SASTA OLIPHANT SCIENCE AWARDS

SOUTH AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

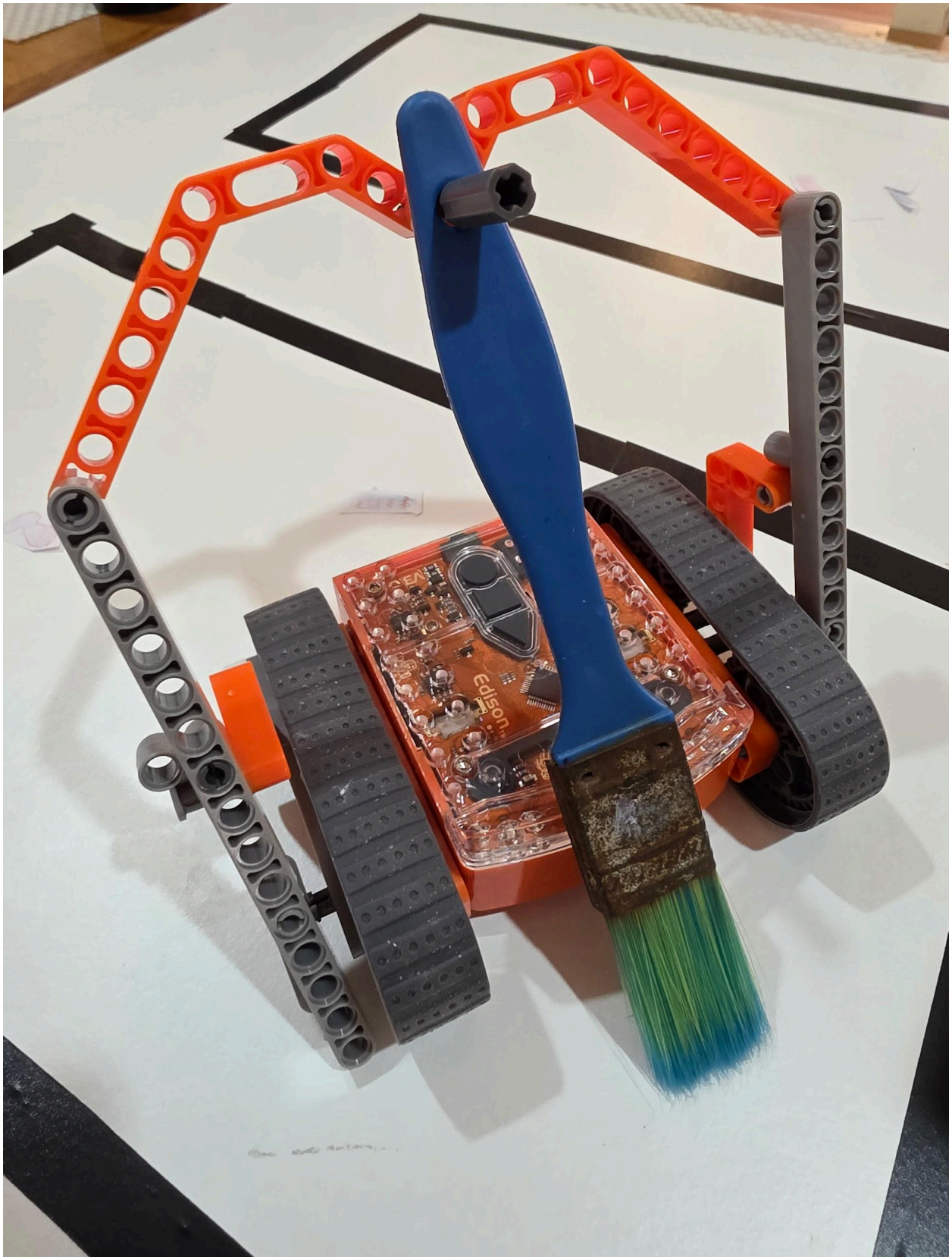
Prize Winner

Programming, Apps & Robotics

Year R-2

Andrew McLauchlan

Cedar College


Edison

Aim of Entry

For my robot to find and dig up artefacts at archaeology dig sites by itself.

Scientific Purpose

To find out the past of humans. It means people don't have to do as much hard work and they won't get burnt from the sun because the robot is doing it. It's easier to get to dig sites for the robot. I wanted to see if I could build a robot that could find a dig site and then start brushing to clear the sand off and find artefacts.

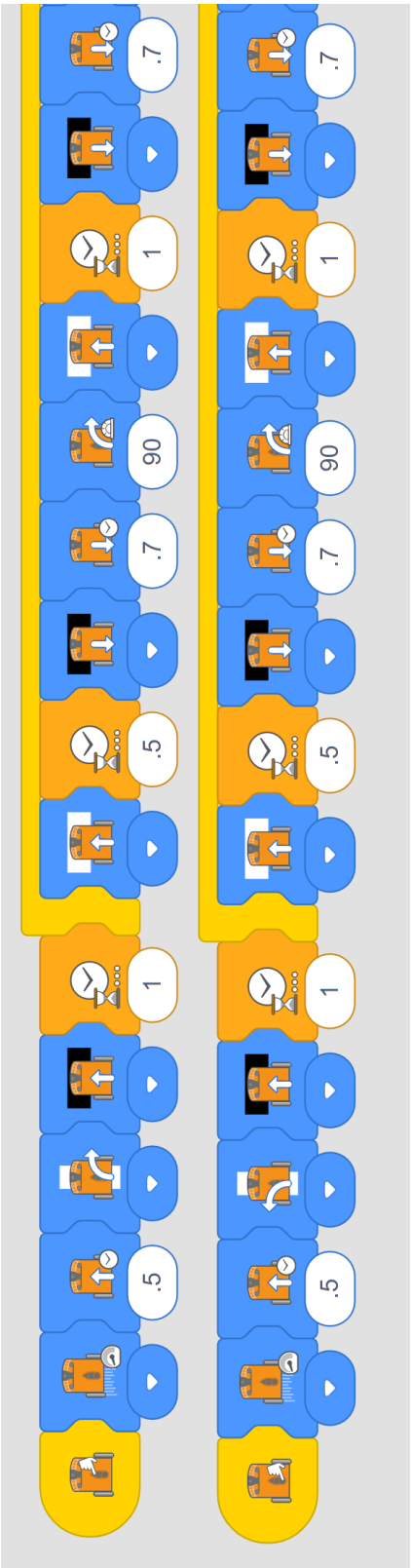
Potential Applications

The robot has tracks so it can go to dig sites like in the desert or valleys and it could brush a really large area of hard to reach dig sites.
It could also be used as a paleontologist robot and because it has a brush it can be used for sweeping rubbish at the rubbish dump, in schools or in parks.

Instructions

EdBlocks can be used on any PC or Mac with an internet connection. It can be accessed in a browser by visiting www.edblocksapp.com/v3/. My program was saved to Google Drive here, and can be downloaded as andrew-mclauchlan-eddys-archaeology.edblocks and then loaded into EdBlocks.

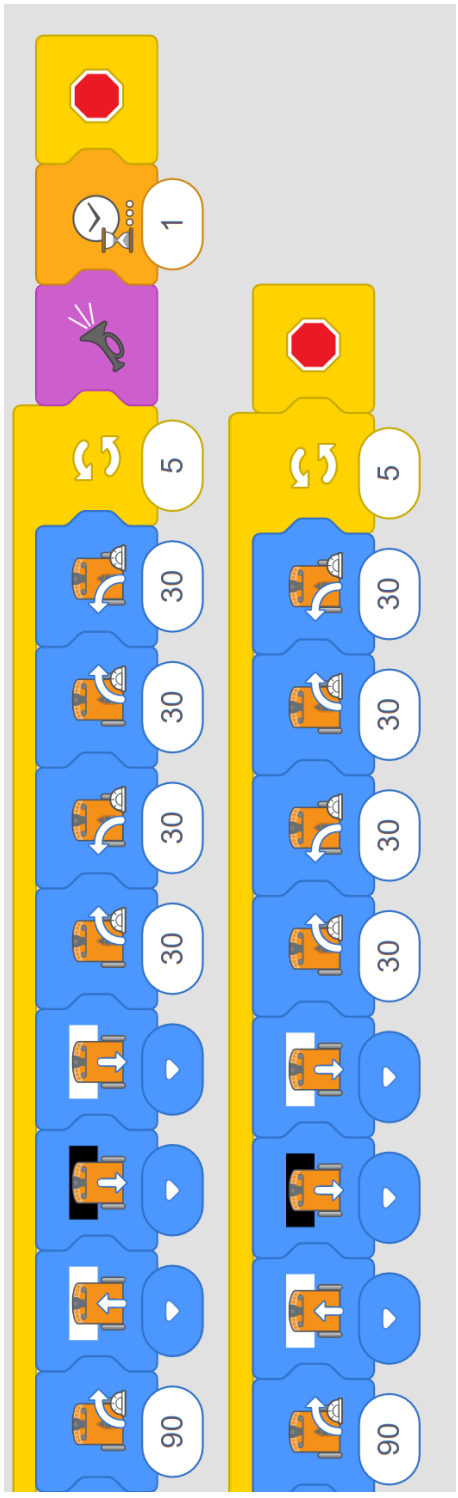
Hard Copy of the Program



I made two programs because I made two different dig sites, one on the left and one on the right, and they're both rectangles.

It's going forward really slow, then it's going forward for .5 seconds, then it turns until it hits a black line.

In the loop, it goes forward when it's on white, then it waits. When it hits a black line it goes backwards. Then it goes backwards for .7 seconds, then it does a 90 degree turn, then it goes forward while it's on a white line again. Then it waits a second, then goes backwards at the black line, then drives backwards for .7 seconds again.



Then it does a turn for 90 degrees, and then it goes forward when it sees white, when it hits a black line it goes backwards, then when it hits white it goes backwards. Then to sweep it does 30 degrees left and right twice.Then after doing all of this 5 times it beeps and it's done.

External Support

Andrew's mum printed some resources for Andrew including the EdBlocks activity book and picture of the Edison robot so he could draw his designs onto it. During the research process she pointed him in the right direction of resources he could find himself, such as driving him to the library and providing access to a tablet to find videos on YouTube. He independently researched his topics using these methods and documented findings in his notebook (see Appendices).

When faced with hurdles, Andrew's mum and dad acted as sounding boards, helping him troubleshoot. Each time Andrew was able to find the solution himself.

Andrew's mum assisted with transcribing notes and formatting Andrew's report. Andrew wrote or spoke (to transcribe) the bulk of the report and the ideas, research, design and coding were Andrew's own work.

Acknowledge of AI Use

When Andrew found Edison wasn't behaving the way he expected on one occasion, he troubleshooted using Gemini with support from his mum. He sent a screenshot of his setup to Gemini and phrased the problem and question himself.

He also tried using Gemini to ask for some different kids' archaeology robot videos. This is how he found the *First LEGO League UNEARTHED Robot (Mission 1)* video.

Challenges

Some paint brushes were too big and some were too small, and some didn't have holes to fit on the Edison. It was hard to attach the paintbrush. I tried attaching it using lego blocks on the front but it didn't work. I also thought about trying on the back but that made coding harder.

I realised the paintbrush needed to be up straight. Dad helped me make the frame to hold up the paintbrush.

I wasn't allowed to use sand because it's messy and it might get stuck inside Edison. I used red lentils to show how the brush works.

Coding challenges: It went outside of the area of the dig site (the black lines). It was hard trying to get it to sweep different shaped dig sites. It was hard to find the right blocks to program Eddy to do what I wanted it to. I wanted to attach a shovel on the back but that was hard to code.

Bibliography

Examples of Challenges that Archaeologists Face. YouTube Challenge 2025/26 Game Missions. YouTube

Jessi Has a Problem! Think like an Engineer Part 1 YouTube

First LEGO League UNEARTHED Robot (Mission 1) YouTube

Solving Mysteries with Archaeologists YouTube

Science for Kids - Learn about the types of Scientists! Youtube

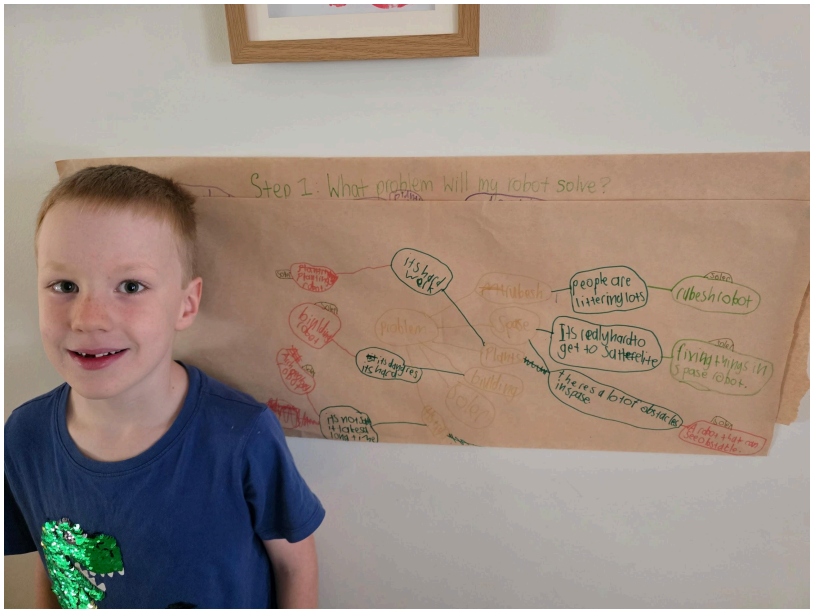
Practice 1 - Asking Questions and Defining Problems YouTube

Coding activity book written by Jenny Jacoby

Edison EdBlocks Lesson Activities: Student activity sheet for Edison V3

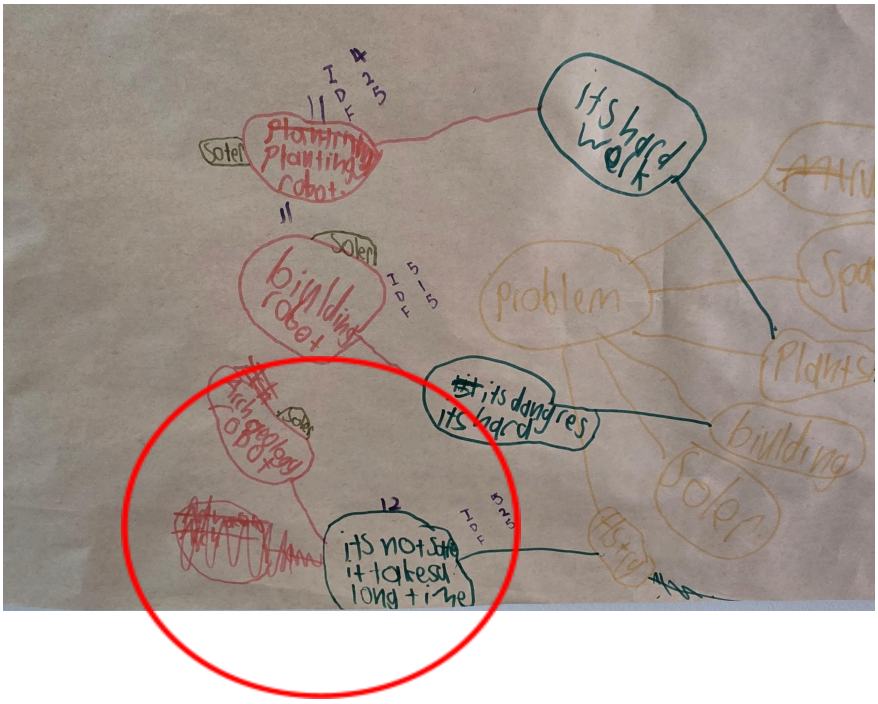
Coming up with the Idea

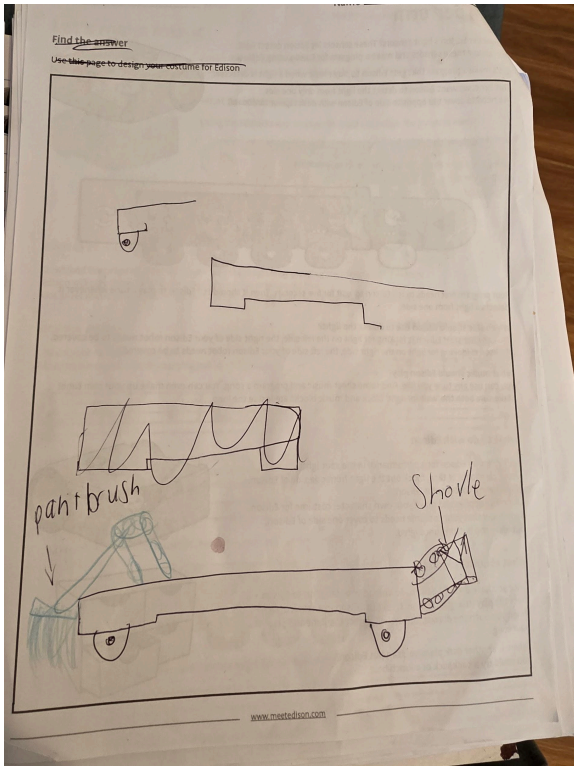
First I looked at winning ideas (from last year). (I liked) a robot to look at underwater animals. I could do a mind map. I could draw a picture [*See Appendix A for handwritten notes]*.



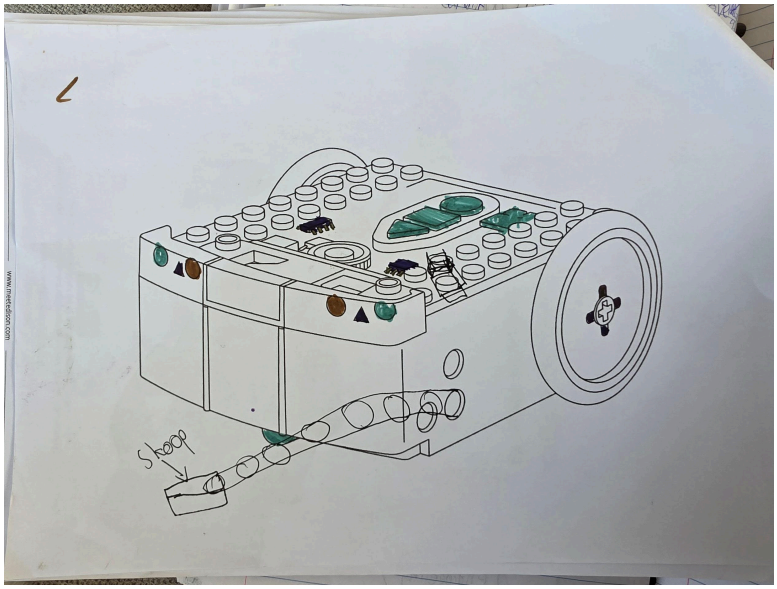
I made a mind map to think about different robot ideas.

Mum told me how to give a score to each idea to help me decide. I gave them all a score and the archaeology robot had the highest score. It was also my favourite idea.



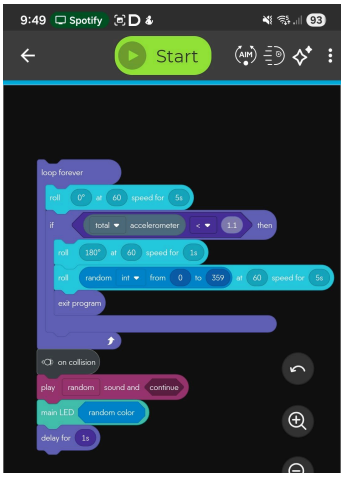


I drew what my robot could look like.



Research Process

I borrowed the Sphero robot from the library and wrote down what I learned.



TRYING CODING WITH SPHERO:

I learnt that it can spin really fast and it can change colour. It can do 26 fps. It can be for racing. Some blocks don't fit in with the normal spaces (referring to coding with Sphere app).

[See my handwritten notes in Appendix A]

I watched some videos and I learnt about archaeology. Examples of Challenges that Archaeologists Face:

- Safety
- Protection from the sun
- Working in dangerous sites
- Accessing remote sites

[*Appendix A]*

I learnt how to use keywords to find good videos.

Keywords (for my first space robot idea):
Robot, Science, Problem, Space

Keywords (for archaeology):
Archaeology, Dig, Robot, STEM, Lego

[*Appendix B]*

Engineering Process
I watched an engineering video and learnt about engineering.
Ask, Imagine, Create, Improve.

[See my handwritten notes in *Appendix B]*

What is science
I watched a science video to learn about types of science.
DNA
Plants
Earth
Universe

[*Appendix B]*

I also learned STEM means Science, Technology, Engineering and Maths. Coding is to do with instructing computers.

[*Appendix B]*

Surveying is putting flags where they think there's artefacts. My Edison could make a musical sound to locate the spot to start digging or I could build a flag into it.

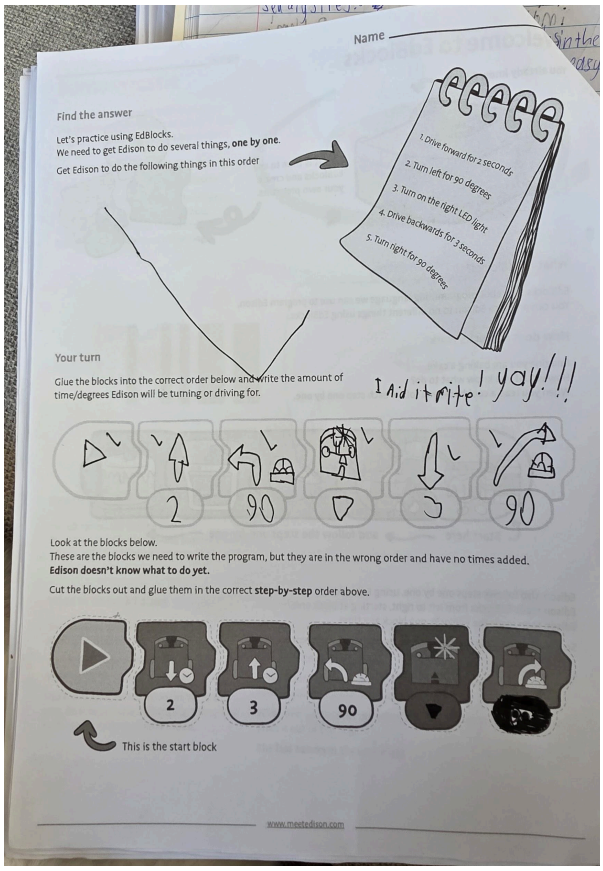
The ropes in archaeology are called grids or survey lines.

[*Appendix D]*

Understanding how to code with Edison

[See my handwritten notes in Appendix C]

I have an Edison robot! It can drive with the shovel on the ground! I had to connect the shovel to the main part.



You use code blocks on the computer to tell Edison what to do.

When I clap once Edison drives right. When I clap twice it goes forwards.

Edison has a light sensor! The light sensor can help see dig sites!

Edison can track down lines! If I put lines in the desert that go to different dig sites Edison could travel easier.

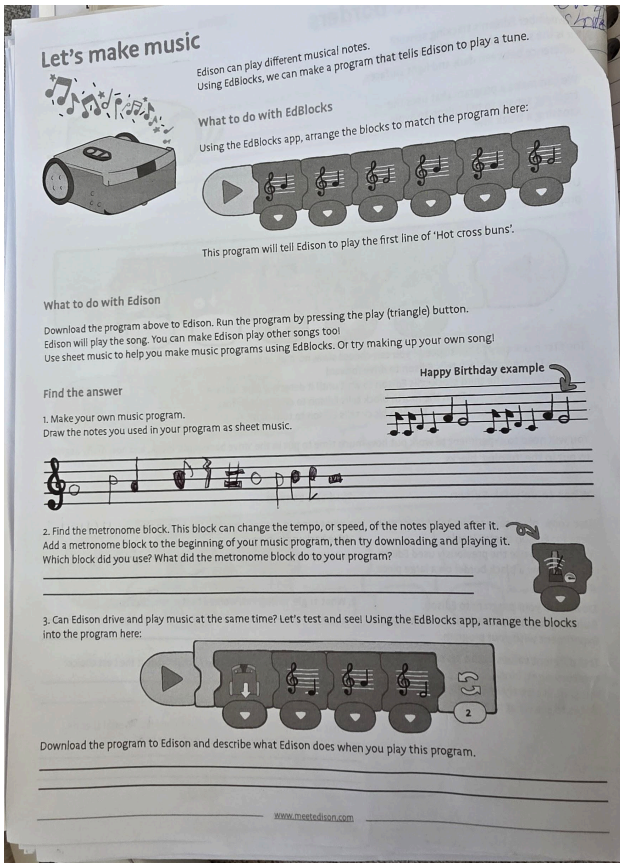
Edison can avoid obstacles. It can avoid obstacles in the desert.

My Edison has a sensor. It could avoid a giant black line around the [?] it is about to go!

Edison can drive really fast! And turn fast!

My Edison can repeat things over and over again. It could be for a shovel because it could repeat and repeat digging. (Referring to loops).

My Edison can avoid obstacles in valleys.



Let's make music

Edison can play different musical notes.
Using EdBlocks, we can make a program that tells Edison to play a tune.

What to do with EdBlocks

Using the EdBlocks app, arrange the blocks to match the program here:

This program will tell Edison to play the first line of 'Hot cross buns'.

What to do with Edison

Download the program above to Edison. Run the program by pressing the play (triangle) button.
Edison will play the song. You can make Edison play other songs too!
Use sheet music to help you make music programs using EdBlocks. Or try making up your own song!

Find the answer

Happy Birthday example

1. Make your own music program.
Draw the notes you used in your program as sheet music.

2. Find the metronome block. This block can change the tempo, or speed, of the notes played after it.
Add a metronome block to the beginning of your music program, then try downloading and playing it.
Which block did you use? What did the metronome block do to your program?

3. Can Edison drive and play music at the same time? Let's test and see! Using the EdBlocks app, arrange the blocks into the program here:

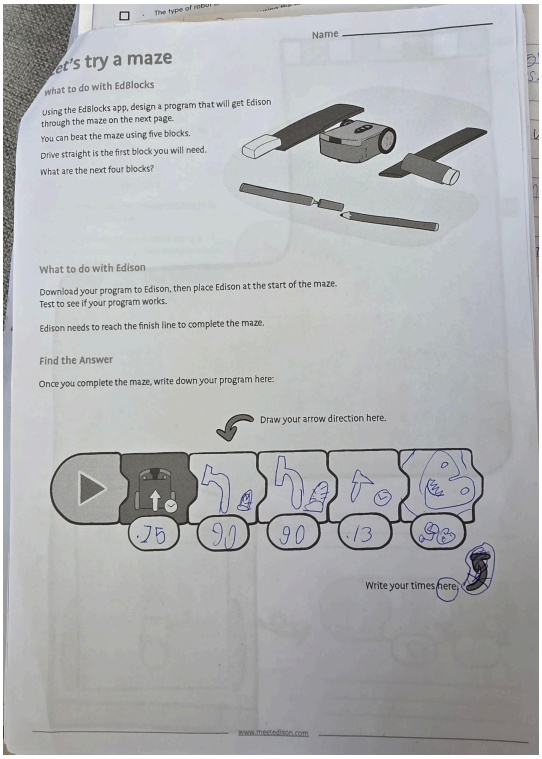
Download the program to Edison and describe what Edison does when you play this program.

www.meetedison.com

If I had two Edisons they could make musical sounds to tell the other one I need help. If you program Edison to make music you can cover (with) your hand and it will stop making music.

[Appendix C]

You can change the degrees to make Edison go left and right at different angles.



Name

et's try a maze

What to do with EdBlocks

Using the EdBlocks app, design a program that will get Edison through the maze on the next page.
You can beat the maze using five blocks.
Drive straight is the first block you will need.
What are the next four blocks?

What to do with Edison

Download your program to Edison, then place Edison at the start of the maze.
Test to see if your program works.

Edison needs to reach the finish line to complete the maze.

Find the Answer

Once you complete the maze, write down your program here:

Draw your arrow direction here.

.75 90 90 .13

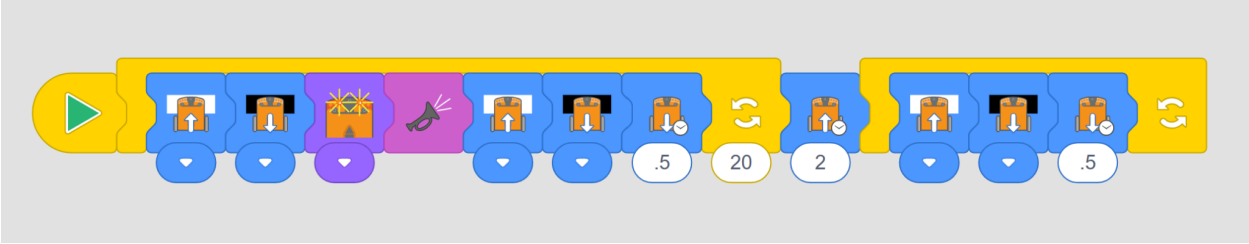
Write your times here.

www.meetedison.com

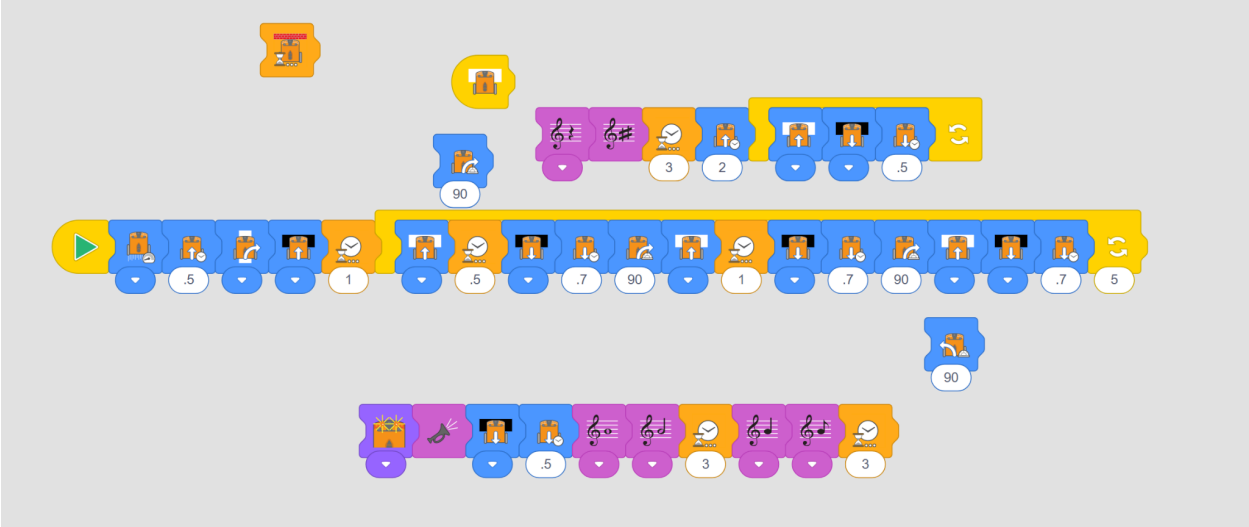
Building and Coding Process

It was a bit tricky to make the arms for the paintbrush.

This was what I did first to get my robot to work in the black lines. It worked but didn't turn to explore different areas. I also added flashing lights and a beep.

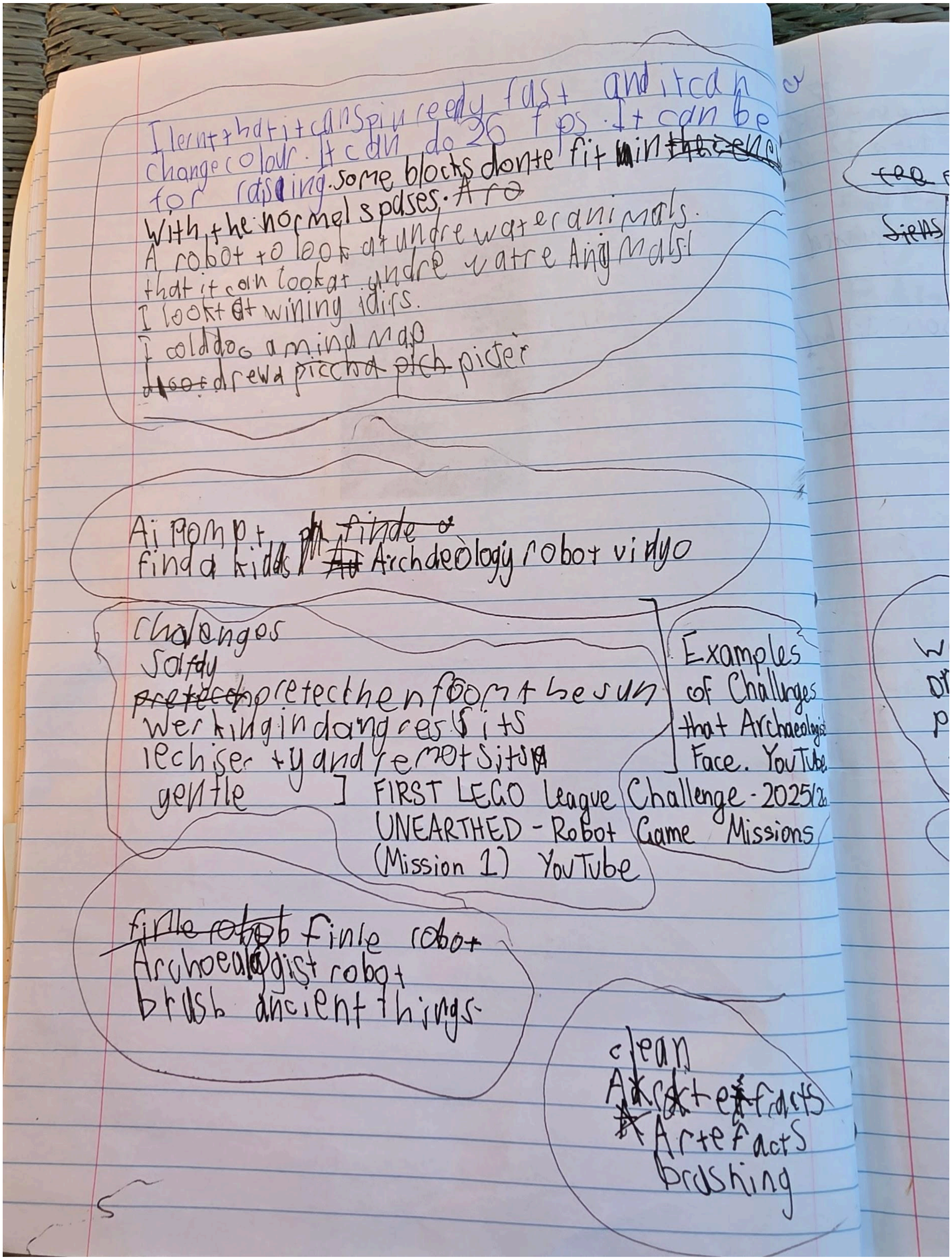


These are some of the blocks I tried using. I wanted to use musical notes but the program was getting too long for Edison. I changed it after this to work when a dig site is on the left side.



I made clay artifacts but they didn't work with the brush. I made paper artifacts instead and they worked. The artifacts were some bricks, the 10 Commandments and some ancient pots. I used black tape for the dig site grid lines.

Appendix A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Examples of Challenges that Archaeologists Face. YouTube
FIRST LEGO League Challenge - 2025/26 UNEARTHED - Robot Game Missions (Mission 1) YouTube
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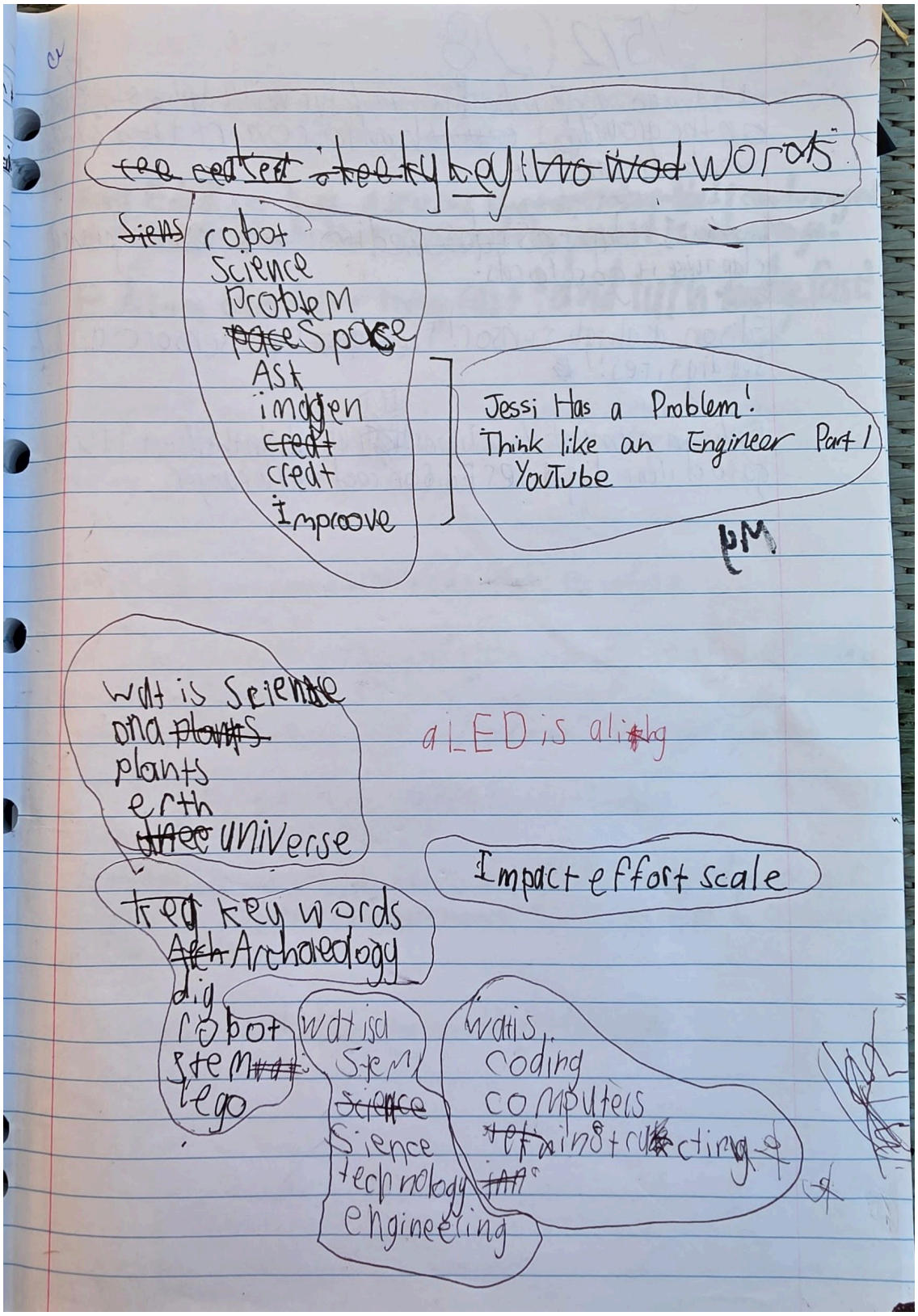
brush ancient things.
clean
Artefacts
brushing

Appendix B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Improove
Jessi Has a Problem!
Think like an Engineer Part 1
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robot
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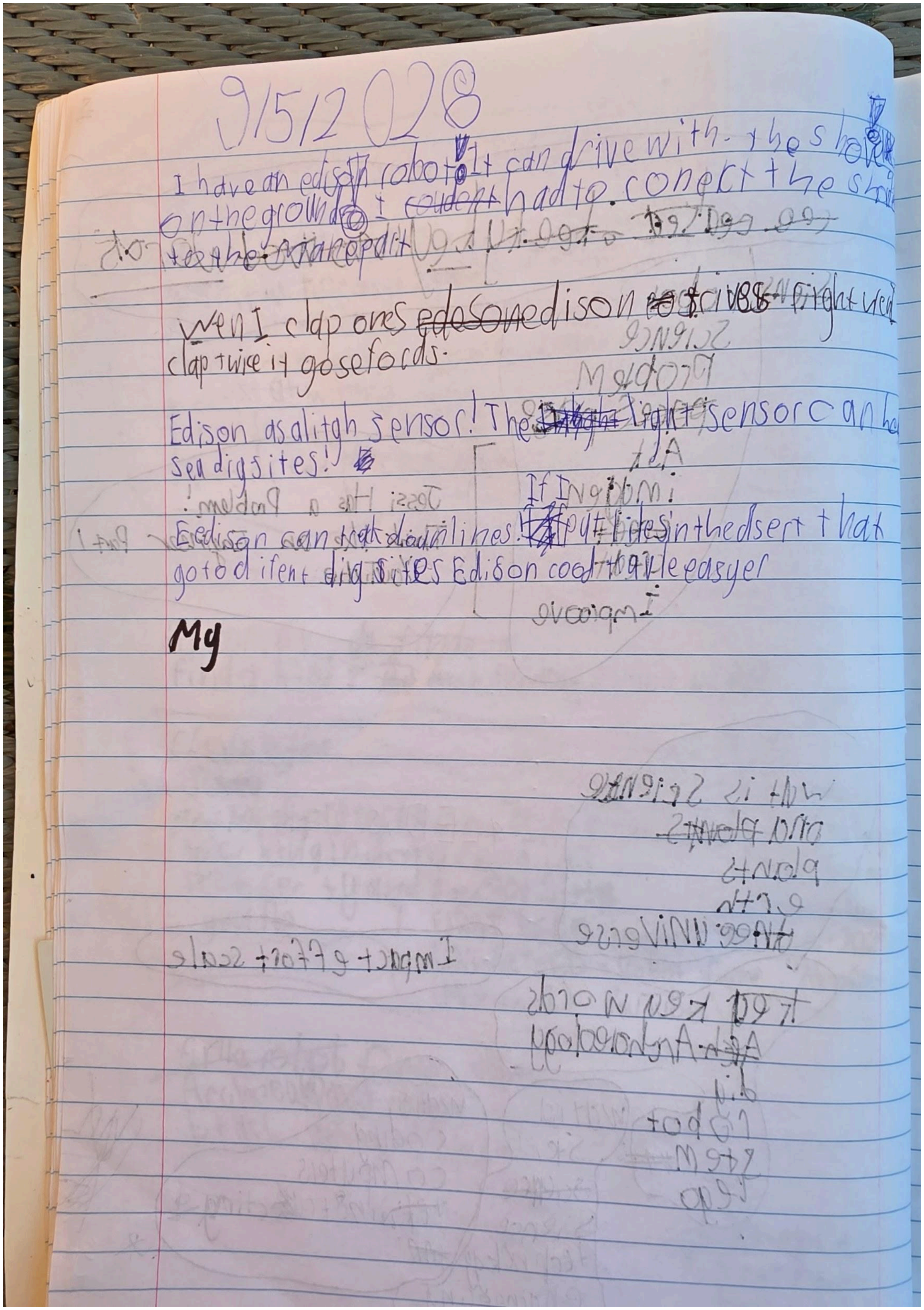
lego
wdt is stem
Sience
technology
engineering
wdt is
coding
computers

Appendix C


9/5/2028
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sea digsites!
Edison can lines. If put lites in the dsert that go to diferent dig sites Edison cool easyer
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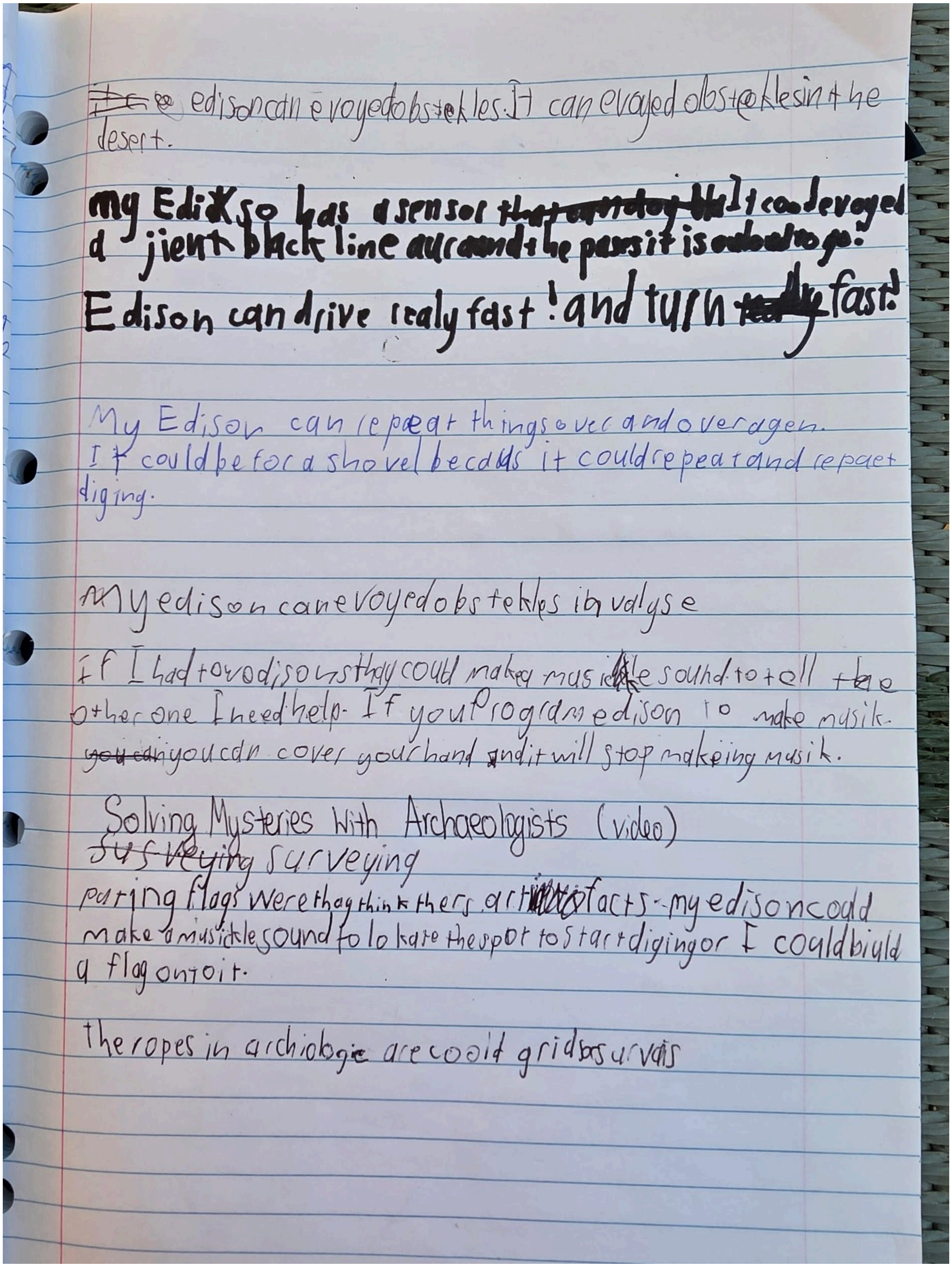
Appendix D



edison can evoyed obstekles. It can evayed obsteklesin the desert.

my Edi~~x~~so has a sensor ~~that~~ It coudevoyed a jient black line aurcaund the pass it is ~~about to go~~.

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Solving Mysteries With Archaeologists (video)

~~susveying~~ surveying

puting flags were thay think thers artifacts. my edison codd make a musikle sound to lokare the spot to start diging or I could biuld a flag on to it.

the ropes in archiologie are coold grids surveis