

How to Design Cheat-Proof Multiple-Choice Exams to Improve Higher-Level Thinking Skills



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Presentation

Q&A and discussion

Try it yourself!

The dilemma...

$$\frac{120 \text{ minutes}}{100 \text{ questions}} = 1:12$$



Our exam philosophy

- minimize students' ability to google answers
- assess students' critical thinking skills
- assist students in seeing assessment as a learning experience rather than a barrier to overcome

Examples of standard multiple-choice questions

What will the temperature do when a cold front passes?

- a. increase
- b. decrease
- c. stay the same
- d. increase, then decrease

What will the wind direction do when a cold front passes?

- a. change from southerly to westerly
- b. change from northerly to westerly
- c. change from westerly to northerly
- d. change from easterly to southerly



temperature changes cold front



All

Images

News

Videos

Shopping

More

Tools

About 202,000,000 results (0.53 seconds)

https://en.wikipedia.org/wiki/Cold_front

Cold front - Wikipedia

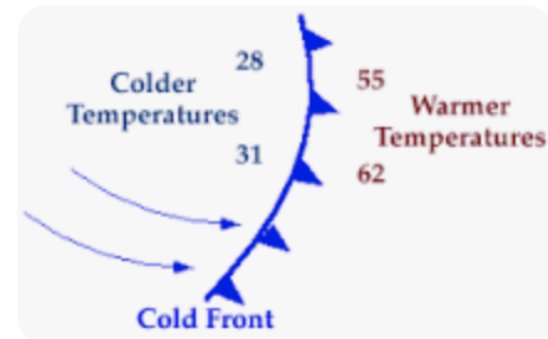
Temperature changes — **Cold fronts** are the leading edge of cooler air masses, hence the name "**cold front**". They have stronger **temperature changes** during ...

[Development of cold fronts](#) · [Precipitation](#) · [Temperature changes](#) · [References](#)

People also ask

What happens to temperature when a cold front passes?

The air behind a cold front is noticeably colder and drier than the air ahead of it. When a cold front passes through, **temperatures can drop more than 15 degrees within the first hour.** ... There is typically a noticeable temperature change from one side of a cold front to the other.



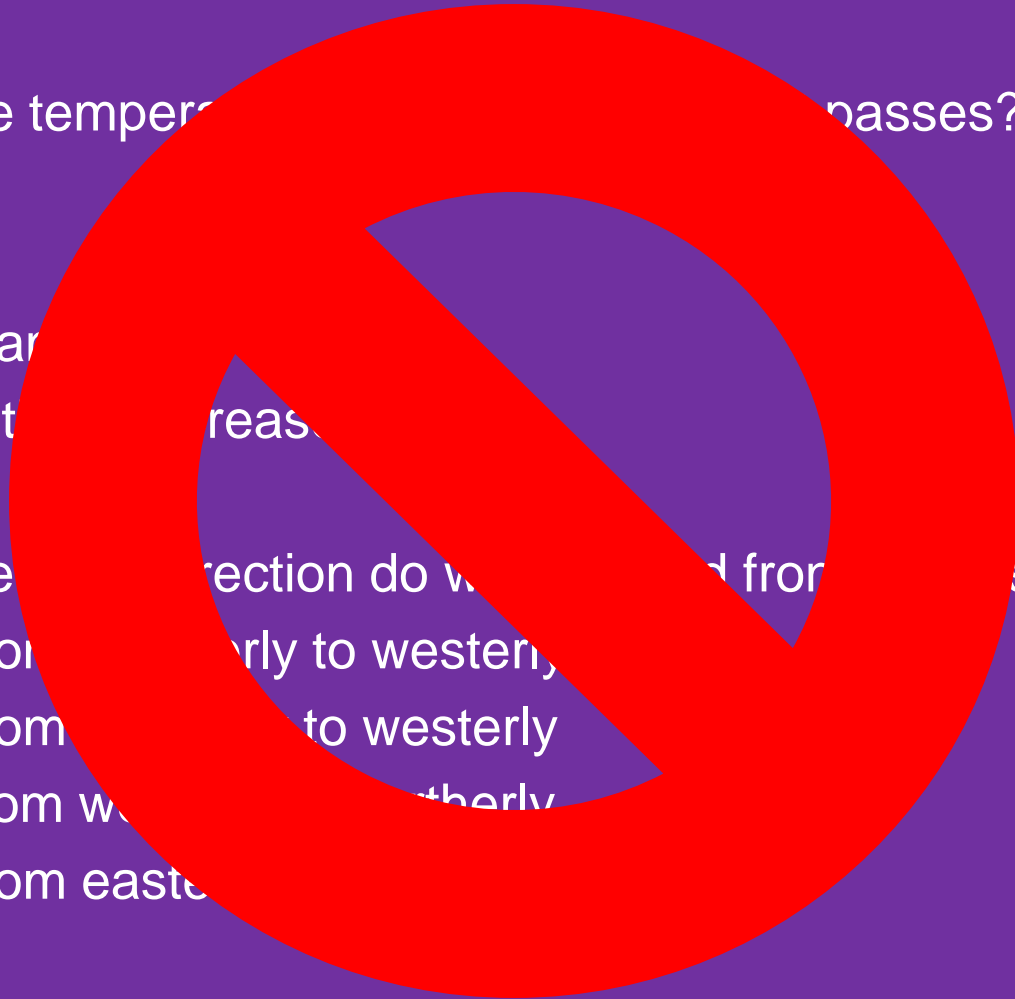
Examples of standard multiple-choice questions

What will the temperature of the masses?

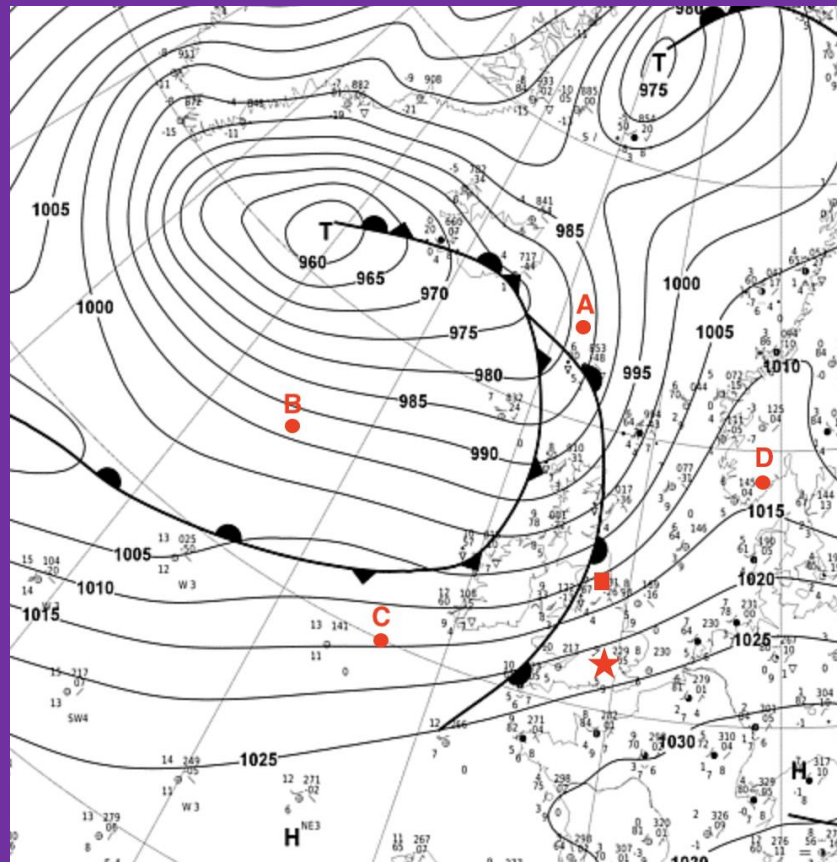
- a. increase
- b. decrease
- c. stay the same
- d. increase, then decrease

What will the wind direction do when the wind from the north?

- a. change from northerly to westerly
- b. change from northerly to easterly
- c. change from westerly to northerly
- d. change from easterly to northerly

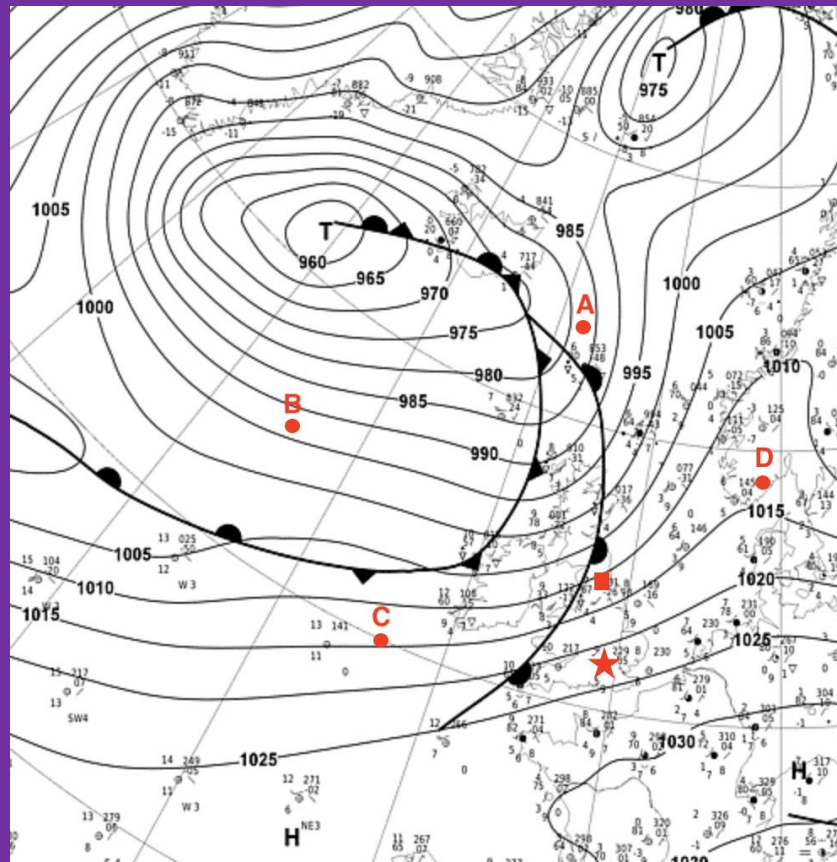


How to rewrite these types of questions to meet our exam philosophy



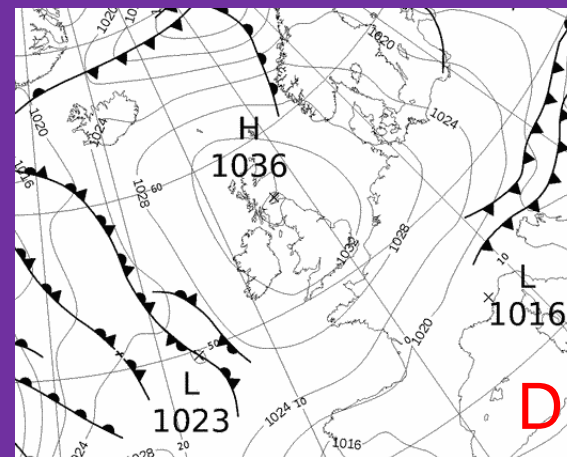
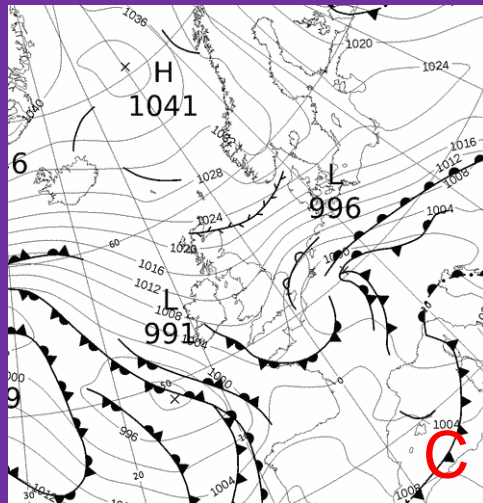
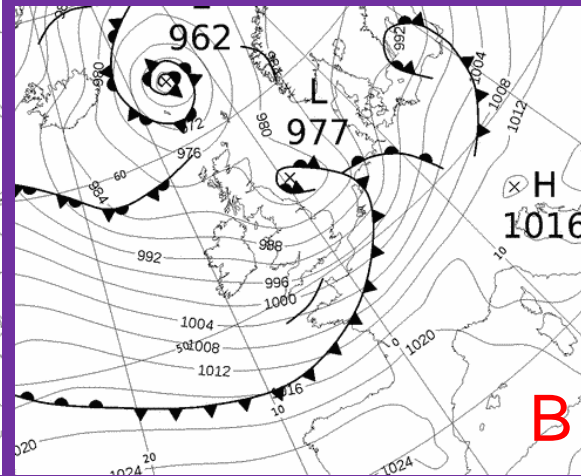
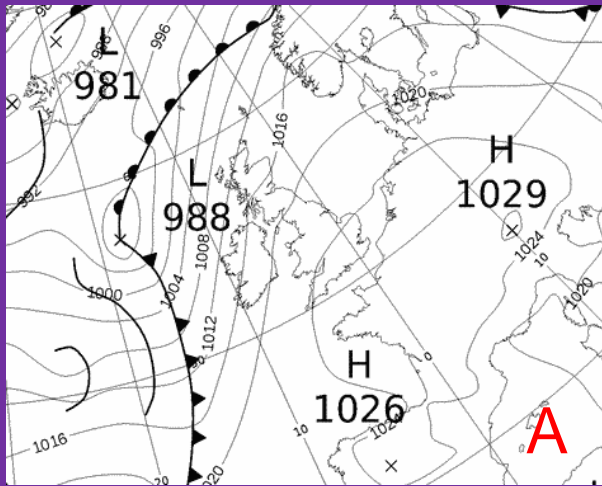
Above is a weather map. What will the temperature in York (red square) do over the next 24 hours?

- a. increase
- b. decrease
- c. stay the same
- d. increase, then decrease



Above is a weather map. What will the wind in York (red square) do in the next 24 hours?

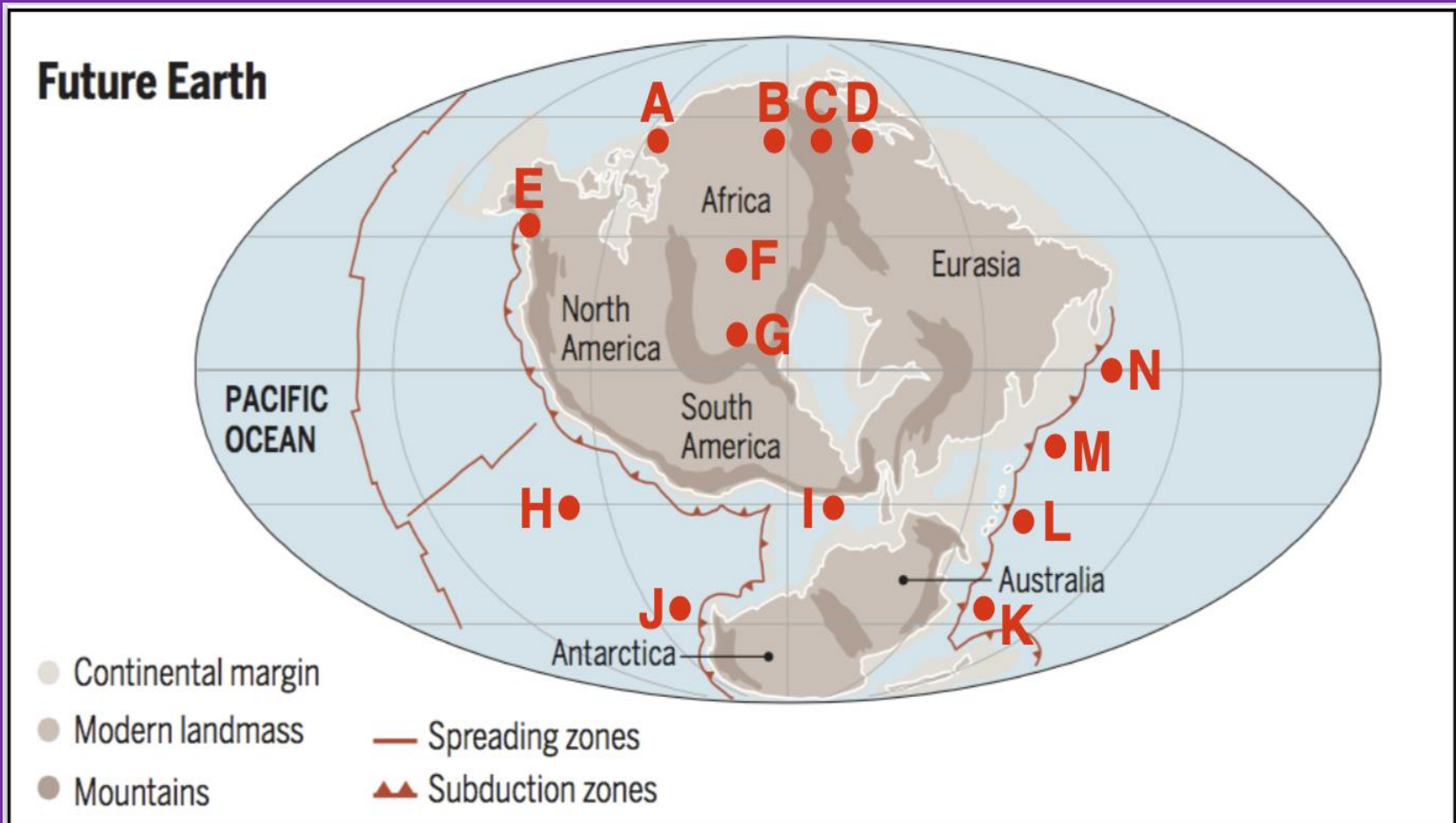
- a. change from southerly to westerly
- b. change from northerly to westerly
- c. change from westerly to northerly
- d. change from easterly to southerly



All four of these maps are taken from winter months. Which of the following weather maps would bring the coldest windiest weather to the UK?

Which of the following weather maps would most likely be associated with poor air quality in the UK?

Below is a graphic of what Earth could look like 250 Ma from now due to plate motions now and in the future. This reconstruction is called Future Earth. Assume that humanity stabilizes greenhouse gases at present levels by then.



Which of these four locations is likely to have the:

- most annual-average precipitation?
- least annual-average precipitation?
- highest temperature anytime during the year?
- highest annual-average salinity?

Over which of these four locations is the polar-front jet stream most likely to occur?

At which of these four locations would you most likely find aeolian sandstones?

Tricks to doing it this way

- Find or create graphics that the students haven't seen before or can't easily search online for
- Create real-life or hypothetical scenarios
- Consider the kinds of questions or the kind of information that they might encounter in the real world

Benefits of doing it this way

- Students will have a hard time finding answers online with a short specified test-taking period.
- Students get more realistic questions (authentic assessment).
- Answers better reflect student knowledge gain.
- Greater spread in results.
- Students learn that exams don't have to be rote memorization, but application.