Grade 6 Computing

Unit 9 · Computers That Learn

ANSWER KEY · FOR TEACHERS

Full marks 28

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. ordinary program
2. examples
3. training
4. model
5. machine learning
6. artificial intelligence
7. nearest neighbor
8. data centers

K · 4

Each carries 0.5 mark.

2 Label the diagram

1. An ordinary program
2. Examples, with the right answers
3. Training finds the pattern
4. The model

K · 2

Each carries 0.5 mark.

3 Multiple choice

i. **b.** A computer finding the pattern in examples with the right answers, and using it to answer for new things — K · 1

Machine learning is learning from examples. Following rules that a person wrote is an ordinary program.

ii. **a.** Working out the total of a shop's bill — U · 1

Adding prices has an exact rule, and an ordinary program follows it perfectly, every time, with little electricity. The other three have no rules anyone could write in full, so AI learned them from examples.

iii. **c.** It says "cat" or "dog", whichever is closer. — U · 1

It only has two answers, so it gives one of them. A model doesn't know what it doesn't know.

iv. **c.** None of its examples looked like a green tomato, so it can't recognize one. — A · 1

A model only knows what its examples showed it. Every tomato it saw was red, so to it, "tomato" means red. Give it green tomatoes as examples too, and it will learn them.

v. **b.** Read it all and correct any words it got wrong, especially names. — U · 1

Voice typing is very useful, and it often mishears names and unusual words. A mistake here is easy to check and fix, so use it, then check. Asking the AI whether it is right doesn't help: it doesn't know when it is wrong.

4 True or false

i. ✗ **False:** AI has no feelings: it has learned that people write those words.
ii. ✗ **False:** It follows rules that people wrote; not every clever machine is AI.
iii. ✓ **True**
iv. ✓ **True**
v. ✗ **False:** AI sounds just as sure when it is wrong; how sure it sounds tells you nothing.
vi. ✓ **True**

U · 3

Each carries 0.5 mark.

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5 Why it makes mistakes

U · 2

1. Every suntala it saw was ripe, so it calls a green suntala a kagati. → **e.** its examples didn't look like the new thing
2. Size and color can't tell it a tennis ball from a fruit. → **c.** it measures only some things
3. Shown a goat, a sorter of cats and dogs says "dog". → **a.** it can only give the answers it was taught
4. Someone ringed a kagati as a suntala, and now it repeats the mistake. → **b.** some examples were wrong

Each carries 0.5 mark.

6 Be the sorter

MARKING SCHEME

A · 3

- ✓ i. Suntala: the fruit is closest to the suntala example (nearly the same size and color).
- ✓ ii. Kagati: on the map, a green fruit is much closer to the green kagati than to the orange suntala.
- ✓ iii. Probably not: a green fruit 6 cm across is likely an unripe suntala, but the sorter never saw a green suntala.

7 Learning, or rules?

a. MARKING SCHEME

U · 2

- ✓ An ordinary program follows rules that a person wrote, such as the calculator or the alarm clock.
- ✓ A program that learns found the pattern in many examples with the right answers, such as the gallery's photo search, voice typing or a translation app.

b. MARKING SCHEME

A · 3

- ✓ i. A wrong label does no harm and you can see it: fine to use, or just correct the label.
- ✓ ii. A wrong spray wastes money and harms the soil, and the app may not know Nepal's diseases: use it, then check with an agriculture technician before spraying.
- ✓ iii. A mistake could kill someone, and you can't check it yourself: don't rely on it; ask an expert, or don't eat it.

c. MARKING SCHEME

U · 2

- ✓ A dictionary gives the right spelling every time; an AI's answer is a guess from its examples and can be wrong.
- ✓ AI takes much more computing, and so much more electricity, than a simple tool for the same job.

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8 Think

ANSWER HA · 2

No. Right 99 times out of 100 sounds very good, but it means about 1 in 100 answers is wrong: with 500 people a day, about 5 people a day could be wrongly called thieves. An honest customer could be shamed or arrested because of a model's guess. The AI can be used to point out someone to watch, but a person should check what really happened before anything is done. A person, not the app, is responsible for what is done with its answer.

MARKING SCHEME

- ✓ No: 1 wrong in 100 is about 5 wrong answers a day with 500 people, so honest people would be called thieves.
- ✓ A person should check before acting; the AI's answer is a guess, and people are responsible for what is done with it.

9 Activity: AI hunt

(not marked)

WHAT STUDENTS SHOULD FIND

For example: the gallery's search (learned from named photos), voice typing (from recordings of people speaking with their words written out), the keyboard suggesting the next word (from a great many sentences people typed), video suggestions (from what millions of people watched). Not AI: the calculator, the alarm or the torch, which follow rules that people wrote.

Marks by level	Knowledge	Understanding	Application	Higher ability	**Total**
Marks	7	12	7	2	**28**

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