

Supporting Teaching, Learning and Assessment in the Context of Accredited Grades 2021

March 2021

1. Introduction

Teachers and students have adapted to alternative approaches to teaching and learning throughout the period of the closure of school buildings through emergency remote teaching and learning. However, despite additional resourcing to schools, disparities remain in accessing technology, connectivity and digital skills, which may have impacted on learning. Therefore, all Leaving Certificate 2021 school students will be able to opt in to receive a set of SEC Accredited Grades.

Teachers are asked to use their professional judgement, drawing on existing records and available evidence, to arrive at a provisional estimated percentage mark for each student. An estimated percentage mark must be provided by teachers for all students in a class group regardless of whether the student is opting for an Accredited Grade or not. In reaching their estimate, teachers will have regard to the written examination and the additional component, where relevant.

To assist teachers planning for assessment for Leaving Certificate students between the return to school and 14 May 2021, the Department committed to providing additional subject specific advice and guidance on assessment.

The information provided in this guide should be read in conjunction with A Guide to State Examinations and Accredited Grades for Leaving Certificate 2021, available here, and the subject-by-subject exam paper adjustments that issued from the State Examinations Commission (SEC) on 23 March outlining further adjustments to the written papers. Additional guidance in relation to Leaving Certificate Applied has also been issued to schools. These Arrangements for Leaving Certificate Applied 2021 can be accessed here.

2. Purpose of this Guidance

As outlined in Section 6 of the Guide to State Examinations and Accredited Grades for Leaving Certificate 2021, following the return to school, teachers may set a limited number of additional assessments up to the 14 May 2021. The purpose of this guidance is to provide additional information to teachers on assessment approaches that may be considered when planning and designing assessments for Leaving Certificate students to support the Accredited Grades process.

This guidance is not intended to be prescriptive or to replace teacher's own professional judgement as to what the most appropriate assessment approaches are for their class group. The material outlined in the document is intended to stimulate individual teacher reflection and/or support professional discussion among teachers when deciding on the approaches to be adopted in their own subject and school context. The examples provided in section four are not indicative of assessment themes or questions that may appear in the Leaving Certificate examinations in June 2021.

In the period up to the 14 May it is important that over-assessment is avoided. Insofar as possible, teachers should maintain the modes of assessment and feedback that are familiar to students and that are consistent with the approaches they would normally adopt at this stage of the year.

Therefore, if a teacher decides to set additional assessments, such assessments should be considered proportionately with other forms of evidence of the student's learning over the two years of the Leaving Certificate programme when determining a student's estimated mark.

This guidance acknowledges that schools and teachers are best placed to meet the needs and abilities of their students. They have significant autonomy in deciding how to plan, sequence and deliver assessment moments for students in their school. Communicating the agreed assessment plan to students and their parents in a timely manner would be another helpful step in supporting students' wellbeing.

Teachers' knowledge and experience of the curriculum and the 2021 examination arrangements, including where relevant written examination and additional component(s) are essential to the process of arriving at the estimated mark. Section 6 of the *Guide to State Examinations and Accredited Grades for Leaving Certificate 2021* sets out the steps involved in reaching an estimated percentage mark for each student.

3. Key Considerations for assessment during this period

3.1 Review of Curriculum and Assessment Arrangements

To make accurate judgements, it is important that teachers have a clear understanding of:

- the range of knowledge, skills and understanding described in their subject syllabus/specification
- the assessment arrangements for the 2021 Certification Examinations, such as the nature and weighting of each component.

In arriving at a provisional estimated percentage mark for a student, it is not necessary to assess every aspect of the syllabus/specification. The teachers' professional judgement is informed by a range of assessments tasks that were carried at intervals over the two years of the programme under appropriate conditions, which provide evidence of learning.

3.2 Review of Evidence

Teachers are encouraged to consider the evidence they have already accrued over the course of the two years of senior cycle, including the breadth and depth of learning that was assessed within the assessments considered as part of the evidence. This review will help determine the extent and format of additional assessment that is required.

3.3. Collaboration with colleagues

It may be helpful for subject teachers to discuss a possible collaborative approach to identifying the assessment approaches they want to administer. It will be important to ensure that the balance of in-school time remains focused on teaching and learning, and that over-assessment is avoided.

3.4. Planning assessment moments

The Leaving Certificate syllabuses/specifications set out a number of objectives which outline what students should know, understand and be able to do. The design of assessment tasks should be informed by these objectives and the learning outcomes of the syllabuses/specifications to ensure the activities set assess the range of knowledge, understanding and skills underpinning the syllabus. Teachers should consider how one or more of these objectives can be demonstrated by students in the completion of a task. In advance of assigning tasks, due consideration should be given to the variety of the assessment approaches used.

A whole-school view of the assessments planned for each subject area would be useful to avoid overassessment of students on particular days or weeks.

3.5 Familiarity

If administering an in-class teacher-designed test, teachers should consider building on the familiarity that students have with the usual layout of such tests, the question types used and how students will receive feedback in relation to the outcomes achieved, for example comments, descriptor of achievement or a numeric indicator such as a mark or percentage.

3.6. Inclusion

Teachers should be cognisant when planning assessment that the relevant method or format should be inclusive of all students (SEN, EAL, VHR, educationally disadvantaged students etc.). Such assessments should provide a differentiated approach to enable students to access the appropriate assessment modes and be adaptable to their particular context. These arrangements do not necessarily have to be identical to those provided during the Certificate Examinations, as the context and constraints are different, but will have been intended to achieve the same objective, to remove any access barriers that might stand in the way of a student being able to demonstrate what they know and can do. In addition, the marking of such assessments should also take into account any reasonable accommodation the candidate may be entitled to, including for example, a grammar and spelling waiver.

4. Examples of approaches to assessment during the period up to 14 May 2021

In this section the information is presented in terms of broad subject groupings. The rationale for this approach is that in many instances the normal means of assessment used with these subjects are similar.

If administering an in-class, teacher-designed test, the test should be no more than one lesson in duration (maximum one hour) and a maximum of three class tests may be administered up to the 14 May 2021. Examples of summative tests that may be administered are written, oral, aural or practical tests. Students may take the same assessment or it may be differentiated for different levels in the case of mixed-ability class groups. In discussing options it is important that any summative assessment takes account of the material that students have covered and the impact that COVID-19 has had on students' level of skill and ability to apply themselves to a prolonged task.

In the examples provided a range of assessment approaches have been provided as examples in each of the cognate areas. In many instances the examples provided can be adapted by teachers in designing tests that they may consider administering up to the 14 May 2021.

4.1. Irish

The assessment of students' learning should be in keeping with the aims of the syllabuses and the principles of a communicative approach to language learning. The range of assessment tasks should support the formative assessment of all the main language skills (listening, speaking, reading and writing), ideally using assessment approaches that allow for the demonstration of those skills in an integrated way.

A balance should be achieved across the range of tasks to allow for the demonstration of students' proficiency across all language skills in the receptive and productive competences, paying particular attention to breadth in vocabulary and grammatical accuracy.

Listening comprehension tasks:

Using authentic listening texts (e.g. Raidió na Gaeltachta or TG4 news items) or through the dictation of appropriate texts, teachers could generate oral or written questions based on these texts and/or invite students to pose questions on the texts.

Oral tasks:

Students could deliver presentations in which they speak about their experiences and interests, their responses to literary texts that were part of their course as well as other themes or topical issues. Stimulus materials could include picture sequences which would allow students demonstrate their learning across their receptive and productive skills. To enhance spontaneity in oral interaction skills, consideration could be given to facilitating role-play, discussion and debate. Those students in listening mode could be invited to pose questions, thereby allowing further opportunities to assess understanding, knowledge and skills.

The level of students' competence in oral skills could also be ascertained by ongoing observation of their active participation in class, including their oral contributions to collaborative tasks.

Written tasks:

To allow for a differentiated approach to the assessment of students' writing skills, students could be set tasks such as short accounts, stories, essays, speeches, debates. These tasks could, for instance, be based on themes that are common to a picture sequence, a literary text or a topical item.

Reading tasks:

Students could be asked to read or recite extracts from prescribed or elective literary texts and other material. When determining competence level, emphasis should be placed on the extent to which the student reads with fluency and meaning and is mindful of phonetic accuracy.

Reading comprehension tasks:

Authentic texts from a variety of genres, including multimedia, could be used for this purpose. Questions could be designed to elicit students' general and deeper understanding of the content. Depending on their ability level, students could also be provided with extended opportunities to identify aspects of grammar. In addition to responding to questions, students could also have a role in generating questions.

Approaches to assessment should reflect the integrated approach to development of language skills.

A common theme could be identified to form the basis of listening and reading comprehension tasks and written tasks such as short passages, letters, essays dialogue and speeches. Similarly, a literary theme in a poetry or prose text from the prescribed or elective list, as relevant, could be selected. It is important that questions allow students demonstrate their language awareness including the correct use of syntax and grammatical accuracy.

In-class assessment tasks could include, as appropriate:

- listening and reading comprehensions
- composition assignments
- response to literary texts

Stimulus materials could be used where required to support the completion of assessment tasks.

4.2. English

Assessment in English should be in keeping with the aims of the syllabus and the principles of an integrated approach to the two domains of comprehending and composing. When designing assessments teachers should be conscious of achieving an appropriate weighting across a range of tasks so that students are provided with opportunities to display the knowledge and skills they have mastered over the duration of their senior cycle studies.

Through a focus on particular tasks or topics, teachers may encourage in-class discussions or debates which support students in displaying their knowledge and skills. Such discussions might, for example, focus on particular characters, themes or literary techniques encountered in texts which they have studied.

In addition, formative questioning of students, with appropriate wait-time, will support teachers in assessing and advancing students' learning. When questioning students in class, an appropriate focus could be brought to bear on the development of higher-order thinking skills. Appropriate use of oral presentations is a further way in which students can develop their consideration of texts they have studied. Oral presentations could also support their engagement with current events which will inform their work in the composition elements of the syllabus.

Written tasks could focus on ensuring that students experience opportunities to write across a range of different genres. Examples of such writing exercises might include personal essays, short stories, newspaper reports, and journal entries, among many others. Opportunities for students to relate particular genres or stimulus material such as magazine articles, podcasts or documentaries to their experiences of particular studied texts on their course may also be used.

Engaging in written or oral comparison across a variety of text genres, including dramatic texts, novels, short stories, films, and poetry would also be worthwhile. Comparative work could focus particularly on the comparative modes prescribed for this year's course. Students might, for example, analyse the value-system advocated and/or implied by texts or focus on a particular theme or issue.

Written and oral activities could also encourage students to articulate evidence-based personal responses to texts, focusing on techniques being used, for example, tone, imagery, rhythm, choice of words, and selection of detail.

In all written tasks, students should be expected to shape their language to address specific audiences and purposes, while also displaying knowledge and control of the formal aspects of language including register, paragraphs, syntax, punctuation and spelling.

Assessment tasks should reflect the domains of composing and comprehending set out in the syllabus. They should seek to assess students' skills and knowledge of key aspects of the syllabus.

For example, students might be expected to produce extended written responses in areas such as:

- Composition assignments
- Texts studied
- Reading comprehensions
- Literary analysis of dramatic texts, novels, short story collections, or poetry.

4.3. Modern Foreign Languages

Consideration should be taken of the five language skills (listening, reading, spoken production, spoken interaction and writing) in practical ways.

Given the current context and the short timeframe involved, formative assessment can be used to support focused preparation for the assessment of students' oral competence. For example, students could watch a short video/ listen to an aural stimulus of interest to them. The teacher would then provide written questions, in the language of schooling or in the target language, about the video/audio to assess comprehension. The students could also record an oral summary of the stimulus material in the target language and receive guidance for improvement from the teacher.

Students could read a text and answer questions on the text. They then produce a short piece of formal or informal writing about the topic of the text and receive written feedback for improvement from the teacher. They could also be asked to reflect on oral feedback from their teacher before producing a short piece of text.

Students prepare a short speaking piece about a topic being studied. The option could be provided for this to be delivered in a variety of digital formats as appropriate. Students receive

feedback on their oral production from the teacher. The feedback could relate to specific points around improving pronunciation/vocabulary/tenses/sentence structure. Students then make notes on key points of learning from the feedback which they will incorporate into future oral tasks.

In the main, the types of questions used will be in line with those normally used in the language and at the relevant level.

Written tasks

Teachers may provide a short text (e.g. literary or journalistic) in the target language. Students are required to answer reading comprehension questions in either the target language or the language of schooling as appropriate. Teachers could also provide a written production task, either formal or informal. This task could be linked to the subject matter of the text if appropriate to the level.

Listening comprehension tasks

Teachers could provide a listening comprehension task related to a recent or current topic of learning.

Oral tasks

Students could prepare a short oral presentation or participate in a roleplay linked to a recent or current topic of learning. Students could also listen to an aural stimulus and provide an oral response in the target language to questions on that stimulus or respond orally in the target language to a series of short questions on a recent topic.

Reading comprehension tasks

Students could be asked to respond to a reading comprehension text in the target language. Questions posed could be multiple-choice or short answer with, if desired, a question which requires an extended answer in the target language. Students could also respond to a written stimulus in the target language, with mix of short answers in the language of schooling and one extended answer in the target language.

4.4. Mathematics and Science subjects

Where health and safety guidelines allow for student performance of practical lessons, teacher observation of practice as well as directed questioning of practice could be used to check for learning and understanding of the skills being executed. Teachers could provide students with opportunities to reflect and improve their practical skills through the use of video or simulations of practical work, experiments or investigations. Teachers could also use written or oral questions with these activities to gather evidence of the students' learning and understanding.

Assessment approaches which are normally incorporated into typical classroom teaching and learning methodologies involve developing frameworks to question students orally on their knowledge and understanding of key concepts in the science subjects and Mathematics. In addition, students could be assigned a question which they must research and then present their findings.

Analysis of secondary data in either tabular or graphical format supported by written or oral questions developed by the teacher is another way in which students could be assessed in their understanding of scientific concepts and the relationship between variables.

In the case of Mathematics, assessments approaches should include questions which cover multiple strands and not be limited to one particular skill or topic. The series of assessments should be focused on content and skills that have been covered by the students.

A note on Applied Mathematics

A similar approach could be used for Applied Mathematics. However, the nature of previous Applied Mathematics examinations would need to be taken into account. In general, previous examinations questions have tended to focus on individual topics with only occasional combining of topics within one question.

4.5. Technology subjects

Students can be provided with opportunities to reflect on and improve their practical skills development through guided self-reflection. As students complete or participate in practical work, teacher observation and one-to-one discussions could be used to ascertain their understanding and knowledge of the skills being executed. Strategic questioning and polls/quizzes can help teachers get a better sense of how much students understand.

Assessments in the subjects may also involve a review of portfolio work; creating a detailed infographic using computer based graphical organisers or freehand sketching for their project which is an effective way for students to reinforce what they have learned. For example, they can cover definitions, key facts, statistics, research, how-to info and graphics. Students may be asked to create a 5-10 minute audio recording about specific core concepts from each unit of learning. Students could also orally present on a topic or project of their choice. It would be important to discuss and create success criteria in advance of this.

4.6. Business Subjects

Teachers' observation of students' learning and progression in lessons and their engagement with oral formative feedback provided on projects, presentations, extended and essay type questions is relevant as an assessment approach. In addition, teachers' could use structured questioning to facilitate dialogic conversations which allow students to demonstrate the knowledge, understanding and skills associated with business and economic environments. For example, a media clip of local or national enterprise; supported by prompt written questions or oral questions provided by the teacher. Evidence of the students' learning and understanding could be used to identify the focus of a follow-up lesson.

Other approaches include the observation of the development of students' online research skills from their engagement with the research project in economics and evidence of application to classroom discussion activities and written assignments.

Evidence may be available of students acting upon formative feedback received from their teachers whereby they display for example, how they have developed computational skills in the completion of prescribed lesson activities.

A combination of questions types using appropriate and current stimulus material should be used for in-class assessments from across all units of learning. Case studies and comprehension questions on current topics linked to the Units of Learning in focus for the 2021 final Business assessment and extended answer questions based upon appropriate stimulus material centred on a range of business and economic topics, could be used to assess learning. Appropriate stimulus material may include newspaper reports, business articles or teacher generated business and economic scenarios.

Business: Case studies and comprehension questions on current topics and themes linked to the seven Units of Learning.

Economics: extended answer questions based on a current topic/trend which involves using online research to support a developing critical perspective.

Accounting: short answer questions which evidence students' mastery of the key accounting concepts and computations.

4.7. Art

Evidence of learning may be noted in coursework workbooks, presentations/projects on an artwork based on research, or a virtual gallery visit/heritage site. Other examples include students' observational drawings of primary sources and research or quizzes on Art History and Appreciation topics. Essay type questions can also be completed by students with two-way feedback between teacher and student.

In providing developmental feedback to students teachers could develop an assessment rubric to facilitate students to reflect on how they have implemented the feedback provided.

For Art, it will be important that assessment approaches assess students' knowledge and understanding of both practical and theory components. They can also assess students' creativity and their ability to develop ideas from initial concept to realised work, as well as technical skills in a range of areas of practice. Opportunities also exist to assess students' ability to make connections between their own work and that of others.

The assessments developed can provide students with opportunities to demonstrate their knowledge, understanding and ability to critically evaluate the artworks they have studied. They could also provide opportunities for students to demonstrate the influence of artists' work on their own work and ideas. Annotated notebooks or sketchbooks could be used to demonstrate students' practical skills and thought processes used to develop ideas.

Other forms of assessment may include, for example, written and practical in-class projects; reviews based on virtual visits to galleries or heritage sites; or film reviews.

4.8. Music

As Music has three components: Listening, composing and performing, teachers can take a variety of approaches to extend the assessment profile they already have.

A variety of short, focussed written activities could be designed to assess the skills of listening and composing. These may include short, focussed worksheets or quizzes. In lessons, questioning strategies could be varied so that they assess students' knowledge and understanding as well as their ability to apply the key skills of Music. Students could be asked to demonstrate knowledge by researching and presenting on an aspect of their learning to their peers thus enabling the class to learn from each other. Such activities could be undertaken individually, pairs or groups, while maintaining physical distancing requirements. In all listening components including Irish Music, teachers could incorporate short writing tasks to determine students' knowledge. In addition, short focussed listening activities could be used to assess students' analytical skills and their ability to apply previously acquired knowledge to un-prescribed pieces.

In all practical activities, students, in addition to the teacher, could be given opportunities to provide feedback to each other using pre-selected performance criteria. During class, students could be afforded the opportunity to perform a sample of their programme in order to ensure that students have as many opportunities as possible to experience performances.

In listening components, summative assessments could include questions that assess the student's ability to recognise the main features and themes of their prescribed course. Questions could also be designed so that students demonstrate how they can link the learning from their prescribed works to un-prescribed works including Irish music. Where relevant, questions should provide students with the opportunity to demonstrate the extent of their knowledge and the ability to recall factual information.

4.9. Home Economics

If designing class tests they could include a mix of short-answer type questions which address different areas of the syllabus. In addition, stimulus materials such as a bar charts could be presented to students. Written questions to accompany the stimulus material would provide opportunities for students to demonstrate lower and higher-order thinking skills and to draw on their learning from different areas of the syllabus.

Students could view a media clip which outlines a problem faced by an individual or family in managing their resources to meet their needs. Students would then be required to apply their knowledge, understanding, skills and values to identify a solution to the problem.

Students could be tasked with presenting their learning in a logical and structured way by creating graphic organisers on a variety of themes. When undertaking this task students could depict how aspects of the chosen theme relates to other areas of the syllabus, and the teacher could provide feedback on the quality of the work produced. Alternatively, case studies could be presented on the theme identified where students would be required to consider the information presented and apply their knowledge, understanding, skills and values to make informed choices and decisions.

Teachers could observe the development of students' manipulative and creative skills while designing and making a textiles item.

4.10. Computer Science

For Computer Science it is important that assessment reflects both the application of skills and the theoretical content of the specification. Questions (oral and written) should assess both the core concepts and the practices and principles of computer science and require students to combine knowledge and skills from across several areas of the specification.

Assessment may comprise questions of varied format and types. It should include an element of in-class assessment of programming skills either in the form of a computer based or paper based test.

During lessons teachers are also encouraged to use open-ended questions to encourage students to think through the processes they are working with and develop their understanding about concepts in Computing. Students' responses provide teachers with an indication of their understanding and progression.

If assessing the *computer science in practice* elements of the curriculum, teachers are advised to use Computational Artefacts produced to date rather than assigning new work. This type of assessment can be completed both in class and remotely. Teachers should assess the individual work only where the work was done as part of a team.

Teachers could assess students' design skills which will give an indication of their use of computational thinking to produce solutions (ability to analyse problems, and to design, develop and evaluate solutions). Applied skills could be assessed by reviewing students' abilities to read, write, test and modify computer programs.

4.11. Humanities

A variety of questioning strategies can be used with students, individually, in small groups, or the entire class. Effective assessment approaches include those that test students' capacity to answer higher-order questions. Higher-order questions require more in-depth thinking from the students. They can help the teacher discern the level and extent of the students' understanding, knowledge, skills and attitudes have developed.

A variety of stimuli could be used, both visual and text, such as, primary documents, photographs, video or audio clips, to extrapolate appropriate use of, and critical reflection on texts and primary/secondary sources, to assess genuine engagement with the subject. In this way students could demonstrate their ability to understand, express and discuss relevant concepts, events, case studies and key personalities. Extended writing tasks could also be assigned.

Students could continue to develop their research skills by locating and selecting relevant and appropriate evidence, from books, articles, websites, audio-visual and resources.

If designing in-class tests, the tests should include questions which cover multiple strands and should not be limited to one particular skill or topic. Assessments should provide students with opportunities to demonstrate knowledge, understanding, skills and attitudes as outlined in the specification/syllabus.

Assessment of coursework should centre on the relevant skills and processes underpinning the knowledge and applied knowledge and understanding relevant to the particular subject. Evidence of students' learning may be gathered from elements of coursework completed to date.

Students' critical engagement with the different strands or topics students could be demonstrated through assigning a question which they research and then discuss or present their evidence based findings or arguments on particular topics. In this way students will be able to demonstrate their level of knowledge and understanding through the presentation of effective evidence based arguments or discussion. This approach is best facilitated through discussing and creating success criteria at the start of the assessment activity.

Students could be assigned essay style questions, which may include sub-sections, to assess evidence of research/study and depth of knowledge, skills, understanding and appreciation. These essays may also allow students to demonstrate an understanding of the interrelatedness of different topics/strands on the course.

4.12. Physical Education

Quantitative and qualitative rating scales can be used with students to assess performance and provide feedback to guide improvements. For example:

A: Quantitative rating scale (1-10). Feedback provided on a 10-point scale with information given re strengths and weaknesses of the performance.

B: Qualitative rating scale – uses qualifier words to distinguish levels of performance and to provide feedback. As above but with use of qualitative descriptors and feedback as to strengths and weaknesses of performance.

Teachers can also use checklists to assess essential elements in the execution of a skill to be demonstrated. These are best used when the performance being judged is clearly correct or not.

An analytical rubric is another useful tool for teachers which can be used to indicate and identify levels of performance using a scale of criteria. This is usually written by the teacher during planning to help set expectations and to facilitate self-assessment and shared with students.

Steps to writing a rubric for LCPE:

- a. Design a task in relation to a specific outcome(s)
- b. Negotiate levels of performance and success criteria for the task, with the students. (Even number of levels are better than an odd.)
- c. Write the language using clear and concise words
- d. Differentiate clearly between different levels of performance.

Assessment should be based upon clearly defined student goals related to appropriate (psychomotor, cognitive, and affective) content. Criteria for determining student achievement are clearly identified. Student grades are based upon individual progress toward the achievement of predetermined goals. Students should not be graded on a single measure that is not valid or reliable.

For example:

- **1.2 Analysing skill and technique** Analyse selected skills and techniques from the following perspectives:
 - biomechanical; planes and axes, levers
 - · movement; vectors and scalars, Newton's laws of motion
 - quality/effectiveness; economy of movement, creative application of skill

Standardised rubric formats applying learning for 1.2, for different physical activity areas:

- Basketball (skill testing)
- Underhand VB Serve
- Badminton strategy
- Athletics technique

Video analysis – record and view using the rubric. This may be also done in real time.

Applied case study assessment: Learners' engagement with a case study designed to require learners to apply their learning in a particular physical activity scenario. Scoilnet.ie provides access to the full Irish Times Archive back to 1859 is freely available to all schools on the Schools Broadband Network (SBN). Teachers may find this resource useful for stimulus material when designing case study assessments.

Extended response question (facilitating choice) focused on one or more learning outcomes. These assessment tasks can be constructively aligned with the learning outcomes in the LCPE specification. The design of aligned written assessments that are manageable, authentic, multi-dimensional, inclusive, equitable, valid and reliable is important.

Short questions based on a wide range of learning outcomes using a variety of stimulus materials, diagrams, charts and tables.