GEC 2022 TRAINING MANUAL

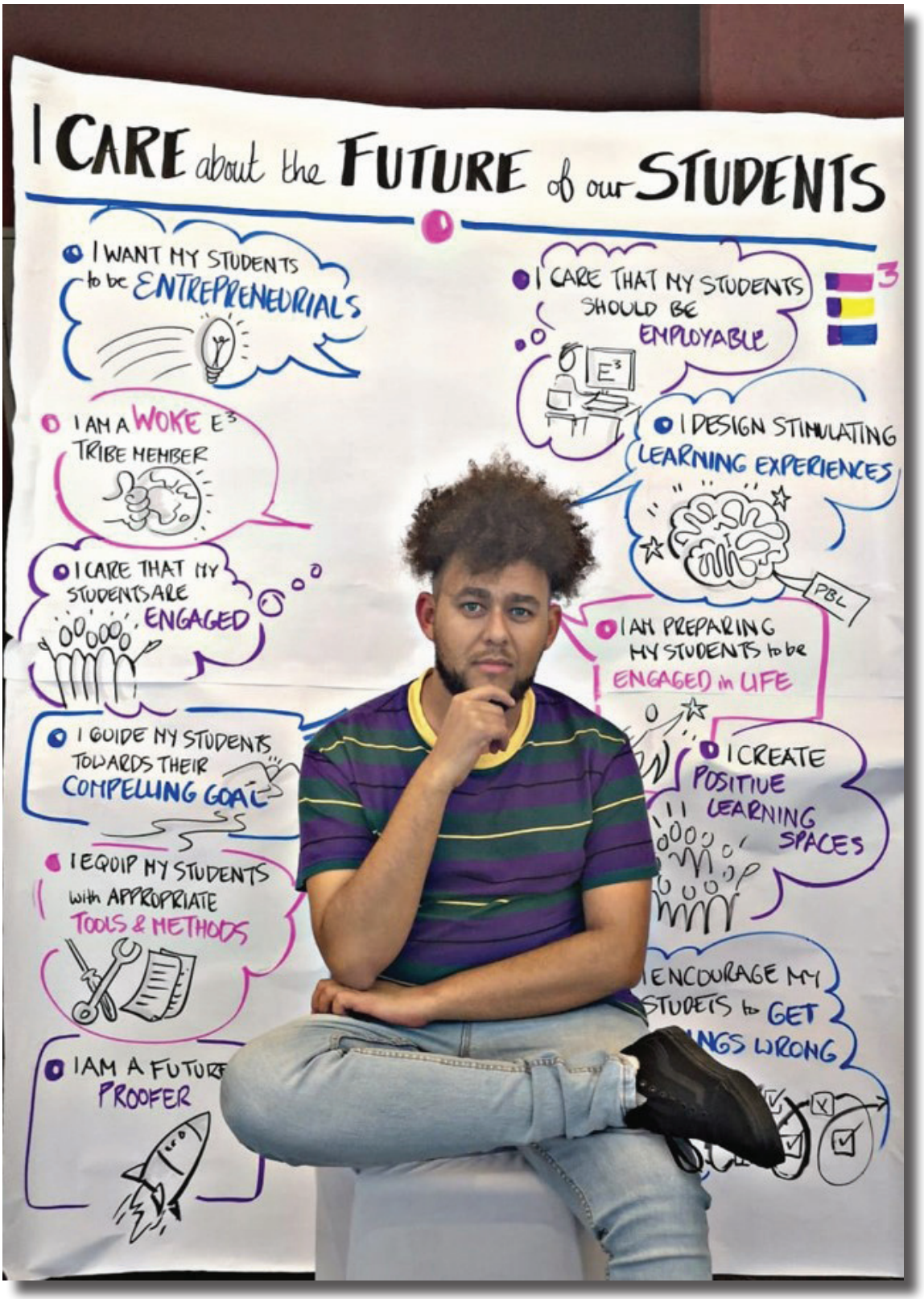
basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

LEARN TO SUCCEED

TABLE OF CONTENTS:

21st Century Teaching



1: Overview of the GEC and Purpose of the Training

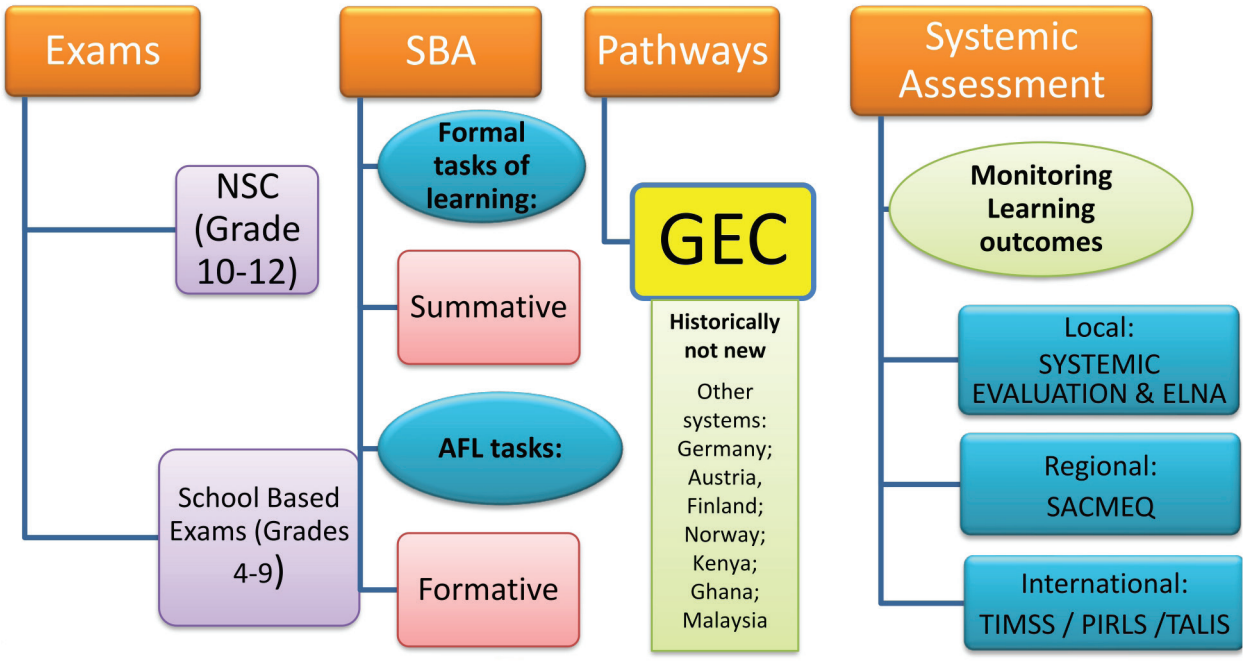
1.1 The National Assessment Framework (NAF)

GEC (General Education Certificate) forms part of the National Assessment Framework (NAF) and will assist learners in establishing pathways after ten years of schooling, for example, the Occupational stream, Vocational stream and Academic stream.

The NAF Principles are:

(a) To improve learning by providing feedback to the teacher and the learner on whether learning is taking place and on areas of weakness;
(b) To make a judgement about a learner's level of performance against defined learning outcomes;
(c) To monitor the performance of the education system and to identify trends (systemic) against the social justice principles;
(d) To monitor how the identified goals of the system are supporting the desired outcomes, from early learning to exit levels; and
(e) To support a positive engagement within the community, with relevant data that balances accountability and support for improving learning outcomes.

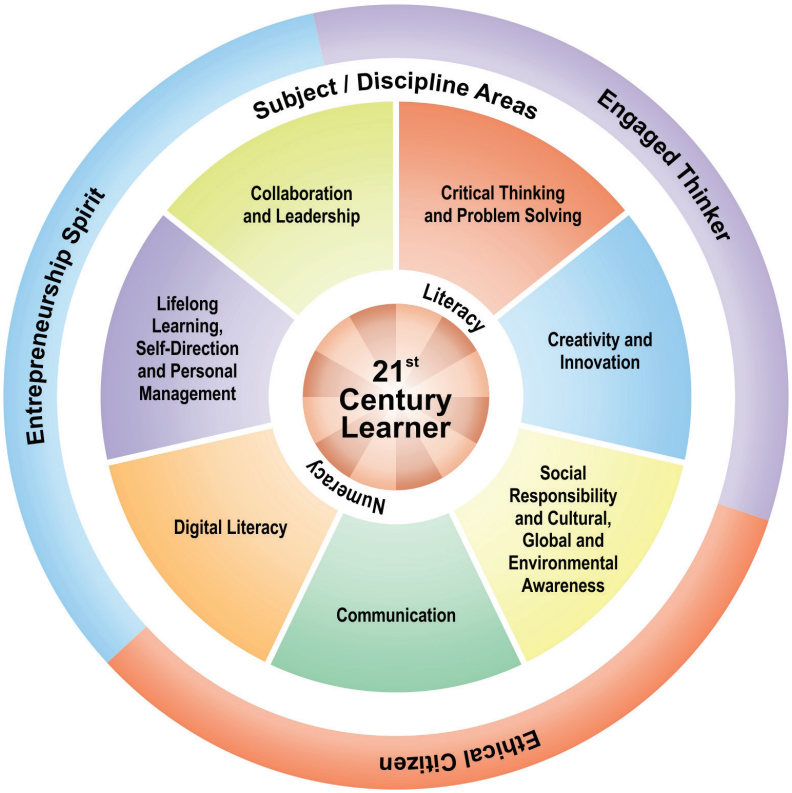
The framework is not yet finalised but has as its pillars:
Summative (Exams and SBA); Formative (SBA); and Systemic evaluations – local, regional and international.



1.2 Broad Goals of the GEC

Broad Goals of the GEC are to:

- Recognise the holistic skill-set for learners over schooling in GET.
- Set appropriate curriculum standards to be achieved at the end of Grade 9.
- Enable learners to access further education streams linked to the 3-stream model.
- Integrate and facilitate the assessment of 21st century skills (critical thinking; creative thinking; collaboration; and communication).
- Award learners a report card/certificate that reflects the skills, talents and competencies that will be inclusive to all learners and assist them in their transition from school to work or further education.



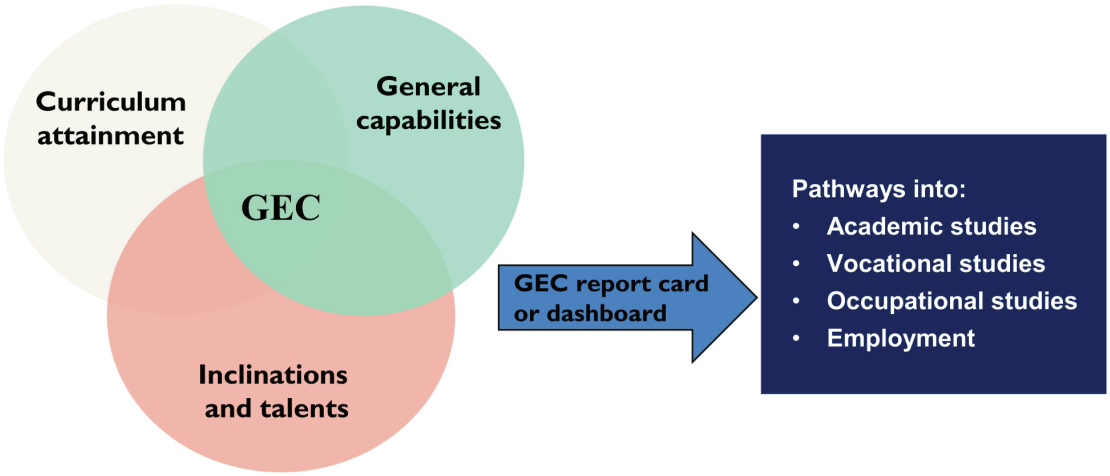
The 21st century learner is different from those of previous generations. We need to adapt our teaching methodology to this learner. Read more about this generation in Section 7.

1.3 A new emphasis: a 360º assessment model

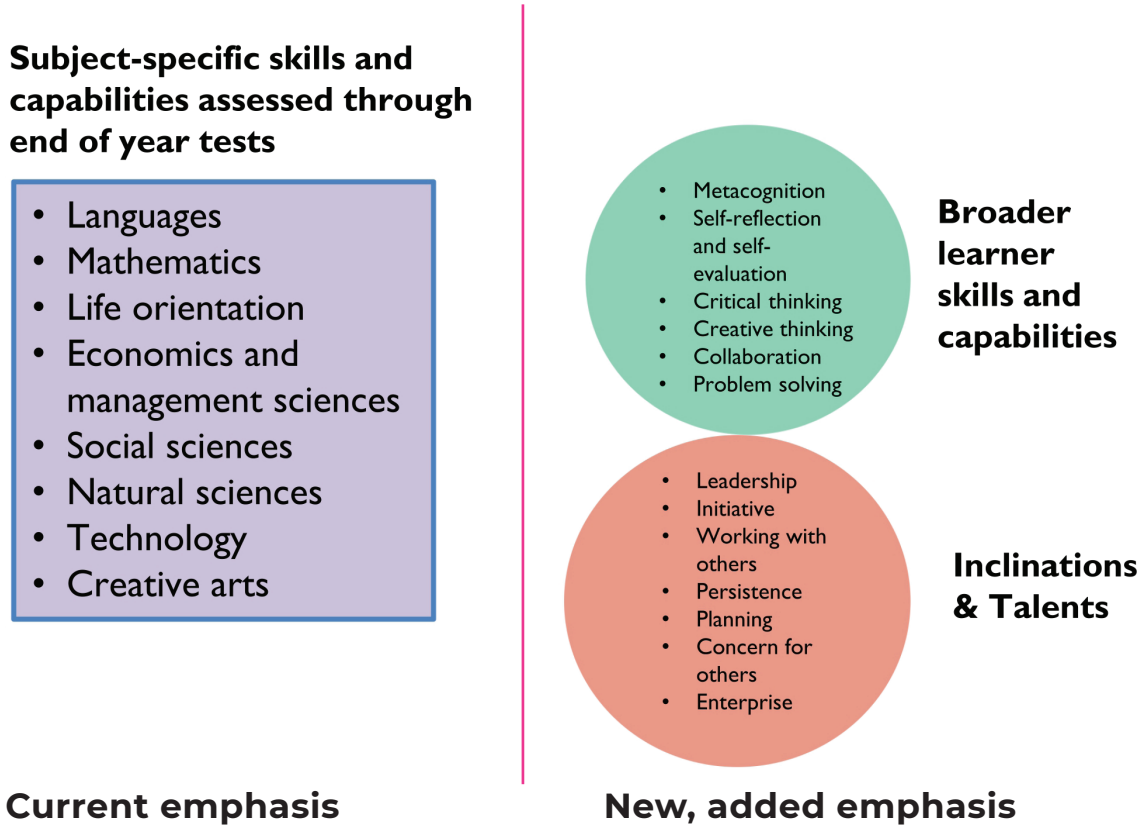
Currently, learners are made aware of their summative performance in the nine subjects only. We want to give them a holistic assessment result of their abilities in terms of three areas. This can assist in guiding them with a pathway after Grade 9.

The diagram on the next page unpacks this holistic learner assessment more fully.

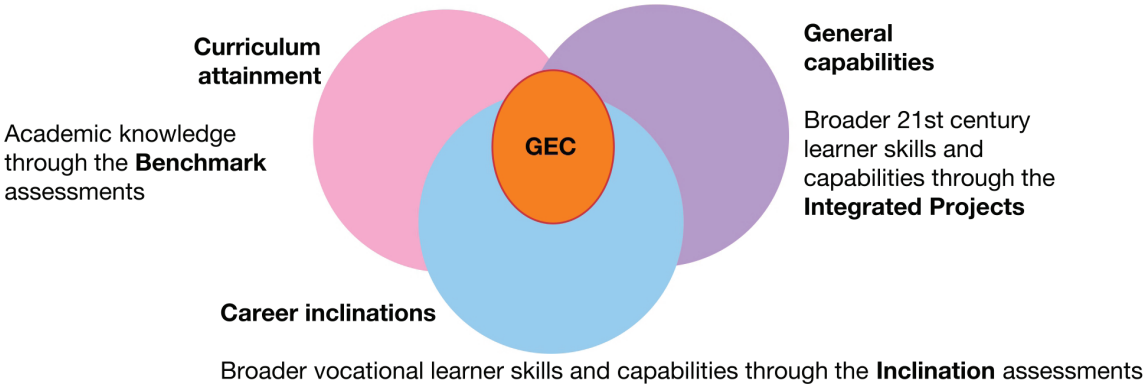
The current empasis is on a mark which is an end of year test. In order to build a more holistic learner profile, the GEC assessment model will include new and additional elements: a talents or inclination component, and a component which will focus on broader learner competencies. At the end of Grade 9, a GEC report card will assist learners in selecting pathways other than just the academic stream.



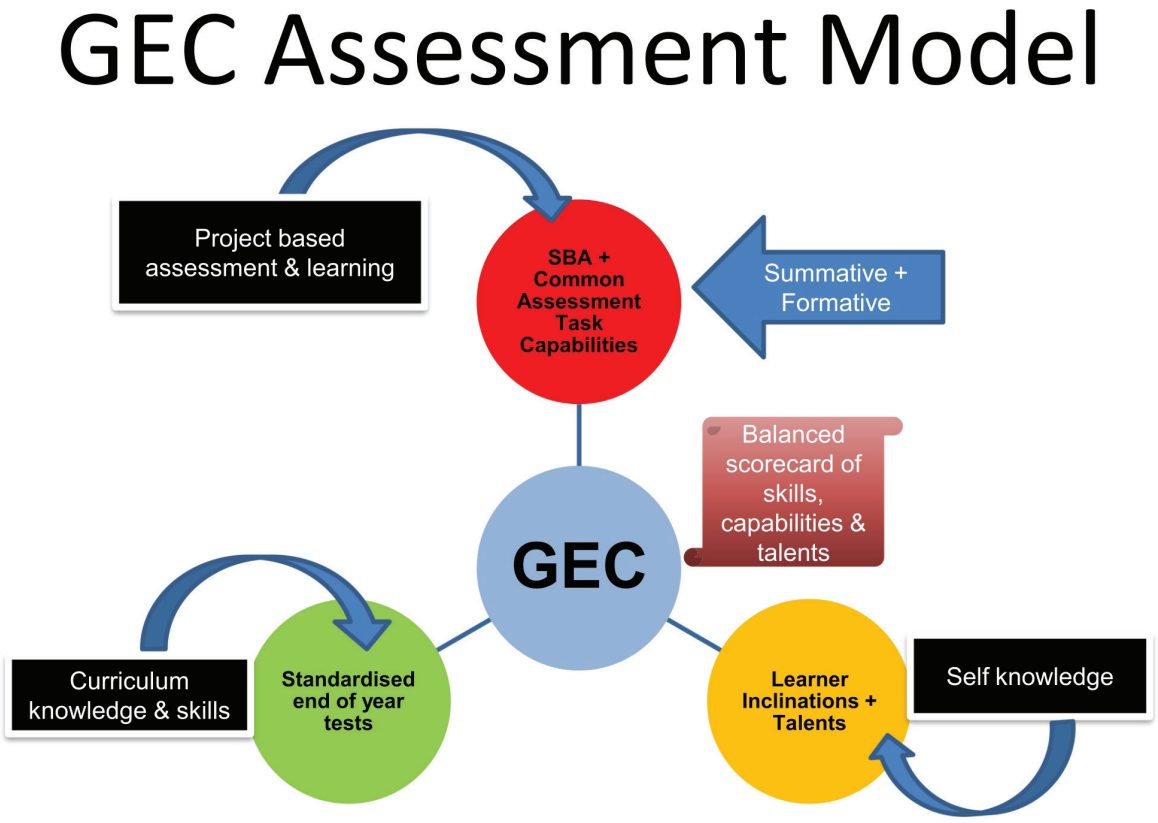
At present, learners are assessed, and receive results, in terms of the nine subjects. We are aiming to also report on different aspects of the learners' capabilities, as part of 360° assessment. The focus has to move to other aspects of learning, like skills and competencies, as well as inclinations and talents.



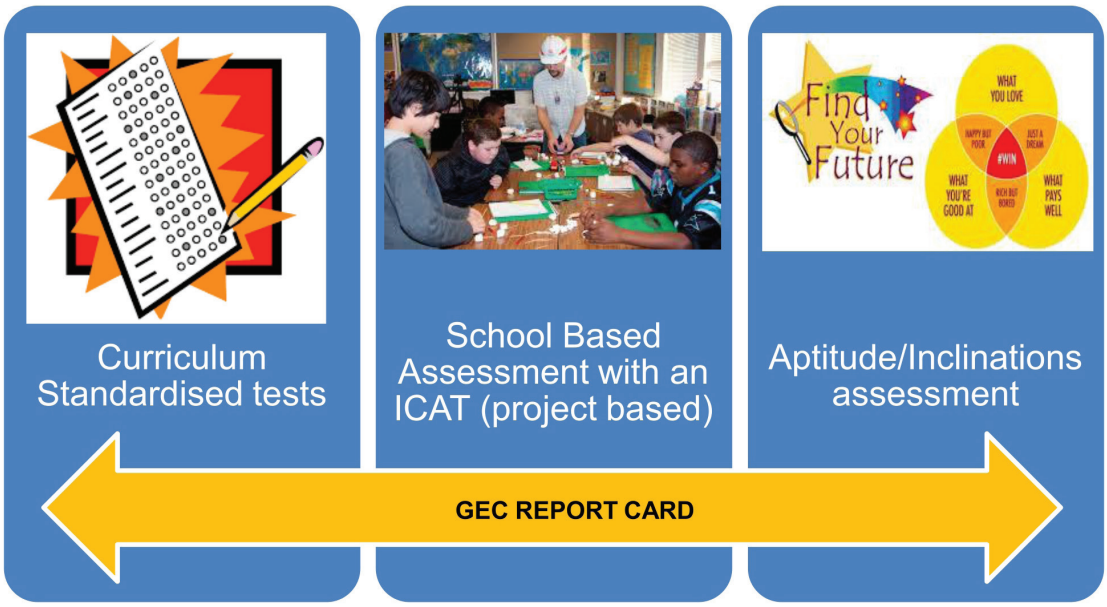
As part of the GEC assessment conceptualisation, an international collaboration with ACER was sought. The model below was used as a blueprint to create the GEC assessment model.



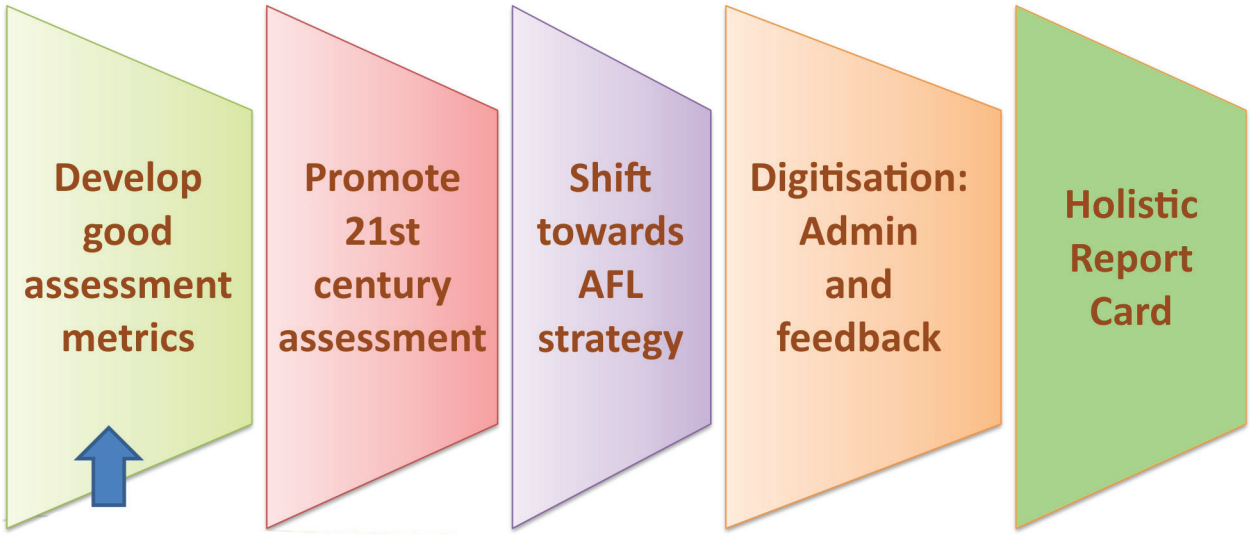
The GEC consists of the three aspects of assessment: SBA (summative, e.g., integrated project and formative), summative (exams, controlled tests in terms of recovery ATPs – standardised assessments at the end of the year) and the Inclinations Assessment, which will ultimately lead lead to a holistic assessment card for each learner.



The aim is for an integrated assessment model with a three-pronged approach that includes Curriculum standardised tests, School-based assessment with an ICAT (project-based), as well as an Aptitude or Inclinations assessment that will all appear across the GEC report card.



1.4 Theory of change for the GEC assessment model



We are in the process of changing the assessment landscape: starting with the development of the assessment metric (model), looking to bring in, develop and assess 21st century skills, adopting an Assessment for Learning (AFL) pedagogy, aiming to bring in digitalisation in the administration of the GEC, and ultimately, being able to provide the holistic report card (certificate).

2: The GEC Implementation and Rollout Plan for 2022

Activity	Time Frame	Responsibility	Notes
Sampling	December to February 2022	DBE	Sampling is done in acssociation with Australian Council For Educational Research (ACER)
Informing and verification sampled schools	April to May 2022	DBE, PED	Sample released to PEDs from verification of, and informning, sampled schools
Advocacy	April to May 2022	DBE, PED	Advocacy done in partnership with E³ together with Entrepreneurship advocacy
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Implementing Inclinations Assessment	Third and Fourth term	Sampled schools supported by PEDs	Inclination Assessment conducted: results captured and communicated to schools by E³
Writing, marking and moderation of Curriculum tests	17 to 29 November	Sampled schools	Tests wrtitten according to Timetable approved by Director General
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Feedback on field trial results	January 2023	DBE	Field trial report drafted

3: GEC Roles and Responsibilities

Provincial Assessment Coordinator - should take overall responsibility for the administration and the GEC assessment model. This would entail communication with sampled schools, managing provincial logistics around printing and delivery of materials to schools, preparing monitoring plans, dealing with promotion and progression matters linked to the GEC and compiling provincial reports.

Provincial Curriculum Coordinator - will be responsible for the coordination and training of the provincial and district GET subject advisors and school leaders on grade 9 Integrated Project Common Assessment Task (IPCAT).

District officials - Districts are also required to nominate two GEC coordinators preferably a deputy chief education specialist or a subject advisor as master trainers from the curriculum unit and an official from the district assessment unit. These officials will also provide continued support to schools during the field trial.

4: The GEC and Underlying Methodologies

4.1 Assessment for Learning (AfL)

When an assessment is completed and the evidence from that assessment is used to improve learning (and teaching), it is known as Assessment for Learning (whether it is a summative exam or test at the end of a chapter, or a formative assessment during the teaching process). If the evidence is not used for improving learning and teaching, it is not AfL.

Grade 8 learners writing a final exam and not given feedback for improvement get promoted to Grade 9, carrying all the gaps identified by the exam with them. However, if the exam is analysed and the learner gains information that will help him/her improve, and the teacher understands how to help these learners improve, then both the learner and the teacher have made the assessment purposeful.

4.2 Deeper Learning

“The Department has identified as part of the curriculum strengthening process, a focus on deeper learning. Deeper learning has been identified in modern education systems as a potential methodology of promoting 21st century skills. In addition to 21st century skills, deeper learning allows for further focus on academic, social, emotional, and Intellectual engagement. Education researchers indicate that a clear focus on learning skills, dispositions, knowledge, and values are essential to a productive and wholesome life. There is a need for dynamic learning environments, collaborative learning partnerships, transforming pedagogical practices and leveraging new digital resources. Building on the knowledge currently in CAPS, we need to identify and define the skills and competencies needed for the 21st century jobs and there is a need to work towards a curriculum competency framework. Initial work from the DBE has included a trimmed curriculum with a focus on core and fundamental topics.”

5: Three Components of Assessment

Assessment of the GEC Integrated Project will take place on three levels (please see 5 in this manual). The basic CAPS assessment, however, is done by all the different subject teachers. Rubrics and worksheets have been carefully planned to include all the marks that are necessary for a final project mark in each subject.

5.1 Inclinations Assessment

Framework / Rationale
As part of the GEC small-scale pilot in 2021, an international collaboration with ACER was sought. The model below was used as a guide to create the GEC assessment model:
The Inclinations Assessment, based on the Holland Code framework, looks to offer broader vocational learner skills and capabilities in the 2022 field-test.

The aim of this is to offer all learners in South Africa access to deep, rich and personalised feedback around their own skills and capabilities and to assist them in the transition from school to work or further education.

Actual Inclinations tool

The Inclinations Assessment in the 2022 field-test will be accessed via the DBE's E^3 WhatsApp bot called TeacherConnect*chat*.

While not data-free, WhatsApp has a very low data use.

The Inclinations Assessment will be accessed on TeacherConnect*chat* using a keyword that learners will be required to send to 060 060 33 33.
Once TeacherConnect*chat* receives the keyword, the questions will be triggered which will need to be answered in order for the result to be shared. The result is immediate on completion of the assessment.

Administration instructions

A data-enabled, mobile handset that has access to WhatsApp should be provided in order to access the GEC Inclinations Assessment in the 2022 field-test.
One handset can be used by multiple parties.

It is recommended that at least 30 minutes per person is allocated to complete the Inclinations Assessment.

Access is by sending a WhatsApp with the provided keyword to the following number: 060 060 33 33. (This is the number for DBE E^3's TeacherConnect*chat*).

Once the keyword has been entered, a series of questions will appear on the mobile handset.

The first set of questions will be registration information about the user.
The subsequent questions will relate to the Inclinations Quiz.

It's simple, easy to use and should take no more than 30 minutes to complete.

All questions are in English.

Just read the question that is in the message and reply with one of the prompts, depending on what a user feels is closest to how they would respond how they would respond to a specific scenario or what is closest to their character or area of interest.

*Please note that if a question is not responded to within 5 minutes, the Inclination Quiz will time out and the user will need to start again from the beginning.

Once all the questions have been answered, a message where the personalised response can be accessed, will be served. The response is in the form of a PDF that can be shared.

Inclination Quiz: Suggested information for school coordinator, teacher and learner.

School Coordinator	Teacher	Learner
• Coordinate activities within the school • Ensure accurate information at all levels, e.g., contact information and reliable data • Liaise with provincial coordinators - challenges and milestones reached • Communicate any activity to the school management, teachers, learners and parents • Arrange date/dates where learners can do the Inclinations Quiz on gadgets (e.g., bring devices to school)	• Teachers will guide learners on an agreed date to complete the assessment	• Participate in the Inclinations Quiz as far as possible • See whether a gadget can be found with a friend or share a gadget with a friend • Receive and consider results of the assessment and communicate results to parents/care giver

5.2 School-based Assessment (The Integrated Project)

Summary and next steps

- **Assessment Framework / Rationale**

  The integrated project forms part of the three-pronged holistic evaluation envisaged for the GEC. This is the SBA for Term 3 in the CAPS and thus not new to teachers who know that all learners in their subject have to complete a project for the Term 3 SBA.

  The differences between a project (as an event or a product) and project-based learning as a process are manifold:
  - There are two projects covering 8 subjects in order to lend the projects depth, to lessen the number of projects learners complete, and to create an activity which more closely represents a real-life experience.
  - The project is completed in class time.
  - The Integrated Project differs from the traditional project in that the project-based learning paradigm is process driven and takes a number of hours of class time for completion. This gives the teacher to observe and document learners' competencies, especially in the 5Cs: collaboration, communication, critical thinking, cooperation and communication.
  - In observing PBL-in-action in group work, the teacher is able to practice Assessment for Learning (AfL) strategies and change course if necessary.

- **Actual Assessment tool/exemplar**

  The Integrated Project Pack comprises three parts: the Teacher's Book, the Learner's Workbook (the actual SBA assessment tasks with CAPS-aligned worksheets and rubrics) and a resource pack containing printouts of information to support learners who do not have access to technology for research, as well as videos with instructions on how to play the game. Once ready, your assessment coordinator will forward the school coordinator a We Transfer folder with all three components for printing for the start of Term 3.

- **Administration instruction**
  - Meet your Assessment Coordinator and E^3 coordinator from Curriculum to iron out any queries.
  - Once you receive the WeTransfer file, print out the Teacher's Book, a Resource pack for every group (6-8 depending on your class size), and a Learner's Workbook for every individual learner. You may wish to print a cover page for this workbook and indicate that it is the SBA.
  - The number of pages will be fewer than the number had 8 individual projects been printed and should thus fall within your school's print budget.
  - Ensure that the Grade 9 teachers meet to understand their individual roles and assessment task from which their own subject's marks will be extrapolated. Read the section on rolling out Interdisciplinary learning for more detailed hints on facilitating the process. (Section 7; 7.4 - The importance of Interdisciplinary Learning)
  - Please note: if the LOLT of your learners is Afrikaans, there will be an MS Word version of the Learner's Workbook in the WeTransfer file for easy translation by your team.
  - Consider starting a PLC which meets weekly to highlight challenges, celebrate successes and share best practice, and also to plan for the coming week.

- **Assessment instruction for the teacher**
  - Study your section of the Integrated project and note any concerns. Ask your School GEC Coordinator to share these concerns, if they cannot be addressed as part of weekly PLCs, with the provincial Assessment Coordinator.
  - Work through the Resource Pack and select what you think will be useful to your learners, particularly those with no access to devices for research.
  - Read through the entire project so that you can reinforce the main outcome of the project by referring to what your colleagues are also doing. Break down subject silos as often as you can.
  - Attend weekly PLCs or planning meetings without fail.
  - Stress the importance of the project in developing competencies every time you see your learners. Explain that their ability to solve problems creatively, cooperate, communicate, collaborate and think critically will be observed during group work and will form part of their SBA mark. Unpack the rubrics attached to this manual so that learners fully understand what each of these 5 Cs entail.

- **Assessment instruction for the learner**
  - This integrated project is a vehicle for preparing you for the real world.
  - Use every opportunity during group work to show that you are developing the 5 Cs, which your teacher will explain.
  - Complete the cover page correctly and hand in your project on time.

Integrated Project-based Assessment: Suggested information for school coordinator, teacher and learner.

School Coordinator	Teacher	Learner
• Coordinate activities within the school • Liaise with provincial coordinators • Communicate any activity to the school management, teachers, learners and parents • Ensure that training dates are communicated and teachers attend training - face to face, virtual, webinars	• Teachers to attend the training • Be responsive to the idea of Intergraded Task • Encourage learners to participate and create a conducive environment • Communicate observations during reflection meetings virtually • Make recommendations based on the field trial	• Participate in the groups • Contribute to the group when tasked with responsibilities • Conduct relevant and proper research where requested to do so

5.3 Curriculum Tests

Assessment Framework Rationale

The curriculum tests are an important part of the 360° assessment model as they cover the CAPS content required for Terms 3 and 4. ***In Mathematics, the core concepts of Terms 1, 2, 3 and 4 are covered in the test after Term 3 and 4: As per the recovery ATPs/***

In 2022, five subjects will be written according to the timetable. These tests are developed by test panels, nominated from the ranks of provinces, and appointed by the DBE. The tests for 2022 are Maths, Natural Sciences, EMS, FAL and the 12 Home Languages (Sign Language being the 12th). Tests are set according to the recovery ATPs and consist of 80% Multiple Choice Questions and 20% structured responses, mostly with variations in some subjects. Introducing learners to MCQ questions is important, and diagnostic tests are available at National Assessments (education.gov.za) for Grade 3, 6 and 9. Examples will be made available.

PROPOSED COMMON ASSESSMENT TIMETABLE FOR THE GEC TRIAL IN FIVE SUBJECTS	
WEEK 1	TEST SESSION: 08:00
Thursday 2022/11/17	English First Additional Language (2hrs) OR Afrikaans Eerste Addisionele Taal (2hrs)
WEEK 2	TEST SESSION: 08:00
Monday 2022/11/21	Home Language (2hrs)
Tuesday 2022/11/22	Mathematics (2hrs)
Wednesday 2022/11/23	EMS (Financial Literacy) P1 (1hr)
Thursday 2022/11/24	Natural Sciences (2hrs)
WEEK 3	TEST SESSION: 08:00
Tuesday 2022/11/29	EMS (Economy & Entrepreneurship) P2 (1hr)

Curriculum test: Suggested information for school coordinator, teacher and learner.

School Coordinator	Teacher	Learner
• Coordinate activities within the school • Liaise with provincial coordinators • Communicate any activity to the school management, teachers learners and parents • Ensure that the classes, number of learners, Home Language(s) provided are accurate • Ensure compliance with the timetable • Ensure teachers attend marking guideline discussions • Ensure moderation is taking place in the school • Final marking guidelines to be provided to GEC coordinators after Marking Guideline discussions • If the school is sampled for moderation, ensure that scripts of sampled class are submitted/ collected to/by PED	• Ensure that learners are prepared for Standardised tests • Use Diagnostic examples and 2021 Examplers on DBE website to introduce learners to answering MCQ questioning • Follow marking guideline discussions and mark according to final marking guidelines • Final marking guidelines to be provided to GEC coordinators after Marking Guideline discussions • Accurate recording of marks on marksheets/ class lists and transfer of marks on SA-SAMS Term 4 • Package and label scripts for external moderation submission to DBE in identified sampled schools. (One randomly sampled class in 45 sub-sampled schools)	• Prepare for the tests • Follow instructions in the tests • Answer on provided answer books

6: Preparing for a Changing World

Alignment between E³ and the GEC

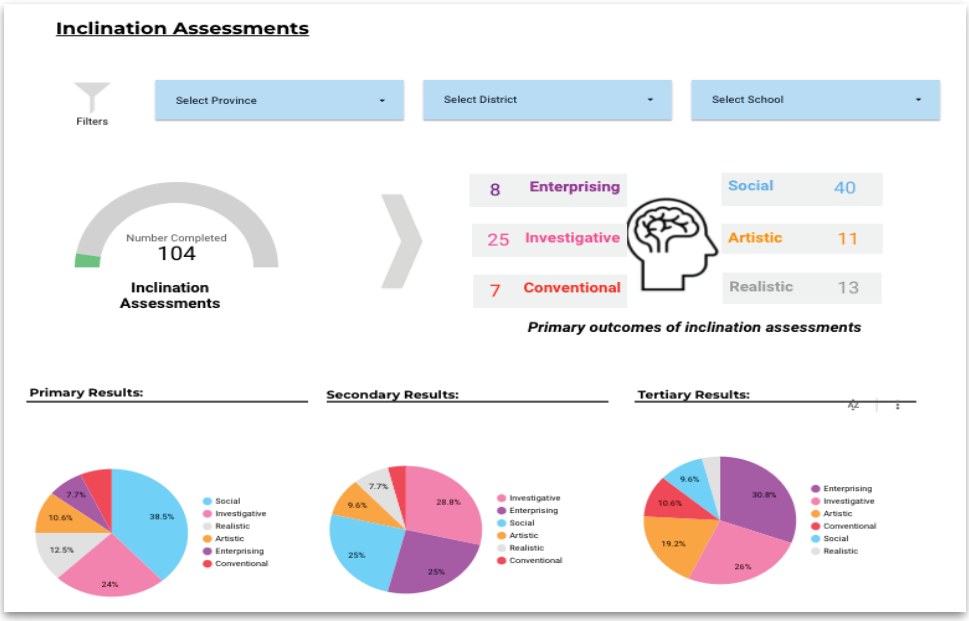
In order to prepare teachers for the task of facilitating understanding of 21st century teaching and learning which is critical for a successful GEC learner experience, DBE-E³ is supporting the GEC pilot. This is a natural "fit" for DBE-E³ as both programmes share the following goals: the move to a competency-based assessment; the holistic development of the learner; the testing of an AFL approach; and a focus on learner-centred activity-based learning. The graphic on the next page also links the GEC and DBE-E³ to the national goal of preparing learners for a changing world and thereby reducing youth unemployment. DBE-E³ uses PBL as the vehicle to develop 21st century competencies.

Refer to the annexures for more information on how E³ envisages using Project-based Learning as a vehicle for unlocking skills and compentencies learners need to succeed in a changing world.

7: Recording and Reporting

7.1 Innovation in Reporting

Innovation in teaching has to be followed by innovation in reporting. Below is a draft version of a possible online school report and an overview of the online system report that may be a possible way of reporting.



7.2 Online Training

An online version of the training course for teachers is being prepared and a small sample of schools from each province will be invited to undertake the training as part of the 2022 GEC Pilot.

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BRIDGING SA's UNEMPLOYMENT GAP THROUGH EDUCATION

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8: Moderation, QA and Remarking

Internal processes:

Moderation of the Standardized Curriculum Tests should happen in line with already existing internal school moderation processes. Typically, a sample of tests will be drawn and moderated by the Head of Department/Senior teacher/subject head. This also forms part of the Quality Assurance processes at school level. Anomalies would be handled in terms of the school's internal processes.

District/ Provincial process:

Similar to the schools' internal processes there would be district/provincial moderation that takes place in line with the standing procedures.

Remarking

A sub-sample of 45 schools will be drawn, where one class in the school will be sampled. The scripts of the learners in the sampled class will be forwarded to DBE via the district for re-marking during December 2022. The sampled schools as well as the sampled classes will be communicated in due course.

9: Implementation Phases

Implementation phases :

Activity	Time Frame	Responsibility	Notes
Sampling	December to February 2022	DBE	Sampling is done in acssociation with Australian Council For Educational Research (ACER)
Informing and verification sampled schools	April to May 2022	DBE, PED	Sample released to PEDs from verification of, and informning, sampled schools
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Annexures

Annexure 1: Assessments

Traditional assessment and alternative assessment

Traditional assessments

For much of the 20th century, standardised assessment tests had a dominant role in assessing learners' achievements because of their reliability and the ease with which they could be administrated.

Unfortunately, such tests may not always match their intended use, as they are less efficient at capturing how well students understand content, use their skills, operate in group or collaborative settings, or display their abilities within teaching and learning contexts.

The use of traditional assessment modes may also over-encourage the use of pedagogical approaches that teachers use to "teach to the exam" and so "push up the marks" using drills, practice and memorisation rather than more progressive approaches that focus on the learner as a whole, not just their memory and knowledge.

Alternative assessments

Interest in alternative assessments increased significantly during the 1990s in response to dissatisfaction with standardised assessments and as a systemic strategy to improve student learning. Non-standardised assessment methods that aimed to capture a broader array of student knowledge, understanding, and skills/abilities started being used.

Such tasks and activities might require students to respond to or complete open-ended issues/questions, essays, practical laboratory tests, experiments, projects and portfolios. Alternative assessment typically shares common characteristics.

These characteristics include:

1. Learners being required to do an activity, create, perform or deliver a product;
2. Learners having the opportunity to engage in a broader array of cognitive processes, such as higher-order thinking and problem solving;
3. Participating in meaningful and formative instructional activities;
4. Learners engaging in real-world tasks, scenarios or applications;
5. Learners being assessed by their teachers/human judgment, not automatic scoring;
6. Learners analysing the learning process and thinking about how they, as individuals, learn best (metacognition) so that they can manage their own learning;
7. Learners grappling with open-ended questions with multiple answers;
8. Teachers being involved as coaches and in other mediating roles to assist students with producing their best performance.

The following table sums up the richness of different types of assessment, where each may be used productively, and who the assessors could be to enrich the process:

Type?	Why?	When?	Who?
Baseline *Usually informal* *Just for information*	How much do they know before I start assuming things?	Right at the beginning	Teacher
Formative *Usually informal* *Just for information*	Checking little bits of learning and competency development	After every mini-chunk	Teacher/self/ peers/outsider/ groups
Summative *Usually formal* *Usually for marks*	To see whether they can manage a big chunk	At the end	Teacher
Systemic *Usually formal* *Reporting to the system*	To check if the process is working	After the process	Monitoring and evaluation

Annexure 2: Background to the Integrated Projects (Term 3 SBA).

The Grade 9 GEC Pilot classes will be offered 2 integrated projects.

Project 1: One project to replace five others

The Grade 9 Integrated Project is ONE project that learners undertake to earn marks for the third term projects in the following subjects:

Life Orientation (Anchor Subject)	70 marks
Economic Management Sciences	50 marks
Social Sciences (History)	50 marks
English FAL	50 marks
Home Language	50 marks
Creative Arts (choice of two)	25 marks each, total 50 marks

(please note that Creative Arts may possibly be replaced by a technical subject to accommodate technical schools)

Project 2: One project to replace three others

The Grade 9 Integrated Project 2 (Technology, Natural Sciences and Mathematics) revises learners' knowledge on electrical circuits while they learn more about resistance in circuits and use this new knowledge to research, design and build a simple battery-operated audio amplifier for their cellphones. Output is explained using graphs and calculated values.

Technology (Anchor subject)	70 marks
Natural Sciences	50 marks
Mathematics	30 marks

The projects are completed mostly in class during the hours allocated for all the above subjects in term three. These projects are assessment tasks covering the SBA (Project) for the above subjects. Teachers work together to plan ahead and support each other in scaffolding the learning that takes place during the project.

The projects have been written according to the Annual Teaching Plan (ATP) and all other circulars. Please note that if, and where these projects deviate from the ATP, writers had to make concessions to create flow and good sense in two projects that integrate so many subjects.

Project-based Learning is the perfect vehicle

The Integrated Projects move through 13 steps in three phases, applying Inquiry-based, Problem-based and Design-based methodologies, and use Project-based Learning (PBL) as a means for learners not only to research and discover content, but also to gain competencies that will serve them well in a changing world. There is much emphasis on the 4 Cs: Creativity, Collaboration, Critical thinking and Communication. The development of these skills is carefully interwoven into the projects.

The projects are easy to follow. They follow the 13 specific steps that are all inclusive to the Project-based Learning methodology. This creates a valid template for teachers to use should they endeavour to create their own PBL projects in other subjects.

Teachers use the Teacher's Book as a daily guide, where every step has been noted with easy-to-follow instructions. There is always room for improvement or improvisation - at which South African teachers excel.

Learners follow along in the Learner's Workbook, which is the SBA assessment task. Each of the worksheets is either a way to extrapolate marks for a specific subject (or two) or a means of assessing the learner's growing competencies. As always, some districts will have challenges with resources, like internet access or electricity.

There is another source, the Teacher's Resource Pack, where every video that learners watch is also transcribed and internet articles are printed so that these learners are not left behind. Although much has been done to facilitate and circumnavigate resource issues, teachers will still have to use their initiative and experience to liven up the learning experience for their learners.

Annexure 3: A changing world

The Fourth Industrial Revolution (4IR), Artificial Intelligence (AI), catastrophic weather conditions resulting from climate change, and epidemics and pandemics such as Covid-19, have resulted in our world changing at a quicker pace than ever before. There is much uncertainty in our lives, but what is certain is that our children will enter a post-school world that will be very different from ours. In order to cope in this changing world and find their meaningful place in a shifting economy, they will need a different set of skills and competencies.

So what does the future look like in this changing world of ours? What we know is that we are entering, if not already in the Fifth Industrial Revolution. We also know that computers are a huge part of our lives, and that the world as we know it now in terms of jobs and opportunities - especially for young people - will be changed dramatically by these computers.

We know that computers are already being seen as the source of all knowledge (real and fake). We assume that we can use a computer to find all that we need to know at the touch of a button. We know that computers will bring digital, physical and other systems together that will change our lives and our jobs forever. Computers will be able to do a lot, but there are things, unique to humans, that computers won't be able to do. Computers won't be able to be totally creative - they are not creative beings. They won't be able to form relationships with people, and they can't perform unstructured tasks. These are the skills that will not be taken over by computers and which will open up huge opportunities for humans and keep us 'on top of the food chain.'

If we are very conscious of the things that we need and can do that, give us the edge over computers, we can stay truly creative. If we can design in a creative manner, we can stay ahead of computers and enhance our creative intelligence. So, if we are to interact with this new changing world as humans, we need to enhance our creative and communicative intelligence. We need to think of ways of being more and more creative. We need to be able to strengthen our communication skills and our relationship intelligence, because this is an area where computers can't compete. We need to have the skills and agility that don't necessarily follow structure, because we know that computers can only operate in a structured environment. So it is important that we as teachers start to think about what this means for us personally and professionally. What does it mean to be creative, to strengthen communication skills and to have the skills and agility that do not follow structure?

Preparing learners for success in a changing world

(Key Messages)

The science tells us that infants are born with potential because:
Infants are born intrinsically motivated to learn - with the potential to survive and thrive in a changing world

AND

Infants learn best through discovery - growing their entrepreneurial way-of-being (solution-seekers)

SO

Every child can develop an entrepreneurial way of being because the intrinsic motivation to learn is key to discovery, which grows the entrepreneurial mindset that is critical for success in a changing world.

The science also tells us that great teaching environments grow learners' potential entrepreneurial way-of-being through:

Safe environments for discovery learning - curiosity will nurture the entrepreneurial way-of-being

AND through

The 7 S.P.E.C.I.A.L. principles of learning, which support the process of discovery-learning and unlock learners' entrepreneurial way-of-being

USING A

Project-based teaching-for-learning approach - because it mirrors the natural process of discovery - the entrepreneurial way-of-being that prepares learners to thrive in a changing world.

If you would like to find out more, please read the E³ Teacher's Guide How Project-Based Learning (PBL) can help teachers to prepare learners for a changing world. You can access it here: https://drive.google.com/file/d/1Lb4R39fTqqSTle1B0Bdmuy7hSrPYsdSi/view?usp=sharing

Teachers

21st century learners are very different. They have a different way of approaching the world: they are tech savvy, they are impatient, they want to do things. They don't just want to sit and copy from an outdated textbook. They want to be involved and engaged and they want their classroom to be fun. As teachers, we have the amazing opportunity to meet the different needs of our 21st century learners, but for this to happen, we need to be ready to embrace a more authentic way of teaching that is results driven, action-based and relevant.

Teachers need to be able to reflect on whether they are ready for what it means to prepare learners for our changing world. It is comfortable to stay in one's old way of being, and it is easy to use one's old teaching notes, but let's ask ourselves what we need to do to be ready to adapt to this new classroom.

As teachers, we are in an incredibly powerful position to impact the lives of learners in a positive way. It is teachers who learners sit in front of, day after day for 13 years, so it is teachers who are the most important frontline people to become agents of change in the lives of their learners. As frontline staff, teachers need to assess their changing role in the 21st century classroom and commit to teaching differently and more effectively. This assessment and commitment may require a shift in mindset and reflection on questions such as:

> *Am I resilient enough to deal with the new demands of the 21st century classroom? Can I embrace the 21st century skills and competencies I need to help unlock the potential of every learner and help them thrive and become active members of the modern economy?*

We all want to see our learners have the opportunity to become either gainfully employed as entrepreneurs, be employable and find jobs, or pursue an educational journey after school – and as teachers, we are perfectly placed to make this happen.

What used to work

Successful teachers in the not-too-distant past were those who were 100% prepared. They took time to study the lessons from the textbook and even made themselves notes so that they would be able to answer all questions. They were strict but fair, and allowed no noise in class. Everyone worked quietly and studiously.

They were truly organised and masters at their trade. They also suited learners from that generation and were equipped with the skills needed for that time.
Why is this style of teaching no longer successful today? Reflecting on the above, there are glaring problems which lead to very important questions:

- Can a teacher today ever be 100% prepared? Why? Why not?
- Is the textbook the best driver of a lesson? Why? Why not?
- Can teachers prepare well enough to answer all learner questions? Should they be there to answer their questions? What is their role?
- Is the word 'teacher' still relevant?
- Is a teacher who allows no noise in the classroom fair?
- Is a silent classroom an educationally sound learning space?
- What are the characteristics of teachers who are masters of their trade in the 21st century?

The Buck Institute of Education has listed a number of standards to describe the successful Project-based Learning facilitator:

PBL facilitator	Traditional teacher
Designs and plans A learner problem arises and a lesson is created around it. She knows her curriculum and this will help her to link the problem to relevant CAPS information/knowledge transfer.	Selects a textbook and writes a lesson plan for that lesson. Sometimes uses scripted lesson plans.
Aligns to standards Knows the CAPS and links lessons to outcomes and expectations from the CAPS.	The textbooks are already CAPS-aligned, so teacher does not need to take out her CAPS document at all.
Builds the culture Understands that school culture plays a huge role in modelling appropriate and meaningful relationships.	Classroom culture is not her concern. Who learners are and what they think is not her concern – as long as they do their work and keep quiet. She demands respect. Being kind leads to undisciplined learners.

Manages activities The project is designed around practical real-life solutions. There is very little transmission teaching. Learners are given a task with clear instructions and the teacher observes learners and helps them when needed. She is a class and activity manager.	There are no classroom activities. She presents the lesson and asks learners to summarise that lesson or even do a creative summary on a poster as a project.
Scaffolds student learning She understands that all learners are different and learn in a variety of ways. She sees her role as that of supporter, as each individual learner is helped to climb to the next level because of her one-on-one coaching.	She never allows group work and seldom has a private one-on-one with any of her learners. Once she has taught her lesson, she gives learners work, usually the questions at the end of the chapter, and she goes back to her marking. She has so many exercises to mark.
Assesses student learning In her classroom, there are 3 types of assessment and each is treated differently and has a different purpose: Baseline – Where should we start? Where are the gaps? Formative – How are we doing, every little step of the way? Summative – How did we do when tested on a chunk of work?	The marks that she allocates are used to decide whether a learner is successful or not. Paper and pen tests, she believes, are a solid gauge of learner progress, and knowledge and information are assessed because statistics give the best results.
Creates enabling environment Intentionally creates an enabling classroom environment.	Her classroom atmosphere was not as important as the facts and information she transmitted.
Engages and coaches Her role is to pay attention to the needs of every learner and to offer them support, not via formal teaching, but by one-on-one coaching, especially as they work in groups.	No activities or homework are done in class. Classroom time is for her lesson, so she has no opportunity to coach learners or observe their progress.

Teachers need to reassess their roles. The time for good lecturing has passed. The time has come to put learner needs and their problems at the centre of the lesson and to do everything in our power to make school useful for life after school, to help learners know and believe in themselves, to give them space to become problem solvers themselves, and, of course, to have fun! Learners go to school not to WORK, but to LEARN!

Learners

We have discussed the entrepreneurial, search and discovery, and solution-seeking mindset that is critical for success in our changing world. Although not all learners will become entrepreneurs, we should think of them all as ''entrepreneurials'' - a generation of young people with an opportunity-seeking mindset that drives their abilities, actions and purpose in helping others.

In order for an education system (starting at school) to develop these learners, every element of the E³ approach must be unlocked. This includes the entrepreneurial mindset (self-efficacy, a growth mindset, resilience, an internal locus of control and intrinsic motivation) and 21st century skills (foundational literacies, competencies and character qualities, rooted in life-long learning).

Gen Z

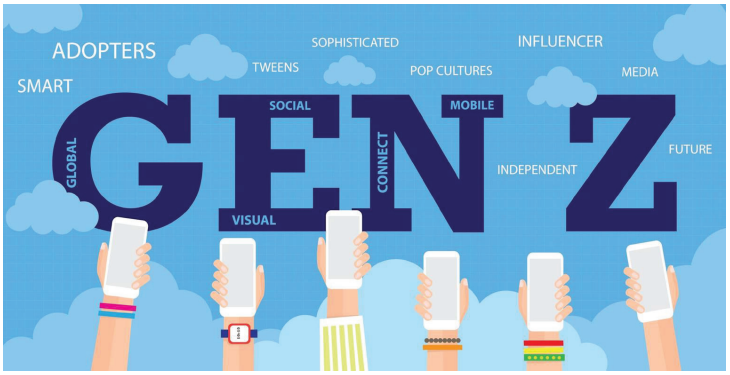
The learners in our Grade 9 classrooms are mainly Generation Z (people born from the mid-1990s to the early 2000s). Their mindsets are very different from our own. In a sense, both young teachers (Generation Y) and their learners (Generation Z) are already "entrepreneurials". Even though they will not necessarily start their own businesses, they share a common mindset.
The diagram below sums up mindsets that unlock competencies for a changing world as E³ has summed them up.

Understanding the needs of this generation will help us understand their learning preferences. Our learners are Generation Z, and we need to find a language that communicates the best with them if we are serious about facilitating a career pathway for each of our learners - a pathway that is unique to their competencies and attitudes.

What are the characteristics of GenZs?

The learners of today have certain characteristics that make them unique, and there are certai things that excite them. Clearly, knowing what engages them is a huge advantage to caring teachers.

- Born mid 1990 to early 2000s
- Already "entrepreneurials"
- Social Learning Environments
- More Career Focused
- Refuse to be passive learners
- Thrive in immersive lessons
- Learn best by doing



Technology

GenZs are known as neo-digital natives. They cannot imagine a world without technology – and are not awestruck or intimidated by it.

GenZs don't use technology for the sake of using it. For them, it is simply a way to get what they want, be it information, entertainment or connection. Technology immigrants (BBTs – Born Before Technology) found friends on the playground; GenZs find them on social media sites. BBTs used libraries; GenZs use google. BBTs went shopping; GenZs shop online.

There are many, many differences between the generations that all highlight the fact that there is a poor fit between GenZs and traditional teaching. It is not possible or fair to reshape GenZs to fit an outdated educational system. What we need is to shift education so that it 'fits' and meets the needs of these young people.

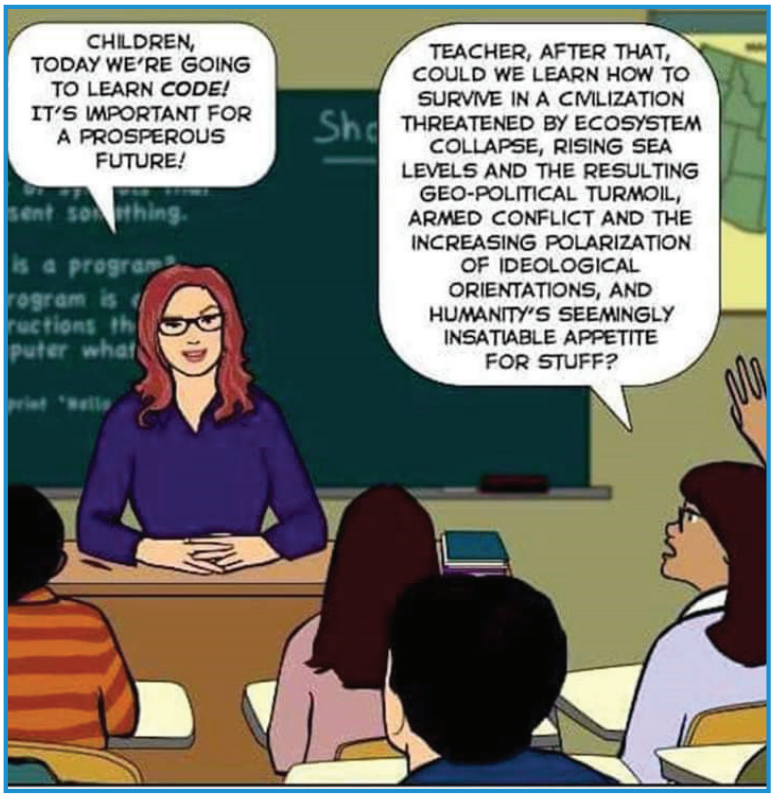
Multi-tasking

GenZs know no other way. On the day that they were born, they were probably filmed, and pictures and announcements were sent around the world at the press of a button. This is how they were welcomed into the world. Whether multi-tasking is productive or not, which is another topic altogether, we need to accept that this is how they operate: watching TV with headphones, jamming their favourite songs, texting a friend, and telling you how their day went - all at the same time. Life happens quickly.

What they do should matter

Their parents tell them that they can become whatever they choose to – and they choose to do things that matter.

GenZs are often criticised for having a close-to-zero attention span, but if they are passionate about something, they can focus on it for hours. If they understand the value of what they are doing, chances are they will see it through. They want authentic, they want real, and they want it now. It is no use telling them that they will reap the rewards of what they are doing now sometime in the future. They need to know upfront, otherwise they simply won't commit.



Opinion is important

GenZs' opinions are important. The modern learner wants and needs to be heard, and their opinions matter. This goes two ways. Firstly, they want to be heard - hence the constant blogging, vlogging, uploading, updating and saying. They believe that their opinion matters and will be heard. They are master negotiators who want immediate feedback. Not many things are quite as devastating as being ignored or brushed off. They need to be heard and acknowledged. Furthermore, they are especially sensitive to the opinions of their peers.

Please note
Cultural environment does play a role. With many young South Africans growing up with their grandmothers or non-literate parents, the above may not be true in many, particularly rural, families.

Work and play – in the same day

Work and play is inseparable for the modern learner. Learners learn through play, and it is critical that we structure our teaching around this fact.

Please note
In South Africa, GenZs are a little more serious, as they are often the first generation to go on to tertiary education, and the sacrifices of their parents and the extended family can be heavy burdens to carry.

Generation "Why not?"

This is the 'why not?' generation. Modern learners think critically and always question. They want to negotiate and are willing to compromise.

DID YOU KNOW?

Baby boomers are people born between 1946 and 1964. Comically referred to as "helicopter" parents, they can be overprotective and take an excessive interest in the life of their children

Up-tempo – quick, quick, quick!

GenZs are racing cars, so to speak. They are used to instant online everything. They want things to happen quickly, they multi-task, and their lives happen quickly, thus their learning needs to be up-tempo as well.

Structure and instruction

This may seem like a contradiction, coming from a generation which seems to break all the previous generation's rules, but they were often raised by helicopter parents, and thus are used to, and even enjoy, some structure.

A world in pictures

These "screenagers", as GenZs are sometimes called, are naturally more comfortable in image-rich environments. They love pictures, whether posting selfies on the 'gram or learning through pictures, the visual aspect of learning is imperative for this generation.

Just do it!

GenZ is the 'just do it' generation. The modern learner is hands-on – they want to participate and not just observe. They prefer to try stuff by themselves – to explore the world and their environment on their own. They are actively involved in whatever happens on the screen in front of them. This is why play-/activity-based learning engages them.

Social connection and team players

Last, but by no means least, is social connection. Generation Z needs to collaborate. They do not alienate themselves with technology, but it is actually how they connect. They are also much more inclusive than generations before them, as well as more comfortable and more accepting of diversity. This is the generation for whom gay culture and xenophobia are almost not an issue. They are very tolerant of "different-ness".

The importance of Interdisciplinary Learning

The Integrated Project Assessment Task is key to the success of the GEC. Thus, it is important to understand why subject integration and inter-disciplinary learning are key.

The Science Education Resource Centre at Carleton College defines the approach as follows:

> *...an approach that integrates different aspects of more than one academic discipline to examine a theme, issue, question, or topic.*

Another definition explains the approach a little differently:

> *... a method, or set of methods, used to teach across subjects or "the bringing together of separate disciplines around common themes, issues, or problems."*

Why is Interdisciplinary Learning so powerful?

The vehicle for reaching this big dream of reducing youth unemployment is Project-based Learning, because this approach ...

> *...allows the learner to engage in real-life activities*
>
> *...focuses on seeking solutions for problems that learners really care about*
>
> *...develops the competencies learners need to prepare them for a rapidly changing world, e.g., for the purposes of the 2021 pilot: creative thinking, critical thinking, communication and collaboration.*

Globally, integrated learning, learning-across-the-curriculum, or interdisciplinary learning, is regarded as very powerful in preparing learners in complex thinking processes which, in a natural way, unlock various competencies. If learners are gripped by an activity that is well-designed, competencies will be acquired and strengthened without being "taught" in a direct way. Real-world problems are complex and their solutions often need to pull from different modes of thought to find solutions for large-scale problems every day.

The benefits of Interdisciplinary Learning (IL)

Research papers list a number of learning gains that are not easily developed in a single subject approach. Interdisciplinary Learning (IL) has a number of benefits:

1. IL helps students learn how to solve problems and answer questions by recognising biases, thinking critically, and embracing ambiguity;
2. IL develops transferable and generic skills of critical thinking, synthesis and research which are critical for higher learning and equipping learners to negotiate the real world;
3. IL gives students a "more complete and coherent" understanding of the material they're studying;
4. IL motivates learners, as they have an interest in pursuing topics that are interesting to them;
5. IL gives the learners a purpose for learning, as they recognise that what they are learning is connected to real life – they are practising at school what they need to be good at when they leave school;

6. IL makes the learning meaningful, purposeful and deeper, resulting in learning experiences that stay with the learner for a lifetime;
7. IL allows learners to cover topics in more depth because they are considering the many and varied perspectives from which a topic can be explored;
8. IL unlocks critical thinking skills and develops, as learners cross subject boundaries, the ability to consider other viewpoints and also begin to compare and contrast concepts across subject areas;
9. IL consolidates learning by synthesising ideas from many perspectives and considers an alternative way of acquiring knowledge;
10. IL explores topics across a range of subject boundaries and motivates students to pursue new knowledge in different subject areas; and
11. IL stimulates creativity as learners acquire and apply knowledge and skills from different subjects.

In short:
Interdisciplinary Teaching **Helps Advance Critical Thinking and Cognitive Development**. Interdisciplinary teaching and learning helps learners develop their cognitive abilities - brain-based skills and mental processes that are needed to carry out real-life tasks.

Teaching and Interdisciplinary Learning

Successful interdisciplinary learning

Educators who successfully introduce interdisciplinary forms of instruction into the classes they lead must overcome a number of hurdles. To ensure that your integrated project goes well, consider the following:

- **Learn as much as possible about the content and subject skills** of each subject in the integrated project. Even though you will not be teaching the subject of a colleague, you will have to make links whilst teaching your own subjects and answer learner questions. As a team, your goal is to break down the walls between your subjects.

- **Convince students** that what they are doing and the possible confusion they may be experiencing is worth it – this is how one solves problems in the real world, and they have the advantage of trying to think this way in the safe environment of your classroom. The additional costs of thinking in an interdisciplinary fashion are also worth it.

- **Avoid polarity,** which happens when teachers doing an integrated project consider their subject more important than that of their colleagues. Do not become territorial; all subjects are equally important in an integrated project. Do not feel threatened by another discipline's viewpoint or another teacher's opinions. Believe in yourself and the process and be prepared to defend it.

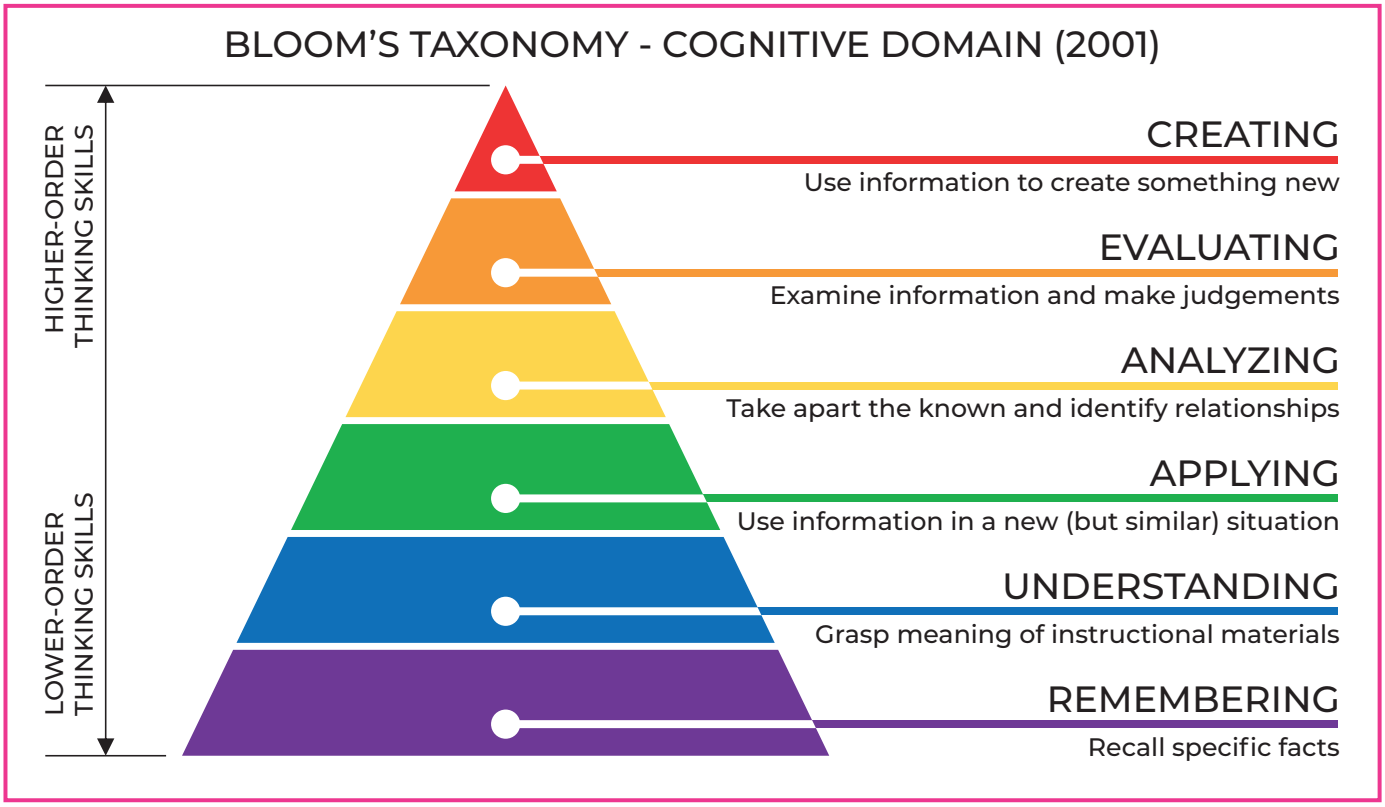
- **Be prepared for a feeling of ambiguity or confusion.** You and your learners are used to single subject learning and teaching. Integration subjects may be messy, but take it step by step. You may feel a loss of control and, if you are a perfectionist, you could lose focus. Just remember that you are preparing your learners for a world that is confusing and ambiguous- a VUCA world:
  VUCA stands for volatility, uncertainty, complexity, and ambiguity. It describes the situation of constant, unpredictable change that is now the norm in certain industries and soon in education. VUCA demands that you avoid traditional, outdated approaches to day-to-day working and schooling.

- **Promote the synthesis of ideas** from a variety of disciplines leading to an integrated form of analysis. Acquiring the ability to synthesise, a higher-order cognitive skill in Bloom's (1956) taxonomy and a key objective of interdisciplinary teaching, is difficult for learners. In the original Bloom's Taxonomy, the ability to synthesise information is the second highest level of cognitive development.

- **Be flexible** – you may have to change your plan midway – this is normal!

In the revision of Bloom's Taxonomy (latest version below), although the word "synthesis" is not actually used, it is certainly a process used in pulling together information at a high cognitive level and making sense of it:

"Synthesis" is the ability to combine parts of a whole in new and different ways. It requires students to think flexibly, determine alternatives, and find new ways to accomplish a given task.



Key steps to implementing Interdisciplinary learning

1. **Planning for integrated learning and teaching** – work with all the teachers implementing the project to decide on a plan of action. You could create a PLC that meets once a week to discuss progress, but it would be useful to draw up an agreement on how you can support each other, for example:
   - **Step 1:** Have a meeting and unpack your content for the team so that everyone knows what everyone else is doing in their classes and how it will be assessed. This will help you reassure learners as they work through the process.
   - **Step 2:** As a team, study the integrated project together and make any changes you think are needed for your context.
   - **Step 3:** Study the Grade 9 timetable and decide whether it is possible to combine periods and team teach. Just ensure that you keep to the 2 hours allocated to your subject (more for the language component).
   - **Step 4:** Agree to refer to each other's part of the project as you can (e.g., "You have just come from Social Sciences where you... How do you think what you learnt links to... In other words, help learners see the connections between subjects and explain that problems are solved more efficiently if viewed from different subject angles. The solution will also be more deeply embedded.
   - **Step 5:** Have weekly meetings to plan for the next week. Share problems and celebrate successes, especially in the progress of your learners. Often "top" learners find the process messy and become anxious, and struggling learners perform better than expected because there are no expectations of success!
   - **Support each other in this ground breaking work:** Educators considering adopting an interdisciplinary approach to teaching face both time costs associated with preparation, and psychological costs generated by stresses brought about by the uncertainty common to this form of instruction. You will need each other!

2. **Explain the methodology to learners** – Launch the Grade 9 integrated project in a meeting of all Grade 9 learners and teachers and give them an overview of what each subject you'll be covering. Explain why you are doing it and how each subject answers a part of the big question.
   - Impress upon them the importance of sharing what they have learnt from other subjects to form a framework of analysis that will lead to a rich understanding of complex questions.
   - Make clear that you will be modelling how to approach an issue in an interdisciplinary manner, and that ultimately, they will be asked to master this skill. There is no rush for quick success – they must get used to struggling and the feeling of not always knowing what to do next – thus they need to build confidence in asking questions.
   - Allay student fears by explaining that they will be given a project that will explain the process step-by-step and that they will be working in groups (mostly). They are detectives trying to solve a complex problem and should be honest in sharing ideas with their team (group). Groups can bring their work back to the larger group for tweaking/refinement.

3. **Take it to the classroom** – The project has been written by a team of teachers and approved by the Curriculum section of the DBE. Lead the way, but consider the following:
   - Introduce the class by asking learners what they have done in the other subjects and then link the information to your own lesson.
   - Do not intervene too quickly, let the students grapple with how to integrate

and offer a range of ideas and approaches to reach this end.

- Consider adopting small group activities to allow students to engage in cooperative learning to become more proficient in integrating insights from other subjects.
- In small class settings, ask students open-ended questions that require them to synthesise and integrate information. Also ask them where subjects are similar and where subjects are different.
- Encourage students to be creative and take risks as they wrestle with the challenges of being more inclusive thinkers.

Annexure 4: PBL as a vehicle for change

What is Project-based Learning?

Project-based Learning (PBL) is a progressive approach that promotes individual and small-group learner involvement in solving real-life problems by developing rigorous research strategies. It's learning by doing and focuses on developing specific curriculum knowledge and skills while inspiring learners to question actively, think critically, and draw connections between their studies and the real world. Put differently, Project-based Learning is a collaborative – which refers to teamwork, learner-centred learning activity in which learners integrate knowing and doing. They apply what they know to solve REAL life problems and produce results that matter.

Why choose Project-based Learning?

In the first phase of learning about how learners acquire competencies, E^3 decided that activity-based learning was critical and that Project-based Learning should be the vehicle for organising these activities. Project-based Learning is useful for various reasons.

- ***Project-based Learning equips learners with 21st century skills.***

Solving highly complex problems requires that learners have essential skills - reading, writing and maths - and 21st century skills - teamwork, problem solving, research gathering, time management, analysis, and the ability to use high-tech tools.

- ***Learning becomes more relevant and meaningful in PBL.***

Bringing the real world into the classroom provides a very powerful learning experience. A teacher committed to the principles and passionate about the PBL approach will encourage learners to be critical and independent thinkers, and since the projects will mirror the real world, learners will see value and be more committed.

- ***Assessment is more meaningful in PBL, as it is authentic.***

The assessment in PBL is more diverse and includes almost all forms of assessment - from the traditional test to the observation of research practices. Authentic assessment also involves assessing learners' development while they work in pairs, groups or individually. This is less stressful for the learner and allows for repetition and another chance if the learner was not on point on a specific day.

- ***Project-based Learning accommodates diversity in the classroom.***

Globally, classrooms are becoming more diverse and teachers are faced with the challenge of trying to ensure that learners are all treated equitably. Group work ensures that teachers can customise tasks for individual learners and settle individual queries as they arise.

- ***Project-based Learning accommodates learners struggling with English (and any other LOLT)***

Above learners are provided with more options for speaking if the leader is empathetic and well-briefed.

A limited ability to communicate, in English particularly, is a key obstacle to many learners' academic success, especially from grade 4 onwards. If teachers group

learners purposefully, they can ensure that each group has a strong and empathetic lead speaker from whom they can model conversation. Of course, the assumption here is that English is the LOLT (the language of learning and teaching – if another language is the LOLT, a language-strong leader will perform the same leadership task). Thus, learners not comfortable in speaking English (or their LOLT) can do so in the low-risk group environment with peers who can help them.

- ***PBL supports group work and collaborative learning as a 21st century skill.***

Much learning is social, and learners acquire many new skills from their peers in well-structured group work, especially if teachers organise groups intentionally for the outcome they wish to achieve.

- ***Research supports Project-based Learning.***

A growing body of international research supports the use of PBL. Schools where PBL is practised show a drop in absenteeism, an increase in co-operative learning skills and improvement in learner achievement. The marks actually improve. When technology is used to promote critical thinking and communication, these benefits are further strengthened.

- ***Projects are the formal assessment task in term 3 of the CAPS.***

The projects are written to meet the CAPS requirements. Teachers can thus reach the curriculum outcome simply by changing their teaching method. The same information but packaged differently. Project-based Learning is not about the 'what' but the 'how'.

What is the difference between a project and Project-based Learning?

Traditionally, projects were a once-off poster or a flip file consolidating knowledge or content at the end of a chapter or a section of the syllabus. Thus, a project was a product. While Project-based Learning could also feature projects in the traditional sense, in PBL, the focus is more on the process of learning and learner/peer/content interaction than the end product itself. Thus, Project-based Learning is not the dessert at the end of a chunk of information but rather a series of structured events that lead to authentic and impactful learning. The following diagram from the Buck Institute summarises the differences well.

Projects versus Project-based Learning

PROJECT

- Content covered
- Content tested
- Project for marks of course content
- Learner works at home and at school on project
- Project handed in

Outcome: **Learners learn core content (which they forget later) a project is about an end product**

PROJECT-BASED LEARNING

- Meaningful project – info they need to know.
- Inquiry for knowledge needed
- Learners practice skills for a changing world by finding solutions - iteration
- Autonomous Learners guided by a teacher
- Learners presentation to real audience

Outcome: Teams engage in **life long problem solving skills, decision-making and critical thinking, organize their time, plan, organize, analyze information, communicate, experience**

How does PBL work in the classroom?

According to the Buck Institute, learners engage in a project over an extended period of time - from a week up to a term or more - that engages them in solving a real-world problem or answering a complex question. In the GEC, the project will run over 2 months. They demonstrate their knowledge and skills by developing a public product or a presentation for a real audience at the end of the project. Importantly, this approach creates many opportunities for teachers to embed 21st century skills for learners to pick up in a real-life way. The educational focus in Project-based Learning is on both the learner and the curriculum. It is an approach through which learners develop drive, empathy, self-efficacy and 21st century skills like creativity, communication, critical thinking and collaboration. This type of learning is activated by experience, not learnt from a textbook. Because it is real, it has purpose for the learner and subsequently for the teacher.

A uniquely South African PBL Model

As mentioned above, E^3 has begun work on creating a uniquely South African model of Project-based Learning. Being iterative is really important to E^3, and so we will be testing and developing this model over time to ensure that it is the best model for South Africa and makes the biggest impact on learner achievement.

Our model merges 3 important parts:

- Inquiry-based Learning
- Problem-based Learning
- Design-based Learning

Inquiry-based Learning

In the inquiry phase, learners focus on investigating an open question or problem by practising their problem-solving skills. In the process, learners generate and answer their own more focused questions, and as a result, develop their conceptual and procedural knowledge of a given topic. Teachers encourage learners to ask questions, scaffolding them through the investigation process and moving them beyond general curiosity into the realms of critical thinking and understanding.

Problem-based Learning

Learners work in teams to formulate real-world problems and propose possible solutions. Following a learner-centred approach, teachers scaffold the development of learners' ability to work collaboratively, be self-directed, and to think critically - promoting critical thinking skills, communication skills, and cooperation.

Design-based Learning

In the design phase, learners come up with solutions to complex problems by designing, building and testing prototypes that solve some of the problems they identified in the problem phase. The process requires learners to establish goals and constraints, generate ideas, and create prototypes through storyboarding or other practices.

See the image below for more information about what a South African Project-based Learning project might look like.

Supporting deep learning within Project-based Learning

Because our pilot process is iterative, every year of M&E and every classroom observation undertaken by the E^3 team, delivers information which will help us deepen the projects and to strengthen, process and develop teacher skills.

What follows are four strategies to deepen learning in the implementation of Project-based Learning (PBL):

- the importance of recognising diversity and being able to scaffold to address inclusivity;
- an appreciation of the value of collaborative learning;
- an understanding of the LOLT and the recognition that every teacher is a language teacher if learning is to be embedded deeply;
- the recognition that general classroom management enhances deep learning.

Annexure 5: Managing your PBL classes and assessing competencies

In this section, we look at two key tools for ensuring deeper learning.
1. Recognising diversity in the classroom.
2. The importance of recognizing that whatever we teach, we will always be a language teacher first.

Diversity and scaffolding

Diversity

In South Africa, the curriculum and education system as a whole still face huge challenges in responding, in an adequate way, to the diverse needs of the learner population. Overcoming these challenges will contribute to the reduction of the massive numbers of drop-outs, push-outs and failures (White Paper 6, p8).

White Paper 6 (DBE, 2001) is the policy framework that directs the building of a single, inclusive system of education and training, built on the principles of human rights and social justice for all learners. The policy framework states that the education and training system should promote education for all and foster the development of inclusive and supportive centres of learning that would enable all learners to participate actively in the education process so that they can develop and extend their potential and participate as equal members of society.

The South African Constitution (Act 208 of 1996) ensures the fundamental right to basic education for all South Africans. Section 29 states that "everyone has the right to a basic education". This requires the development of a system that accommodates and respects diversity, including departmental, institutional, instructional and curriculum transformation. In order to develop such a system, it is important that all teachers develop knowledge and skills to enable them to enact inclusive practice in the classroom.

Part of our responsibility as teachers is to make sure we think of ways to enhance our inclusive practice to ensure all learners in our classes are learning.

Scaffolding

A core component of supporting learning by all is to provide effective scaffolding when required by learners. The term "scaffolding" is a metaphor taken from the building industry – where a scaffold is a temporary structure that is taken away when the building can stand alone (English, ESL and more 2006).

Scaffolding must begin from what is near to the learner's experience and build to what is further from their experience, i.e., moving from the known to the unknown. Vygotskian theory shows that learning starts from the concrete and moves through the representational to the abstract (Woolfolk, 1998). Scaffolding starts with a learner getting a lot of support while they tackle a task, to teachers slowly removing support as the learner masters the task and can cope independently.

Annexure 6: The Challenge of Language

Every teacher is a language teacher

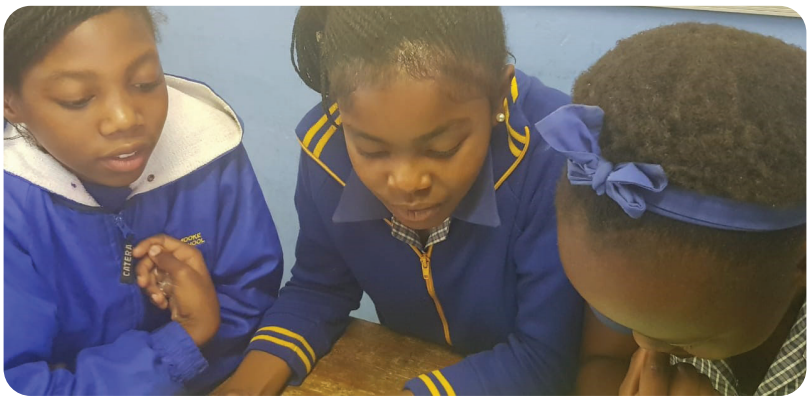
In the South African context, you are likely to find many learners in your classroom being taught in a language that is not their home language. This means that it is every teacher's responsibility to support the language development of learners regardless of whether you are a language teacher or not. Teachers of every subject need to understand that the learners' ability to access subject content is enabled or limited by their language proficiency.

Teachers play a critical role in supporting language development. Beyond teaching children to read and write in school, we need to help children to learn and to use the academic language related to the various school subjects. We need to help them become more aware of how language functions in various modes of communication across the curriculum. As teachers, we need to understand how language works well enough to select materials that will help expand our learners' language competencies and to plan instructional activities that give learners opportunities to use the new language they have learnt.

Teachers need to understand how to design the classroom language environment so as to optimise language and literacy learning and to avoid linguistic obstacles to content area learning (Wong, Fillmore & Snow, 2000, p. 7).

Teachers need to have a basic understanding of the order of language acquisition and how to support each stage. Research has identified stages of language acquisition. Every teacher should be aware of what these are and know some simple strategies for supporting learners in each of these stages.

The table on the next page unpacks signs of each stage. This will help teachers better understand and assist struggling learners.



Language Acquisition Stage	Description of Stage	General Support Strategies
Pre-production	Silent period. Absorbing, not speaking	Emphasise listening. Use visuals. Speak slowly, shorter words, gestures.
Early Production	Learner uses short words and sentences but is still doing more listening than speaking.	Develop new vocabulary. Use visuals. Pair work.
Speech Emergent	Speech is more frequent, words and sentences are longer. Context clues. Vocabulary begins to increase.	More academic vocabulary. Use visuals and make connections with learners' background knowledge as much as possible.
Beginning Fluency	Speech is fairly fluent in social situations with minimal errors. Academic language is challenging.	Work in pairs and groups to discuss content and process the new language. Ask critical questions. Model academic language. Visual support and vocabulary.
Intermediate Fluency	Commenting in the social language is fluent. Beginning to offer opinion or analyse a problem.	Identify and model key academic vocabulary and phrases. More academic skills, brainstorming, prioritising, category summarising, compare and contrast.
Advanced Fluency	Fluent communication in all contexts. Comfortable when exposed to new academic information.	Continue with visual support, building on background knowledge, pre-teaching vocabulary and making connections between content areas. Offer challenging activities to expand vocabulary.

A learner with poor language ability in the LOLT may be misunderstood as "slow" or uninterested. It is critical that teachers recognise that learners who are not engaged or participating in class may be experiencing a language barrier or maybe they just need more time. A basic understanding of language acquisition would help teachers understand that if, for example, a new language learner is ''silent'', this is not because s/he is ''slow'', but because s/he is absorbing and listening deeply. (i.e., s/he is in the Pre-production Period of Silence, and this is normal and actually an extremely important stage.)

Annexure 7: Managing a S.P.E.C.I.A.L classroom

A key element in creating a life-long learning experience for learners - where they are intrinsically motivated to learn, discover and solve problems - are the seven S.P.E.C.I.A.L. principles of learning.

Discovery learning
Research tells us that infants learn through discovery, trying and trying again, and pursuing a goal (like learning to walk). and all while they are having fun! Remember, we also said they had an inborn intrinsic motivation to learn as well.

Research has also summarised the key principles that are essential to learning: **S**ocial interaction, **P**urpose, **E**njoyment, **C**uriosity, **I**teration, **A**ctive engagement, and **L**earner autonomy.

If we are going to prepare learners for a changing world, we need to make sure that the principles that will prepare them to learn are in place. Some teachers are already using many of these S.P.E.C.I.A.L. Principles.

Believing it's possible (your heart)

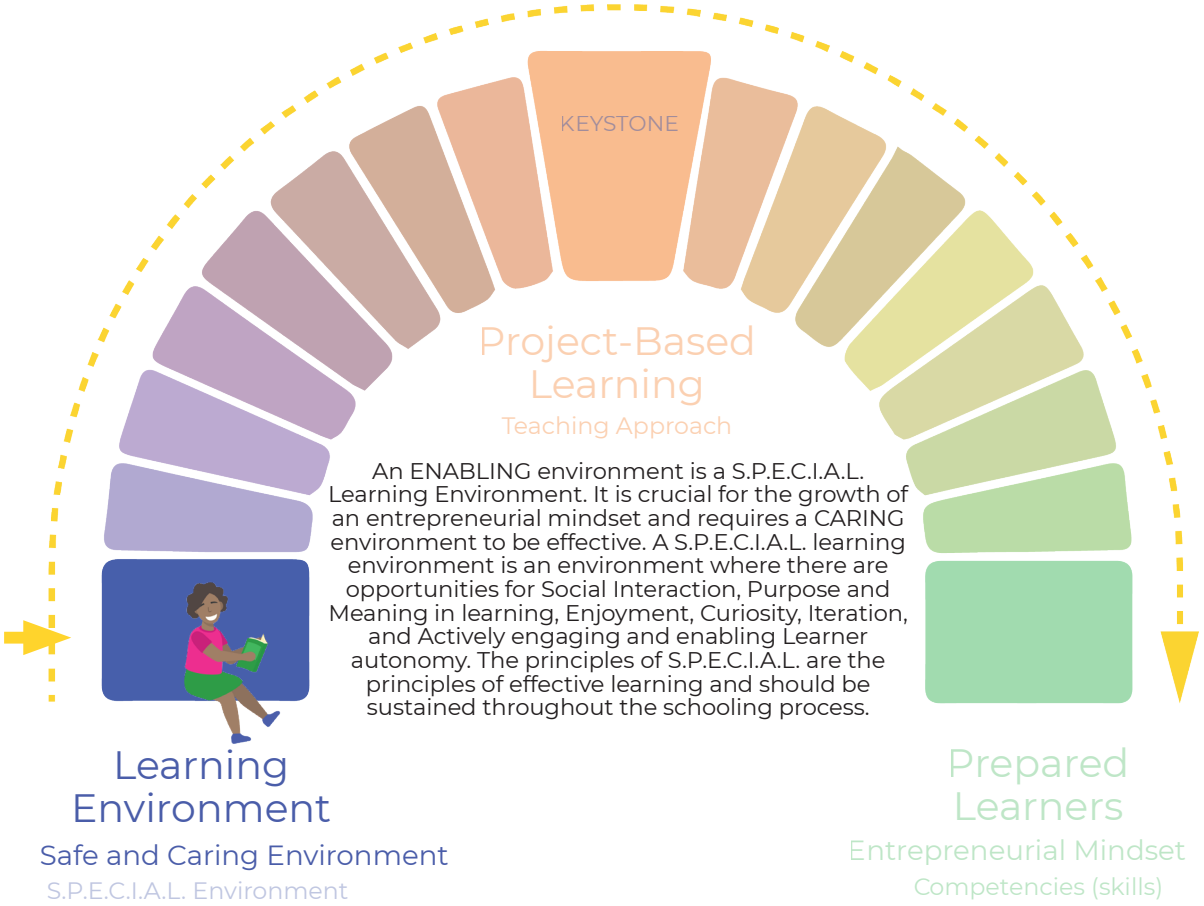
The first step is to believe that PBL will prepare learners. This belief will drive your motivation and give you the energy to create your S.P.E.C.I.A.L. classroom. Just like the intrinsic motivation to learn - you will need to be intrinsically motivated to teach in this way. You will need to be purpose-driven in your belief in this approach to have confidence because of your mastery of your profession and feel free and independent to do what you know works - i.e., to have the autonomy to make your own choices.

Understanding how it works (your head)

The second step is for you to know how to create a S.P.E.C.I.A.L. classroom and what your role is in this environment. This guide will give you more detail on how to do this.

Creating the environment (your hands)

The third step is to just do it! Have the confidence to start. First, make sure you have created a caring environment where learners feel free to "fail". Then, ensure that each element of S.P.E.C.I.A.L. is present as you teach. Look out for opportunities to nurture skills such as collaboration, communication, critical thinking and creative innovation in all learning activities because these are the skills that will prepare learners for their future.



THE FOLLOWING SECTION EXPLAINS EACH OF THE LETTERS IN THE ACRONYM S.P.E.C.I.A.L. IN MORE DETAIL

Social Interaction

Interacting - or working together with others to achieve a goal is one of the most important ways that humans learn. Humans learn best by watching, copying, asking, listening, discussing, helping and sharing with others. We don't need to teach Social Interaction to people, it is a natural human characteristic. From birth throughout life, humans reach out and interact with each other. For example, babies can't learn to walk and talk on their own. They must interact with parents, caregivers and other children who help and support them as they learn these skills.

Purpose?

'Purpose' is the reason why we do things or why something exists. Purpose is like a battery that powers our behaviour. We are likely to focus on information or activities that we find purposeful, meaningful, and useful.

Purpose energises our self-motivation to keep going through challenges such as studying further, saving for a child's education, or training for a marathon. A sense of purpose gives us the energy to keep striving for our goals in life.

Enjoyment

What is joy?
The principle of joy, or enjoyment in the context of a S.P.E.C.I.A.L. learning environment, does not mean fun and games. It means the deeper sense of joy we feel when we work hard and finally master a challenge.

Curiosity?

"Be careful! Don't touch that! Don't put that in your mouth!" - the warnings familiar to anyone who has ever cared for a toddler. Known as the driver of learning, curiosity powers young children to explore and understand their world.

It is Curiosity that energises children to discover, explore and ultimately understand their world and learn through touching, tasting, smelling, listening and looking.

Curiosity is sparked by a need to explain the unexpected and discover more about the unknown. All the world's greatest innovations and discoveries were powered by Curiosity, by somebody asking Why...? Or I wonder what...? Or What if...? Or How...? The role of Curiosity in education.

A lot of research into Curiosity has found that it is the mechanism that leads to the best learning. Studies also show that young children can ask hundreds of questions every day, all driven by their curiosity and need to understand their world.

Sadly, though, when many children enter formal schooling, they ask fewer and fewer questions, and their Curiosity seems to disappear. This means that many learners lose one of the most powerful mechanisms for deep learning.

Iteration?

Iteration (repeating) is part of the natural learning cycle. Trying, failing, learning from mistakes and trying again is the way people learn. Learning to walk is iterative, as toddlers go through the natural cycle of standing, walking, falling and standing up to try again - each time improving and getting a little better until they have mastered the skill and can walk and run around with confidence.

Active Engagement

To be active or to act is to do something and be involved. When people are actively engaged with an activity, they are fully focussed and absorbed in what they are doing. You know those times when a child is so deeply involved in what they are doing that they don't even hear you call? That's an example of Active Engagement.

Learner Autonomy

The main purpose of the DBE-E^3 programme is to prepare learners for a changing world. A big part of being prepared is being responsible for yourself - to have the skills that make you independent and that help you organise yourself and make wise decisions. Young children fight for independence. They want to feed themselves, choose their clothes and make their own decisions about who to play with. This is the spirit of independence that learners need as part of their preparation for a changing world, and this is the purpose of Learner Autonomy: learners start to take charge of their own lives.

A safe and caring environment

A caring classroom environment is a climate where learners feel free to learn by asking questions, taking risks and making mistakes. They are confident to learn from their teacher, their peers and the environment around them.

Without a caring and enabling environment, learners will struggle to grow their entrepreneurial mindsets because Project-based Learning will not work, and learners will not exit school prepared for the challenges of the world.

Feeling safe

In a caring environment, learners feel "psychologically" safe. This means that their mind and emotions feel safe and supported. They know they won't be teased, and they feel free to make mistakes. They are confident that there is no such thing as a "stupid question or ask".

Benefits

A caring environment has great benefits for learning, such as:

- It encourages curiosity, exploration and discovery - all critical elements for nurturing the entrepreneurial mindset.
- It boosts the learners' self-esteem and self-worth.
- It builds positive relationships and develops language skills.
- It creates the environment where the critical skills of the entrepreneurial (namely collaboration, communication, critical thinking, and creative innovation) can happen successfully.
- It leads to happiness in teachers and learners.
- It reduces absenteeism while also improving discipline - learners tend to like, trust, and respect their teachers because they feel safe and supported by them.

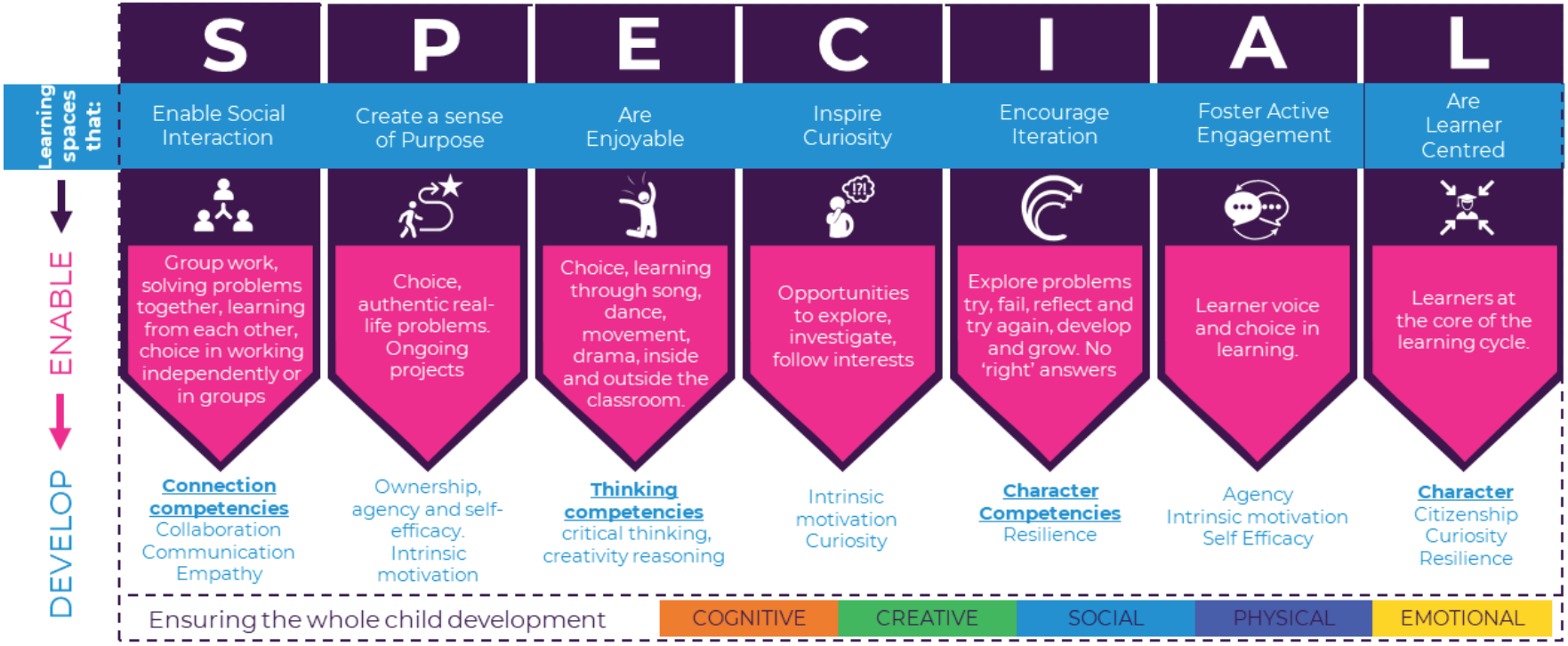
There are myths that creating a caring environment cannot work unless teachers become psychologists; that learners must be happy all the time; that learners will behave badly and there will be no discipline; and that it is expensive. None of these myths is true.

Without the caring environment described above, none of the other essential elements needed to prepare learners for a changing world will succeed. It is therefore imperative that this first step, of creating a safe learning environment, is in place before preparing to teach through Project-based Learning.

What does play look like in South Africa?

The 7 Essential Characteristics of Playful Project-based Learning

Building on the work of Harvard's Project Zero, Pedagogy of Play in South Africa and the work of The Lego Foundation, we have developed a framework for guiding teachers to become more conscious about what play looks like in classroom. This remains to be tested and we anticipate that it will need continued iteration as it is carried out across diverse classrooms throughout South Africa. This is a place for us to start.



Annexure 8: Group Work

8.1 Supporting deeper learning in PBL: Classroom management and group work

8.1.1 Classroom management strategies

Project-based Learning can demand different and often unpractised skills from more traditional teachers. Teachers need to try to create conditions in the classroom for PBL to thrive. This requires classroom management strategies and positive behaviour management techniques that allow for a learner-centred classroom.

Classroom management strategies need to support collaboration and a productive group work environment. This requires careful planning and defined roles for each member of the group. Opportunities should be created for individual tasks, group work and reflection. How do we manage our classrooms during PBL? Here are some considerations to assist you in managing your classroom:

a) Keep learners busy
If learners are engaged, they are less likely to misbehave. Use Project-based Learning activities that have printable guides and sheets to help learners organise their work, and have easy access to "Just-in-time" information either from textbooks, the internet or printed out information sheets which you can later collate and use to form a generic toolkit. Textbooks take on a different role in PBL: they are useful for research and no longer drive the lesson.
Take the time to plan each day of your PBL with a fresh activity that will have learners asking many questions, because this is the beginning of critical thinking. Each day should have a specific task or topic, but different learners might be working towards it in a different fashion - probably very different from your own strategy. Allow them the freedom to explore different ways of solving a problem.

b) Teacher involvement is critical
In the past, some teachers have used projects as a chance to let the learners "get on with it on their own" and would be unavailable to learners. This is not Project-based Learning! In PBL teachers take on the role of facilitator. Take the time during PBL, to walk around and talk to your individual learners. Because everyone is very busy, this is an excellent opportunity for one-on-one conversations with the learners in your class, especially those who shy away from attention.

Don't wait for the "usual suspects" to raise their hand and ask for help. Engage each learner in discussion and ask them questions about the topic. Groups are a safe space for shy learners to find their voice. This allows you to build relationships with your learners and let them know that you're nearby and paying attention to what they're doing.

c) Engage struggling learners by selecting suitable tasks which will empower them.
Target the learners that you know struggle in class. Diversify the activities so that every learner is working on something s/he is good at!

Plan out the questions you'll ask these learners and be prepared to listen to what they have to say. Don't be afraid of silences. Learners sometimes take time to formulate their answers. Give them space and do not give in to the need to fill the

silence with your own words. Let them take responsibility for filling that space.

d) Have a variety of topics for learners to explore

During Project-based Learning, we want learners to ask questions and dive deeper into the topic. If possible, have computers, books and other media available so that no learner has ever really completed the task. Expect more from learners. They should be working against time. This will force the group leader or timekeeper to manage time, encourage creativity and result in high productivity. If learners are really "into" a topic, they won't stop engaging. They will look for more information on their own. This is a part of learning that needs to be instilled in learners because they aren't always allowed the freedom to explore a topic.

e) Universal classroom management strategies

- Model ideal behaviour.
- Let learners help establish guidelines.
- Document rules and consequences.
- Avoid punishing the class.
- Encourage initiative.
- Offer praise – catch the positive.
- Use non-verbal communication.

These are links to online resources about classroom management.

https://performingineducation.com/classroom-management-and-project-based-learning
20 Classroom Management Strategies | Prodigywww.prodigygame.com › blog › classroom-management-strategies/

8.1.2 Group work and assessment of group work

Collaboration is meaningful for different types of learning.
Incorporating collaborative Project-based Learning during class time is an excellent way to help learners develop and practise problem-solving skills as well as teamwork and collaboration.

Collaborative learning refers to learning in and through groups by interaction and dialogue. Mirroring one's own beliefs and ideas is a process that creates inter-subjective and meaningful knowledge. Collaborative learning enables you to negotiate and create new meaning. It is part of our active engagement in the world and is shaped by our dynamic relations with the world.

Learning in Project-based Learning is fundamentally a social process that involves participation in group learning. This collaborative work in the group can be the most rewarding and productive part of learning, as people work together and help each other to understand what was uncovered in research and how it can be applied to the problem presented. This applies to teachers and learners. Collaboration allows you to develop the security and authority needed for taking responsibility for your own learning and is an essential skill you need in your career as you will be invariably working as a team member.

Step 1: Purpose

- Think carefully about how learners will be physically arranged in groups. Think about how the layout of your classroom will impact the class activity. Will learners be able to hear one another clearly? How can you moderate the activity

to control volume?
- Insist on socially appropriate conduct between and among learners to respect people's differences and create an inclusive environment.
- Share your rationale for using group work. Learners must understand the benefits of collaborative learning.

Step 2: Introducing the group activity
- Decide on group size. The size you choose will depend on the number of learners, the size of the classroom, the variety of voices needed within a group, and the task assigned.
- Decide how you will divide learners into groups. Randomly assign learners to groups by counting off and grouping them according to a number. Another idea is to hand out coloured cards and group learners according to the colours they choose.
- Allow enough time for group work. Recognise that you won't be able to cover as much material as you could if you lectured for the whole class period. Cut back on the content you want to present in order to give groups time to work.
- Have learners form groups before you give them instructions.
- Explain the task clearly. This means both telling learners exactly what they must do and describing what the final product of their group work will look like.
- Set ground rules for group interaction. Especially for extended periods of group work, establish how group members should interact with one another, including principles such as respect, active listening, and methods for decision making.
- Encourage the learners to ask questions. Even if you believe your instructions are crystal clear, learners may have legitimate questions about the activity. Give them time to ask questions before they get to work.

Step 3: Monitoring the group task

- Monitor the groups but do not hang around. As learners do their work, circulate among the groups and answer any questions raised. Facilitate more than teach.
- Avoid interfering with group functioning. Allow time for learners to solve their own problems before you get involved.
- Be slow to share what you know. If necessary, clarify your instructions, but let learners struggle — within reason — to accomplish the task.

Step 4: Ending the group task

Provide closure to the group activities. Learners tend to want to see how their work in small groups was useful to them and/or contributed to the development of the topic.

Oral reports: Have each group give one idea and rotate through the groups until no new ideas arise.

Written reports: Have each group record their ideas and either present them yourself or have a group member do so. One variation on this is to have groups record their conclusions on a section of the blackboard or on flipchart paper that is then posted on the wall.

To conclude session 6, successful PBL depends, in part, on confident classroom management – especially the ability to structure and manage groups. Group work is not simply a rearrangement of desks, it is much deeper. Group work should be about collaboration and participation of all learners as they focus on accomplishing

a task. As learners actively work together, they engage with information and concepts far more deeply than if they were merely sitting and listening to you talk. Group work is also one of the best strategies to stimulate 21st century competencies such as connection and thinking.

Group work and all that goes with it can be a huge shift, especially if straight lines and quiet classes are the norm in a school. Learning to structure and manage groups and plan effective group work tasks is a process, it will take time and there will probably be some bad days as you and the learners adjust to all the newness. But please continue to try, because eventually you will see such huge and positive results in your learners that you will never go back.

Annexure 9: Risk taking game rubric

COMPETENCIES ASSESSMENT				
	Excellent 5	Good 4	Adequate 3	Needs work 1-2
Collaboration	Excels at group work, easily adapts to different leaders.	Works well in a group, mostly adapts to different leaders.	Adequate in groupwork, doesn't always take part where required.	Needs more development and time to trust other members of group.
Cooperation	Cooperates very well on every level, within group as well as with authority figures.	Cooperates well within group as well as with authority figures.	Cooperation not always easy.	Struggles to cooperate.
Creativity	Shows excellent use of imagination and comes up with great solutions.	Shows ample use of imagination and finds solutions to most problems.	Adequate use of imagination. Some problem-solving skills.	Needs work on imagination and problem solving skills.
Critical Thinking	Excels at asking questions, analysing information and organising it.	Good at asking questions, analysing information and organising it.	Average at asking questions, analysing information and organising it.	Too little questions asked, needs more development in analysing information.
Communication	Shows great empathy, well-articulated responses. Uses non-verbal communication well and takes care to understand others.	Shows some empathy, articulated responses. Uses some non-verbal communication and tries to understand others.	Average at empathy, adequate responses. Some-times uses non-verbal communication and mostly understands others.	Inadequate empathy and responses. Uses little non-verbal communication and struggles to understand others
TOTAL Competencies				**/ 25**

Annexure 10: Model of Project-based Learning