

READING PASSAGE 1

You should spend about 20 minutes on **Questions 1-14** which are based on Reading Passage I below.

Questions 1-5

Reading Passage 1 has **9 paragraphs A-I**. From the list of headings below choose **5** of the most suitable headings.

NB There are more headings than paragraphs, so you will not use them all.

List of Headings

- | | |
|-------|---|
| i. | English wine-making fatally hit |
| ii. | Explanations found in reduced solar inactivity |
| iii. | Agricultural consequences |
| iv. | Volcanic activity |
| v. | Decimation of vineyards |
| vi. | LIA-related epidemics and plagues |
| vii. | Malnutrition and deteriorating health |
| viii. | Issues of state finance raised by cooling climate |
| ix. | Summer at Lake Geneva |
| x. | A literary legacy |

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|-----------------------|
| <i>Example</i> |
| Paragraph D |
| 1. Paragraph C |
| 2. Paragraph F |
| 3. Paragraph G |
| 4. Paragraph H |
| 5. Paragraph I |

Answer
iv

The Little Ice Age: When Global Cooling Gripped the World

A. The year was 1645, and the glaciers in the Alps were on the move. In Chamonix at the foot of Mont Blanc, people watched in fear as the Mer de Glace (Sea of Ice) glacier advanced. In earlier years, they had seen the slowly flowing ice engulf farms and crush entire villages. They turned to the Bishop of Geneva for help; at the ice front he performed a rite of exorcism. Little by little, the glacier receded. But before long the threatening ice returned, and once again the bishop was summoned. The struggle against the glacier continued for decades. Similar dramas unfolded throughout the Alps and Scandinavia during the late 1600s and early 1700s, as many glaciers grew farther down mountain slopes and valleys than they had in thousands of years. Sea ice choked much of the North Atlantic, causing havoc with fisheries in Iceland and Scandinavia. Eskimos paddled their kayaks as far south as Scotland. These and many similar events, bewildering and disruptive to the societies of the time, are pieces of a global climatic puzzle that scientists and historians today call the "Little Ice Age (LIA)."

B. Most of the Little Ice Age occurred well before the Industrial Revolution and the widespread burning of fossil fuels, so scientists are confident that its climatic convulsions had purely natural causes. The event fascinates scientists because it gives them a glimpse of how Earth's climate system operates when left to its own devices. "It's important because we're trying to understand the warming over the past 100 years," says Alan Robock of the University of Maryland's Department of Meteorology. "Some people have said it's just a 'recovery from the Little Ice Age.'"

C. So, what caused the Little Ice Age? Because the sun is the ultimate source of Earth's warmth, some researchers have looked to it for an answer. In the 1970s, solar researcher John Eddy noticed the correlation of sunspot numbers with major ups and downs in Earth's climate. He found that a period of low activity from 1645 to 1715, called the Maunder Minimum, matched perfectly one of the coldest spells of the Little Ice Age. Judith Lean, a solar physicist at the Naval Research Laboratory in Washington, estimates that the sun may have been about a quarter of 1 percent dimmer during the Maunder Minimum. This may not sound like much, but the sun's energy output is so immense that 0.25 percent amount to a lot of missing sunshine enough to cause most of the temperature drop, she says.

D. Other researchers have examined earthly causes. Volcanic eruptions are known to meddle with climate by injecting a veil of sun-blocking aerosols into the atmosphere. The eruption of Mount Pinatubo in 1991 dropped Earth's average air temperature by about 1 degree an effect that lasted about two years. Martin Robock points out that there were more frequent eruptions during the Little Ice Age than during the 20th century. Most prominent was the 1815 eruption of Tambora in Indonesia. It pumped into the atmosphere vast amounts of ash ten times that of Krakatoa, another famous Indonesian volcano. The following year has been called the "Year Without a Summer." In June and July of 1816, New England and northern Europe suffered frost and even snow. Scientists dispute the importance of these two causes, and of other possibilities such as shifts in ocean currents. But it seems possible that during the Little Ice Age Earth's climate was hit by a one-two punch from a dimmer sun and a dustier atmosphere.

E. The Little Ice Age affected almost any type of food production, especially crops highly adapted to use the full-season warm climatic periods. During the coldest times, England's growing season was shortened by one to two months compared to present day values. The availability of varieties of seed today that can withstand extreme cold or warmth, wetness or dryness, was not available in the past. Therefore, climate changes had a much greater impact on agricultural output in the past.

F. Grapes for wine-making were no exception. Ladurie (1971) notes that there were many "bad years" for wine during the Little Ice Age in France and surrounding countries due to very late harvests and very wet summers. In England in the late eleventh century, vineyards were recorded in 46 places, from East Anglia through to modern-day Somerset. With the coming cooler climate in the 1400's, temperatures became too cold for grape production and the vineyards in southern England gradually declined.

G. In addition to increasing grain prices and lower wine production, there were many examples of economic impact by the dramatic cooling of the climate. Cod fishing greatly decreased, especially for the Scottish fisherman, as the cod moved farther south. In the Hohe Tauern Mountains of the Austrian Alps, advancing glaciers closed the gold mines of the Archbishop of Salzburg who was one of the wealthiest dukes in the empire. Due to famine, storms, and growth of glaciers, many farmsteads

were destroyed, which resulted in less tax revenues collected due to decreased value of the properties,

H. The cooler climate during the LIA had a huge impact on the health of Europeans. As mentioned earlier, dearth and famine killed millions and poor nutrition decreased the stature of the Vikings in Greenland and Iceland. Cool, wet summers led to outbreaks of an illness called St. Anthony's Fire. Whole villages would suffer convulsions, hallucinations, gangrenous rotting of the extremities, and even death. Malnutrition led to a weakened immunity to a variety of illnesses. In England, malnutrition aggravated an influenza epidemic of 1557-1558 in which whole families died. In fact, during most of the 1550's deaths outnumbered births. The Black Death (Bubonic Plague) was hastened by malnutrition all over Europe.

I. Not all of the impact was bad. One thing that happened during the Little Ice Age was that it spoiled the 1816 summer vacation of poet Percy Bysshe Shelley and his wife, Mary, with friends at Lake Geneva in Switzerland. The weather was so cold that they stayed indoors much of the time, entertaining one another with horror stories. Mary Shelley's contribution was Frankenstein, the immortal fable of human tampering with the forces of nature. In Shelley's tale, a legacy of the Little Ice Age, the monster and his creator meet their fates in a frozen Arctic sea. Today she might have chosen a parched greenhouse desert.

Questions 6-11

Do the following statements agree with the information given in Reading Passage 1? In boxes 6-11 on your answer sheet write

TRUE if the statement is true
FALSE if the statement is false
NOT GIVEN if the information is not given in the passage.

6. Scientists have reached unanimous conclusions on the effects of solar and volcanic activities.
7. The growing season in England used to be one to two months shorter than now.
8. As a result of the low temperature, there were only 46 vineyards in England in 1400.
9. Scottish fisherman chased the cod and moved farther south.
10. Most of the years in the 1550s saw lower birth than mortality rates.
11. In Mary Shelley's story Frankenstein died in a desert.

Questions 12-14

Choose **NO MORE THAN THREE WORDS** from the passage to complete the summary below.

Little Ice Age has significant implications for scientific research because it exemplifies the ways.....**12**.....would work independently of human interferences. Among various factors, scientists have identified**13**..... and volcanic eruptions as two major contributors; although they speculate that there might have been other possibilities such as**14**.....

READING PASSAGE 2

You should spend about 20 minutes on **Questions 15 - 26** which are based on Reading Passage 2 below.

A. The age of dinosaurs, which ended with the cataclysmic bang of a meteor impact 65 million years ago, may also have begun with one. Researchers found recently the first direct, though tentative, geological evidence of a meteor impact 200 million years ago, coinciding with a mass extinction that eliminated half of the major groups of life and opened the evolutionary door for what was then a relatively small group of animals; dinosaurs.

B. The cause and timing of the ascent of dinosaurs has been much debated. It has been impossible to draw any specific conclusions because the transition between the origin of dinosaurs and their ascent to dominance has not been sampled in detail. "There is a geochemical signature of something important happening, probably an asteroid impact, just before the time in which familiar dinosaur-dominated communities appear," said Dr. Paul E. Olsen, a professor of earth and environmental sciences at Columbia University's Lamont-Doherty Earth Observatory in Palisades, N. Y.

C. Olsen and his colleagues studied vertebrate fossils from 80 sites in four different ancient rift basins, part of a chain of rifts that formed as North America began to split apart from the super continent that existed 230-190 million years ago. In the layer of rock corresponding to the extinction, the scientists found elevated amounts of the rare element iridium. A precious metal belonging to the platinum group of elements, iridium is more abundant in meteorites than in rocks on Earth. A similar spike of iridium in 65 million-year-old rocks gave rise in the 1970s to the theory that a meteor caused the demise of the dinosaurs. That theory remained controversial for years until it was corroborated by other evidence and the impact site was found off the Yucatan Peninsula. Scientists will need to examine the new iridium anomaly similarly. The levels are only about one-tenth as high as those found at the later extinction. That could mean that the meteor was smaller or contained less iridium or that a meteor was not involved; iridium can also come from the Earth's interior, belched out by volcanic eruptions. Dr. Michael J. Benton, a professor of vertebrate paleontology at the University of Bristol in England, described the data as "the first reasonably convincing evidence of an iridium spike".

D. The scientists found more evidence of rapid extinction in a database of 10,000 fossilized footprints in former lake basins from Virginia to Nova Scotia. Although individual species cannot usually be identified solely from their footprints the tracks of a house cat, for example, resemble those of a baby tiger footprints are much more plentiful than fossil bones and can provide a more complete picture of the types of animals walking around. It makes it very easy for us to tell the very obvious signals of massive fauna change," Dr. Olsen said. Because the sediment piles up quickly in lake basins, the researchers were able to assign a date to each footprint, based on the layer of rock where it was found. They determined that the mix of animals walking across what is now the East Coast of North America changed suddenly about 200 million years ago.

E. The tracks of several major reptile groups continue almost up to the layer of rock marking the end of the Triassic geologic period 202 million years ago, and then vanish in younger layers from the Jurassic period. I think the footprint methodology is very novel and very exciting," said Dr. Peter D. Ward, a professor of geology at the University of Washington. He called the data "very

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required more research. Last year, researchers led by Dr. Ward reported that the types of carbon in rock changed abruptly at this time, indicating a sudden dying off of plants over less than 50,000 years. The footprint research reinforces the hypothesis that the extinction was sudden.

F. Several groups of dinosaurs survived that extinction, and the footprints show || that new groups emerged soon afterward. Before the extinction, about one-fifth of the footprints were left by dinosaurs; after the extinction, more than half were from dinosaurs. The changes, the researchers said, occurred within 30,000 years a geological blink of an eye. The scientists postulate that the asteroid or comet impact and the resulting death of Triassic competitors allowed a few groups of carnivorous dinosaurs to evolve in size very quickly and dominate the top of the jj terrestrial food chain globally.

G Among the creatures that disappeared in the extinction were the dominant predators at the time: 15-foot-long raiuisichians with great knifelike teeth and phytosaurs that resembled large crocodiles. Dinosaurs first evolved about 230 million years ago, but they were small, competing in a crowded ecological niche. Before the extinction 200 million years ago, the largest of the meat-eating dinosaurs were about the size of large dogs. "Not terribly impressive," Dr. Olsen said. The dinosaurs quickly grew. The toe-to-heel length of the foot of a meat eater from the Jurassic period was on average 20 percent longer than its Triassic ancestor. Larger feet can carry bigger bodies; the scientists infer the dinosaurs doubled in weight, eventually evolving into fearsome velociraptors, Tyrannosaurus rex and other large carnivorous dinosaurs.

H. The spurt in evolution is similar to the rise of mammals after the extinction of dinosaurs. Mammals, no larger than small dogs during the age of dinosaurs, ii diversified into tigers, elephants, whales and people after the reptilian competition ii died away. The success of the dinosaurs after the Triassic-Jurassic extinction may [J be why they did not survive the second extinction. Small animals always do better in catastrophic situations," Dr. Olsen said, "because they can survive on smaller amounts of food." He also pointed out that scientists now believe the small dinosaurs did survive. "We just call them birds," he said.

Questions 15-20

Use the information in the passage to match the people (**listed A-C**) with opinions or deeds (**listed 15-20**) below.

Write the appropriate letter (**A-C**) in boxes **15-20** on your answer sheet.

A.	Paul Olsen,	B.	Michael Benton,	C.	Peter Ward
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15. Large animals are in a disadvantageous position when disasters happen.
16. Radical changes in carbon types are related to massive extinction of vegetation.
17. The changes in earth's vegetation become easier to identify.
18. Geochemical evidence suggests an asteroid impact before dinosaurs appeared.
19. Footprint study is a way of research.
20. Persuasive clues of an iridium spike were discovered for the first time.

Questions 21-26

Do the following statements agree with the information given in Reading Passage 2?

In boxes **21 -26** on your answer sheet write

TRUE if the statement is true
FALSE if the statement is false
NOT GIVEN if the information is not given in the passage.

21. The meteor impact theory had been suspected before the discovery of the impact site and other supporting evidence.
22. The rare element, iridium, was only abundant in meteorites.
23. Individual species cannot be identified with footprints because they were more abundant than fossils.
24. According to scientists, the translation to a dinosaur-dominated era took place very quickly by geological time scales.
25. The 15-foot-long raiuisichians had knifelike teeth and looked like large crocodiles.
26. large dinosaurs died out but small ones evolved and competed with mammals.

READING PASSAGE 3

You should spend about 20 minutes on **Questions 27-40** which are based on Reading Passage 3 below.

Rapid, Urban and Flexible

1. The car is so popular that it is about to strangle itself in success. On the other hand, traditional bus/train transit systems are so unattractive that they will never be able to become a real alternative to the car in a society where there is freedom of choice. Something new has to be invented. Something which is as flexible as the car, but as efficient as the train regarding capacity and environmental impact. A Dual Mode system is able to offer this new combination.

2. Modern cities are in very low density. People prefer to have space around them. It is good for the children and you have more privacy than in high-rise buildings. The consequence is that travel patterns are very diffuse both in time and in space. People are traveling from everywhere to everywhere and at the time they choose to travel. This makes it extremely difficult to transport people with traditional transit. Normally people are not willing to walk more than 400m to a station, so a Light Rail system will only appeal to a minor part of the travelers. A Dual Mode system like RUF (Rapid, Urban and Flexible) is able to cover widespread cities. For that reason it is a better alternative to the car than traditional transit.

3. The vehicles drive manually a few kilometers on ordinary roads in order to get to the rail system. The driver programs the RUF to know its destination and this information is transferred to the system when the vehicle gets near to the monorail. The system guides the vehicle to enter the guideway without waiting and at 30 km/h. From there on the driver can relax until he gets close to his destination where he takes over control again and drives manually to his destination. The main part of the trip is

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automated and the system knows when to turn right or left and when to get off. The automated part is very safe and energy-efficient. The travel speed is typically 120km/h on average. Travel times are short and predictable.

4. The RUF system will be implemented as a network of guideways. A typical mesh size will be 5 x 5km, so a typical commuter will use 3 sections of the rail. At every junction, the speed is reduced to 30km/h. The top speed between junctions can reach 200km/h, but typically it will be 150km/h when the mesh size is 5 x 5km. The reason for this speed reduction during switching is partly that the safety has to be extremely high in an automated system, partly that if the speed was any higher, and the radius of curvature would be much higher (it goes with the square of the speed). In an existing city it will not be possible to find room for soft curves. At 30km/h the comfort criteria will allow for a 26m radius of curvature.

5. The vehicles in the RUF system are coupled to form trains when they use the guideway. The length of the train depends on the demand. During night everybody will be allowed to travel alone. During rush hour 1 RUF per second can enter the guideway system. This means that a train of 10 RUFs can be created in approximately 10 seconds. This train creation can be made before merging onto the main rail. This way a very high capacity can be obtained. Capacity is more than just a number. The quality of capacity depends on the frequency. It is much better to have a capacity of 20, 000 passengers per hour per direction with many small units than the same capacity obtained by squeezing people into large trains.

6. The RUF system can reduce the energy consumption from individual traffic. The main factor is the reduction of air resistance due to close coupling of vehicles. The energy consumption per RUF can be reduced to less than 1/3 at 100km/h. Since RUF is an electric system, renewable sources can be used without problems. A combination of windmills and a RUF rail could be used over water. Solar cells can also be integrated into the system and ensure completely sustainable transportation.

7. The RUF system uses the space very efficiently. Only 2.5 x 2.5m is required for the rail. This means that it will often be possible to place a guideway along existing traffic corridors. A tunnel solution can be created where one tube can contain 3 rails. This means that the cost will be much lower than for a train system requiring 2 tubes. The third rail can be used to supply more capacity for rush hour traffic in one direction or to help in an emergency.

8. The vehicles in a RUF system "rides" very safely on top of a triangular monorail. This means that derailments are impossible and that the users will feel safe because it is easy to understand that when the rail is actually inside the vehicle it is absolutely stable. The special rail brake ensures that braking power is always available even during bad weather. The brake can squeeze as hard against the rail as required in order to bring the vehicle to a safe stop, if a vehicle has to be evacuated, a walkway between the two rails can be used.

9. Personal Rapid Transit (PRT) is a beautiful system where small vehicles drive on demand on a guideway system. It is much better than traditional transit. Unfortunately it has never been fully implemented. Part of the reason is that it is not a Dual Mode system. It cannot leave the guideway. RUF can work as a PRT system where it is relevant (in dense parts of a town), but is also a Dual Mode system. In this respect it can be seen as a PRT+system.

10. It will be impossible to start the RUF system as a system with privately owned RUFs from the start. Nobody would invest in a new infrastructure without knowing if anybody would like to buy the vehicles for it. For that reason, it is the intention to start it as a Public Transport system. Since the guideway is very slender and relatively inexpensive, such a system will be less costly than traditional public transport, it would also be a success compared to traditional transit because of the very high level of service offered in RUF.

Questions 27-29 Choose **THREE** appropriate letters and fill in boxes **27-29**.

A Dual Mode system is a real alternative to the car, because it has _____.

- | | |
|---|-------------------------|
| A. wide coverage | B. government support |
| C. large capacity and energy efficiency | D. lower costs |
| E. comfortableness of cars | F. high level of safety |

Questions 30-34

Do the following statements agree with the information given in Reading Passage 3?

In boxes **30 34** on your answer sheet write

- TRUE** if the statement is true
FALSE if the statement is false
NOT GIVEN if the information is not given in the passage.

30. Traditional transit systems are unappealing and cannot displace cars because people have freedom of choice.
31. The low density of cities has caused the travel patterns to centralize both in time and in space.
32. The speed reduction during switching is designed only out of safety concerns.
33. Many individual RUFs achieve higher quality than large trains with the same capacity.
34 Over-water RUF rail uses a combination of windmills and solar cells.

Questions 35-40 Classify the following statements as applying to

A. PRT only,	B. RUF only,	C. Both PRT and RUF
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- | | |
|------------------------------|----------------------------|
| 35. A single mode system | 36. Uses guideways |
| 37. Is used only on rails | 38. Uses separate vehicles |
| 39. Has not been implemented | 40. Coupled to form trains |