Azim Premji University

Test Development Process Handbook for Experts

Principles, Checklists, Samples and Templates

Foreword

Recruiting well-qualified and passionate teachers into the school system plays an important role in ensuring a better quality of education imparted. Hence, the recruitment process needs to be carefully designed and implemented. The National Education Policy (NEP) 2020 highlights the need to strengthen the Teacher Eligibility Test (TET) conducted at both, the state as well as the central level to 'inculcate better test material, both in terms of content and pedagogy'.

Test instruments developed for TET should adhere to standard protocols of quality. It should effectively test the competencies of a potential candidate. In order to ensure the designing of a good quality test instrument, certain standardized processes of test development need to be followed. The current handbook for experts is a comprehensive document detailing out the key stages of test development process in the context of TET. It intends to provide potential test developers a detailed understanding of key principles and guidelines to be followed at each stage of test development in order to develop a valid and reliable test paper. Apart from test item writers, it also provides useful guidelines for test paper reviewers or moderators as well as question paper setters on how to follow globally accepted standards of test development.

This handbook has been developed as a part of Azim Premji University's work with the State Council of Education Research and Training (SCERT), Sikkim on revamping the State Teacher Eligibility Test (STET). It is informed by the University's work with Central Board of Secondary Education (CBSE) Central Teacher Eligibility Test (CTET) unit. This is an adapted version of the CBSE handbook that is appropriately contextualised to meet the STET requirements. We hope this handbook would be a useful resource to all concerned stakeholders.

Team Azim Premji University

Contents

About Sikkim Teacher Eligibility Test (STET)

Background and Rationale

Teacher Eligibility Test (TET) was introduced by the Government of India to improve standards in teaching. It is an immediate outcome of the Right to Education Act, 2009 (RTE) which requires the recruitment of many teachers across the country in a time bound manner. In accordance with the provisions of sub-section (1) of section 23 of the Right of Children to Free and Compulsory Education (RTE) Act, 2009, the National Council for Teacher Education (NCTE) has laid down the minimum qualifications for a candidate to be eligible for appointment as a teacher in grades 1 to 8, vide its notification dated August 23, 2010. One of the essential qualifications for a prospective candidate to be eligible for appointment as a teacher in any of the schools referred to in clause (n) of section 2 of the RTE Act is that he/she should pass the Teacher Eligibility Test (TET) which will be conducted by the appropriate Government. The test is mandatory for teachers who teach from grades 1 to 8. It is conducted by both the Central Government and state governments in India.

The rationale for including the TET as a minimum qualification for a candidate to be eligible for appointment as a teacher as specified in the NCTE guidelines is to:

1. Bring national standards and benchmark of teacher quality in the recruitment process
2. Induce teacher education institutions and students from these institutions to further improve their performance standards
3. Send a positive signal to all stakeholders that the government lays special emphasis on teacher quality

The state of Sikkim has been conducting state-level TET known as the Sikkim Teacher Eligibility Test (STET) from the year 2013 onwards. The STET follows a syllabus and pattern similar to the Central TET. The difference, however, is the attempt to contextualise STET to state specific requirements of Sikkim.

Structure of STET examination

The structure and pattern of STET include two papers. Paper I is for candidates who intend to teach grades 1 - 5 and Paper II is for candidates who intend to teach grades 6 - 8.

Subjects for Paper I Primary Stage (grades 1 to 5)

1. Child Development and Pedagogy	30 Multiple Choice Items	30 Marks
2. Language I	30 Multiple Choice Items	30 Marks
3. Language II	30 Multiple Choice Items	30 Marks
4. Mathematics	30 Multiple Choice Items	30 Marks
5. Environmental Studies	30 Multiple Choice Items	30 Marks
Note: – All five sections are compulsory		

Subjects for Paper II Elementary Stage (grades 6 to 8)

1. Child Development and Pedagogy	30 Multiple Choice Items	30 Marks
2. Language I	30 Multiple Choice Items	30 Marks
3. Language II	30 Multiple Choice Items	30 Marks
4. Opt for any one from a, b and c	30 Multiple Choice Items	30 Marks
a) Mathematics and Science (For Mathematics and Science teacher)	60 Multiple Choice Items	60 Marks
b) Social Studies (For Social studies teacher)	60 Multiple Choice Items	60 Marks
c) For any other teacher – Either 4(a) or 4(b)	60 Multiple Choice Items	60 Marks
Note: – (1), (2) and (3) are compulsory and for the (4) there is a choice in any one subject.		

Format of question paper and type of items

- Each paper contains 150 multiple choice items
- Both Paper I and Paper II contain compulsory sections on Child Development and Pedagogy, Language I and Language II
- Paper I contain sections on Mathematics and Environmental Studies
- Paper II contains a section testing the specific subject (Mathematics and Sciences or Social Studies) which the candidate is eligible to teach at the elementary level
- Each multiple-choice item is for one (1) mark
- No negative marking is given for incorrect responses

Scope of this document

Recruiting well-qualified and passionate teachers into a school education system plays an important role in ensuring a better quality of education imparted. Such recruitment processes need to be carefully designed and implemented to ensure consistent results. Having rigorous test development processes and protocols is crucial in ensuring recruitment quality. In order to enable the same, this handbook details the key stages of the test development process. Such a detailing will help to:

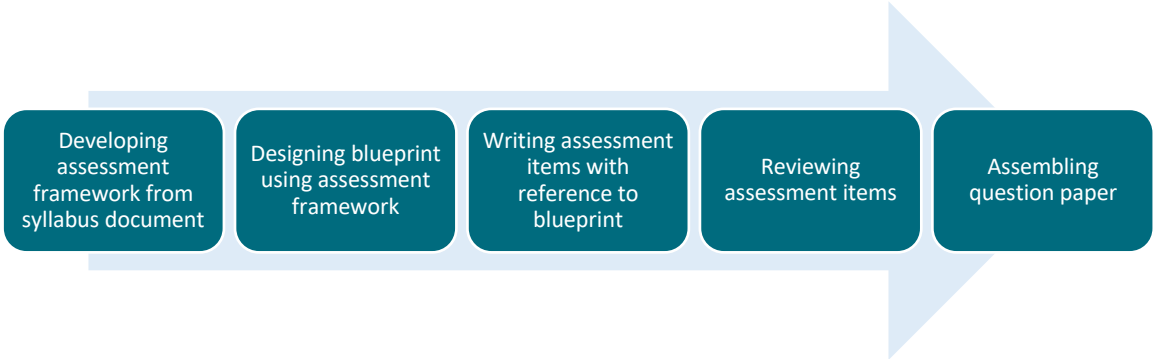
- Develop a common shared understanding among test developers of the principles and guidelines to be followed in the test development process
- Adhere to standards and quality protocols for the development of assessment framework, item writing and tool development
- Maintain consistency in the test development process across the academic years

This handbook would be specifically useful to:

- SMEs/teacher educators responsible for developing and reviewing the STET syllabus
- Item authors who are creating the items
- Item reviewers/moderators and test developers who are creating the final question paper for STET examination

Key stages in test development process

These are six steps in the development of a question paper.



An in-depth discussion on guidelines, approaches, principles, samples, and checklists for each stage is included in the subsequent sections. Based on this discussion, templates are provided at the end of this handbook. These templates and checklists will enable SMEs, item authors, item reviewers and test developers to design quality question papers following international standards and quality protocols.

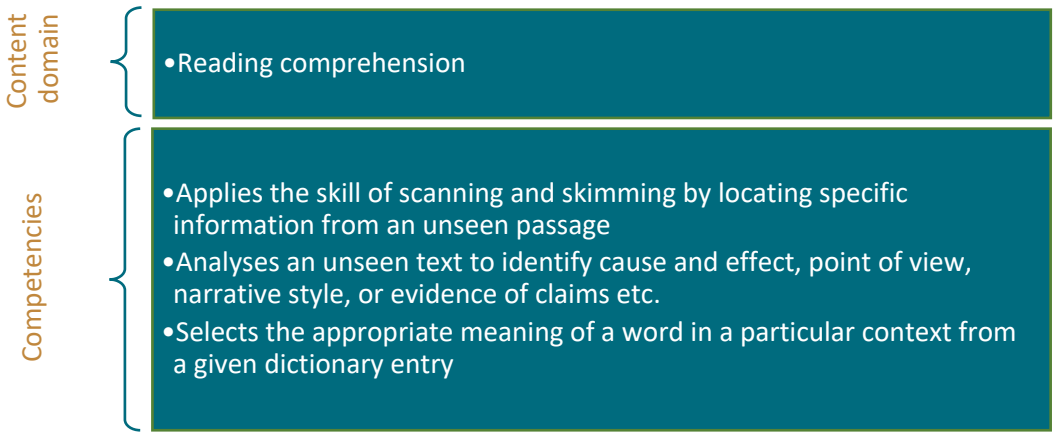
Assessment framework

Introduction

Developing an assessment framework is the first step towards the creation of a question paper. An assessment framework details the content domains and specific competencies to be assessed in the test paper. The framework provides guidance to item authors, reviewers, and test developers to take well thought out decisions regarding what to test and what not to. Thus, it helps in validating the assessment by explicitly defining the purpose of the assessment, and what it will cover in terms of knowledge, skills, and dispositions. Also, it helps in ensuring consistency over different academic years in terms of the content domains, competencies and relative weightage given to each content domain.

Principles of developing an assessment framework

- It should be developed by a team of academic experts, curriculum experts and assessment/evaluation experts. It will be of value to bring together people from different perspectives to draw on a wide range of expertise and opinion.
- It should include an explanation of the purpose of the assessment and who is being assessed.
- It should be rooted in the nature and goals of teaching a subject. Within each subject, competencies should focus on assessing understanding of the nature and objectives of teaching that subject, pedagogic content knowledge, and subject-matter knowledge. Pedagogic content knowledge must include ways of planning teaching learning experiences, methods, and strategies for developing conceptual clarity, usage of teaching learning aids and assessment methodologies specific to the concept, the preconceptions/misconceptions around a concept and the ways to address those misconceptions. It should also clearly represent the knowledge, skills and/or dispositions candidates must master for a specific content domain. These are called competencies and are derived for each content domain based on the degree to which it is delved into with respect to cognitive skills and abilities.
- It should detail the scope of assessment by explicitly defining the criteria for selection of the content domain. The content selection should be done in accordance with the syllabus recommended by NCTE for the pedagogy of subjects and the National Council of Educational Research and Training (NCERT) syllabus for subjects. Concepts that are core building blocks for developing an understanding of other concepts and have a grade-wise progression need to be prioritised.



Sample of competencies in an assessment framework

STET Paper II- Mathematics; Content domain - Numbers and Geometry

Content domain	***Topics***	***Competencies***
Number (numerical aptitude and its teaching)	a. Operations on real numbers – meaning, representation, algorithm, word problems b. Arithmetic progressions c. BODMAS d. Ratio and Proportion (direct and inverse variation) e. Percent – concept and its relation to fractions and decimals, profit and loss/discount f. Simple Interest/Compound Interest/Value Added Tax (VAT)/Goods and Services Tax (GST) g. Exponents – meaning, laws, simplification using laws of exponents h. Unitary method	1. Distinguishes between rational and irrational numbers. 2. Demonstrates properties and operations using appropriate material and representations in the given context. 3. Solves problems in the set of real numbers with different configurations of the basic operations. 4. Identifies patterns in numbers and generalises. 5. Solves problems in the set of real numbers using laws of exponents appropriately. 6. Demonstrates understanding of generalised meaning and proofs of laws of exponents. 7. Compares real numbers by decoding symbolic language and approximates the value of given real numbers. 8. Formulates mathematical expressions connected to real life contexts (ratio-proportion, simple & compound interest, profit and loss, etc.) 9. Solves mathematical expressions connected to real-life contexts. 10. Demonstrates (with or without manipulatives/visuals) how to simplify and explain or solve a word problem.
Geometry (shapes and spatial understanding)	a. Basic geometrical ideas: Lines and angles, triangles, quadrilaterals, circles, tangents and secants to a circle and their properties b. Congruence and similarity of triangles c. Geometrical constructions using ruler and compass d. Van Hiele's levels of geometric thinking	11. Uses results based on properties of angles, polygons and circles. 12. Constructs arguments to prove a geometric statement related to congruency and similarity or other properties of triangles and quadrilaterals. 13. Solves problems based on measures of arc and related angles of a circle. 14. Interprets construction procedures related to angles, triangles, quadrilaterals and circles. 15. Given a situation, maps the Van Hiele levels of geometric thinking. 16. Uses Van Hiele's levels of geometric thinking to analyse the learning gap. 17. Applies theory on levels of geometric thinking in pedagogical practice. 18. Uses results based on properties of angles, polygons and circles.

Checklist for reviewing the quality of assessment framework

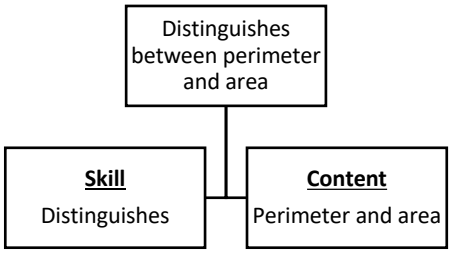
Checklist	
Do the content domains adequately represent the STET syllabus?	☐
Is there any content domain that is not relevant to the assessment of STET syllabus?	☐
Do the competencies represent the critical knowledge skills and abilities to become eligible for teaching professions?	☐
Do the competencies represent the content domain well?	☐
Are the competencies distributed across different cognitive levels?	☐
Are there sufficient competencies belonging to higher order cognitive abilities?	☐
Are the competencies assessable in a paper-pencil test?	☐

Writing good quality competency statements

Competencies are statements of what a candidate is expected to know, understand and/or be able to demonstrate after completion of a process of learning. Competencies are usually expressed as knowledge, skills or attitudes. When writing competencies, it is important to write them in such a way that they are capable of being assessed. In other words, assessment items need to mirror the competencies and should help in gauging a candidate's attainment of a competency. These are a few characteristics of a competency statement that need to be kept in mind while writing it:

1. Structure of a competency statement

These are expressed in terms of skill to be demonstrated and content to be acquired by the candidates. Each statement consists of a verb and a noun. The verb describes the cognitive skill, and the noun describes the content as shown:



2. *Measurability and demonstrability*

The verb in the competency describes an observable behaviour, such as explain, summarise, demonstrate, compare, plan, estimate, etc. so that the candidates' performances are observed and measured to conclude how well they have attained the competency. Also, competencies should target one specific aspect of the expected performance. This helps in developing valid and suitable assessment items.

Knows - Not measurable and observable

- Knows the characteristics and uses of primary and secondary sources

Lists - Measurable and observable

- Lists the characteristics and uses of primary and secondary sources

3. *Adequate representation of the content domain*

Competencies under a content domain should be defined in a manner that attainment of these competencies truly represent candidates' mastery of that content domain. In other words, these competencies should adequately and comprehensively represent a content domain and should represent 'what is important to assess'.

Example for STET Paper II- Science

Lightning: Lightning safety

- Explains lightning in terms of charges produced by rubbing
- Distinguishes types of charges
- Suggests measures to protect ourselves from lightning
- Justifies the need for earthing in buildings/houses
- Analyses the importance of lightning conductors

Checklist for evaluating the quality of competency statement

Checklist	
Does the competency target one specific aspect of expected performance?	☐
Does the competency statement start with a verb that specifies measurable and observable behaviour?	☐
Is the competency pitched at the appropriate grade-specific academic level?	☐
Is the competency statement relevant for the concept to be assessed?	☐

Blueprint

Introduction

Based on the assessment framework, the test developer creates a blueprint which is a planning document where all the relevant information of a test is listed in the form of a table. The blueprint is a map with detailed specifications of the test to ensure that all critical aspects of the curriculum are represented in the question paper. The blueprint translates the design in operational terms and all the dimensions of an item (content domain and cognitive level) become clear to the question paper developer. The information in the blueprint pertains to the content domains that will be tested; cognitive levels that will be tested; number of items; aggregation of the percentages of content domains and cognitive levels. A balanced blueprint adequately represents all the content domains and uniformly addresses a range of cognitive skills.

Steps for developing a balanced blueprint

1. Decide the total weightage to be given to each content domain

- This is based on importance of a topic in terms of its coverage in the subject, test objectives and ability level of the candidates.
- In Science and Social Science papers, equal weightage should be given to each of the component subjects - Physics, Chemistry, Biology, and Political Science, History, Geography respectively.

2. Identify cognitive levels that needs to be assessed for a content domain

- This is based on the nature of competencies addressed through a content domain. For example, the competencies addressed through 'Numbers' content domain belong to *Remember* (states the properties of different number sets, states properties of operations with different types of numbers, recognises the inverse and identity element in a number set), *Understand* (explains the concept behind the algorithm for number operations of whole numbers, chooses an appropriate representation of an operation with fractions, demonstrates understanding that for a fraction the whole can be both continuous and discrete objects, distinguishes the properties of integers from whole numbers) and *Apply* (estimates the outcome of an operation with fractions).

3. Decide on the weightage for each cognitive level

- This is based on the number of competencies from each cognitive level. Weightage is directly proportional to the number of competencies that need to be assessed from each cognitive level.
- Total weightage for each cognitive level should be equal to the weightage given to the content domain.

4. Review the blueprint

- This is based on the checklist provided at the end of this section.

Revised Bloom's Taxonomy

The competencies assessed could be from lower-order thinking to higher-order thinking levels which include *Remember, Understand, Apply, Analyse* and *Evaluate*. As STET is proposed to be a paper-pencil test with all items being Multiple Choice Questions (MCQs), the cognitive domain *Create* is not assessable in this test format.

Given below is a table of illustrative subject-specific cognitive skills that can be assessed in each subject.

Remember: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers

- *Language:* List and define grammatical categories, identify linguistic or literary elements in different texts, assess knowledge of literature, different approaches to teaching and recent advances in assessment, etc.
- *Social Science:* Recall facts, list events chronologically, label maps and diagrams, locate geographical features, e.g., deserts, mountains, valleys, hills, coastal areas, oceans, lakes, etc.
- *Science:* Recognise accurate science statements, knowledge of scientific vocabulary, facts, information, symbols, and units; and select appropriate apparatus, equipment, measurement devices, and experimental operations to conduct investigations, etc.
- *Mathematics:* Recall mathematical facts, properties, theorems, and define terminologies, recognise mathematical objects, such as shapes, numbers, expressions or quantities required for mathematical understanding, etc.
- *Environmental Studies*: Recall facts, list events sequentially, name key ideas and principles in EVS, label maps and diagrams, locate geographical features, minute observation of physical and social environment and experiments conducted etc.

Understand: Demonstrate understanding of facts and ideas by organising, comparing, translating, interpreting, giving descriptions, and stating main ideas

- *Language:* Explain features and elements of language and literature, illustrate through examples, classify them, compare different approaches to language teaching, etc.
- *Social Science:* Identify similarities/differences, classify on the basis of observable and functional similarities, give reasons for particular events and phenomena, explain a natural/social phenomenon, interpret different sources for creating historical accounts, extract information available through a map's/globe's legend, scale and connect the past with the self and the world today, etc.
- *Science:* Provide/identify an explanation for an observation or natural phenomenon, demonstrate understanding of the underlying science concept, principle, law, or theory, selection of illustrative examples in support of statements of facts or concepts, interpret scientific information in light of a science concept or principle, etc.
- *Mathematics:* Retrieve mathematical information from a given situation, derive formula, explain mathematical concepts, prove theorems or propositions, identify preceptions and common misconceptions, etc.
- *Environmental Studies*: Identify similarities and differences, classify observable and functional similarities, give description of and reasoning for specific events, natural and social phenomena, compare, contrast, and classify information to demonstrate understanding of the underlying EVS concept or principle, interpret different sources to reconstruct historical accounts, read and interpret information, explain source and perspective-based statements of facts, relationships, or concepts etc.

Apply: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way

- *Language:* Assess the ability to use the understanding of language, of how children learn, of the underlying structure of language and of literary elements in different genres, registers, contexts and texts, choose an appropriate illustration of a structure, a text, an approach to teaching and understanding in variety of contexts and across the curriculum, make choice of appropriate strategy to solve a problem, display linguistic or literary sensibility and appreciation in various forms, etc.
- *Social Science:* Apply concepts, methods, use what is learnt in a new and concrete situation, use knowledge from various areas to find solutions to problems, etc.
- *Science:* Assess direct application of knowledge and understanding of science in straightforward situations, use and apply understanding of science concepts and principles to find a solution, develop an explanation, etc.
- *Mathematics:* Use the mathematical knowledge and understanding in variety of contexts within the domain of mathematics and also in real life in completely new situations, make choice of appropriate strategy to solve a problem, display mathematical information in various forms and generate equivalent representations of mathematical entities or ideas comprise ability to apply, assess application of formulas to solve problems, use of already proven theorems to prove other propositions and interpret and draw inference from given data, use different pedagogical approaches to teach and address misconceptions and assessment strategies mapped with objectives, etc.
- *Environmental Studies*: Apply knowledge and understanding of concepts, events, phenomena, and relationships in new situations, use information from range of observations to suggest solution to a problem etc.

Analyse: Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalisations

- *Language:* Break information into parts, identify motives and causes, make inferences and find evidence to support generalisations, identify reasons for a particular way of thinking of a candidate about grammar or literature, etc.
- *Social Science:* Arrange and organise information, distinguish between relevant and irrelevant sources, gather and analyse evidence (artefacts, documents and graphics) and issues of provenance, critically read and weigh different viewpoints, dispel misconceptions, cite evidence to support claims, etc.
- *Science:* Provide scientific reasoning to solve problems, develop explanations, draw conclusions, make decisions, and extend their knowledge to new situations, give reason from scientific principles to provide an answer, break down a problem into component parts, each involving the application of a science concept or relationship, analyse a problem to determine what underlying principles are involved, devise and explain strategies for problem-solving, select and apply appropriate equations, formulas, relationships, or analytical techniques; and evaluate their solutions, etc.
- *Mathematics:* Break information into parts, identify motives and causes, make inferences and find evidence to support generalizations, identify reasons for a particular way of thinking of a child, etc.
- *Environmental Studies*: Organize information, distinguish between relevant and irrelevant sources, gather and analyse evidence, identify different viewpoints, cite evidence to support a claim and clear misconceptions, use reasoning to develop explanations, draw conclusions, make decisions, and extend their knowledge to new situations etc.

Evaluate: Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.

- *Language:* Select and defend opinions, make judgments about approaches, validate ideas or quality of work based on set criteria, choose appropriate examples, make a choice of one approach over another, choose the best possible explanation for a particular response, etc.
- *Social Science:* Judge the value of material for a given purpose (judgments are to be based on definite criteria ie accepting or rejecting ideas based on standards), choose appropriate examples, choose one strategy over the other for desired results, etc.
- *Science:* Weigh advantages and disadvantages to make decisions about alternative processes, materials, and sources; consider scientific and social factors to evaluate the impact of science and technology on biological and physical systems; evaluate alternative explanations and problem-solving strategies and solutions; evaluate results of investigations with respect to sufficiency of data to support conclusions, etc.
- *Mathematics:* Select and defend opinions, make judgments about approaches, validate ideas or quality of work based on a set criteria, choose appropriate examples, make a choice of one approach over other, choose best possible explanation for a particular response, etc.
- *Environmental Studies*: Judge the merit and validity of a statement, formulate views about an observation/event/other sources based on evidence and perspective-based reason, consider advantages, disadvantages of selected evidence to justify and evaluate their inferences etc.

Sample of a balanced blueprint

STET Paper I- Environmental Studies

Content domain		*Cognitive Level*					*Total*
		Remember	*Understand*	*Apply*	*Analyse*	*Evaluate*	
Knowledge of Subject Matter	*Family and friends*	2	2	1			5
	Food and Water	1	2			1	4
	Clothing and Shelter	1	1	1			3
	Travel and places	1	1		1		3
Pedagogy of Mathematics	*Nature and objectives of EVS*	1	2		1		4
	Integrated and thematic approach	1	2			1	4
	Teaching and learning resources	1	1	1			3
	Assessment	2	1	1			4
TOTAL		10	12	4	2	2	30
***Note**: All are multiple choice items of 1 mark each.* *Distribution of difficulty level: Easy – 30%, Moderate – 40%, Difficult– 30%*							

Checklist for reviewing the quality of blueprint

Checklist	
Are all content domains uniformly addressed?	☐
Is there a scope to assess all the competencies for a content domain?	☐
Is sufficient weightage given to higher-order cognitive levels?	☐
Is there a good spread of items belonging to different difficulty levels?	☐
Do the total marks match the maximum marks for the section?	☐

Assessment items

Multiple-choice items

A multiple-choice item is composed of two parts: a stem that describes the item or problem, and a set of alternatives or possible answers that contain a key that is the best answer to the item, and a number of distractors that are plausible but incorrect answers to the item. Candidates respond to multiple-choice items by indicating the alternative that they believe best answers or completes the stem.

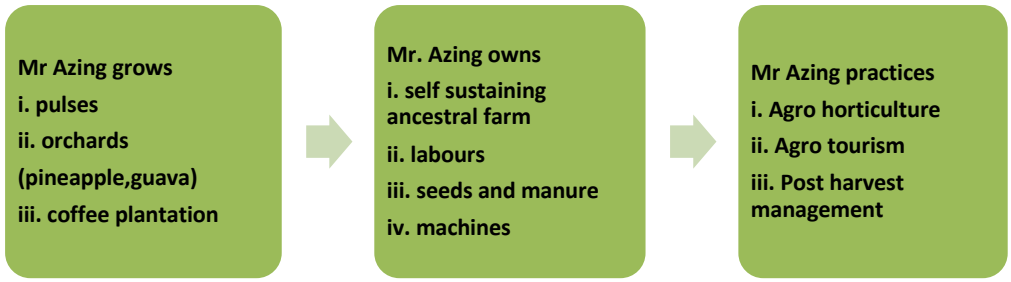
<table>
<tr><td colspan="2">Source: STET Item Bank</td></tr>
<tr><td>Paper</td><td>Paper I</td></tr>
<tr><td>Subject</td><td>Language I</td></tr>
<tr><td>Content Domain</td><td>Challenges in the teaching of English as the medium of instruction</td></tr>
<tr><td>Competency</td><td>Selects a professional development plan for a teacher.</td></tr>
<tr><td>Type</td><td>Pedagogical Content Knowledge</td></tr>
<tr><td>Cognitive Level</td><td>Analyse</td></tr>
<tr><td>Item Stem</td><td>An English teacher is unable to find good stories for her class 1 students. Most of the stories available in the textbook or the market have unfamiliar names and storylines. Children do not enjoy these stories. Identify the workshop that is most likely to help the teacher in addressing this problem.

<table>
<tr><th>Workshop 1</th><th>Workshop 2</th><th>Workshop 3</th><th>Workshop 4</th></tr>
<tr><td>This workshop is about helping learners develop their speaking and listening skills</td><td>This workshop is about developing and using contextual big books</td><td>This workshop is about building word walls and designing quality worksheets for English</td><td>This workshop is about making puppets and props for storytelling</td></tr>
</table>
</td></tr>
<tr><td>Key</td><td>Workshop 2</td></tr>
<tr><td>Distractor 1</td><td>Workshop 1</td></tr>
<tr><td>Distractor 2</td><td>Workshop 3</td></tr>
<tr><td>Distractor 3</td><td>Workshop 4</td></tr>
</table>

Considerations in writing multiple-choice items

1. Alignment to the competency

The cognitive ability assessed by the item should be aligned to the cognitive level of the competency statement to ensure validity of the item.

Source: *STET Item Bank*	
Paper	Paper II
Subject	Social Science
Content Domain	Resources
Competency	Categorises different type of farming
Type	Content Knowledge
Cognitive Level	Understand
Item Stem	 *Source:Field visit by SCERT* Read the above flow diagram and identify the type of farming system followed by Mr Azing?
Key	Commercial farming
Distractor 1	Intensive farming
Distractor 2	Subsistence farming
Distractor 3	Vertical farming

Source: *STET Item Bank*	
Paper	Paper I
Subject	Child Development & Pedagogy
Content Domain	Theoretical constructs and critical perspectives
Competency	Applies Piaget's stages of cognitive development in learning and development of children
Type	Pedagogical Content Knowledge
Cognitive Level	Apply
Item Stem	According to Piaget's concept of conservation of constancy which of the following activities would be appropriate for students in their early childhood?
Key	Moulding play dough to make different shapes and sizes
Distractor 1	Visiting a garden to observe nature
Distractor 2	Building a structure using differently shaped blocks
Distractor 3	Watching a digital content on writing letters

2. *Stem*

The stem of a question should be very specific and should consist of only relevant information needed for answering the item. Test validity is compromised when irrelevant material is used in the item stem. Also, there are some factors that can increase item difficulty. For example: items containing long and complex sentences; items that include difficult vocabulary; unnecessarily complex illustrations and diagrams; items that require a lot of reading; topics or texts that are not accessible/unfamiliar to the candidates; items that favour a particular gender, group, community, religion or state. These factors should not be used to make items more or less difficult because they do not contribute to competencies that indicate candidates' skills and knowledge in the domain being tested.

Examples of items with quality stem

Source: *STET Item Bank*	
Paper	Paper 1
Subject	Environmental Studies
Content Domain	Integrated and thematic approach
Competency	Explains the need to engage every student in the teaching-learning process, contextualising, and integrating the contents and themes, such as safety, hygiene, animals, plants, or food.
Type	Pedagogical Content Knowledge
Cognitive Level	Apply
Item Stem	An EVS teacher designs activities for his Class 5 students. He includes worksheets for some students, picture reading for others and also enacts a poetry for the remaining. What is the teacher trying to achieve by using these varied activities?
Key	Creating an inclusive environment
Distractor 1	Including a variety in the activities
Distractor 2	Exploring his own creative capabilities
Distractor 3	Integrating a variety of assessment tools

Source: *STET Item Bank*	
Paper	Paper II
Subject	Language I
Content Domain	Language diversity and multilingual contexts
Competency	Identifies the relationship between L1 and L2 from a given list of statements.
Type	Pedagogical Content Knowledge
Cognitive Level	Analyse
Item Stem	Which of the following statements show the relationship between L1 and L2 according to the theory of Language Interdependence by Jim Cummins? A. L1 helps in the acquisition of L2 B. All errors in L2 are acquired from L1 C. L2 should be introduced after a threshold in L1
Key	A and C
Distractor 1	A and B
Distractor 2	B and D
Distractor 3	B and C

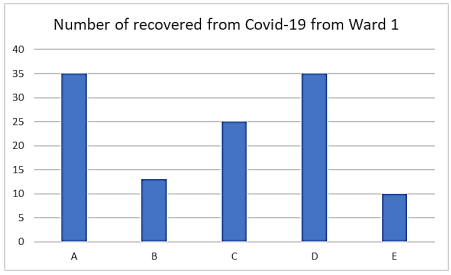
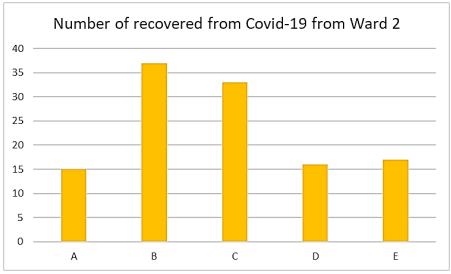
3. Stimulus

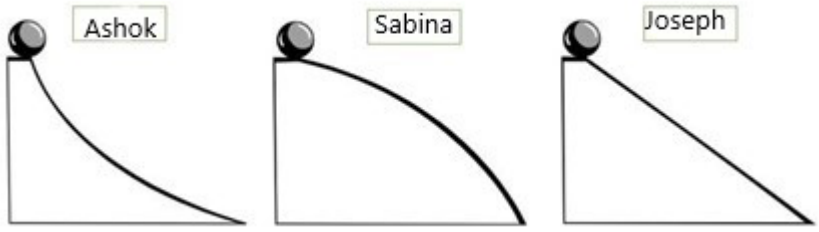
It refers to the prompt or context of a given question. It may be a piece of text, diagram, graph, table, map, chart, story, poem, poster, etc.

In languages, usually extended texts that lend themselves to a series of items are chosen for addressing a range of skills. Often, more than one item is based on a single stimulus. Candidates only have to consider the stimulus once, and then they can use the information from it to answer several items.

Other subjects including EVS, Science, Social Science and Mathematics may include short stimulus material, such as several numbers to be added or an equation to be completed, or a more complex stimulus, such as a graph, chart, table, or diagram.

Examples of items with quality stimulus

Source: *STET Item Bank*	
Paper	Paper II
Subject	Mathematics
Content Domain	Data Handling and probability
Competency	Interprets pictographs, tables, bar graphs, pie charts, histogram, line graph (using comparison, sum and difference)
Type	Content Knowledge
Cognitive Level	Understand
Item Stem	The bar graphs below show the recovery of people infected with COVID-19 in two wards, I and II. Which statements can truly describe the recovery situation fully?  
Key	Both wards had equal recoveries
Distractor 1	Ward I had more recoveries
Distractor 2	Ward II had more recoveries
Distractor 3	The data is inconclusive to arrive at the result

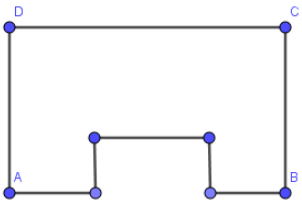
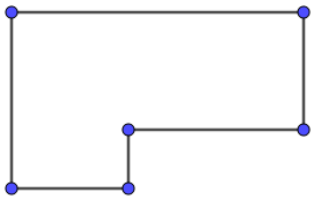
Source: *STET Item Bank*	
Paper	Paper II
Subject	Science
Content Domain	Moving things, people, and ideas
Competency	Identifies simple types of motion (linear, uniform, and non-uniform motion) from a given scenario/ table/ graphs/ relating position, velocity, and acceleration as functions of time
Type	Content Knowledge
Cognitive Level	Apply
Item Stem	Ashok, Salma, and Joseph are playing with marbles. They decide to have a contest to see who can make a marble roll down a ramp the fastest. Each friend uses the same height, same horizontal distance, and identical marbles. They let go of their marbles at the top of their ramps at the same time. (They do not give their marbles a push.)  Whose marble will reach the bottom of the ramps first?
Key	Ashok's
Distractor 1	Sabina's
Distractor 2	Joseph's
Distractor 3	It will be a tie

4. Distractors

These should point to candidates' misconceptions or common errors. The distractors should be mutually exclusive and should be of similar length. The alternatives 'none of the above' and 'all of the above' should be used sparingly. When used, such alternatives may be used as the correct response. Distractors that are obvious incorrect answers must be strictly avoided.

Examples of items with quality distractors

Source: *STET Item Bank*		
Paper	Paper II	
Subject	Science	
Content Domain	Moving things, people, and ideas	
Competency	Explains relation between force, mass, acceleration and rate of change of momentum	
Type	Content knowledge	
Cognitive Level	Apply	
Item Stem	A body of mass 500 g moves with an acceleration of $2m/s^2$. The rate of change of momentum is:	
Key	1 Newton	***Reason for choosing distractor***
Distractor 1	2 Newton	Candidate fails to identify force as rate of change of momentum and assumes that acceleration is same as rate of change of momentum.
Distractor 2	250 Newton	Candidate assumes force, mass and acceleration is related through the equation, Force = Mass/Acceleration
Distractor 3	1000 Newton	Candidate is not aware of converting mass expressed in CGS units to SI units

Source: *STET Item Bank*		
Paper	Paper I	
Subject	Mathematics	
Content Domain	Measurement and mensuration	
Competency	Explains changes in area or perimeter when the attributes change	
Type	Content knowledge	
Cognitive Level	Analyse	
Item Stem	From two different rectangles, a U-shaped portion and an L-shaped portion are cut out as shown in Fig 1 and 2. The perimeter of:  Fig1  Fig 2	
	Fig 1 increases but Fig 2 remains the same	***Reason for choosing distractor***
Distractor 1	Fig 1 and Fig 2 remain the same	Candidate does not notice extra side in Fig 1 due to the cut.
Distractor 2	Fig 1 and Fig 2 decrease	Candidate thinks that any cut causes decrease in perimeter.
Distractor 3	Fig 1 and Fig 2 increase	Candidate thinks that perimeter increases irrespective of location and shape of cut-out portion

Checklist for writing quality items

Quality parameters in stems and prompt with respect to factual and conceptual accuracy and language	
Is the information in the stem/prompt factually and conceptually accurate?	☐
Does the stem/prompt avoid being unnecessarily wordy/providing extraneous information?	☐
Does the stem/prompt use negatives, e.g., NOT/CANNOT/INCORRECT/WRONG only when necessary?	☐
Does the stem/prompt avoid complex, ambiguous, and/or tricky language?	☐
Is the stem/prompt free of grammatical errors?	☐
Does the stem/prompt present one clearly formulated item?	☐
Does the stem/prompt contain all information necessary for a response?	☐
Quality concerns in options/distractors for multiple-choice items	
Is there one, and only one, clearly correct answer?	☐
Are options independent of each other? Are there no options with the same meaning?	☐
Are distractors based on reasonable misconceptions and errors?	☐
Are options parallel in structure, degree of specificity, and/or length? Are there no unnecessarily verbose options?	☐
Do options avoid repetitive wording?	☐
Are options sufficiently plausible and reasonable for item discrimination?	☐
Is the correct answer not clued by the item stem, such as absolutes or words repeated in both the stem and options?	☐
Are options in a logical order?	☐
Are there no absolute words, such as *always* and *all*, in only one option?	☐
Are there no misleading and/or tricky options?	☐
Are there no all-inclusive options?	☐
Quality concerns in stimuli	
Does the art/stimulus avoid clueing the correct answer to an item?	☐
Does the art/stimulus contain appropriate and accurate labels?	☐
Is the art/stimulus not confusing or overwhelming?	☐
Is the art/stimulus clear, accurate and sufficient to answer the item?	☐
Is the art/stimulus significantly free from copyright issues?	☐
Is the art/stimulus necessary, relevant, and useful to answer the item?	☐
Is the art/stimulus likely to be interesting/engaging to candidates?	☐
Is the art/stimulus pitched at appropriate grade/age/reading level?	☐
Item bias and sensitivity issues	
Is the item accessible to the greatest number of test-takers?	☐
Is the item free from bias in the areas of gender, caste, religion, socio-economic class/status/regional differences, age, culture, physical appearance?	☐
Is the item language unbiased towards a particular linguistic group?	☐
Is the item sensitive to special-needs groups?	☐
Does the item avoid offensive, disturbing or controversial information?	☐

Review of items

Purpose of review

During item development, an item author may unintentionally show bias in writing stem or choice of the stimulus, or in the distractors. An item author may also unknowingly use ambiguous or confusing wording in the item. The review of items by peers to identify and rectify such problems at an early stage is an essential part of the item development process.

This initial review, sometimes called 'panelling', is conducted by a group of peers. The SMEs, including the item author who initially developed the items, sit together to analyse sets of first-draft items.

Guidelines for review committee

Items are inspected with regard to:

- Alignment with the competency
- Significance of the skill being assessed
- Item difficulty (including distinguishing between intrinsic and extrinsic difficulty)
- Precision and clarity of phrasing
- Reasoning that gives the answer
- Equity for all students of different genders, cultural backgrounds, languages, religion, state or socio-economic groups

Assembling the Question Paper

Introduction

Once the items are scrutinised for quality and the most appropriate items short-listed, the test paper developers need to assemble the items into a formal question paper. While assembling the question paper, it is important to follow certain guidelines and principles to ensure that the prospective question paper is well-aligned to the curricular goals; assesses a range of cognitive dimensions of learning; is not predictable; and will be evaluated in a fair, transparent and credible manner. It is also important to undertake timely review of the assessment framework, the blueprint and its alignment with the framework and the quality of items. Collaboration among teachers in a school or SMEs in an organisation can contribute towards developing a quality question paper.

Principles of developing a good quality question paper

- The language requirements for the assessment items chosen in the question paper should be appropriate to the candidates.
- The items should be arranged from simple to complex difficulty levels.
- The correct responses should be randomly distributed among the alternative positions throughout the question paper, having approximately the same proportion of alternatives A, B, C, and D as the correct response.

Checklist for reviewing the quality of question paper

Checklist	
Are the instructions to the candidates accurate and unambiguous?	☐
Are the items sequenced from easy to hard difficulty levels?	☐
Are items with diagrams/ illustrations on the same page or on adjacent pages?	☐
Are items based on a passage on the same page or on adjacent pages?	☐
Is the key well distributed between options A, B, C and D?	☐
Are the items with diagrams/illustrations interspersed with dense text items?	☐
Is the font size age-appropriate and space used judiciously to avoid unnecessary lengthiness?	☐
Is the printing and layout clear?	☐

References

1. Anderson, L. W., & Bloom, B. S. (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives. Longman.
2. Central Board of Secondary Education. (2021). Test Development Process Handbook for Experts: Principles, Checklists, Samples and Templates. New Delhi: Central Board of Secondary Education.
3. Guidelines for question paper development, Assessment resources, Azim Premji University
4. Information Bulletin, CTET July 2020
5. Rashtriya Madhyamik Shiksha Abhiyan, NCERT, Large-Scale Learning Assessments A Handbook for the Indian Context, Chapter 6- Item writing and Chapter 7- Equivalence in multilingual assessments

Templates

Assessment framework

Content domain	***Topic***	***Competencies***

Blueprint

Content domain		*Cognitive Level*					*Total*
		Remember	*Understand*	*Apply*	*Analyze*	*Evaluate*	
Knowledge of Subject Matter							
Pedagogical content knowledge							
TOTAL							

***Note**: All are multiple-choice items of one (1) mark each.*

Distribution of difficulty level: Easy – , Moderate – , Difficult–

Multiple-choice item

Subject		
Content domain		
Competency		
Type	Content knowledge/ pedagogical content knowledge	
Cognitive level	Remember/ Understand/ Apply/ Analyse/ Evaluate	
Item stem		
Key		***Reason for choosing distractor***
Distractor 1		
Distractor 2		
Distractor 3		

Review of items

Item no	
Alignment of item with competency	
Generic comments	
Quality of stem	
Quality of stimuli	
Quality of distractors	

Question paper

Instructions to the candidate:	
Q. No.	***Item stem and distractor***

Test Development Process

Handbook for Experts