

ANGLAIS

GROUPE 11

**Brevet de Technicien Supérieur
GÉOLOGIE APPLIQUÉE**

Durée : 2 heures

Coefficient : 2

L'usage d'un dictionnaire bilingue est autorisé.

Tout autre matériel est interdit.

Avant de composer, le candidat s'assurera que le sujet comporte bien
3 pages numérotées de 1/3 à 3/3.

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Traiter les deux questions suivantes :

I - Rédiger en anglais un compte-rendu de ce texte (en 250 mots, à ± 10 % près).
(Indiquer le nombre de mots utilisés).

15 points

II - Traduire en français, l'extrait suivant (lignes 45 à 53) :

"Engineering geologists at BGS have extensive research experience into ground movement in the UK caused by shrinking and swelling clays. BGS also holds large amounts of information about a soil's structure and behaviour (geotechnical data). The geologists have used these to create digital maps that identify areas affected by shrink/swell clays. Prevention is better and cheaper than repair and for new buildings the planner can use these maps to avoid unfavourable areas. If buildings must be constructed in these areas then the engineer can take appropriate design and construction measures that solve the problem, although at greater cost than in areas unaffected by shrinkable clay."

5 points

Cracking open the property market

Based on the prediction of long hot summers occurring two out of every three years, councils in south-east England warned of possible road closures again this year. Last year the government had to release almost £15 million in emergency funds to help tackle the damage caused by the dry weather. Problems are worst on roads in east and south-east
5 England because they are built mainly on peat and shrinkable clay soils. Increasingly heavy traffic on A-roads¹ has added to the damage and means the cost to repair them has also increased. This is eating into the councils' repair budgets, leaving limited funds available to repair or remake the B-roads², some of which are overdue for improvement.

We have all seen what happens to a duck pond in the height of summer, the water
10 evaporates and the hot weather dries up the bottom of the pond leaving it cracked and broken. This happens because the ground below the pond, which is usually made up of clay, dries out and shrinks. This process happens wherever there are clay soils, causing cracks in your flower beds and in your lawn, making paths tilt and crack, creating cracks alongside the local road and under your house. As the summer draws on more and more
15 cracks will appear. Hair-line cracks may even appear on the outside walls of your house. If the dry weather continues, the cracks in your garden will open wider and wider until it looks like crazy paving³. On the roads cracks and hollows will appear in the carriageway, making it uncomfortable to drive on. The hair-line cracks in your house will widen and get longer,
20 doors and windows might stick and the walls and floor may look out of level. If this happens it is time to contact your insurance company or seek expert advice.

¹ A-roads : main roads

² B-roads : secondary roads

³ Crazy paving : irregular pieces of flat stones fitted together as a path

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When the rains eventually fall on the dry, cracked, ground the clay soils will begin to swell, the cracks will close and everything will appear to have returned to normal. However, if the drought has been severe, large, deep, cracks will have formed. These allow water to get deeper into the soil and cause damaging swelling (heave), affecting patios, driveways and roads. If loose soil and sand have fallen into these cracks, preventing them from closing fully, greater force exerted during the swelling process could make the damage even worse. If the cracks have allowed water to get under the house, the normally dry ground may expand so forcefully that the foundations may move. Different parts of the house can move at different speeds and by different amounts, causing the foundations to crack. Cracks may appear at the corners of windows or doors, distorting them so they may become jammed shut. The walls may deform and the floor may bulge. Again, if this happens contact your insurance company.

Indications are that global warming and climate change will have an increasingly adverse effect on these soils and therefore on the damage caused to homes, buildings and roads. The government has recognised that climate change is one of the biggest problems that the UK faces and, if current predictions are correct, we can expect hotter, drier summers in the south-east of England and milder, wetter winters, in the rest of the UK. The shrink/swell process is controlled by temperature and the amount of rainfall, and their distribution throughout the year. It also depends on the amount of clay minerals in the soil, the more clay it contains the higher its swell potential and the more water it can absorb. The change in the amount and distribution of rainfall, as a result of climate change, will lead to a significant increase in the damage done by the shrinking and swelling behaviour of these clay soils.

How can the British Geological Survey (BGS) help?

Engineering geologists at BGS have extensive research experience into ground movement in the UK caused by shrinking and swelling clays. BGS also holds large amounts of information about a soil's structure and behaviour (geotechnical data). The geologists have used these to create digital maps that identify areas affected by shrink/swell clays. Prevention is better and cheaper than repair and for new buildings the planner can use these maps to avoid unfavourable areas. If buildings must be constructed in these areas then the engineer can take appropriate design and construction measures that solve the problem, although at greater cost than in areas unaffected by shrinkable clay.

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Planet Earth, Autumn 2004*