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3

91429



914290



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Level 3 Geography 2020

91429 Demonstrate understanding of a given environment(s) through selection and application of geographic concepts and skills

9.30 a.m. Wednesday 2 December 2020
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of a given environment(s) through selection and application of geographic concepts and skills.	Demonstrate in-depth understanding of a given environment(s) through selection and application of geographic concepts and skills.	Demonstrate comprehensive understanding of a given environment(s) through selection and application of geographic concepts and skills.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

Pull out Resource Booklet 91429R from the centre of this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

Excellence

TOTAL

08

ASSESSOR'S USE ONLY

INSTRUCTIONS

Refer to the resource booklet about air pollution in Mongolia. You should demonstrate your understanding of a range of geographic skills and concepts when answering the question.

QUESTION: Air pollution in Mongolia

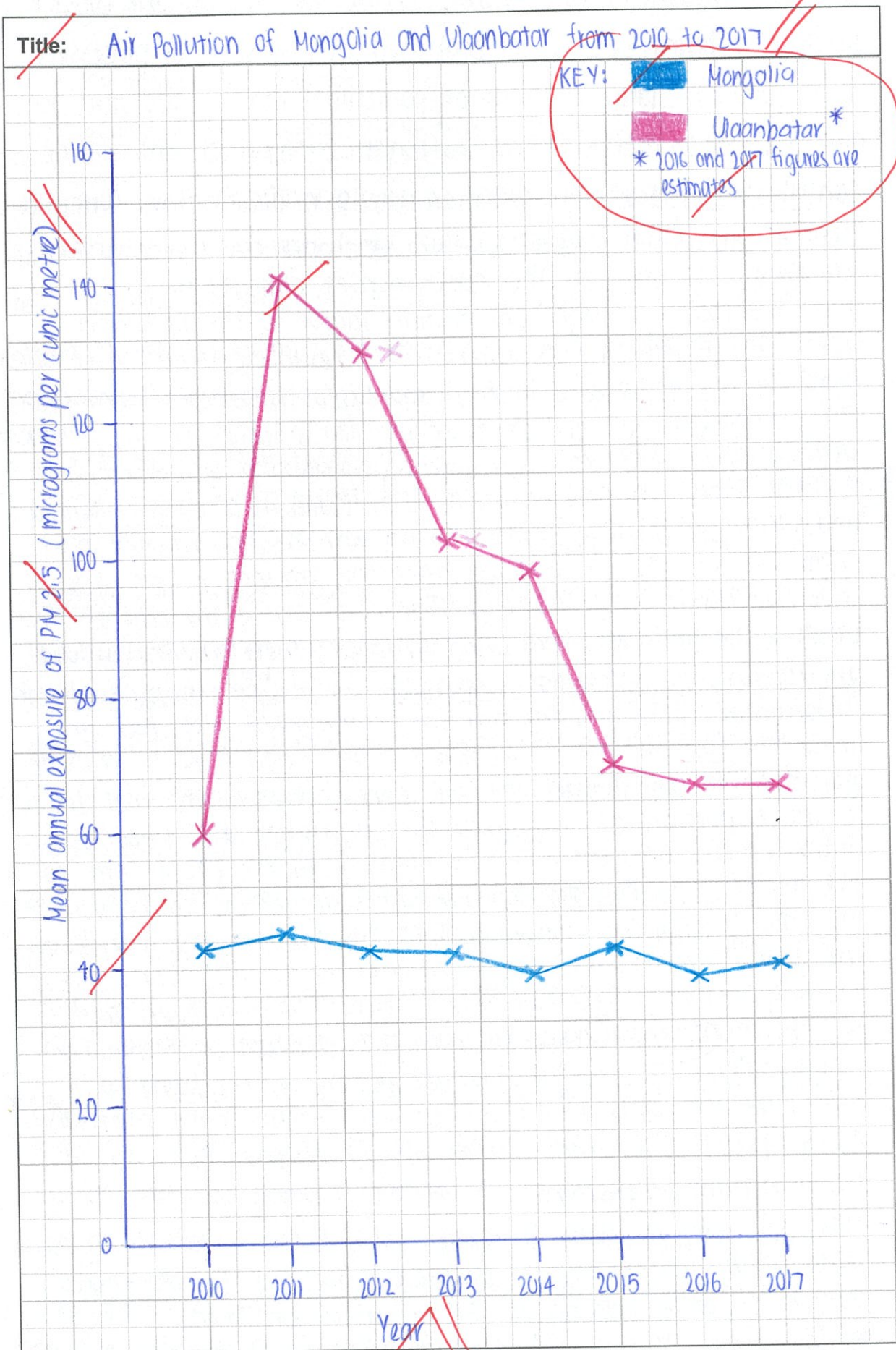
- (a) Using **Resources A to I** on pages 3–10 of the resource booklet, comprehensively analyse how the environment (natural and cultural) contributes to Ulaanbaatar's air pollution.

Mongolia is a landlocked country located in East Asia with a population of 3 million people. Although the country is one of the least densely populated in the world, the capital of Mongolia - Ulaanbaatar is where 1.5 million people live making the city very densely populated. The large population size is one of the main contributing factors as to why Ulaanbaatar ~~is~~ has some of the worst pollution levels in the world. ~~and with birth rates increasing, the pollution would only be expected to get worse.~~ Pollution is measured by the level of fine particulate matter (PM 2.5) and in Ulaanbaatar, these levels have reached more than 133 times the World Health Organization's safe level during the winter months placing it fifth in the top 10 most polluted capitals in 2018. The annual average PM 2.5 levels ~~are~~ in 2018 were 58.5 micrograms per cubic metre. In the winter is when pollution levels are at their highest due to the fact that temperatures can reach as low as between -36°C and -40°C with average temperatures in February and December being just 17°C . As the temperatures are so low, there is a huge need for heating in order to keep warm. In Ulaanbaatar, more than 60% of the population live in gers ~~districts~~ which in ger districts. Gers are portable dwellings which are popular because they can easily be moved and foundations don't need to be driven into the ground. However, these dwellings lack central heating which means they are heated by traditional stoves in the centre of the ger with a chimney that

passes up through the roof. Although coal, wood, and dung can be burnt on the stoves, coal is most commonly used in the winter because it burns longer. The coal used isn't washed or processed, so it produces large amounts of particulate matter and also sulfur dioxide, carbon monoxide, and nitrogen oxide which all contribute to the high pollution levels in Ulaanbatar. Currently, there is no clean fuel alternatives which are cost competitive for people to use. So, the harsh winter climate and the need for coal is a huge contributing factor to the pollution levels. The ~~to~~ freezing weather is as a result of Ulaanbatar being found 1300m above sea level, hundreds of kilometres away from the nearest coastline and experiencing the effects of the Siberian anticyclone. Landforms surrounding Ulaanbatar also ~~effect~~ have a large effect on the pollution. It is found in a narrow valley and surrounded by mountains. During winter, the polluted air from use of coal is trapped near the ground by an inversion which is a layer of warm air above the cold ^{polluted} air that prevents the pollutants from being released. Therefore, the natural environment is somewhat responsible for the ^{high} pollution levels in Ulaanbatar. However, the natural environment also has an influence on the cultural environment and how it links to pollution. In Ulaanbatar, the soil experiences permafrost for a large portion of the year which makes building infrastructure difficult. This is why so many people opt to live in Gers as they don't require the foundations to be dug into the ground and can therefore be built at any time during the year. However, as mentioned previously, the Gers lack heating which is sustainable. There has also been a lot of changes recently in the location of Mongolian people. Because of the climate during winter being so cold, livestock gets killed off making farming not profitable.* As a result, urbanisation has increased because of rural-urban migration of farmers moving to the city to find jobs and be closer to better schools and hospitals. In every year, approximately 45,000 people are shifting to Ulaanbatar which is only adding to the pollution problems. (PAGE 8)

* The fact that little land in Mongolia is fertile and most vegetation is just grassy steep slopes will also make farming difficult.

- (b) Use the most appropriate graphing method and graphing conventions, and the data in **Resource 1** on page 10 of the resource booklet, to show how air pollution for BOTH the city of Ulaanbaatar and Mongolia as a country changed between 2010 and 2017.



- (c) Critically evaluate possible solutions to air pollution in Ulaanbaatar, and come to a justified conclusion as to which solution will best solve the problem.

ASSESSOR'S
USE ONLY

In your answer, you should:

- integrate specific information from **Resources J to M** on pages 11–13 of the resource booklet
- apply relevant geographic concepts (see page 2 of the resource booklet).

The fact that air pollution in Mongolia is responsible for 4000 deaths every year shows how important it is that change is implemented to help combat the issue. Currently there are national plans to reduce air pollution by 80% and cut air pollution in half by 2025. There are several solutions which can help these goals to be reached including encouraging movement from the city of Ulaanbatar to rural areas, legislation, funding for clean stoves and home insulation in the Ger districts and implementing new housing policies. ||

In 2017, the government decided to put a ban on migration from rural areas to urban areas until 2020 with the hope of helping to resolve pollution. From the perspective of experts and locals of rural areas such as Erdeneburen Ravjikh they believe that the ban alone will not help towards reducing pollution in Ulaanbatar and instead the rural areas need to be improved to make it more appealing for people to move from the city to rural areas. In most rural areas, there is no central heating, only coal-fired metal stoves, often a walk to obtain water and bathrooms which are horrible during the winter months. The fact that jobs are also scarce in the rural areas ^{with unemployment rates of 10.7%} is what also drives people to Ulaanbatar as it is much easier to find jobs because over half of the country's GDP is generated there. Therefore, if rural areas were upgraded to have proper heating and toilets as well as a good water supply they would be much more appealing to move to. However, this

solution currently isn't supported by the government and ^(it) would be very time consuming to upgrade the facilities and create jobs in enough rural areas to have a significant impact and decrease the population of Ulaanbatar enough to improve pollution. The solution also has no target on ^{one of} the main contributors to the pollution which is coal consumption in Ulaanbatar. Therefore, I believe ^{improving rural areas} it is not the best solution to provide a significant change in ^{only} pollution levels of Ulaanbatar.

With the cases of respiratory infections tripling in the last 10 years, pneumonia being the second highest cause of death in under five year olds and ~~air pollution~~ air pollution-related diseases costing public health services in Ulaanbatar USD 8.5 million in 2016, the Prime Minister ^{They announced from April} has implemented some new legislation from January 2018. There will be a ban on the transportation and use of raw coal except for in thermal plants. However, ~~th~~ from the perspective of miners and sellers of coal they don't believe that the air quality is possible so don't think that the ban ^{ca} will work which suggests the public may need educated about the impact that coal has on pollution. Subsidies have also been offered to families so they can purchase less-polluting stoves by the government as well as free electricity being providing free electricity at night to many high-polluting districts with the hope of improving sustainability in these areas. Although this idea seems good, many homes in the ger districts can't afford electric heaters and aren't connected to the electricity which makes it less effective. Face masks and air purifiers have also been distributed to households, schools and hospitals but it is thought the face masks don't filter out all toxic gases and instead encourage residents to go outside in hazardous conditions.

Although this solution does reduce the use of coal, I don't believe that it is the best solution because not enough alternatives to coal are provided for those living in the ger districts which is where the main issue is. By providing masks and air purifiers it is also only providing a way for people to cope with the pollution and not prevent it which is why I believe money could be better spent on other options. ||

In the ger districts, only 5% of house households are using electricity for heating which isn't sustainable and therefore needs to change. This is because heating expenses are typically higher in ger districts than for apartments and therefore housing policies need to be introduced which allow the ger district residents to move into apartments. For example, people who live in gers which are in 'air quality improvement zones' are being offered the first 30% of the mortgage towards a new apartment to be funded by the government. This solution would result in a decrease in pollution because people would be encouraged to move into city apartments which use more electricity than coal heating. However, as there is 200,000 gers in Ulaanbatar, I believe that it would not cause enough change to have a significant impact on the pollution in Ulaanbatar and have a positive effect on the environment. ||

I think that the best solution to reducing air pollution in Ulaanbatar is targeting the ger districts where the main coal use is and supporting change to more environmentally friendly alternatives.

For example, providing insulation to homes as this can have the effect of cutting the coal use by a household by up to an 1/8th of what is usually used during a winter which also allows for a significant decrease in the budget. Subsidies have also been provided

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Extra space if required.

Write the question number(s) if applicable.

ASSESSOR'S
USE ONLYQUESTION
NUMBER

(a)

So, overall the natural and cultural environment ^{individually,} as well as their interaction play a large role in the pollution of Ulaanbatar. For the natural environment, there is the cold climate during winters, the mountains surrounding the city trapping the pollutants and the soil and vegetation which influence the cultural environment and actions of people. The permafrost in soils ~~has~~ and lack of vegetation has caused urbanisation to increase and the traditional Ger which is a large contributor to pollution in the winter months because of the coal used to become very popular. ||

(c)

towards providing clean stoves and between 2010 and 2015 175,000 were distributed to houses in the Ger district. This resulted in a steady decrease in pollution during the time of implementation. However, since then, rates have worsened. This is because there is lack of regulation regarding use of clean stoves and boilers which has caused ger residents to turn back to using their high polluting traditional stoves and low-pressure boilers. The terrain ~~surface~~ in and around ger districts also makes it difficult for necessary pipes and substations to be installed allowing for connection to the district heating system. In spite of this, I believe that causing change to the ways of heating in the Ger district is the best way to reduce air pollution ^{in Ulaanbatar}. This is because it directly targets one of the main causes which is coal uses in Gers and improvements have already been seen since clean stoves and insulation were subsidies. If, along with the subsidy there was also legislation to make sure ger residents didn't revert to their old ways it would significantly reduce ^{air} pollution in Ulaanbatar and make a much safer environment.

91429

Excellence Exemplar 2020

Subject	Geography		Standard	91429	Total score	08
Q	Grade score	Annotation				
	E8	<p>Although not an exhaustive analysis of the aspects contributing to the air pollution, both parts of the environment – natural and cultural – are analysed and not simply restated and described. The candidate refers to the fact that other fuel sources can be used but coal is preferred above wood and dung due to its longevity and that the permafrost means that gers are built, which lack infrastructure. Insight is shown where the candidate considers that the natural environment is somewhat responsible and influences the cultural environment and that it is them interacting.</p> <p>The graph demonstrates precision. All conventions are correct, including correctly identifying that the figures for 2016 and 2017 for Ulaanbaatar are estimates. Very few candidates did this although this was not a limiting factor to demonstrating 'precision'.</p> <p>Each solution offered is evaluated by considering the strengths and weaknesses of it. Sustainability is clearly understood and referenced throughout the response. Recognising that some solutions would bring about some change, but not enough change to make a difference, demonstrates insight as does identifying that the provision of masks and purifiers will only allow people to cope with the levels of pollution and not address the cause, so the money would be better spent elsewhere.</p>				