Name _____ Class _____ Date _____

DAY 46

What's inside an AI if you open it up? — Neural networks

1 · Think first

Before the lesson, write down what you think the answer is.

2 · Experiment · Put it in order

Try it — What happens inside a neural network, in order

What did you change in the experiment, and what happened?

3 · Quiz

Circle the right answer.

Q1 What's closest to what one dot in a neural network does?

① Multiplies by weights, adds, checks a threshold
② Memorizes whole sentences
③ Fetches answers from the internet
④ Writes down its own rules in words

Q2 Why can a neural network make complex judgments?

① Each dot is really smart
② Simple math builds up over many layers
③ People wrote the answers in advance
④ Its screen is big

Q3 What does a 'weight' decide?

① The size of the text
② Screen brightness
③ How strong a signal passes
④ Internet speed

The takeaway in my own words

“One dot can only multiply and add. Stack them in layers, and out comes judgment.”

Rewrite this line in your own words.

Name _____ Class _____ Date _____

DAY 47

Where should a word look to get its meaning? — Attention

1 · Think first

Before the lesson, write down what you think the answer is.

2 · Experiment · Probability slider

Try it — Turn the strength of attention with the handle

What did you change in the experiment, and what happened?

3 · Quiz

Circle the right answer.

Q1 What does attention do, in one line?

① Looks words up in a dictionary
② Decides how hard one word looks at another
③ Shortens sentences
④ Fixes spelling

Q2 What happens when 'It was delicious' becomes 'It was full'?

① The sentence gets shorter
② Nothing changes
③ Attention moves from the cake to the dog
④ Attention spreads out evenly

Q3 If one word gets looked at really hard, the rest...

① Vanish and come back
② All get stronger too
③ Double
④ Get smaller shares

The takeaway in my own words

“Attention is sharing out a fixed amount of focus, and where it piles up is what the meaning becomes.”

Rewrite this line in your own words.

Name _____ Class _____ Date _____

DAY 48

How does a computer understand the word 'apple'? — Meaning as numbers

1 · Think first

Before the lesson, write down what you think the answer is.

2 · Experiment · Split it up

Try it — Switch words' pieces of meaning on and off

What did you change in the experiment, and what happened?

3 · Quiz

Circle the right answer.

Q1 Why turn words into bundles of numbers?

① To make the letters look nice
② To save storage space
③ Computers use numbers, and to measure closeness
④ To fix spelling

Q2 Which words end up with similar numbers?

① Words with the same number of letters
② Short words
③ Words it learned first
④ Words used with similar words around them

Q3 In the experiment, why is the soccer ball far from apple?

① Only one box overlaps
② Its name is longer
③ It came later
④ It has more boxes

The takeaway in my own words

“Turn meaning into bundles of numbers, and 'similar' becomes 'close.'”

Rewrite this line in your own words.

Name _____ Class _____ Date _____

DAY 49

Which of two sentences is closer? — Finding similar things

1 · Think first

Before the lesson, write down what you think the answer is.

2 · Experiment · Pick one

Try it — Which one is closer to the base sentence?

What did you change in the experiment, and what happened?

3 · Quiz

Circle the right answer.

Q1 What does it mean for two sentences to be 'close'?

① They share lots of words
② They were written on the same day
③ They're about the same length
④ Their spots are close as number bundles

Q2 'This movie was not fun' and 'This movie was really fun' are...

① Same words, opposite meaning — so far apart
② Same words, so the closest of all
③ Close, because they're the same length
④ In the same spot, since both are about movies

Q3 What if two sentences share no words at all?

① Always far apart
② Close if the meaning's same
③ Can't be calculated
④ Only half close

The takeaway in my own words

“Being close doesn't mean sharing words. When meanings overlap, they land close together.”

Rewrite this line in your own words.

Name _____ Class _____ Date _____

DAY 50

What happens when you ask AI something it doesn't know? — Open-book answers

1 · Think first

Before the lesson, write down what you think the answer is.

2 · Experiment · Put it in order

Try it — The steps of an open-book answer

What did you change in the experiment, and what happened?

3 · Quiz

Circle the right answer.

Q1 Which is the right order for an 'open-book answer'?

① Write the answer first, then find text
② Get the question, find text, answer using it
③ Memorize all the text, then answer
④ Shorten the question, then answer

Q2 How does it find the pieces of text that fit your question?

① The one that comes first alphabetically
② The longest piece
③ The piece closest to the question in numbers
④ The most recently made piece

Q3 Which one is NOT a good thing about this method?

① Can keep up with new info
② Can show its sources
③ No retraining needed
④ Always gets it right

The takeaway in my own words

“Answer from memory and it's easy to make stuff up, but find it, lay it open and answer, and the evidence stays.”

Rewrite this line in your own words.

Name _____ Class _____ Date _____

DAY 51

Can you teach a fully trained AI one extra job? — Extra training (fine-tuning)

1 · Think first

Before the lesson, write down what you think the answer is.

2 · Experiment · Before & after

Try it — Same model, before and after a little extra training

What did you change in the experiment, and what happened?

3 · Quiz

Circle the right answer.

Q1 What does extra training (fine-tuning) do?

① Rebuilds the model from scratch
② Searches the web and adds it to the answer
③ Teaches an already-trained model a bit more
④ A person fixes the answers by hand

Q2 Why is a method like LoRA such a big deal?

① It makes every answer correct
② It cuts the model's size in half
③ It runs without the internet
④ It needs 10,000 times fewer numbers changed

Q3 How do you get it to tell you a lunch menu that changes every week?

① Find it and attach it
② Teach it more
③ Make the model bigger
④ Write a longer question

The takeaway in my own words

“You don't raise a grown-up model all over again, you just polish it a little, as much as you need.”

Rewrite this line in your own words.

Name _____ Class _____ Date _____

DAY 52

Given two answers, which one would a person score higher? — Humans scoring answers

1 · Think first

Before the lesson, write down what you think the answer is.

2 · Experiment · Pick one

Try it — If you were the human scorer, which one would get your point?

What did you change in the experiment, and what happened?

3 · Quiz

Circle the right answer.

Q1 In this method, what does the person do?

① Writes the right answer themselves
② Makes up the questions for it
③ Fixes spelling mistakes
④ Picks the better of two answers

Q2 Why don't people have to score every single answer?

① The picks are used to build a scoring model
② The AI already knows the right answer
③ There's an answer key on the internet
④ There's always only one answer

Q3 What mostly changes when you polish an AI this way?

① It knows more facts
② Its answers get more usable
③ The model gets smaller
④ It needs no internet

The takeaway in my own words

“Nobody told it the right answer, people only told it which one was better.”

Rewrite this line in your own words.

Name _____ Class _____ Date _____

DAY 53

How did graphics cards made for gaming become the heart of AI? — GPUs

1 · Think first

Before the lesson, write down what you think the answer is.

2 · Experiment · Number sense

Try it — Getting a feel for graphics cards by order of magnitude

What did you change in the experiment, and what happened?

3 · Quiz

Circle the right answer.

Q1 Why are graphics cards such a good fit for AI math?

① They do tons of easy calculations all at once
② They solve hard problems all on their own
③ They have fast internet
④ They have huge storage space

Q2 About how many tiny switches are in one card used for AI training?

① About 8,000
② About 80 billion
③ About 800,000
④ About 80 quadrillion

Q3 How many cards were tied together to train Llama 3?

① 16 cards ② 160 cards ③ 16,000 cards ④ 1,600 cards

The takeaway in my own words

“AI didn't pick graphics cards. The shape of the math was the same all along.”

Rewrite this line in your own words.

Name _____ Class _____ Date _____

DAY 54

How much electricity does it take to ask AI one question? — Data centers and electricity

1 · Think first

Before the lesson, write down what you think the answer is.

2 · Experiment · Number sense

Try it — Lining up electricity in the same unit

What did you change in the experiment, and what happened?

3 · Quiz

Circle the right answer.

Q1 How much electricity does one text question to AI take?

① About as much as an air conditioner all day ② About as much as a TV on for 9 hours
③ About as much as a TV on for 9 seconds ④ No electricity at all

Q2 In 2024, what share of all electricity did the world's data centers use?

① About 0.001% ② About 50% ③ About 15% ④ About 1.5%

Q3 What does the International Energy Agency expect for 2030?

① It more than doubles ② About the same as now
③ It drops by half ④ Nobody has any idea

The takeaway in my own words

“One question is 9 seconds of TV. Add them all up and it's a whole country.”

Rewrite this line in your own words.

Name _____ Class _____ Date _____

DAY 55

Can your phone run AI all on its own? — AI on your phone

1 · Think first

Before the lesson, write down what you think the answer is.

2 · Experiment · Split it up

Try it — Does this job finish on the phone, or go out?

What did you change in the experiment, and what happened?

3 · Quiz

Circle the right answer.

Q1 What's true about an AI model that runs on your phone?

① It's much bigger than server models
② It can't handle photos at all
③ It uses more electricity
④ It's small and runs without internet

Q2 What happens when a hard question gets sent to a server?

① It does better, but your text leaves the phone
② Your phone battery lasts longer
③ You don't need internet
④ The answer is always wrong

Q3 How do phones actually work today?

① All on the phone
② Split into pieces
③ All on a server
④ They do nothing

The takeaway in my own words

“Your phone doesn't send it all out or keep it all in. It holds on to just the pieces it can handle.”

Rewrite this line in your own words.

Answer key · Part 5: Looking Inside

DAY 46 · What's inside an AI if you open it up? — Neural networks

Q1 · Answer ① Multiplies by weights, adds, checks a threshold
One dot only multiplies, adds, checks the threshold and passes it on. The amazing part doesn't come from one dot — it comes from huge numbers of those dots stacked in layers.

Q2 · Answer ② Simple math builds up over many layers
The first layer only picks up small bits like lines. Those bits become eyes and ears in the next layer, and a cat in the last one. Depth is what makes the judgment.

Q3 · Answer ③ How strong a signal passes
Each link has a different weight, so some signals pass on strongly and others weakly. Training is really just fixing these weight numbers, bit by bit.

Today in one line · One dot can only multiply and add. Stack them in layers, and out comes judgment.

DAY 47 · Where should a word look to get its meaning? — Attention

Q1 · Answer ② Decides how hard one word looks at another
It scores how well words fit together, then turns those scores into shares of attention. That share is exactly 'how hard it looks.'

Q2 · Answer ③ Attention moves from the cake to the dog
What can be delicious is the cake; what can be full is the dog. Change one word, the fit scores change, and attention moves over completely.

Q3 · Answer ④ Get smaller shares
The total is fixed, so it gets shared out. Pile it on one side and the other shares shrink automatically — which is also how clues get missed.

Today in one line · Attention is sharing out a fixed amount of focus, and where it piles up is what the meaning becomes.

DAY 48 · How does a computer understand the word 'apple'? — Meaning as numbers

Q1 · Answer ③ Computers use numbers, and to measure closeness
A computer can't understand letters themselves. Turn them into numbers and it can work with them — and even calculate how close two words are.

Q2 · Answer ④ Words used with similar words around them
When the words around them are similar, like 'I ate an apple' and 'I ate a banana,' it learns to make their numbers similar. So words with close meanings gather in close spots.

Q3 · Answer ① Only one box overlaps
Banana shared four boxes with apple, but the soccer ball shares only 'round.' The fewer boxes overlap, the farther apart the number bundles — which means the meanings are far apart.

Today in one line · Turn meaning into bundles of numbers, and 'similar' becomes 'close.'

DAY 49 · Which of two sentences is closer? — Finding similar things

Q1 · Answer ④ Their spots are close as number bundles

Sentences get turned into number bundles, and then the distance between them is measured. A short distance means they're close — which means their meanings are similar.

Q2 · Answer ① Same words, opposite meaning — so far apart

If you only count shared words, these two look the closest. But what's measured is meaning, so when one says 'fun' and the other says 'not fun,' their spots end up far apart.

Q3 · Answer ② Close if the meaning's same

'School lunch was so good today' and 'The cafeteria food hit the spot' share no words, yet they're very close. Meaning decides the spot, so the words don't have to overlap.

Today in one line · Being close doesn't mean sharing words. When meanings overlap, they land close together.

DAY 50 · What happens when you ask AI something it doesn't know? — Open-book answers

Q1 · Answer ② Get the question, find text, answer using it

Finding comes before answering. First it pulls out related text and lays it open, then it builds the answer while reading it.

Q2 · Answer ③ The piece closest to the question in numbers

Just like yesterday. Both the text pieces and the question get turned into lists of numbers, and it pulls out only a few pieces that are close.

Q3 · Answer ④ Always gets it right

If the text it found is wrong or off-topic, the answer is wrong too. An open-book test doesn't help if you opened the wrong book.

Today in one line · Answer from memory and it's easy to make stuff up, but find it, lay it open and answer, and the evidence stays.

DAY 51 · Can you teach a fully trained AI one extra job? — Extra training (fine-tuning)

Q1 · Answer ③ Teaches an already-trained model a bit more

It keeps the big, already-trained base model as it is and just shows it more examples of the job you need. It's not raising it again, it's polishing it.

Q2 · Answer ④ It needs 10,000 times fewer numbers changed

The 2021 LoRA paper froze almost all the numbers inside and trained only a tiny part. That meant 10,000 times fewer numbers to train.

Q3 · Answer ① Find it and attach it

You saw it in the third case of the experiment. For new facts, especially ones that keep changing, showing it the open book like yesterday works better than making it memorize.

Today in one line · You don't raise a grown-up model all over again, you just polish it a little, as much as you need.

DAY 52 · Given two answers, which one would a person score higher? — Humans scoring answers

Q1 · Answer ④ Picks the better of two answers

People don't write answers. They just pick one of the two that came out. Picking is much faster than writing, so you can collect it tens of thousands of times.

Q2 · Answer ① The picks are used to build a scoring model

People's picks are gathered to build a small scoring model that copies their taste. After that, the scoring model gives scores in their place, even millions of times.

Q3 · Answer ② Its answers get more usable

It doesn't gain knowledge. What changes is how it talks, to fit the standards people picked. In the 2022 research, a small model polished this way got picked more often than a model over 130 times bigger.

Today in one line · Nobody told it the right answer, people only told it which one was better.

DAY 53 · How did graphics cards made for gaming become the heart of AI? — GPUs

Q1 · Answer ① They do tons of easy calculations all at once

They were built that way to color in millions of dots on a game screen at the same time. AI training is also trillions of easy multiplications at the same time, so the shape was exactly the same.

Q2 · Answer ② About 80 billion

The H100 has 80 billion. That one card does about 1,000 trillion calculations a second.

Q3 · Answer ③ 16,000 cards

16,000 cards were tied together into one cluster and ran for 54 days. Even with each card doing 1,000 trillion calculations a second, one big model needs this many.

Today in one line · AI didn't pick graphics cards. The shape of the math was the same all along.

DAY 54 · How much electricity does it take to ask AI one question? — Data centers and electricity

Q1 · Answer ③ About as much as a TV on for 9 seconds

In 2025 measurements, the median was 0.24 watt-hours. One question is small. The problem is that those questions pile up nonstop.

Q2 · Answer ④ About 1.5%

It was 415 terawatt-hours, about 1.5% of the world's electricity. It's still a small slice, but the point is how fast it's growing.

Q3 · Answer ① It more than doubles

It expects a jump from 415 terawatt-hours in 2024 to 945 terawatt-hours in 2030, more than double. That's about as much as the whole of Japan uses in a year.

Today in one line · One question is 9 seconds of TV. Add them all up and it's a whole country.

DAY 55 · Can your phone run AI all on its own? — AI on your phone

Q1 · Answer ④ It's small and runs without internet

The on-phone model released in 2024 had about 3 billion numbers. It's tens to hundreds of times smaller than server models, but it runs even in airplane mode.

Q2 · Answer ① It does better, but your text leaves the phone

The big model does much better. But your text makes a trip to that building you saw yesterday and back. What you get and what you give up come together.

Q3 · Answer ② Split into pieces

You saw it in the third button of the experiment. Even handling one photo splits into pieces for the phone and pieces for the server. The phone tries first and sends out only the pieces that are too much.

Today in one line · Your phone doesn't send it all out or keep it all in. It holds on to just the pieces it can handle.