

READING PASSAGE 1

You should spend about 20 minutes on Questions 1-13, which are based on Reading Passage 1 below.

How the mind ages

The way mental function changes is largely determined by three factors-mental lifestyle, the impact of chronic disease and flexibility of the mind.

Experiments have shown that younger monkeys consistently outperform their older colleagues on memory tests. Formerly, psychologists concluded that memory and other mental functions in humans deteriorate over time because of changes in the brain. Thus mental decline after young adulthood appeared inevitable. The truth, however, is not quite so simple.

Stanley Rapoport at the National Institute of Health in the United States measured the flow of blood in the brains of old and young people as they completed different tasks. Since blood flow reflects neural activity, Rapoport could compare which networks of neurons were the same, the neural networks they used were significantly different. The older subjects used different internal strategies to accomplish comparable results at the same time,'Rapoport says. At the Georgia Institute of Technology, psychologist Timothy Salthouse compared a group of fast and accurate typists of college age with another group in their 60s. Both groups typed 60 words a minute. The older typists, it turned out, achieved their speed with cunning little strategies that made them more efficient than their younger counterparts. They made fewer finger shifts, gaining a fraction of a second here and there. They also read ahead in the test. The neural networks involved in typing appear to have been reshaped to compensate for losses in motor skills or other age changes.

In fact, there's evidence that deterioration in mental functions can actually be reversed. Neuropsychologist Marion Diamond at the University of California has shown that mental activity makes neurons sprout new dendrites* which establish connections with other neurons. The dendrites shrink when the mind is idle. For example,'when a rat is kept in isolation, the animal's brain shrinks, but if we put that rat with other rats in a large cage and give them an assortment of toys, we can show, after four days, significant differences in its brain.'says Diamond. After a month in the enriched surroundings, the whole cerebral cortex has expanded, as has its blood supply.'But even in the enriched surroundings, rats get bored unless the toys are varied. Animals are just like we are. They need stimulation,'says Diamond. A busy mental lifestyle keeps the human mind fit, says Warner Schaie of Penn State University. 'People who regularly participate in challenging tasks retain their intellectual abilities better than mental couch potatoes.'

In his studies, Schaie detected a decline in mental function among individuals who underwent

lengthy stays in hospital for chronic illness. He postulated it might be due to the mental passivity encouraged by hospital routine.

One of the most profoundly important mental functions is memory. Memory exists in more than one form, what we call knowledge- facts- is what psychologists such as Harry Bahrck of Ohio Wesleyan University call semantic memory. Events, conversations and occurrences in time and space, on the other hand, make up episodic memory. It's true that episodic memory begins to decline when most people are in their 50s, but it's never perfect at any age.

Probing the longevity of knowledge, Bahrck tested 1,000 high school graduates to see how well they remembered the school subject algebra. Some had completed the course a month before, other 50 years earlier. Surprisingly, he found that a person's grasp of algebra did not depend on how long ago he'd taken the course. The determining factor was the duration of instruction. Those who had spent only a few months learning algebra forgot most of it within two or three years while others who had been instructed for longer remembered better. According to Bahrck, 'the long-term residue of knowledge remains stable over the decades, independent of the age of the person and the memory.'

Perhaps even more important than the ability to remember is the ability to manage memory- a mental function known as metamemory. 'You could say metamemory is a byproduct of going to school,' says psychologist Robert Kail of Purdue University, 'The question-and-answer process, especially exam taking, helps children learn and teaches them how their memory functions. This may be one reason why the better educated a person is, the more likely they are to perform well in many aspects of life and in psychological assessments: A group of adult novice chess players were compared with a group of child experts at the game. But when asked to remember the patterns of chess pieces arranged on a board, the children won.' Because they'd played a lot of chess, their knowledge of chess was better organized than that of the adults, and their existing knowledge of chess served as a framework for new memory,' explains Kail. Cognitive style, another factor in maintaining mental function, is what Schaie calls the ability to adapt and roll with life's punches. 'He measured mental flexibility with questions and tests requiring people to carry out in an offbeat way an everyday activity they had done millions of times. One example was asking people to copy a paragraph substituting uppercase letters for lowercase ones. These tests seem silly, but flexible-minded people manage to complete them,' says Schaie. The rigid person responds with tension instead and performs poorly. Those who score highly on tests of cognition at an advanced age are those who tested high in mental flexibility at middle age'.

On a more optimistic note, one mental resource that only improves with time is specialized knowledge. Crystallised intelligence about one's occupation apparently does not decline at all until at least age 75. Vocabulary is another such specialized form of knowledge. Research clearly shows that vocabulary develops with time. Retired teachers and journalists consistently score higher on tests of vocabulary and general information than college students.

Questions 1-3

Choose the correct letter **A, B, C or D**.

Write the correct letter in boxes **1-3** on your answer sheet

1 What does the writer say about the performance of older typists on the test?

- ☐ **A** They used different motor skills from younger typists.
- ☐ **B** They had been more efficiently trained than younger typists.
- ☐ **C** They used more time-saving techniques than younger typists.
- ☐ **D** They had better concentration skills than younger typists.

2 The experiment with the rats showed that

- ☐ **A** brain structure only changed when the rats were given a familiar toy
- ☐ **B** the rats became anxious after a lengthy period of time alone
- ☐ **C** the rats lived longer then they were part of a social group
- ☐ **D** the rats' brains expanded or shrank depending on the level of mental activity

3 A comparison between adults and children who played chess showed that

- ☐ **A** the children were as capable as the adults of remembering a series of numbers
- ☐ **B** the children had better recall of the layout of pieces
- ☐ **C** the adults stored memories of chess moves in a more logical manner
- ☐ **D** the adults had clearer memories of chess games they had played

Questions 4-9

Complete the summary below.

Choose **ONE WORD ONLY** from the passage for each answer.

Write your answers in boxes **4-9** on your answer sheet.

Psychologists distinguish between two different types of memory: 4 _____ and

5 _____ memory. A study was conducted into people's knowledge of

6 _____ to determine recall ability. This aspect of memory was found to be a function not of age but rather of length of tuition.

School also helps with a brain function called 7 _____. This is why a more highly educated person is generally more successful and does better in 8 _____ tests.

Some of our mental functions remain unaffected by age or even improve. For example, as we get older, our knowledge of 9 _____ increases.

Questions 10-13

Look at the following statements and the list of people below.

Match each statement with the correct person, **A-E**.

List of People	
A	Stanley Rapoport
B	Marion Diamond
C	Warner Schaie
D	Harry Bahrick
E	Robert Kail

Write the correct letter, **A-E**, in boxes **10-13** on your answer sheet.

10 The educational system makes students aware of how their memory works.

11 Although older people may use a different mental approach when completing a task, they can still achieve the same result as younger people

12 Being open to new ways of doing things can have a positive impact on your mental condition as we get older

13 Both animals and humans need to exist in an environment full of interest.

READING PASSAGE 2

You should spend about 20 minutes on Questions 14-26, which are based on Reading Passage 1 below.

Ensuring our future food supply

Climate change and new diseases threaten the limited varieties of seeds we depend on for food. Luckily, we still have many of the seeds used in the past-but we must take steps to save them.

Six miles outside the town of Decorah, Iowa in the USA, an 890-acre stretch of rolling fields and woods called Heritage Farm is letting its crops go to seed. Everything about Heritage Farm is in stark contrast to the surrounding acres of intensively farmed fields of corn and soybean that are typical of modern agriculture. Heritage Farm is devoted to collecting rather than growing seeds. It is home to the Seed Savers Exchange, one of the largest non government-owned seed banks in the United States.

In 1975 Diane Ott Whealy was given the seedlings of two plant varieties that her great grandfather had brought to America from Bavaria in 1870: Grandpa Ott's morning glory and his German Pink tomato. Wanting to preserve similar traditional varieties, known as heirloom plants, Diane and her husband, Kent, decided to establish a place where the seeds of the past could be kept and traded. The exchange now has more than 13,000 members, and the many thousands of heirloom varieties they have donated are kept in its walk-in coolers, freezers, and root cellars the seeds of many thousands of heirloom varieties and, as you walk around an old red barn that is covered in Grandpa Ott's beautiful morning glory blossoms, you come across the different vegetables, herbs, and flowers they have planted there.

"Each year our members list their seeds in this," Diane Ott Whealy says, handing over a copy of the Seed Savers Exchange 2010 Yearbook. It is as thick as a big-city telephone directory, with page after page of exotic beans, garlic, potatoes, peppers, apples, pears, and plums-each with its own name and personal history. For example, there's an Estonian Yellow Cherry tomato, which was brought to the seed bank by "an elderly Russian lady" who lived in Tallinn, and a Persian Star garlic from "a bazaar in Samarkand." There's also a bean donated by archaeologists searching for pygmy elephant fossils in New Mexico.

Heirloom vegetables have become fashionable in the United States and Europe over the past decade, prized by a food movement that emphasizes eating locally and preserving the flavor and uniqueness of heirloom varieties. Found mostly in farmers' markets and boutique groceries, heirloom varieties have been squeezed out of supermarkets in favor of modern single-variety fruits and vegetables bred to ship well and have a uniform appearance, not to enhance flavor. But the movement to preserve heirloom varieties goes way beyond the current interest in North

America and Europe in tasty, locally grown food. It's also a campaign to protect the world's future food supply. Most people in the well-fed world give little thought to where their food comes from or how it's grown. They wander through well-stocked supermarkets without realizing that there may be problem ahead. We've been hearing for some time about the loss of flora and fauna in our rainforests. Very little, by contrast, is being said or done about the parallel decline in the diversity of the foods we eat.

Food variety extinction is happening all over the world - and it's happening fast. In the United States an estimated 90 percent of historic fruit and vegetable varieties are no longer grown. Of the 7,000 different apple varieties that were grown in the 1800s, fewer than a hundred remain. In the Philippines thousands of varieties of rice once thrived; now only about a hundred are grown there. In China 90 percent of the wheat varieties cultivated just a hundred years ago have disappeared. Experts estimate that in total we have lost more than 50 percent of the world's food varieties over the past century.

Why is this a problem? Because if disease or future climate change affects one of the handful of plants we've come to depend on to feed our growing planet, we might desperately need one of those varieties we've let become extinct. The loss of the world's cereal diversity is a particular cause for concern. A fungus called Ug99, which was first identified in Uganda in 1999, is spreading across the world's wheat crops. From Uganda it moved to Kenya, Ethiopia, Sudan, and Yemen. By 2007 it had jumped the Persian Gulf into Iran. Scientists predict that the fungus will soon make its way into India and Pakistan, then spread to Russia and China, and eventually the USA.

Roughly 90 percent of the world's wheat has no defense against this particular fungus. If it reached the USA, an estimated one billion dollars' worth of crops would be at risk. Scientists believe that in Asia and Africa alone, the portion currently in danger could leave one billion people without their primary food source. A famine with significant humanitarian consequences could follow, according to Rick Ward of Cornell University.

The population of the world is expected to reach nine billion by 2045. Some experts say we'll need to double our food production to keep up with this growth. Given the added challenge of climate change and disease, it is becoming ever more urgent to find ways to increase food yield. The world has become increasingly dependent upon a technology-driven, one-size-fits-all approach to food supply. Yet the best hope for securing our food's future may depend on our ability to preserve the locally cultivated foods of the past.

Questions 14-20

Do the following statements agree with the views of the writer in Reading Passage?
In boxes **14-20** on your answer sheet, write.

TRUE	if the statement agrees with the information
FALSE	if the statement contradicts the information
NOT GIVEN	If there is no information on this

- 14 Heritage Farm is different from most other nearby farms.
- 15 Most nongovernment-owned seed banks are bigger than Seed Savers Exchange.
- 16 Diane Ott Whealy's grandfather taught her a lot about seed varieties.
- 17 The seeds people give to the Seed Savers Exchange are stored outdoors.
- 18 Diane and her husband choose which heirloom seeds to grow on Heritage Farm.
- 19 The seeds are listed in alphabetical order in The Seed Savers Exchange Yearbook.
- 20 The Seed Savers Exchange Yearbook describes how each seed was obtained.

Questions 21-26

Complete the notes below.

Choose **ONE WORD AND/OR A NUMBER** from the passage for each answer.

Write your answers in boxes **21-26** on your answer sheet.

The food we grow and eat

Supermarkets

sell fruit and vegetables that transport well

want fruit and vegetables to be standard in their 21 _____

Public awareness

while people know about plants disappearing from 22 _____ very few know

about the decline in fruit and vegetable varieties

Extinction of food varieties

less than 100 of the types of 23 _____ once available in the USA are still grown
over 24 _____ of food varieties around the world have disappeared in the last
100 years

Current problems in food production

a particular fungus is attacking wheat in various countries

Rick Ward believes the threat to food supplies in Asia and Africa might lead to a
25 _____

Food production in the future

climate change and disease may put pressure on food production

twice the amount of food may be needed because of an increase in 26 _____

READING PASSAGE 3

You should spend about 20 minutes on Questions 27-40, which are based on Reading Passage 1 below.

The fluoridation controversy

The long-standing debate about whether to fluoridate our drinking water continues. Fluoridation is the addition of fluorine to public water supplies with the aim of reducing tooth decay. The fluorine, when mixed with water, becomes fluoride and the desired concentration of fluoride in public water is approximately one part per million, depending on the regional temperature and hence the amount of water people are likely to drink. Many studies, such as those by McClure in 1970 through to Burt in 1983, have shown that when children drink fluoridated water, their average rate of tooth decay seems greatly reduced. A typical figure claimed is 50 percent reduction. This apparently enormous benefit for children's teeth is the major argument in favor of fluoridation.

Three main grounds for opposition to fluoridation have been expressed. First, opponents claim the benefits are exaggerated or not established. Second, there are claims of health risks to parts of the population, for example, allergic reactions. It is also accepted that high levels of fluoride can cause discoloration of otherwise healthy teeth. Proponents do not consider this to be a problem in such small concentrations, whereas opponents disagree - especially because some people drink more water and obtain much more than the standard 1 milligram of fluoride per day. Third, fluoridation is thought to be an infringement on individual rights because it is compulsory medication of all members of a community.

An understanding of the fluoridation issue has important implications. If, according to the experts, fluoridation is unquestionably a beneficial and non-hazardous measure, then the wisdom of allowing the public to vote on, and reject it must be questioned.

Almost all studies that have been done have assumed that the scientific aspects of the controversy are unproblematic, and they have excluded science from sociological examination. The traditional view is that science is a special kind of knowledge, which is established through scientific methods and objectively applied by members of a scientific community. However, in recent years there has been a major challenge to this picture by a sociology of science that shows how scientific knowledge is socially negotiated, and inevitably linked to the values of the relevant parties, both scientists and nonscientists. These challengers do not see scientific knowledge as exempt from social inquiry.

Kuhn (1970) argued that scientific knowledge does not always develop as an orderly process, but is characterized by periodic revolutions in which the methods of study and the assessment criteria change in a fragmented way. According to Kuhn, the shift from one scientific way of

thinking to another is not made solely on the basis of clear rules of formal scientific practice, but can include social factors, though Kuhn has never developed a full analysis of what these might be. Collins (1975) took this concept further when he asserted that the outcome of experiments was not something whose meaning could be immediately comprehended, but rather something for interpretation, discussion between scientists, and reinterpretation in the light of other experiments.

One interpretation of this analysis of science is that traditional distinctions between facts and theories, and between scientific knowledge and values, can no longer be justified. Because social processes are involved at all stages of the creation, evaluation, and establishing of scientific knowledge, social values may also be involved.

In the same way as many scientists who study fluoridation have overlooked social values, sociologists have also downplayed an important part of the debate by ignoring the number of eminent scientists who have questioned aspects of fluoridation. An example is the study by Sutton in 1960, which analyzed the classic North American studies of the effect of fluoridation on tooth decay, and found that each showed significant methodological shortcomings. Sutton's detailed study throws doubt as to the extent of reductions in tooth decay from fluoridation. Yet Sutton's book is not cited in a single analysis of the fluoridation issue by any sociologist. In a situation of some scientific uncertainty, differences in values are highlighted. A supporter of fluoridation might argue. The evidence for the benefits of fluoridation is quite substantial, while the evidence for harm is limited and dubious. I think the likely benefits outweigh the possible dangers; hence I support fluoridation because it is the cheapest and easiest way to make sure every child reaps the benefits. An opponent might argue, 'Though the evidence for the benefits of fluoridation is substantial, there is some doubt about it. Since fluoridation is not necessary for good teeth, we should forego the benefits if there is some slight chance of harm. Some scientists claim that a small percentage of the population could be harmed by fluoride. Therefore I oppose fluoridation of water supplies and favor the voluntary use of fluoride tablets by those who want to take them.'

Both arguments consider the scientific evidence concerning fluoridation, but differ in their assessments of the social benefits and costs. This difference is not between rationality and irrationality but is a legitimate difference in values, for example, the positive value placed on good teeth, the negative value placed on possible health risks, and the social benefits or costs of compulsory or voluntary intake of fluorides.

From the sociological point of view, opposition to fluoridation is not necessarily irrational. Rather, claims to rationality and to scientific authority are better seen as part of a strategy to promote fluoridation than as incontrovertible statements of fact. Second, social values are likely to be bound up in any decision about fluoridation, so this is not an issue on which declarations by scientific experts ought to be considered the final word.

Questions 27-31

Choose the correct letter, **A, B, C or D**

Write the correct letter in boxes **27-31** on your answer sheet

27 The optimum amount of fluorine in fluoridated water is calculated partly according to

- A** ☐ how hot the area is.
- B** ☐ how warm the water is.
- C** ☐ how many dental problems there are in the community.
- D** ☐ how much fluorine the community chooses to have in its water.

28 One reason given by the writer for opposing fluoridation is that

- A** ☐ it may contribute to tooth decay
- B** ☐ it will be unacceptably expensive for the public.
- C** ☐ obligatory fluoridation takes away personal freedom.
- D** ☐ excessive fluoride could be added to the water by mistake.

29 The writer mentions Kuhn in order to

- A** ☐ provide a contrast with the view of Collins.
- B** ☐ support the rational nature of scientific inquiry.
- C** ☐ demonstrate that Kuhn did not argue his case adequately.
- D** ☐ show that science can be influenced by non-scientific considerations

30 What did Sutton's research discover about earlier studies in North America?

- A** ☐ There were failings in the way they were carried out.
- B** ☐ The scientists involved had achieved unique results.
- C** ☐ Proponents of fluoridation had not understood its long-term effects.
- D** ☐ Fluoridation had a greater effect on tooth decay than previously believed.

31 In the last paragraph, what does the writer say about scientists?

- A** ☐ They should reveal their true motivations.

- B** ☐ They should not decide the fluoridation policy.
- C** ☐ They are solely concerned with scientific truths.
- D** ☐ They cannot reach agreement on the fluoridation issue.

Questions 32-35

Do the following statements agree with the views of the writer in Reading Passage?

In boxes **32-35** on your answer sheet, write

YES	if the statement agrees with the views of the writer
NO	if the statement contradicts the views of the writer
NOT GIVEN	if it is impossible to say what the writer thinks about this

- 32 Scientific knowledge should be kept separate from social values.
- 33 Many sociologists have disregarded the doubts that some scientists have concerning fluoridation.
- 34 Sutton's findings have been given insufficient attention by scientists outside of North America.
- 35 There are valid arguments on both sides of the fluoridation debate.

Questions 36-40

Complete each sentence with the correct ending. **A-G**.

Write the correct letter. **A-G**, in boxes **36-40** on your answer sheet.

The traditional view of science is that 36

A sociological view of science argues that 37

Collins is of the opinion that 38

The writer suggests that a supporter of fluoridation may conclude that

39

The writer suggests that an opponent of fluoridation may conclude that

40

- | | |
|---|--|
| A | the results of scientific research are not always understood at first |
| B | scientific knowledge is based on experiments conducted by scientists. |
| C | people should be able to choose whether they want fluoride. |
| D | there is insufficient proof to support a cautious approach. |
| E | the serious damage fluoride causes far outweighs any positive effects. |
| F | children are not the only ones who benefit from fluoridation. |
| G | scientific knowledge is affected by the beliefs of everyone concerned. |