READING

READING PASSAGE 1

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

The concept of intelligence

A Looked at in one way, everyone knows what intelligence is; looked at in another way, no one does. In other words, people all have unconscious notions – known as 'implicit theories' – of intelligence, but no one knows for certain what it actually is. This chapter addresses how people conceptualize intelligence, whatever it may actually be.

But why should we even care what people think intelligence is, as opposed only to valuing whatever it actually is? There are at least four reasons people's conceptions of intelligence matter.

B First, implicit theories of intelligence drive the way in which people perceive and evaluate their own intelligence and that of others. To better understand the judgments people make about their own and others' abilities, it is useful to learn about people's implicit theories. For example, parents' implicit theories of their children's language development will determine at what ages they will be willing to make various corrections in their children's speech. More generally, parents' implicit theories of intelligence will determine at what ages they believe their children are ready to perform various cognitive tasks. Job interviewers will make hiring decisions on the basis of their implicit theories of intelligence. People will decide who to be friends with on the basis of such theories. In sum, knowledge about implicit theories of intelligence is important because this knowledge is so often used by people to make judgments in the course of their everyday lives.

C Second, the implicit theories of scientific investigators ultimately give rise to their explicit theories. Thus it is useful to find out what these implicit theories are. Implicit theories provide a framework that is useful in defining the general scope of a phenomenon – especially a not-well-understood phenomenon. These implicit theories can suggest what aspects of the phenomenon have been more or less attended to in previous investigations.

D Third, implicit theories can be useful when an investigator suspects that existing explicit theories are wrong or misleading. If an investigation of implicit theories reveals little correspondence between the extant implicit and explicit theories, the implicit theories may be wrong. But the possibility also needs to be taken into account that the explicit theories are wrong and in need of correction or supplementation. For example, some implicit theories of intelligence suggest the need for expansion of some of our explicit theories of the construct.

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E Finally, understanding implicit theories of intelligence can help elucidate developmental and cross-cultural differences. As mentioned earlier, people have expectations for intellectual performances that differ for children of different ages. How these expectations differ is in part a function of culture. For example, expectations for children who participate in Western-style schooling are almost certain to be different from those for children who do not participate in such schooling.

F I have suggested that there are three major implicit theories of how intelligence relates to society as a whole (Sternberg, 1997). These might be called Hamiltonian, Jeffersonian, and Jacksonian. These views are not based strictly, but rather, loosely, on the philosophies of Alexander Hamilton, Thomas Jefferson, and Andrew Jackson, three great statesmen in the history of the United States.

G The Hamiltonian view, which is similar to the Platonic view, is that people are born with different levels of intelligence and that those who are less intelligent need the good offices of the more intelligent to keep them in line, whether they are called government officials or, in Plato's term, philosopher-kings. Herrnstein and Murray (1994) seem to have shared this belief when they wrote about the emergence of a cognitive (high-IQ) elite, which eventually would have to take responsibility for the largely irresponsible masses of non-elite (low-IQ) people who cannot take care of themselves. Left to themselves, the unintelligent would create, as they always have created, a kind of chaos.

H The Jeffersonian view is that people should have equal opportunities, but they do not necessarily avail themselves equally of these opportunities and are not necessarily equally rewarded for their accomplishments. People are rewarded for what they accomplish, if given equal opportunity. Low achievers are not rewarded to the same extent as high achievers. In the Jeffersonian view, the goal of education is not to favor or foster an elite, as in the Hamiltonian tradition, but rather to allow children the opportunities to make full use of the skills they have. My own views are similar to these (Sternberg, 1997).

I The Jacksonian view is that all people are equal, not only as human beings but in terms of their competencies – that one person would serve as well as another in government or on a jury or in almost any position of responsibility. In this view of democracy, people are essentially intersubstitutable except for specialized skills, all of which can be learned. In this view, we do not need or want any institutions that might lead to favoring one group over another.

J Implicit theories of intelligence and of the relationship of intelligence to society perhaps need to be considered more carefully than they have been because they often serve as underlying presuppositions for explicit theories and even experimental designs that are then taken as scientific contributions. Until scholars are able to discuss their implicit theories and thus their assumptions, they are likely to miss the point of what others are saying when discussing their explicit theories and their data.

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Questions 1–3

Reading Passage 1 has ten sections, **A–J**.

Which section contains the following information?

*Write the correct letter, **A–J**, in boxes 1–3 on your answer sheet.*

1 information about how non-scientists' assumptions about intelligence influence their behaviour towards others

2 a reference to lack of clarity over the definition of intelligence

3 the point that a researcher's implicit and explicit theories may be very different

Questions 4–6

Do the following statements agree with the claims of the writer in Reading Passage 1?

In boxes 4–6 on your answer sheet, write

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

4 Slow language development in children is likely to prove disappointing to their parents.

5 People's expectations of what children should gain from education are universal.

6 Scholars may discuss theories without fully understanding each other.

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Test 3

Questions 7–13

Look at the following statements (Questions 7–13) and the list of theories below.

Match each statement with the correct theory, ***A****,* ***B****, or* ***C****.*

Write the correct letter, ***A****,* ***B****, or* ***C****, in boxes 7–13 on your answer sheet.*

NB *You may use any letter more than once.*

7 It is desirable for the same possibilities to be open to everyone.

8 No section of society should have preferential treatment at the expense of another.

9 People should only gain benefits on the basis of what they actually achieve.

10 Variation in intelligence begins at birth.

11 The more intelligent people should be in positions of power.

12 Everyone can develop the same abilities.

13 People of low intelligence are likely to lead uncontrolled lives.

List of Theories	
A	Hamiltonian
B	Jeffersonian
C	Jacksonian

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READING PASSAGE 2

*You should spend about 20 minutes on **Questions 14–26**, which are based on Reading Passage 2 below.*

Saving bugs to find new drugs

Zoologist Ross Piper looks at the potential of insects in pharmaceutical research

A More drugs than you might think are derived from, or inspired by, compounds found in living things. Looking to nature for the soothing and curing of our ailments is nothing new – we have been doing it for tens of thousands of years. You only have to look at other primates – such as the capuchin monkeys who rub themselves with toxin-oozing millipedes to deter mosquitoes, or the chimpanzees who use noxious forest plants to rid themselves of intestinal parasites – to realise that our ancient ancestors too probably had a basic grasp of medicine.

B Pharmaceutical science and chemistry built on these ancient foundations and perfected the extraction, characterisation, modification and testing of these natural products. Then, for a while, modern pharmaceutical science moved its focus away from nature and into the laboratory, designing chemical compounds from scratch. The main cause of this shift is that although there are plenty of promising chemical compounds in nature, finding them is far from easy. Securing sufficient numbers of the organism in question, isolating and characterising the compounds of interest, and producing large quantities of these compounds are all significant hurdles.

C Laboratory-based drug discovery has achieved varying levels of success, something which has now prompted the development of new approaches focusing once again on natural products. With the ability to mine genomes for useful compounds, it is now evident that we have barely scratched the surface of nature's molecular diversity. This realisation, together with several looming health crises, such as antibiotic resistance, has put bioprospecting – the search for useful compounds in nature – firmly back on the map.

D Insects are the undisputed masters of the terrestrial domain, where they occupy every possible niche. Consequently, they have a bewildering array of interactions with other organisms, something which has driven the evolution of an enormous range of very interesting compounds for defensive and offensive purposes. Their remarkable diversity exceeds that of every other group of animals on the planet combined. Yet even though insects are far and away the most diverse animals in existence, their potential as sources of therapeutic compounds is yet to be realised.

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E From the tiny proportion of insects that have been investigated, several promising compounds have been identified. For example, alloferon, an antimicrobial compound produced by blow fly larvae, is used as an antiviral and antitumor agent in South Korea and Russia. The larvae of a few other insect species are being investigated for the potent antimicrobial compounds they produce. Meanwhile, a compound from the venom of the wasp *Polybia paulista* has potential in cancer treatment.

F Why is it that insects have received relatively little attention in bioprospecting? Firstly, there are so many insects that, without some manner of targeted approach, investigating this huge variety of species is a daunting task. Secondly, insects are generally very small, and the glands inside them that secrete potentially useful compounds are smaller still. This can make it difficult to obtain sufficient quantities of the compound for subsequent testing. Thirdly, although we consider insects to be everywhere, the reality of this ubiquity is vast numbers of a few extremely common species. Many insect species are infrequently encountered and very difficult to rear in captivity, which, again, can leave us with insufficient material to work with.

G My colleagues and I at Aberystwyth University in the UK have developed an approach in which we use our knowledge of ecology as a guide to target our efforts. The creatures that particularly interest us are the many insects that secrete powerful poison for subduing prey and keeping it fresh for future consumption. There are even more insects that are masters of exploiting filthy habitats, such as faeces and carcasses, where they are regularly challenged by thousands of micro-organisms. These insects have many antimicrobial compounds for dealing with pathogenic bacteria and fungi, suggesting that there is certainly potential to find many compounds that can serve as or inspire new antibiotics.

H Although natural history knowledge points us in the right direction, it doesn't solve the problems associated with obtaining useful compounds from insects. Fortunately, it is now possible to snip out the stretches of the insect's DNA that carry the codes for the interesting compounds and insert them into cell lines that allow larger quantities to be produced. And although the road from isolating and characterising compounds with desirable qualities to developing a commercial product is very long and full of pitfalls, the variety of successful animal-derived pharmaceuticals on the market demonstrates there is a precedent here that is worth exploring.

I With every bit of wilderness that disappears, we deprive ourselves of potential medicines. As much as I'd love to help develop a groundbreaking insect-derived medicine, my main motivation for looking at insects in this way is conservation. I sincerely believe that all species, however small and seemingly insignificant, have a right to exist for their own sake. If we can shine a light on the darker recesses of nature's medicine cabinet, exploring the useful chemistry of the most diverse animals on the planet, I believe we can make people think differently about the value of nature.

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Questions 14–20

Reading Passage 2 has nine paragraphs, **A–I**.

Which paragraph contains the following information?

*Write the correct letter, **A–I**, in boxes 14–20 on your answer sheet.*

14 mention of factors driving a renewed interest in natural medicinal compounds

15 how recent technological advances have made insect research easier

16 examples of animals which use medicinal substances from nature

17 reasons why it is challenging to use insects in drug research

18 reference to how interest in drug research may benefit wildlife

19 a reason why nature-based medicines fell out of favour for a period

20 an example of an insect-derived medicine in use at the moment

Questions 21 and 22

*Choose **TWO** letters, **A–E**.*

Write the correct letters in boxes 21 and 22 on your answer sheet.

Which **TWO** of the following make insects interesting for drug research?

A the huge number of individual insects in the world
B the variety of substances insects have developed to protect themselves
C the potential to extract and make use of insects' genetic codes
D the similarities between different species of insect
E the manageable size of most insects

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Test 3

Questions 23–26

Complete the summary below.

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

Write your answers in boxes 23–26 on your answer sheet.

Research at Aberystwyth University

Ross Piper and fellow zoologists at Aberystwyth University are using their expertise in **23** ..... when undertaking bioprospecting with insects. They are especially interested in the compounds that insects produce to overpower and preserve their **24** ..... . They are also interested in compounds which insects use to protect themselves from pathogenic bacteria and fungi found in their **25** ..... . Piper hopes that these substances will be useful in the development of drugs such as **26** ..... .

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