger synapses.

the Brain is the control center of your Body it gathers information, processes this infomation and contros how your Body responds. If the Brain is full of neurons. These are cells that are conected to each other to pass messages ~~amoug~~ among ~~themse~~ themselves

synapses - join the neurons together and use cemicals to relay info from one neuron to the next.

Spikes - are little pules of electricite that move along neurons to tell synapses when to send messages.

~~the tile is that the B~~

the Brain Book, Dr Liam Drew,

Dr Liam Drew, 2021, The Brain Book, Dorling Kinderlty Limited

15-5-2025

Question-
Will my weak foot become strong as my dominant foot if i pratcis?

Prediction-
We predictict our left foot will become better if we

Pratctis. can We train our left foot to
can we increase the nubers of
juggles on our left foot?
Can we improve the cordination
of our left foot when juggling
if we practice.

Can we train ovr left foot to become stronger and more comfortable to use.

Hypothesis: We predictict that with Pratictes We can
encrease

16-5-2025

We predictict that if we practice, we will be able to increase the number of juggles we can do on our left foot.

15-5-2025

Baseline test-

Right foot

Accury - 6 shots %.

Speed - 6 shots o/o

Juggle's

~~distance~~ -

Left foot

- 6 shots

test Procedure Ideas

1. juggling

~~2.~~

2. Measuring the speed of our penalty shots

3. taget practice

juggling will be the easyest to. ~~measurage~~ and require the least equipment.

equipment: soccer ball
sneakers
pen paper
calcalator
calender

1. Baseline test. ~~the~~ record how many juggles on our left ro right and ~~to~~ together. calculate the arreage of fire attempts. ~~to~~

2. ~~Practice~~ juggling with left foot every 2nd day for ~~t~~ 15 minutes for 4 weeks

May 2025

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16 baselin test	17 15 min Prac
18	19 15min Prac	20	21 15 min Prac	22	23 test	24 15 min Prac
25	26 15 min Prac	27	28 15 min Prac	29	30 test	31 15 min Prac

June 2025

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 15 min Prac	3	4 15 min Prac	5	6 test	7 15 min Prac
8	9 15 min Prac	10	11 15 Min Prac	12	13 final test	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

Date Friday 16 May

Time 8:30

Weather Fine

Ball type · Premirleage Size four

Shoes. indoor nike F

location Ground : flat

ball PSV

R 1. 9
2. 6
3. 8
4. 13
5. 29.

F

R. 1. 2
2. 3
3. 7
4. 7
5. 9

V R 29
F R 9

V

L 1. 3
2. 3
3. 1
4. 4
5. 3

F

L 1. 1
2. 2
3. 4
4. 2
5. 5.

U L 4
F L 5

V

2 feet -

1. 6
2. 14
3. 5.
4. 12.
5. 3

V 14.

F

2 feet

1. 6.
2. 4
3. 4
4. 3
5. 2

F 6.

to calculate average:

attempt ~~on~~ 1 ~~+~~ attempt 2 + attempt 3 + attempt 4 + attempt 5 / the number of attempts (5)

Left Foot Juggling Practice log

Date	Frankie completed	Van completed
Sat May 17, 15 min practice	✓	✓
Mon May 19, 15 min practice	✓	✗
Wed May 21, 15 min practice	✓	✗
Fri May 23 - Test	✓	✗
Sat May 24, 15 min practice	✓	✓
Mon May 26, 15 min practice		✓
Wed May 28, 15 min practice	✓	✓
Fri May 30 - Test	✓	✓
Sat May 31, 15 min practice	✓	✓
Mon June 2, 15 min practice	✓	✓
Wed Jun 4, 15 min practice	✓	✓
Fri Jun 6 - Test	✓	✓
Sat Jun 7, 15 min practice	✓	✓
Mon Jun 9, 15 min practice	✗	✓
Wed Jun 11, 15 min practice	✗	✓
Fri Jun 13 - Final Test	✓	✓

Friday May 16 2025

Right Foot	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Van	9	6	8	13	29	13
Frankie	2	3	7	7	9	5.6

Left Foot	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Van	3	3	1	4	3	2.8
Frankie	1	2	4	2	5	2.8

Both	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Van	6	14	5	12	3	8
Frankie	6	4	4	3	2	3.8

Findings:

Van Right foot is better than right

Frankie Right foot is better than right

Friday, May 23 2025

Right Foot	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Van						
Frankie	5	12	7	8	6	7.6

Left Foot	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Van						
Frankie	4	2	3	7	3	3.8

Both	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Van						
Frankie	5	5	4	11	4	5.8

Findings:

Van : van hurt foot at P.E. and could not juggle

Frankie: improvement on left than previous week.

Friday, May 30 2025

Right Foot	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Van	8	4	4	5	2	4.5
Frankie	8	10	14	6	9	8.4

Left Foot	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Van	4	5	4	2	2	3.4
Frankie	4	6	3	5	5	4.6

Both	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Average
Van	4	5	3	12	7	6.2
Frankie	2	8	2	3	3	3.6

Friday, June 6 2025

Right Foot	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	
Van	4	6	6	13	5	6.8.
Frankie	13	4	10	17	6	10

Left Foot	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	
Van	2	5	3	4	3	3.4.
Frankie	6	5	5	4.	6	5.2

Both	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	
Van	5	2	17	12	7	8.6
Frankie	5	4	3	8.	11	6.2

Friday, June 13 2025

Right Foot	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	
Van	8	3	4	15	6	7.2.
Frankie	4	11	3	8	4	6

Left Foot	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	
Van	3	4	7	4	4	4.4
Frankie	4	5	5	3	5	4.4

Both	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	
Van	12	7	3	4	4	6
Frankie	5	5	10	4	4.	5.6.

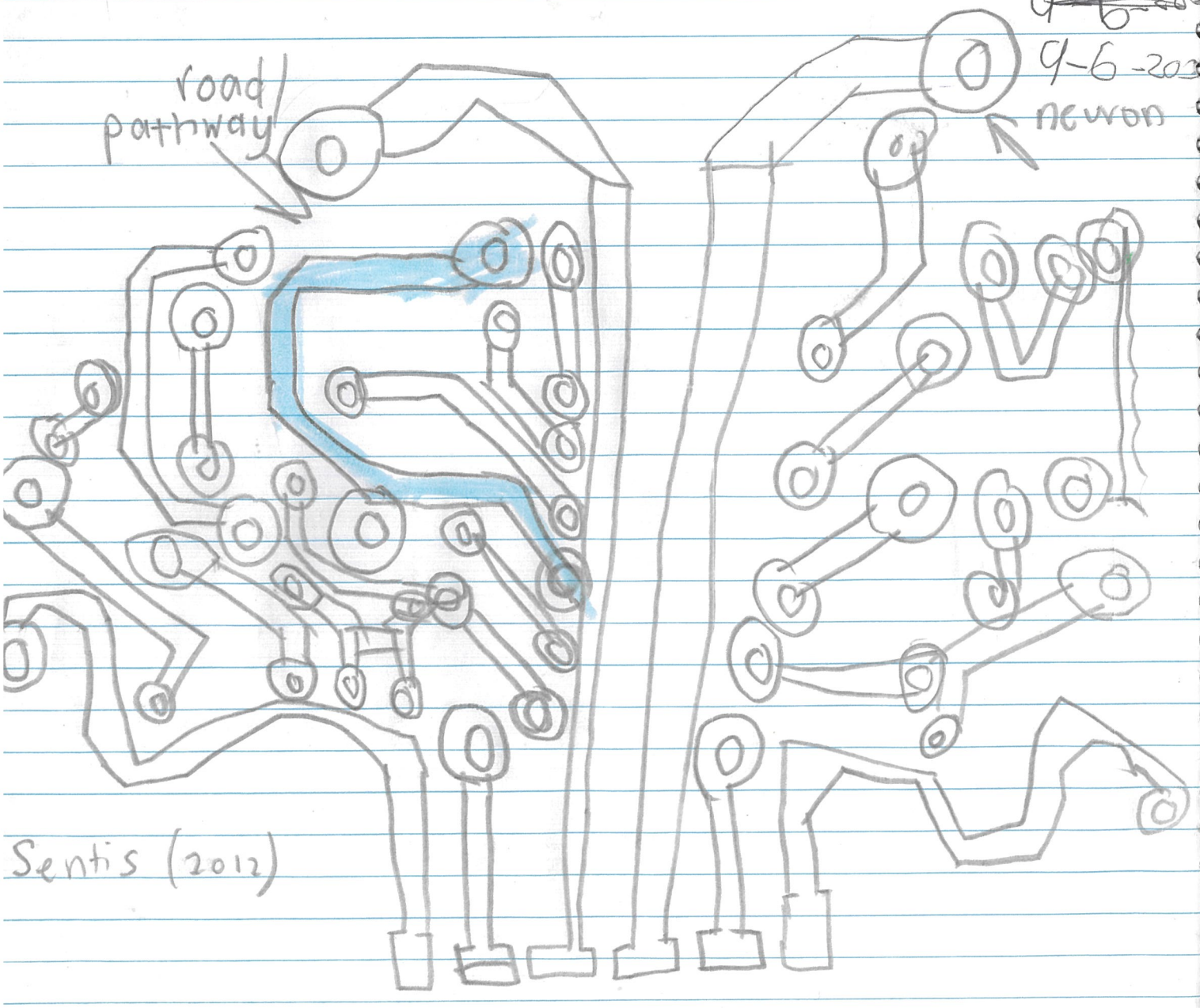
~~When you learn a new skill~~ 6-6-2025

learning a new skill can trigger the creation of new synapses this partly why you improve at the skill over time. synapses can also be lost over time if a skill is not practiced.

Howell, 12/21/2019, The Brain and Nervous system, White-thomas publishing Ltd

~~6-6-2025~~

6-6-2025



Sentis (2012)

Practice.

13-6-2025

When you learn new things the info needs to travel from one neuron to another over and over, eventually The brain creates Pathways between neurons. It becomes easier to recall info and put it to use.
The brain, Alison George.