Code								Number	ASCII
128	64	32	16	8	4	2	1		
0	0	0	0	0	0	0	1	= 1	
0	0	0	0	0	0	1	0	= 2	
0	0	0	0	0	0	1	1	= 3	
0	1	0	0	0	0	0	1	= 65	= A
0	1	0	0	0	0	1	0	= 66	= B
0	1	0	0	0	0	1	1	= 67	= C

Hi I am _____, I'm going to send you a message using the table, can you read?

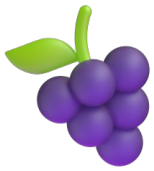
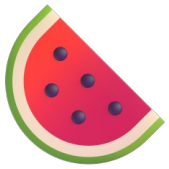
128	64	32	16	8	4	2	1	= Number	= Letter

What is the message: _____

Guess My Number. I'm thinking of a number from 1 to 10. What is the fewest yes/no questions that will **always** find it? _____

Now I'm thinking of a number from 1 to 1000. What is the fewest yes/no questions that will **always** find it? _____

Guess My Fruit. I picked one of these fruits. You may only ask yes/no questions — no fruit names!

			
Banana	**Apple**	**Grapes**	**Watermelon**

My question 1: _____

My question 2: _____

How many questions do I need, at most? _____

Draw your question tree:

At home (with a parent)

Play Guess My Number (1 to 100) with a parent. Take turns asking yes/no questions.

Questions I needed: _____ Questions my parent needed: _____

Parent's initials: _____

Be a Neuron! Teach a Robot to Spot Apples

A robot can't see fruit the way you do. Its brain is made of tiny parts called **neurons**. Each neuron plays a little **points game**.

Today **you** are the neuron, and you are also its **teacher**. Nobody tells the neuron what an apple is. It has to **learn from examples**, just like real AI.

How the neuron decides

1. Read the fruit's **YES clues** (they are printed for you).
2. Add the points for every YES clue. The points are in the **Points box**.
3. **2 points or more** → light ON: "Apple!" **Less than 2** → light OFF: "Not an apple."

Points box	Red	Round	Yellow	Long
Start (it knows nothing yet)	0	0	0	0
Now (copy Start in pencil, then fix)				

When it is wrong, fix its points (erase and rewrite the pencil row). Right? Change nothing.

- It said OFF, but it **is** an apple → add 1 point to every YES clue.
- It said "Apple!", but it is **not** an apple → take away 1 point from every YES clue.

Teach it: show the neuron one fruit at a time, from top to bottom. The first row is done for you.

Fruit	YES clues	Total points	Light ON or OFF?	Right?	Fix (if wrong)
Apple	Red, Round	0 + 0 = 0	OFF	✗ It is an apple!	Red +1, Round +1 → now 1, 1, 0, 0
Banana	Yellow, Long				
Grapes	Round				
Watermelon	Red				
Apple again	Red, Round				

Back: Can You Fool the Neuron?

1. Test it. Show your neuron a tomato. Use the points in your Points box.

Fruit	YES clues	Total points	Light ON or OFF?	Is it an apple?
Tomato	Red, Round			**No!**

Did the neuron get it right? Yes / No

2. Why was it fooled? Tick one:

☐ A tomato has the **same YES clues** as an apple, so the neuron can't tell them apart.

☐ The neuron forgot what it learned.

3. Change the rules: give the neuron a new clue.

Make up a clue that is **YES for an apple** but **NO for a tomato** (ideas: grows on a tree? sweet?).

My new clue: _____ ? It is worth **1 point**.

Every YES clue is worth 1 point. New rule: **3 points or more** → light ON: "Apple!"

Fruit	Red?	Round?	My clue?	Total	Apple?
Apple	Yes	Yes			
Tomato	Yes	Yes			
Watermelon	Yes	No			

4. Challenge: name something that fools it again (it says "Apple!" but it is not): _____

At home (with a parent): kitchen test. Use your new neuron (Red, Round, your clue; 3 points = "Apple!") on 3 real things in your kitchen. Take turns trying to fool it!

Thing	YES clues	Total	Apple?	Fooled it?

Parent's initials: _____