

Children's thinking

One of the most eminent of psychologists, Clark Hull, claimed that the essence of reasoning lies in the putting together of two 'behaviour segments' in some novel way, never actually performed before, so as to reach a goal.

Two followers of Clark Hull, Howard and Tracey Kendler, devised a test for children that was explicitly based on Clark Hull's principles. The children were given the task of learning to operate a machine so as to get a toy. In order to succeed they had to go through a two-stage sequence. The children were trained on each stage separately. The stages consisted merely of pressing the correct one of two buttons to get a marble; and of inserting the marble into a small hole to release the toy.

The Kendlers found that the children could learn the separate bits readily enough. Given the task of getting a marble by pressing the button they could get the marble; given the task of getting a toy when a marble was handed to them, they could use the marble. (All they had to do was put it in a hole.) But they did not for the most part 'integrate', to use the Kendlers' terminology. They did not press the button to get the marble and then proceed without further help to use the marble to get the toy. So the Kendlers concluded that they were incapable of deductive reasoning.

The mystery at first appears to deepen when we learn, from another psychologist, Michael Cole, and his colleagues, that adults in an African culture apparently cannot do the 'task either. But it lessens, on the other hand, when we learn that a task was devised which was strictly analogous to the Kendlers' one but much easier for the African males to handle.

Instead of the button-pressing machine, Cole used a locked box and two differently coloured match-boxes, one of which contained a key that would open the box. Notice that there are still two behaviour segments — 'open the right match-box to get the key' and 'use the key to open the box' - so the task seems formally to be the same. But psychologically it is quite different. Now the subject is dealing not with a strange machine but with familiar meaningful

objects; and it is clear to him what he is meant to do. It then turns out that the difficulty of 'integration' is greatly reduced.

Recent work by Simon Hewson is of great interest here for it shows that, for young children, too, the difficulty lies not in the inferential processes which the task demands, but in certain perplexing features of the apparatus and the procedure. When these are changed in ways which do not at all affect the inferential nature of the problem, then five-year-old children solve the problem as well as college students did in the 'own experiments.

Hewson made two crucial changes. First, he replaced the button-pressing mechanism in the side panels by drawers in these panels which the child could open and shut. This took away the mystery from the first stage of training. Then he helped the child to understand that there was no 'magic' about the specific marble which, during the second stage of training, the experimenter handed to him so that he could pop it in the hole and get the reward.

A child understands nothing, after all, about how a marble put into a hole can open a little door. How is he to know that any other marble of similar size will do just as well? Yet he must assume that if he is to solve the problem. Hewson made the functional equivalence of different marbles clear by playing a 'swapping game' with the children. The two modifications together produced a jump in success rates from 30 per cent to 90 per cent for five-year-olds and from 35 per cent to 72.5 per cent for four-year-olds. For three-year-olds, for reasons that are still in need of clarification, no improvement—rather a slight drop in performance - resulted from the change.

We may conclude, then, that children experience very real difficulty when faced with the Kendler apparatus; but this difficulty cannot be taken as proof that they are incapable of deductive reasoning.

Questions 1-8

Classify the following descriptions as a referring

Clark Hull

CH

Howard and Tracy Kendler	<i>HTK</i>
Micheal Cole and colleagues	<i>MC</i>
Simon Hewson	<i>SH</i>

Write the appropriate letters in boxes **1-8** on your answer sheet.

NB You may use any answer more than once.

1 is cited as famous in the field of psychology.

2 demonstrated that the two-stage experiment involving button-pressing and inserting a marble into a hole poses problems for certain adults as well as children.

3 devised an experiment that investigated deductive reasoning without the use of any marbles.

4 appears to have proved that a change in the apparatus dramatically improves the performance of children of certain ages.

5 used a machine to measure inductive reasoning that replaced button-pressing with drawer-opening.

6 experimented with things that the subjects might have been expected to encounter in everyday life, rather than with a machine.

7 compared the performance of five-year-olds with college students, using the same apparatus with both sets of subjects.

8 is cited as having demonstrated that earlier experiments into children's ability to reason deductively may have led to the wrong conclusions.

An Aviation Wonder and its Creator.

A. The Supermarine Spitfire was a single-seater fighter plane used by the British Royal Airforce and pilots from a number of the country's allies during the Second World War. The first flight of a Spitfire prototype was on 5 March 1936 and usage of the plane continued until the 1950s. It was said to be one of the most effective fighter planes available during that period and was produced by Vickers-Armstrongs, a British engineering corporation which was formed in 1927 as a result of the merger of Vickers Limited and Sir W G Armstrong Whitworth & Company.

B. The Spitfire was designed by aeronautical engineer Reginald Joseph Mitchell. His career began when he joined a locomotive engineering company in 1911 at the age of 16. However, in 1917 he moved from his hometown to join the Supermarine Aviation works in Southampton and was promoted to Chief Designer within his first year of employment. By the time the company was taken over by Vickers-Armstrongs in 1928, Mitchell had held the post of Technical Director for a year; and his capabilities and contributions were deemed so significant Vickers-Armstrong made his continual employment for a five year period a condition of the purchase of the company.

C. In the fifteen years prior to 1936 Mitchell designed 24 aircraft of different categories including fighter planes, bombers and seaplanes. The first predecessor of the Spitfire in the fighter plane category to gain him national acclaim was the Supermarine S.B for which he won the Schneider Trophy (a cup and monetary award for technical advances in aviation which came to focus mainly on speed) in 1931. Despite the withdrawal of financial support from the British Government that year, the Supermarine S.B. was able to compete for the Schneider Trophy as a result of a private donation of 100,000 pounds. Mitchell's team won outright on September 13th their aircraft achieving a new world speed record of 606 km/h; within days the Supermarine S.B. went on to break

its own newly achieved record when on the 29th of the same month it became the first aircraft ever to achieve speeds of over 400 miles per hour (640 kilometres) when it reached 407.5 mph (640 kilometres per hour).

D. Reginald Joseph Mitchell was awarded a CBE in 1932 for his contributions to high-speed flight. CBEs are awarded by the British Monarch and reserved to recognise individuals who have 'fulfilled a conspicuous leading role in regional affairs, through achievement or service to the community, or making a highly distinguished, innovative contribution in his or her area of activity'. Mitchell's achievements with the Supermarine S.B. also prompted the Air Ministry to contract his company for the design of a new fighter aircraft, despite the organisation's reputation being built predominantly on sea-plane and not fighter plane manufacturing.

E. The first type, the 224, was to prove unsuccessful and it was eventually rejected by the Royal Air Force due to unsatisfactory performance; however, private sponsorship enabled research, development and modifications which led to the creation of the Type 300 which would eventually become the Spitfire. Soon after the first flight of the Spitfire prototype (trial version) and prior to completion of all stages of its official trials, convinced by its potential, the British Royal Air Force ordered 310 models. With its smooth lines, load-bearing metal shell, and a heavy eight-machine gun armament, the Spitfire was considered revolutionary. In 1938, the aircraft was first put into official service; however, Mitchell, who died from cancer in 1937 at the age of 42, was not to witness this or the extensive impact and longevity of use the aircraft would have. In total 20,351 spitfires of different versions were produced making it the most produced British aircraft of the Second World War.

F. After Mitchell's death, his former Chief Draughtsman Joe Smith took over the position of Technical Director and led the subsequent development of the

Spitfire which would keep it at the forefront of aircraft technology while many other designs quickly became obsolete; 24 models of spitfire were designed along with many sub-variants containing different engine types and possessing different wing configurations; the most widely used being the Spitfire Mark V, of which 6,479 were built. The original version first used for active service in 1938 had a top speed of approximately 580 km per hour; while one of the last models used in the later stages of the Second World War – the Spitfire XIV – had a top speed capability of 710 km per hour. Spitfires were used continually by the Royal Air Force, later purely as surveillance planes (to monitor activity overhead though carrying no armament), until 1954 when the last model was retired.

G. In his hometown, Reginald Joseph Mitchell C.B.E. is today remembered in a number of ways. A combined theatre and education centre ‘The Mitchell Memorial Theatre’ bears his name, and the city museum, at the entrance of which stands a bronze statue of Mitchell, displays an authentic and complete Spitfire as part of its collection. In addition, a local high school is named after him; as is a major roadway and he is locally recognised as one of the most significant historical sons of the town.

Questions 7-9

According to the information in the passage, classify the following information as relating to:

- A The Supermarine SB
- B The Spitfire
- C Neither the Supermarine SB or the Spitfire
- D Both the Supermarine SB and the Spitfire

Write the correct letter **A, B, C** or **D** in boxes **7-9** on your answer sheet.

7. Its development was commissioned by the Air Ministry____

8. Mitchell was awarded the CBE due to its development____

9. It was innovative for its time. _____

Task - 1

The table below shows information and predictions regarding the change in percentage of the population aged 65 and above in three countries.

Country	1988	2000	2030
Canada	16.32	20.67	26.35
Germany	20.45	25.32	30.42
UK	14.23	14.89	20.35



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The assigned table chart illustrates the information about the percentage of the Canadian, German and British population aged 65 years old and over in 1988, 2000 and predictions for 2030.

Overall, it can be clearly seen that the German had the maximum percentage of older residents including future predictions, while the UK had the minimum proportion in given three years.

To begin with, 16% Canadians were 65 years old and over in 1988, however the percentage inclined by 5% after more than a decade. It is estimated that the figure will reach 26 percent in 2030. The percentage of Germany's natives was 20 in the initial year, whereas it rose to 25% in 2000.

Moving ahead, the future figure will be 5% more of the past in case of Germany's population. A difference of 1% could be seen in the density of 65 years old people of the UK in 1988 and 2000, recorded as 14% and 15%, respectively. It is assumed to be 20 Percent in the future.

Questions 14 and 15

Choose TWO letters, A-E.

Which TWO issues does the speaker ask the audience to consider before they apply to be volunteers?

A. their financial situation

B. their level of commitment

C. their work experience

D. their ambition

E. their availability

Test 1

Questions 27 and 28

Choose **TWO** letters, **A–E**.

Which **TWO** mistakes did the speaker admit she made in her first job?

- A** being dishonest to her employer
- B** paying too much attention to how she looked
- C** expecting to become well known
- D** trying to earn a lot of money
- E** openly disliking her client

Questions 29 and 30

Choose **TWO** letters, **A–E**.

Which **TWO** pieces of retail information do Hugo and Chantal agree would be useful?

- A** the reasons people return fashion items
- B** how much time people have to shop for clothes
- C** fashion designs people want but can't find
- D** the best time of year for fashion buying
- E** the most popular fashion sizes

The Science of Yoga

The term yoga comes from the Sanskrit word 'yuji' meaning yoke or union. Yoga is said to unite the mind and body. There are many different forms but all include physical poses, meditation and breathing exercises intended to bring relaxation and stress reduction. It's physical and mental benefits have been lauded for centuries and now science can back up some of these claims.

A number of studies have looked at the effect of yoga on stress. Research carried out in 2005 by Andreas Michalsen of the University of Duisberg- Essen in Germany, followed 24 women suffering from emotional distress on a three-month yoga programme. Findings showed a significant reduction in their levels of cortisol which is the primary stress hormone. Their levels of anxiety, stress, fatigue and depression also dropped considerably.

A comparable study was carried out in 2007 at the University of South Australia by researcher Caroline Smith, in this case, comparing the effect of yoga and relaxation on stress and anxiety. Smith's work with 131 people over a period of 10 weeks showed similar results. In addition, yoga did appear to provide a comparable improvement in stress, anxiety and health status compared to relaxation.

Another area of health that has been subject to research is heart health. Scientists at the Department of Physiology, Government College, Nagpur, focused their research on the effect of yoga on the cardiovascular system in subjects over 40 years old. The results were encouraging with Vijay Bharshankar reporting that, "participants over 40 years of age who practiced yoga for five years had a lower blood pressure and pulse rate than those who didn't".

Other research suggests that making yoga a part of a healthy lifestyle can actually help to slow the progression of heart disease. A study on 113 patients with heart disease conducted by Dr J. Yogendra of The Yoga Institute, Santacruz, Mumbai, looked at the effects of a lifestyle change that included one year of yoga training combined with dietary modifications and stress management. The encouraging results showed an average decrease in cholesterol of 23% and the progression of heart disease stopped in 47% of patients. While it was unclear how much of a role yoga had versus other factors like diet, yoga was shown to reduce stress which is one of the major contributors to heart disease.

Questions 1-4

Look at the following ideas (**Questions 1-4**) and the list of researchers below.

Match each idea with the correct researcher, **A, B, C** or **D**.

Write the correct letter, **A, B C** or **D**, in the boxes **1-4** on your answer sheet.

- 1** the importance of yoga in decreasing the main hormone linked to stress
- 2** the advantage of yoga compared to relaxation in decreasing stress and anxiety
- 3** the significance of yoga in relation to existing cases of heart disease
- 4** the connection between practicing yoga and improvements in the circulatory system

List of Researchers

- A** Caroline Smith
- B** Jayadeva Yogendra
- C** Andreas Michalsen
- D** Vijay Bharshankar

The rocket - From East to West

A - The impact of the reaction principle

The concept of the rocket, or rather the mechanism behind the idea of propelling an object into the air, has been around for well over two thousand years. However, it wasn't until the discovery of the reaction principle, which was the key to space travel and so represents one of the great milestones in the history of scientific thought, that rocket technology was able to develop. Not only did it solve a problem that had intrigued man for ages, but, more importantly, it literally opened the door to exploration of the universe.

B - Undeveloped for centuries

An intellectual breakthrough, brilliant though it may be, does not automatically ensure that the transition is made from theory to practice. Despite the fact that rockets had been used sporadically for several hundred years, they remained a relatively minor artefact of civilisation until the twentieth century. Prodigious efforts, accelerated during two world wars, were required before the technology of primitive rocketry could be translated into the reality of sophisticated astronauts. It is strange that the rocket was generally ignored by writers of fiction to transport their heroes to mysterious realms beyond the Earth, even though it had been commonly used in fireworks displays in China since the thirteenth century. The reason is that nobody associated the reaction principle with the idea of travelling through space to a neighbouring world.

C - How the reaction principle works

A simple analogy can help us to understand how a rocket operates. It is much like a machine gun mounted on the rear of a boat. In reaction to the backward discharge of bullets, the gun, and hence the boat, move forwards. A rocket motor's 'bullets' are minute, high-speed particles produced by burning propellants in a suitable chamber. The reaction to the ejection of these small particles causes the rocket to move forwards. There is evidence that the reaction principle was applied practically well before the rocket was invented. In his *Noctes Atticae* or *Greek Nights*, Aulus Gellius describes 'the pigeon of Archytas', an invention dating back to about 360 BC. Cylindrical in shape, made of wood, and hanging from string, it was moved to and fro by steam blowing out from small exhaust ports at either end. The reaction to the discharging steam provided the bird with motive power.

D - The first rockets

The invention of rockets is linked inextricably with the invention of 'black powder'. Most historians of technology credit the Chinese with its discovery. They base their belief on studies of Chinese writings or on the notebooks of early Europeans who settled in or made long visits to China to study its history and civilisation. It is probable that, some time in the tenth century, black powder was first compounded from its basic ingredients of saltpetre, charcoal and sulphur. But this does not mean that it was immediately used to propel rockets. By the thirteenth century, powder-propelled fire arrows had become rather common. The Chinese relied on this type of technological development to produce incendiary projectiles of many sorts, explosive grenades and possibly cannons to repel their enemies. One such weapon was the 'basket of fire' or, as directly translated from Chinese, the 'arrows like flying leopards'. The 0.7 metre-long arrows, each with a long tube of gunpowder attached near the point of each arrow, could be fired from a long, octagonal-shaped basket at the same time and had a range of 400 paces. Another weapon was the 'arrow as a flying sabre', which could be fired from crossbows. The rocket, placed in a similar position to other rocket-propelled arrows, was designed to increase the range. A small iron weight was attached to the 1.5m bamboo shaft, just below the feathers, to increase the arrow's stability by moving the centre of gravity to a position below the rocket. At a similar time, the Arabs had developed the 'egg which moves and burns'. This 'egg' was apparently full of gunpowder and stabilised by a 1.5m tail. It was fired using two rockets attached to either side of this tail.

E - Rockets for military use

It was not until the eighteenth century that Europe became seriously interested in the possibilities of using the rocket itself as a weapon of war and not just to propel other weapons. Prior to this, rockets were used only in pyrotechnic displays. The incentive for the more aggressive use of rockets came not from within the European continent but from far-away India, whose leaders had built

up a corps of rocketeers and used rockets successfully against the British in the late eighteenth century. The Indian rockets used against the British were described by a British Captain serving in India as 'an iron envelope about 200 millimetres long and 40 millimetres in diameter with sharp points at the top and a 3m-long bamboo guiding stick'. In the early nineteenth century the British began to experiment with incendiary barrage rockets. The British rocket differed from the Indian version in that it was completely encased in a stout, iron cylinder, terminating in a conical head, measuring one metre in diameter and having a stick almost five metres long and constructed in such a way that it could be firmly attached to the body of the rocket. The Americans developed a rocket, complete with its own launcher, to use against the Mexicans in the mid-nineteenth century. A long cylindrical tube was propped up by two sticks and fastened to the top of the launcher, thereby allowing the rockets to be inserted and lit from the other end. However, the results were sometimes not that impressive as the behaviour of the rockets in flight was less than predictable.

F - What's next?

Since then, there have been huge developments in rocket technology, often with devastating results in the forum of war. Nevertheless, the modern day space programs owe their success to the humble beginnings of those in previous centuries who developed the foundations of the reaction principle. Who knows what it will be like in the future?

Write the appropriate letters **A-E** in boxes **7-10** on your answer sheet.

NB You may use any letter more than once.

FIRST invented or used by

- A The Chinese
- B The Indians
- C The British
- D The Arabs
- E The Americans

- 7 Black powder**
- 8 Rocket-propelled arrows for fighting**
- 9 Rockets as war weapons**
- 10 The rocket launcher**

Task - 1

The table below shows the contribution of various economic sectors to Xcountry Gross Domestic Product in 2016, 2017, and 2018.

Summarize the information by selecting and reporting the main features, and make comparisons where relevant.

The Contribution of Various Economic Sectors to Xcountry Gross Domestic Product in 2016, 2017 and 2018

Economic Sectors	Percentage to GDP		
	2016	2017	2018
Agriculture	13%	11%	15%
Industry	22%	25%	30%
Service	65%	64%	55%

The data presented in the table are used only for illustration.



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The assigned table chart illustrates the information about the contribution of three distinct economic sectors to x country and the percentage of gross domestic product in 2016, 2017 and 2018.

Overall, it can be clearly seen that the service sector contributes the maximum percentage in the consecutive three years, while agriculture had the minimum participation.

To begin with, the Service sector had the highest percentage of grant to GDP, accounted as 65% in 2016 which was followed by 2017 at 64%. However, 55% of GDP was contributed by the Service sector.

Moving ahead, in the initial year, the percentage of the agriculture sector's contribution was 13% which declined by 2% but then rose to 15% in the eventual year. 22% GDP was granted by the industry sector in the first year, interestingly it rose by 25% next year. Whilst, in the last year the percentage of gross domestic product amounted to 30%.

PART 2 **Questions 11–20**

Questions 11 and 12

Choose **TWO** letters, **A–E**.

What are the **TWO** main reasons why this site has been chosen for the housing development?

- A** It has suitable geographical features.
- B** There is easy access to local facilities.
- C** It has good connections with the airport.
- D** The land is of little agricultural value.
- E** It will be convenient for workers.

Questions 13 and 14

Choose **TWO** letters, **A–E**.

Which **TWO** aspects of the planned housing development have people given positive feedback about?

- A** the facilities for cyclists
- B** the impact on the environment
- C** the encouragement of good relations between residents
- D** the low cost of all the accommodation
- E** the rural location

Questions 25 and 26

Choose TWO letters, A-E.

Which TWO issues following the Laki eruption surprised the students?

- A. how widespread the effects were
- B. how long-lasting the effects were
- C. the number of deaths it caused
- D. the speed at which the volcanic ash cloud spread
- E. how people ignored the warning signs