

What is the CAT?

The *CAT (cognitive ability test)* assesses an individual's ability to reason with and manipulate different types of symbols. Three main types of symbol play a substantial role in human thought. These symbols represent:

- words;
- quantities;
- spatial, geometric or figural patterns.

In the *CAT*, separate batteries of subtests are provided to assess competence in working with each of these three types of symbol:

- Verbal Battery;
- Quantitative Battery;
- Non-verbal Battery.

Where possible, parallel question types have been incorporated in two or all three batteries, so that the influence of the different media can be identified more clearly. For example, tests of reasoning through analogies are included in all three batteries. The set of three scores will give a profile showing the level and pattern of each student's abilities. Knowledge of areas of relative strength and weakness should help both the individual and the school to use strengths most effectively, and to compensate for areas of weakness (see Chapter 3 of "Getting the Best from CAT").

Perceiving relationships

CAT emphasises *relational thinking* - the perceiving of relationships among elements. Throughout each of the subtests the basic elements have been kept relatively simple, clear, familiar and appropriate to the ages of the students who will take the test. All students educated in schools and exposed to modern cultural influences should have had an opportunity to acquire the background knowledge needed to answer the questions.

All questions in the subtests were pre-trialled with random samples of students of different ages, and only those questions that were of the desired difficulty and clarity were included in the final test. Questions were also evaluated to minimise or eliminate sex or ethnic bias. Thus questions that proved to be exceptionally difficult or easy for either males or females or for one of the ethnic groups were omitted or counterbalanced in the final test (see the *CAT Technical Manual*, pages 14 to 21).

Developed abilities

The *CAT* measures *developed* rather than *innate* abilities. The development of these abilities begins at birth and continues through early adulthood. It is influenced by both in-school and out-of-school experiences. Although test scores are based on experience, this does not negate the value of the test in helping to understand the individual as he or she is at the present time. Because these abilities are closely related to an individual's success in school in virtually all subjects, *CAT* scores, together with other relevant information, can be used to devise the types of learning experiences that will help students to improve their current levels of performance.

The three CAT test batteries

Verbal Battery - thinking with words

The Verbal Battery comprises three subtests:

- Verbal Classification;
- Sentence Completion;
- Verbal Analogies.

Although performance in these subtests depends upon the student's store of verbal concepts, the questions included in the Verbal Battery have been written with a view to making demands primarily upon the individual's flexibility in using his or her concepts.

The Verbal Battery is designed to assess relational thinking when the relationships are formulated in verbal terms. Since the greater part of education is presented through verbal symbols, the relevance of a verbal test for educational prognosis and diagnosis is clear. Tests of verbal reasoning have always been among the best ways of predicting educational progress.

Quantitative Battery - thinking with numbers

The Quantitative Battery comprises three subtests:

- Number Analogies;
- Number Series;
- Equation Building.

The solution of the problems in each question requires that the student has a basic store of quantitative concepts, but all the questions call for *perception of relationships* among concepts and for *flexibility in using* quantitative concepts. None of the questions in the subtests require reading, so reading skills will not affect performance.

Next to verbal reasoning, the ability to reason with quantitative symbols is the one most frequently required in an educational setting. Subjects such as mathematics, science, geography and economics make heavy demands on quantitative abilities. Quantitative reasoning together with verbal reasoning constitutes what some theorists have called 'academic ability'.

Non-verbal Battery - thinking with shape and space

The Non-verbal Battery comprises three subtests:

- Figure Classification;
- Figure Analogies;
- Figure Analysis.

The questions in this battery involve neither words nor numbers, and the shapes or figures used bear little direct relationship to the formal school curriculum. The first two subtests emphasise discovery of, and flexibility in manipulating, relationships expressed in figures. The third subtest, Figure Analysis, assesses 'spatial ability': that is, the ability to create, maintain and manipulate visual-spatial images.

Despite the lack of overlap with formal schooling, non-verbal reasoning tests have been found to relate significantly to school achievement, providing a useful addition to verbal tests. Among students with similar levels of verbal ability, the level of non-verbal ability may well identify those with the greater aptitude for the visual-spatial academic disciplines, such as mathematics, physics, art and design and technology. Tests of spatial ability are used in employment settings to identify those with aptitude for such careers as design, engineering and architecture.

The Non-verbal Battery measures what has been termed 'fluid intelligence': that is, an ability to reason that is not strongly influenced by cultural and educational background. Where performance on this battery is superior to that on the other two batteries, it may suggest potential that is not fully expressed in performance on school-related tasks, for one reason or another. Scores on this battery may be particularly valuable in assessing the reasoning ability of students with poor English language skills, students with specific problems in language-based work, or disaffected students who may have failed to achieve in academic work for motivational reasons.

Examples of the types of questions are given below:

Verbal Reasoning: Verbal Classification,

Example:

These three words are similar in some way. Decide how they are the same. Then choose the word from the answer choices that goes with the first three words. Look at the example below.

green blue red
Answer Options: colour crayon paint yellow rainbow

Calls upon students to recognize the conceptual link tying the three given words together and then choose the word among the options that belongs with the original set of three words.

Verbal Reasoning: Sentence Completion.

Each question has a sentence with one word left out. Look at the answer choices and choose the word that completes the sentence. Look at the example.

Apples _____ on trees.
Answer Options: fall grow show bloom spread

Students are required to select the one word from the five options presented that sensibly fills a gap in the sentence.

Verbal Reasoning: Verbal Analogies.

For each question there are three words in dark type. The first two words go together. The third word goes together with one of the answer choices. Choose the word from the answer choices that goes with the third word. Look at the example.

new → old : wet → ?
Answer Options: rain drip hot sun dry

Students have to work out the relationship between the given pair of words, and then choose the option to complete the analogy for the given single word.

Quantitative Reasoning: Number Analogies.

The question starts with two numbers that are linked together in some way. Next there are two more numbers that are linked in exactly the same way. You have to work out how the numbers are linked and then finish off the third pair. Look at the example.

[2 → 3][9 → 10][6 → ?]

Answer Options: 3 4 5 6 7

Students work out how the two given pairs of numbers are related and then choose the third number that has the same relationship from among the five options presented.

Quantitative Reasoning: Number Series.

Each question shows a series of numbers. You have to work out the rule or rules used to arrange the numbers. Then decide what number should come next in the series. Look at the example.

15 14 13 12 ?

Answer Options: 9 10 11 13 14

From among the five options, students choose the number that continues the given sequence.

Quantitative Reasoning: Equation Building.

For each question you are given some numbers and signs. By combining all of the numbers and signs, you can make different equations or number sentences. Choose the answer that is a solution to an equation that can be made by combining the numbers and signs you are given. Look at the example below.

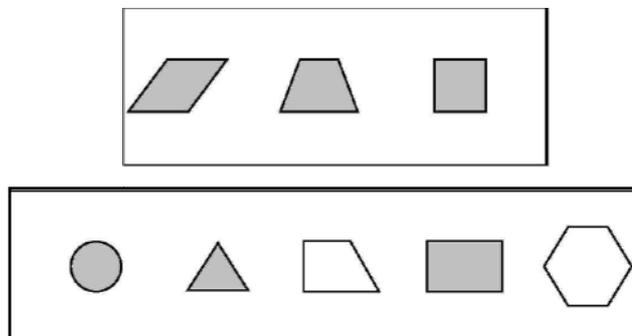
2 3 4 + —

Answer Options: 0 2 4 5 7

Students have to combine the given numbers and arithmetical signs to give a number sentence that has one of the options as its answer. Only one of the responses is possible.

Non-Verbal Reasoning: Figure Classification

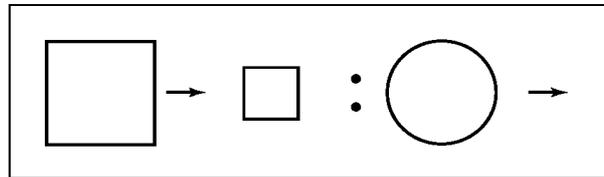
In each question the first three figures are similar in some way. Decide how they are the same. Then choose the figure from the answer choices that goes with them. Look at the example below.



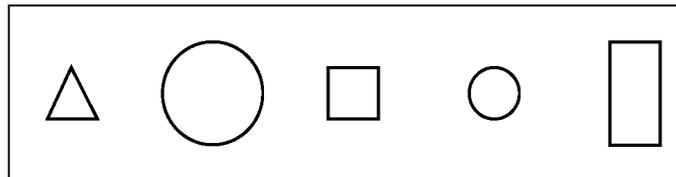
Students identify the common characteristics of the three given figures and choose the option from the five presented that shares the characteristics.

Non-Verbal Reasoning: Figure Analogies

In each question there are three figures. The first two figures go together. The third figure goes with one of the answer choices. Choose the answer choice that goes with the third figure. Look at the example below.



Answer Options:



Students identify the relationship between two figures and find the option that has the same relationship to the third figure given.

Non-Verbal Reasoning: Figure Analysis

The first line below shows how a square piece of dark paper is folded and where holes are punched in it. You must select an image from the answer options which shows how the paper will look when it is unfolded.



Answer Options:

