

15th Annual
Hawker Brownlow
**Thinking &
Learning**
Conference

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BIANCA AND LEE HEWES

SATURDAY 19 MAY

Session 3

**Create Project-Based Learning in
F–12: Create Lessons for your
PBL Classroom – Part 3**

MELBOURNE

BIANCA AND LEE HEWES

Bianca Hewes has been a high school English teacher since 2005, and is currently Head Teacher of Teaching and Learning. Bianca started to experiment with Project Based Learning (PBL) in her English classroom in 2010 and is regarded as a leading practitioner in the field, running workshops and delivering presentations on PBL both nationally and internationally.



Lee Hewes has been a primary school teacher since 2013. He has extensive experience applying a range of innovative methodologies in his classroom and is celebrated for his creative approach to teaching literacy and numeracy through gaming and Project Based Learning (PBL). Lee has run numerous workshops and presentations on PBL, technology and gaming in education.

A message from Hawker Brownlow Education

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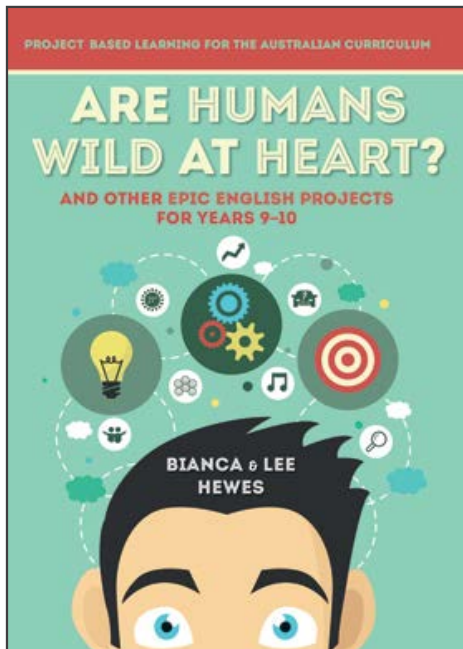
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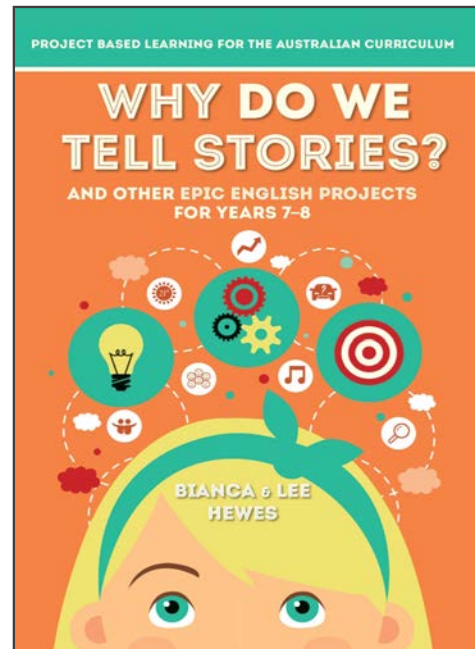
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COMING SOON

Which Australian insect would make the best pocket monster? And other rad projects for Years K-2

How can new technologies be used to tell traditional tales? And other rad projects for Years 3-4

How can humans inhabit extreme environments? And other rad projects for Years 5-6

You're living in a village that is constantly being attacked by dragons. The attacks are so frequent and swift, that your village's resources are being significantly depleted. The King and Queen of your village have asked interested people to submit a proposal and prototype for a dragon trap Design that will save the village.

What's the best Design for a dragon trap?

DISCOVER:

- the strengths and weaknesses of dragons
- the best design for a successful dragon trap

ASSESSMENT:

Critical Thinking
Collaboration

CREATE:

- a prototype for a successful dragon trap, using ONLY the materials given to you

ASSESSMENT:

Creativity and Innovation
Collaboration

SHARE:

- your prototype with the King and Queen and explain its design

ASSESSMENT:

Presentation

HOW CAN THE HEWES PBL FRAMEWORK HELP ME DESIGN A LEARNING EXPERIENCE THAT WILL ENGAGE, CHALLENGE, AND

INSPIRE MY STUDENTS?

DISCOVER:

- Keenan and Balin's criteria for awesomeness
- A framework for Project Based Learning

CREATE:

- A visually appealing project outline that showcases an epic project

SHARE:

- Your project outline with others via a gallery walk AND via social media #AussiePBL

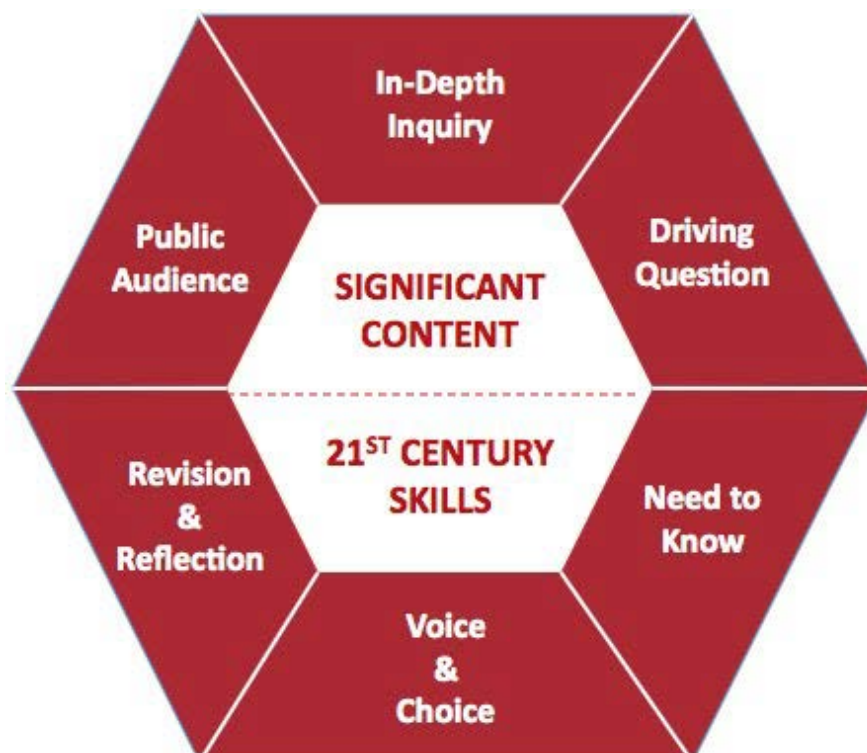
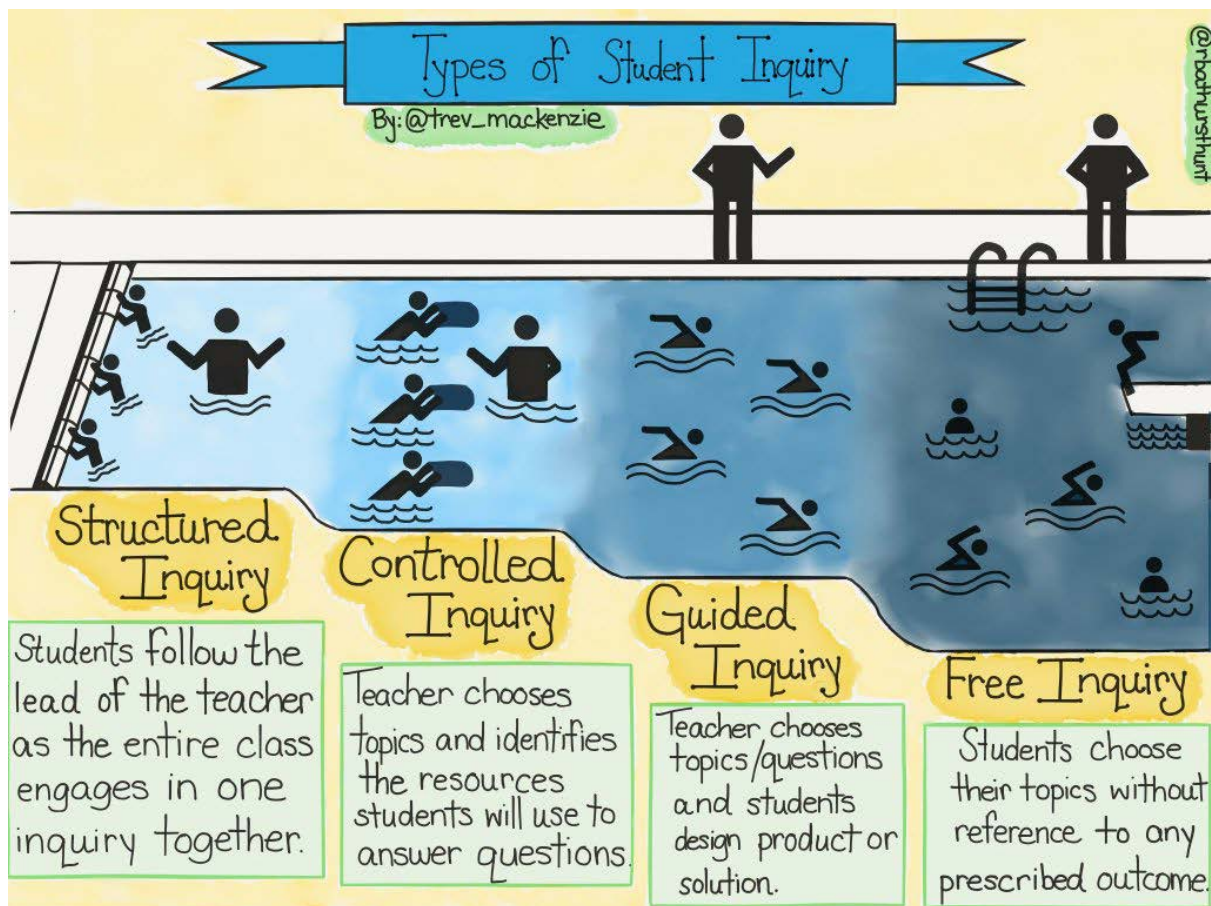
BIANCA & LEE HEWES, 2018

KWHL TABLE

Use a KWHL table like the one below to work out what you already *know* that will help you to succeed at **each** element of the project, what you *want* to learn, *how* you think you can learn what you need to in order to succeed and what you have *learnt* through the project.

What we k now ...	What we w ant to learn ...	H ow we aim to learn it ...	What we have l earnt...

WHAT IS PROJECT BASED LEARNING?



Discover, Create, Share: 3 Cycles of Learning for Rigorous PBL

By Lee Hewes, Merrylands East Public School

Published on bie.org July 22, 2016

You may have read a couple of earlier posts by the Buck Institute entitled, “Why We Changed Our Model of the 8 Essential Elements of PBL” and ‘The Perils of PBL’s Popularity.’ If you haven’t, I encourage you to read them [here](#) and [here](#). In both articles, the authors proclaim their concern over the potential for Project Based Learning to be confused with less rigorous, hands-on pedagogies or class “projects”.

Such approaches, while they may be more engaging and interesting than traditional approaches, lack the planning, preparation and depth that are required of true Project Based Learning, as well as some of the **Essential Project Design Elements** that are clearly outlined in the older and most recent models of Project Based Learning developed by the BIE.

Here in Australia, Project Based Learning is also increasing in popularity and we too are faced with the same perils that concern the authors of the aforementioned articles. In what I would call the “dilution” of PBL, I have seen many educators claim to be engaging in project-based practices, when in fact they are actually just providing their students an opportunity to engage in fun activities (or even worse, not even fun, and overly teacher directed under the guise of a driving question). These may last for an extended period of time, say, several lessons, in relation to a particular topic, without going into much depth of inquiry, having their students solve any significant problem, or prepare any product for an authentic audience outside of their classroom or school. It is important that we remain clear on what is true Project Based Learning, and what is simply a class “project” or some other form of activity or “task completion based learning.”

Over the years since 2010, and through much trial and error, my wife Bianca and I have developed a model which, while ensuring we include all of the BIE’s essential project design elements into every project, breaks down the Project Based Learning process into what we call the three cycles of learning: Discover, Create, Share. By following this process, in conjunction with BIE’s Essential Project Design Elements we can be sure that Project Based Learning does not become diluted, and remains the highly effective, engaging and excellent future focused pedagogy we know it to be.

Discover

This is the sustained inquiry that forms the basis of what students will need to learn throughout the course of the project, and is always centered around some form of challenging problem or question. The key knowledge, understanding and skills that students learn throughout a project go beyond a strict adherence to syllabus documents and teacher direction, as students learn to



work in teams and collaborate to solve problems that arise along the way and to inquire into the questions they're faced with. This goes beyond a series of teacher-planned activities in which students complete tasks under the direction of the teacher; there are often times when students and teachers alike aren't aware of which problems will pop up and must work together to solve them. The teacher acts more as a project manager who works to help each group, and not as a task distributor at the front of the classroom.

Create

In true Project Based Learning, students are required to make some form of public product for an authentic audience. This adds a sense of purpose and authenticity, which is vital to PBL. These products vary from project to project, and may range from anything including artworks and artifacts through to gardens, books, news articles, websites and videos. The range of products is potentially limitless, and what's crucial is that students are given voice and choice over what they make, and with teacher and group assistance, they are constantly revising, critiquing and reflecting on how to make their products the best they can be.

Share

It is imperative that students are aware that they have an audience to share their products with, and they're not just making a diorama to be placed at the back of the classroom. There is often also a public display of their works in some form of exhibition or a visit from their audience, who may also be an expert in their field or an important local figure. This authenticity drives a sense of importance to the project for students and increases engagement. It also provides students with a real world purpose for the work they are doing and an opportunity to take their learning outside of the walls of their classroom.

Some of our previous audiences have included classes and educators from other schools, both locally, interstate and internationally, and also authors, academics, TV celebrities, local businesses and government institutions. A recent project conducted at our school has involved grade 3 and 4 students presenting their work to a local gelato company. As a result, the students have been invited to visit their factory to see gelato making in process and taste some



creations based upon student designs.

At the end of each project it's always powerful to stop and reflect on the knowledge, understanding and skills we have learned along the way. My year 4 class recently overwhelmed

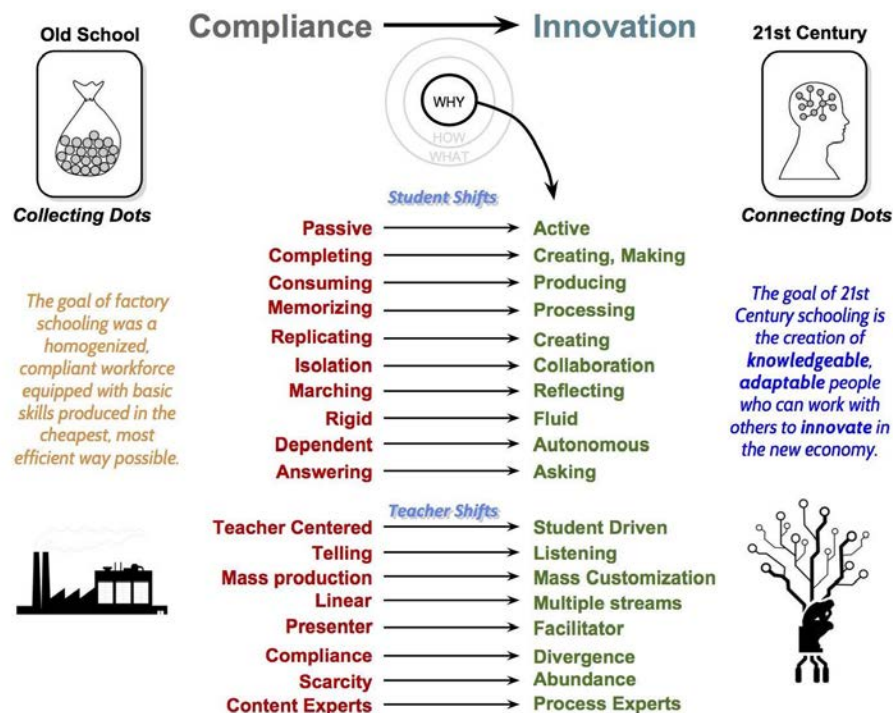
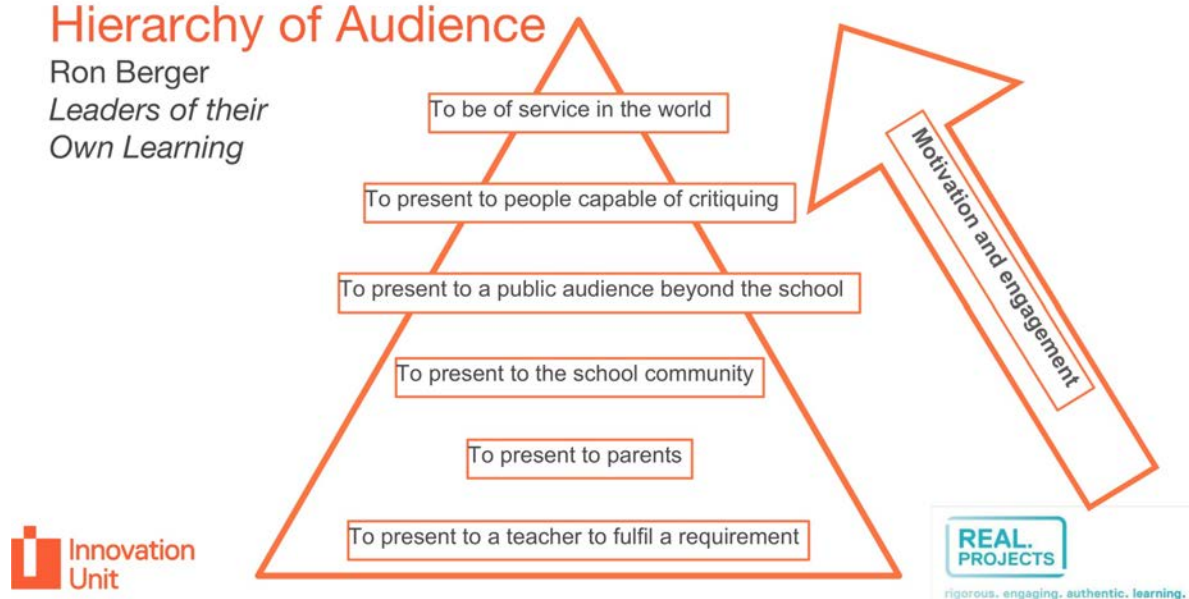
me as they reflected on all of the technological and presentation skills they'd learned throughout our most recent project.

So what have we learned here? I'd like to think that we've learned that with the rise in popularity of Project Based Learning, it's important that we maintain its rigour and we are careful not to dilute it. I'd like to think we've learned that by adhering to the essential project design elements and keeping the three "cycles of learning" in mind we can ensure that we provide gold standard Project Based Learning experiences for our students.

https://www.bie.org/blog/discover_create_share_3_cycles_of_learning_for_rigorous_pbl

Hierarchy of Audience

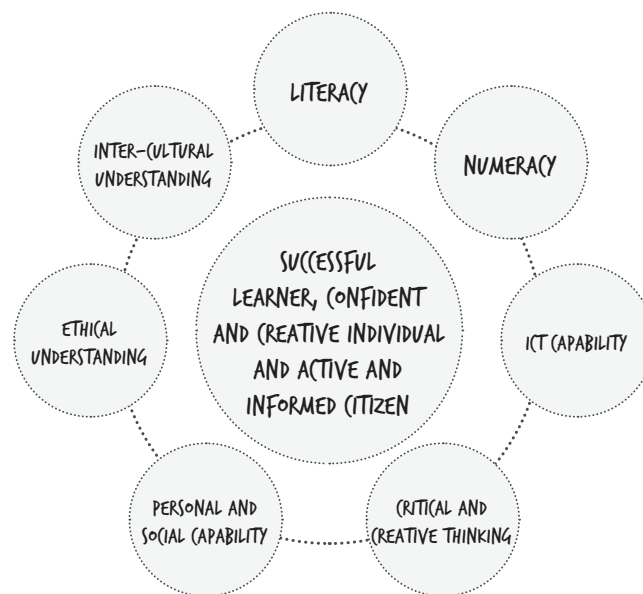
Ron Berger
Leaders of their
Own Learning



PROJECT-BASED LEARNING AND THE GENERAL CAPABILITIES

NOTE: While the term ‘General Capabilities’ is specific to our context as Australian teachers (it comes from our national curriculum) the capabilities themselves are relevant to every teacher around the world, as they are essential skills that all students must master to be successful in the 21st century.

The Australian Curriculum clearly articulates an awareness of the need to change our perceptions of learners and our practice as teachers. This is articulated through the General Capabilities and the Cross-Curriculum Priorities. The image below presents an overview of the General Capabilities. The central text is our goal as educators for our students – for each to become a ‘successful learner, confident and creative individual and active and informed citizen’. It is our intention to show how each of the general capabilities aligns with the key elements of PBL that were identified by the Buck Institute for Education. These 8 essentials for PBL are: Voice and Choice; Significant Content; In-depth Inquiry; Public Audience; Revision & Reflection; Driving Question; Need to Know and 21st-Century Skills. Where possible we give examples of how each capability can be engaged in the PBL English classroom. It is our belief that PBL is a methodology that provides students with the opportunity to strengthen, develop and demonstrate each of these capabilities.



Adapted from: www.australiancurriculum.edu.au/GeneralCapabilities/Overview/general-capabilities-in-the-australian-curriculum

LITERACY

Literacy is the need to know for all young people. Being literate opens the door to the other capabilities. Without being literate, it's very difficult to contribute and participate meaningfully in society. It's not impossible; it's just very difficult. Remember as well that literacy includes visual literacy and critical literacy. During PBL, literacy is developed through both explicit instruction and through more constructivist, constructionist and collaborative learning strategies.

PART ONE: THE WHAT, WHY AND HOW

Furthermore, a key aspect of PBL is the process of planning, drafting, peer/self assessment and revision. When applied to written or spoken products, this process has a significant impact on students' literacy skills. This process becomes more pertinent for students when they are producing the product for a public audience – online or face-to-face.

NUMERACY

PBL provides students with the opportunity to think in a more open way about their subjects. The segregating of subjects is an unfortunate consequence of the traditional schooling model. Thirty minutes on a bus trip chatting with colleagues from other faculties and you'll discover wonderful connections between your subjects, such as the connections between patterns in English and Maths. The moment we stop talking about covering content and start talking real-world applications of our subjects, we realise the need to see our subjects as interrelated. When we are driven by interest and real-world application, not only does engagement improve, but so do learning outcomes.

The trend in the US at the moment is STEM – the integration of the study of Science, Technology, Engineering and Maths. Through multi-disciplinary projects, students are mastering STEM skills. Moreover, these projects drive students through a process of in-depth inquiry as they determine what they need to know and how to find out this information or develop these skills. A lot of the skills you develop by running the projects in this book can be used to design and run successful multi-disciplinary projects in your school.

Numeracy can be incorporated into English projects too. Projects may require students to conduct in-depth inquiry through surveys and analyse the data they collect. They may also engage with the data collected by others (often accessed online) and use this to support their findings about their topic. Even everyday numeracy comes into play as students estimate and calculate the amount of food and drink needed (and related costs) when planning the presentation of learning to a public audience.

PBL necessitates in-depth inquiry. A significant part of both qualitative and quantitative research is accessing numerical data – be it graphs, statistics, tables etc. This applies to all subjects. If we don't give our students the opportunity to engage with significant content through in-depth inquiry, we're missing a wonderful chance to allow them to appreciate the power and importance of numbers, and not just in Maths.

INFORMATION AND COMMUNICATION TECHNOLOGY

While PBL isn't about technology (you can easily complete an awesome project without access to any technology) it certainly is enhanced by access to a range of ICTs. During PBL, ICT capability develops naturally as part of the student's learning. However, it's not about learning to use a particular online tool or program just for the sake of it, or because it might make boring work a little bit more engaging. The early stage of all projects is in-depth inquiry – this is the stage where students are driven by deep and personally developed questions about the project. Like everyone in the 21st century, students will begin their research on the Internet. This phase gives teachers a wonderful opportunity to model effective research skills and the importance of curating information using a variety of online tools (social bookmarking sites and tools like Pinterest, Scoop.it are popular at this stage). Students learn these skills not because the teacher has determined they are good for them, they learn them because they need to know them in order to be successful with their project.

PROJECT-BASED LEARNING FOR YEARS 9 & 10

Collaboration and communication are key to PBL because students spend most of their time working in small teams. We're told so often that these are the 21st-century skills for young people to master – the workforce is collaborative and globalised, therefore our students need to be able to work in a team and to communicate effectively with anyone, anywhere and at any time. This is where an online classroom is essential – not as a space where resources are accessed, but rather as a space where students can collaborate and communicate whenever they need to. Edmodo is an excellent tool for this purpose. This social network for education allows students to develop their digital citizenship (communicating with courtesy, compassion and clarity) in the eye of their teacher and they can communicate with their teams whenever they need to. Teachers can easily assess the development of these 21st-century skills and quickly give feedback to praise good behaviours and redirect negative behaviours.

ICTs play a big part in the revision and reflection process of PBL. In all projects, students are required to draft and revise their work. This process is enhanced through the use of tools like Google docs (great for collaborative writing and planning) and more familiar programs like Microsoft Word, where students can use track changes and comments to illustrate their revisions. One of the core routines of PBL is goal-setting and reflecting on learning. This process can be done in a workbook, but it's far more effective when done using a site like Edmodo or blogs. Blogging throughout a project really allows students to appreciate that learning is a process and that improvement happens over time. Blogging gives students a place to voice both their concerns about the project as well as the joy of successfully solving a problem or creating something amazing.

Finally, the most obvious use of ICTs during PBL is for creating the product and accessing a public audience. Allowing students to have a voice and choice as part of a project is essential to ensure engagement and relevance of learning. This voice and choice typically comes into play around the product that teams will be producing to demonstrate their learning. Your students might choose from a range of forms, some including ICTs, such as videos, websites and online magazines. You might enjoy setting a challenge for your students, so they need to create a type of text they know nothing about, forcing them to develop their ICT capabilities. This can make some students uncomfortable, because they're really being pushed, but if you're there to provide support just in time then this is a great opportunity for mastering responsible risk taking. Your students will enjoy creating cool products such as websites, podcasts, short films and online fiction – things they might not normally get the opportunity to make in English.

Of course, all of these products would mean nothing if they didn't have an authentic, public audience. Teachers are time poor (and our students are too) so having access to an online audience rather than an after-school audience of mums and dads can be really helpful. One great thing to do is to connect with another class from somewhere else in the world – even if it's just the primary school forty minutes away. Today there is a range of technologies at our disposal that can facilitate this connection – Skype, Edmodo and YouTube are just a few. If connecting with another class sounds too risky for you, do a bit of networking and see if you can get a guest expert to Skype in to hear your students' final presentations. Our young people need these experiences – their learning should not be confined to the four walls of the classroom.

CRITICAL AND CREATIVE THINKING

Critical and creative thinking are life-long skills that all people should master. It's this type of thinking that can lead to a happy and successful life. Of course, teaching critical and creative thinking skills is a conundrum for teachers who feel pressured to cover a lot of content. Luckily for people using PBL as their main teaching method, critical and creative thinking is much easier to develop and refine.



PART ONE: THE WHAT, WHY AND HOW

As you will have noticed, the English projects in this book are broken down into three main parts: inquiry/discovery/research, create/compose/produce and present/promote. Of course, the first part of the project doesn't really stop; inquiry is an iterative process and necessary at all stages. It is important to use a lot of visible thinking strategies at all stages of PBL, as these develop and strengthen critical and creative thinking. Making your thinking visible is an important 21st-century skill. This type of thinking is new but it is extremely important in our world today as problems become more complex and more immediate. Strong critical and creative thinking is necessary if our young people are to thrive in our ridiculously fast 21st-century world. If we spend time making thinking visible – showcasing to ourselves and our peers what we're thinking, how we're thinking and why we're thinking like that about a topic, product etc. – then we are valuing critical and creative thinking; we're having conversations about it in class. This is a way of empowering our young people to see that they *can* and *do* think this way.

Through PBL in the English classroom your students will develop their creative thinking by composing and designing products like podcasts, websites, rap battles, narrative poetry, collaborative novellas, machinima, short films and anthologies of personal essays. This process is predicated on revision and reflection. There are many visible thinking strategies for brainstorming and planning that your students can utilise. These include star-bursting, KWL tables, think/pair/share, think/puzzle/explore and mind-mapping on portable whiteboards. Another excellent creative thinking activity is whole-group 'what if' question-asking when students present plans or drafts of their work to their peers.

As previously mentioned, projects necessitate in-depth inquiry. Students are developing their critical thinking as they learn to curate information found on the Internet (and sometimes even in books). There are lots of protocols available to support students in their ability to judge the quality, credibility and relevance of information that they find on the web. PBL means that students aren't being taught these skills in a 'one-off' lesson, rather they are using these methods time and time again at the beginning stages of their projects. We need to have young people who are critical of the content that is delivered to them via the media. This is essential in a media-rich age where consumerism has become the natural state for our young people. A great activity is to actually teach students how to use Google – people expect that this knowledge and skill is a given. Another strategy that encourages critical thinking is the question-formulating technique (QFT). This is a strategy that supports students in their question-asking as they learn to identify open and closed questions and how to develop the best questions to ask. The QFT has resulted in some great questions students have made visible to their peers through writing with whiteboard markers on windows and posting questions to the walls of the classroom.

Finally, giving students the freedom to pursue their interests in projects (even if all you feel you can allow is choice in product or audience), allows them to think more deeply about their own passions. Passions are the drivers of creative and critical thinking. There are a number of stages within PBL where students can be given a voice – what is the significance of the topic to their lives, what are their concerns about it, are we missing something pertinent to them as human beings? – two being the crafting of the driving question and through daily reflection on their feelings about the project and their learning. To discover student interest you could do one of these activities

- get them to write you a letter introducing themselves to you
- get them to list the five things most important to them in their lives
- do circle time where you focus on favourite ways to learn, favourite activities or what they want to do when they leave school
- get your students passion-blogging once a week about what they value the most right now

PROJECT-BASED LEARNING FOR YEARS 9 & 10

PERSONAL AND SOCIAL CAPABILITY

All teachers want their students to go off and live happy and successful lives. Just what successful means and looks like varies significantly between our young people. This is something that we, as teachers, need to accept. Success for many of our students is simply to be happy and healthy, to feel safe and to feel valued. This capability is great because it requires teachers to see the human being behind the student.

This is about considering how our young people are developing emotionally and socially. It's about being great role models and facilitating learning experiences that ensure these young people are being given the opportunity to develop their *self-awareness*, *self-management*, *social-awareness* and *social-management* (these are the four elements of Personal and Social capability as outlined in the AC document). According to the AC, if you just teach the document, students will develop all of these aspects of personal and social capability. We firmly believe that through PBL, students can most effectively develop these capabilities.

The best type of PBL is real-world and authentic. As Suzie Boss says, PBL gives students the opportunity to contribute to and change (even slightly) their world. Boss says all projects should target one of the three As: action, awareness and advocacy. Essentially, if a project is going to be significant, engaging and valuable, it will allow students to develop a sense of themselves and their role within their local and wider community. Students will work on real-world problems in their community or wider society (such as transport issues, employment, youth homelessness, environment issues, bullying, depression etc.) and contribute to solving these problems in some way. By giving our young people a voice through them seeking a public audience for their learning, their compositions and their concerns, we are helping them to develop a better sense of themselves as active and effective contributors to their local and global communities.

ETHICAL UNDERSTANDING

According to the Australian Curriculum, 'Ethical understanding involves students in building a strong personal and socially oriented ethical outlook that helps them to manage context, conflict and uncertainty, and to develop an awareness of the influence that their values and behaviour have on others.' In high school we're often working with young people who simply lack resilience or a deep appreciation for their own values and how these can impact those around them. Why? Because they are young people finding their place within the world. But maybe it's also because they don't understand or can't appreciate the relevance of what they are doing RIGHT NOW in their school lives. To teenagers, school can often seem like they're in a holding pen waiting until they're given the chance to be morally responsible. In order to support our students to develop 'personal values and attributes such as honesty, resilience, empathy and respect for others' (*Melbourne Declaration on Education Goals for Young Australians*) we need to create learning experiences that foster and nurture these values and attributes.

PBL is about problem finding and problem solving. Not the problems in the back of the book, or the imaginary problems identified in a novel, but the REAL problems of our world that need addressing. It is in the driving question of a project that we see the centrality of problems. These problems might be based in the class (*How can we design a learning space that supports the needs of all learners?*), school (*Can we, as students, prevent bullying in our school?*), local community (*How can we educate our community about the impact that individuals' decisions have on others?*), national (*Can we create a short film that will change politician's attitudes to climate change?*) or global (*How can poetry be used to inspire people to donate money to combat the global food crisis?*). The best problems, of course,



PART ONE: THE WHAT, WHY AND HOW

are those identified by students through their own personal experience or through their own in-depth inquiry. To help students with their problem-finding, you could use this sentence from the AC as stimulus for discussion and brainstorming: *Complex issues require responses that take account of ethical considerations such as human rights and responsibilities, animal rights, environmental issues and global justice.* It simply is NOT enough to have our students writing persuasive speeches, research articles or poems about these issues, handing them in to their teacher for a mark and ticking a box. We MUST empower our young people to actually actively take part in making a contribution to their world – to truly contribute their ideas to solving complex problems. This means ensuring that their learning has a public audience.

Of course, we can't expect one class doing PBL to solve the world's problems – but many hands make light work. According to the AC, *'technologies bring local and distant communities into classrooms, exposing students to knowledge and global concerns as never before.* With the capacity to bring others into our classroom via Skype, Edmodo, social media etc., we have the capacity to work together toward incremental changes to our problematic world. Giving students a taste of what their own personal capacity is, and to develop their understanding of themselves as ethical human beings, is really central to our jobs as teachers.

INTER-CULTURAL UNDERSTANDING

For the AC, inter-cultural understanding *'assists young people to become responsible local and global citizens, equipped through their education for living and working together in an interconnected world'.*

Creating learning experiences that provide students with the opportunity to connect and collaborate with students from backgrounds different from their own truly does nurture inter-cultural understanding. During PBL, students develop essential 21st-century skills as they establish connections with other schools or with experts from outside of school. PBL provides the students with *'the ability to relate to and communicate across cultures at local, regional and global levels'.*

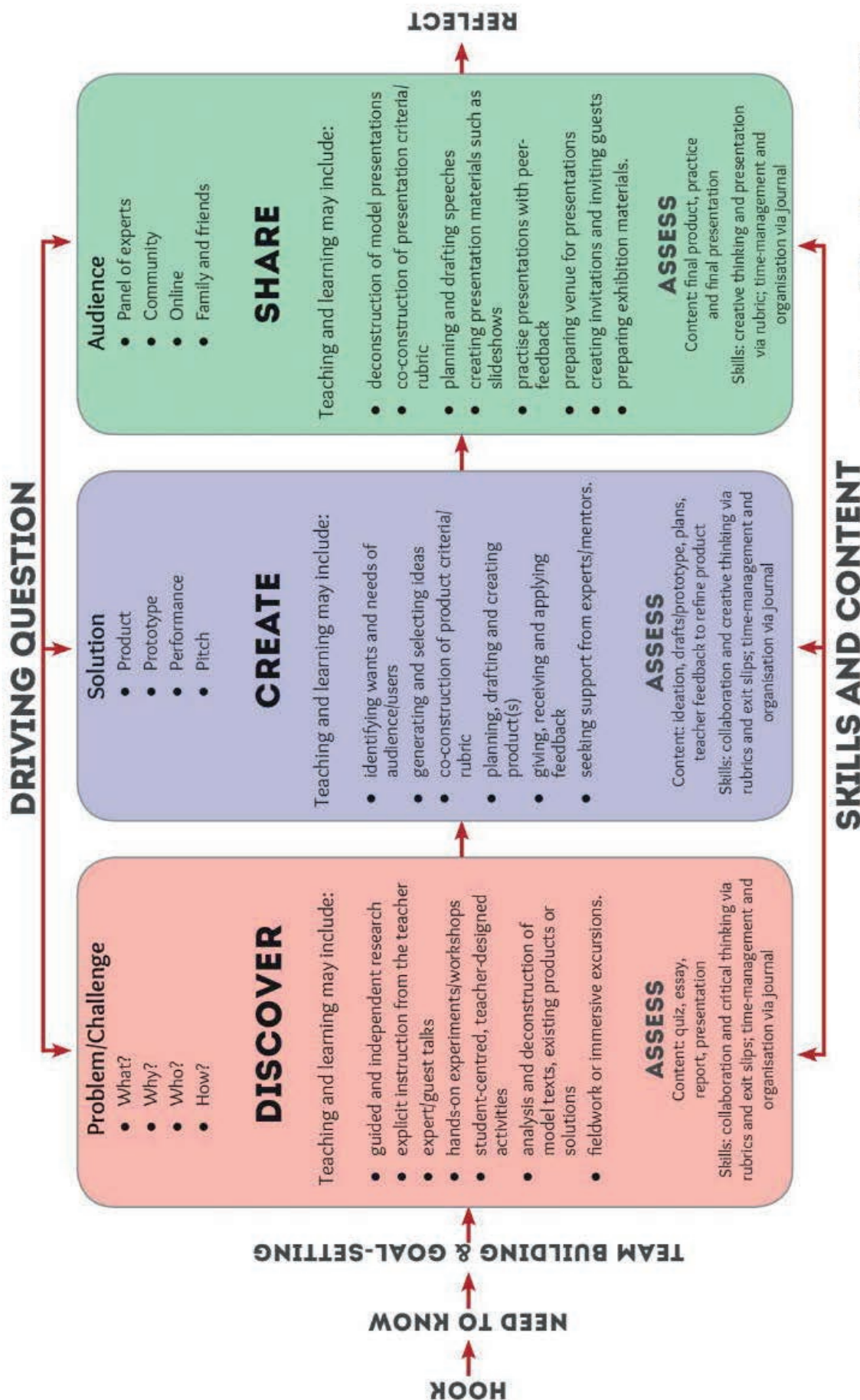
Using this approach to learning truly opens our eyes, as teachers, to the potential connections our young people can make with others. It doesn't have to be connections from outside of the school either, as inter-cultural connections within schools are just as worthwhile.

It is essential that we continue to value our young people as the future of our world and support them as best we can to develop or strengthen these important attributes of good humans. We truly do feel that an approach to learning such as PBL that is experiential, authentic and engaging, provides our learners with the BEST opportunity to hone these very important values and attributes.

HOW DOES PBL RUN IN THE ENGLISH CLASSROOM?




There are five key components that we include in every project to ensure successful student engagement and deep learning. *These are a driving question, a project outline, an expert, a hook lesson and a project wall.* These elements will help you to structure each project and to keep students focused on their learning goals.

ANATOMY OF A PROJECT



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Project Essentials Checklist

Does the Project . . . ?			
FOCUS ON SIGNIFICANT CONTENT AND AUTHENTIC ISSUES Students learn important subject matter content and address problems and issues from the world outside the classroom			
ORGANIZE ACTIVITIES AROUND A DRIVING QUESTION OR CHALLENGE Students find the complex, open-ended question or challenge to be a meaningful focus for their work			
ESTABLISH A NEED TO KNOW AND DO Students are brought into the project by an entry event that captures interest and begins the inquiry process			
ENGAGE STUDENTS IN INQUIRY Students think deeply and ask further questions as they generate answers and solutions			
REQUIRE INNOVATION Students generate new answers and/or create unique products in response to the Driving Question or challenge			
DEVELOP 21ST CENTURY SKILLS Students build critical & creative thinking, collaboration, and presentation skills that are taught and assessed			
ENCOURAGE STUDENT VOICE AND CHOICE Students, with guidance from the teacher, make decisions that affect the course of the project			
INCORPORATE FEEDBACK AND REVISION Students use feedback to improve their work and create high quality products			
CONCLUDE WITH A PUBLIC PRESENTATION Students exhibit products or present solutions and explain their work to others and respond to content- and process-focused questions			

NOTES:



New Tech Network PROJECT IDEA RUBRIC

PROJECT: _____

AUTHOR: _____

	UNACCEPTABLE	ACCEPTABLE	EXEMPLARY
Authenticity	<ul style="list-style-type: none"> Project has little or no connection with the outside world or other curricular areas The problem or question has little or no meaning to the students Problem has a single correct answer 	<ul style="list-style-type: none"> Project simulates "real world" activities. Adults are likely to tackle the problem or questions addressed by the project The problem or question has meaning to the students and provides a clear "need to know" Project has several possible correct solution 	<p>In addition to "Acceptable" attributes:</p> <ul style="list-style-type: none"> Entities or persons outside of the school will use the product of student work Students will present and defend solution to a real and appropriate audience for the student work
Academic Rigor	<ul style="list-style-type: none"> The project is not based on content standards Project demands little specific knowledge of central concepts 	<ul style="list-style-type: none"> The project is derived from specific learning goals in content area standards Project demands specific knowledge of central concepts Student develop and demonstrate life skills (e.g. collaboration; presentation; writing) 	<p>In addition to "Acceptable" attributes:</p> <ul style="list-style-type: none"> There is a well defined, clear driving question that is derived from specific national, state or district content standards Project demands breadth and depth of specific knowledge of central concepts. Students develop habits of mind (e.g., concern for evidence, viewpoint, and cause and effect; precision of language and thought; persistence)
Applied Learning	<ul style="list-style-type: none"> New skills and knowledge are not applied toward solution development Students work primarily alone and with little self-management Learning occurs out of context of project 	<ul style="list-style-type: none"> New skills and knowledge are applied toward solution development Students are required to work in groups where curricular topics and skills are discussed and debated in context of the project Students use self-management skills informally 	<p>In addition to "Acceptable" attributes:</p> <ul style="list-style-type: none"> Students apply new knowledge to a realistic and complex problem Students use high-performance work organization skills (e.g., work in teams, use technology appropriately, communicate ideas, collect, organize and analyze information) Students formally use self-management skills (e.g., develop a work plan, prioritize pieces of work, meet deadlines, identify and allocate resources)
Active Exploration	<ul style="list-style-type: none"> Little independent research is required. Students gather majority of information from textbooks or encyclopedia-like materials provided by the teacher. 	<ul style="list-style-type: none"> Students are required to conduct own, independent research. Students gather information from authentic, but limited number of sources provided by the teacher. Students use raw data provided by the teacher. 	<p>In addition to "Acceptable" attributes:</p> <ul style="list-style-type: none"> Student are required to do field-based or experimental research (e.g., interview experts, survey groups of people, work site exploration) Students gather information from a variety of sources and using a variety of methods (interviewing and observing, gathering and reviewing information, collecting data, model-building, using on-line services)
Adult Connections	<ul style="list-style-type: none"> Students have no contacts with adults other than the teacher(s) 	<ul style="list-style-type: none"> Students have limited contacts with outside adults (e.g., guest speakers, parents). Teacher uses role playing or other staff members to simulate "expert" contact. 	<p>In addition to "Acceptable" attributes:</p> <ul style="list-style-type: none"> Students have multiple contacts with outside adults who have expertise and experience that can ask questions, provide feedback, and offer advice. Students have the opportunity to observe and work alongside adults in a worksite relevant to the project. Outside adults provide students with a sense of the real-world standards for this type of work.
Assessment Practices	<ul style="list-style-type: none"> Students are not provided with clear explanation of the assessment process or and expectations. Assessment of project is summarized into a single final grade. 	<ul style="list-style-type: none"> Students are provided with a clear explanation of the assessment process and expectations in the early stages of the project. Students use structured journals or logs to track progress Assessment of project includes an evaluation of content skills / knowledge as well as life skills and/or habits of mind Final product is a culminating exhibition or presentation that demonstrates their ability to apply the knowledge they have gained 	<p>In addition to "Acceptable" attributes:</p> <ul style="list-style-type: none"> Students help in establishing assessment criteria. Students have many opportunities for feedback on their progress from teachers, mentors, and peers.

Adapted from Adria Steinberg's 6 As, *Real Learning, Real Work*.

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P R O J E C T B A S E D T E A C H I N G R U B R I C

Project Based Teaching Practice	Beginning PBL Teacher	Developing PBL Teacher	Gold Standard PBL Teacher
Design & Plan	<ul style="list-style-type: none"> ▶ Project includes some Essential Project Design Elements, but not at the highest level of the Project Design Rubric. ▶ Plans for scaffolding and assessing student learning lack some detail; project calendar needs more detail, or is not followed. ▶ Some resources for the project have not been anticipated or arranged in advance. 	<ul style="list-style-type: none"> ▶ Project includes all Essential Project Design Elements, but some are not at the highest level of the Project Design Rubric. ▶ Plans for scaffolding and assessing student learning lack some details; project calendar allows too much or too little time, or is followed too rigidly to respond to student needs. ▶ Most resources for the project have been anticipated and arranged in advance. 	<ul style="list-style-type: none"> ▶ Project includes all Essential Project Design Elements as described on the Project Design Rubric. ▶ Plans are detailed and include scaffolding and assessing student learning and a project calendar, which remains flexible to meet student needs. ▶ Resources for the project have been anticipated to the fullest extent possible and arranged well in advance.
Align to Standards	<ul style="list-style-type: none"> ▶ Criteria for products are given but are not specifically derived from standards. ▶ Scaffolding of student learning, critique and revision protocols, assessments and rubrics do not refer to or support student achievement of specific standards. 	<ul style="list-style-type: none"> ▶ Criteria for some products are not specified clearly enough to provide evidence that students have met all targeted standards. ▶ Scaffolding of student learning, critique and revision protocols, assessments and rubrics do not always refer to or support student achievement of specific standards. 	<ul style="list-style-type: none"> ▶ Criteria for products are clearly and specifically derived from standards and allows demonstration of mastery. ▶ Scaffolding of student learning, critique and revision protocols, assessments and rubrics consistently refer to and support student achievement of specific standards.
Build the Culture	<ul style="list-style-type: none"> ▶ Norms are created to guide project work, but they may still feel like “rules” imposed and monitored by the teacher. ▶ Students are asked for their ideas and given some choices to make, but opportunities for student voice and choice are infrequent or are only related to minor matters. ▶ Students occasionally work independently, but often look to the teacher for guidance. ▶ Student teams are often unproductive or require frequent intervention by the teacher. 	<ul style="list-style-type: none"> ▶ Norms to guide the classroom are co-crafted with students, and students are beginning to internalize these norms. ▶ Student voice and choice is encouraged through intentionally designed opportunities, e.g., when choosing teams, finding resources, using critique protocols, or creating products. ▶ Students work independently to some extent, but look to the teacher for direction more often than necessary. ▶ Student teams are generally productive and are learning what it means to move from cooperation to effective collaboration; the teacher occasionally has to intervene or manage their work. 	<ul style="list-style-type: none"> ▶ Norms to guide the classroom are co-crafted with and self-monitored by students. ▶ Student voice and choice is regularly leveraged and ongoing, including identification of real-world issues and problems students want to address in projects. ▶ Students usually know what they need to do with minimal direction from the teacher. ▶ Students work collaboratively in healthy, high-functioning teams, much like an authentic work environment; the teacher rarely needs to be involved in managing teams.

For more PBL resources, visit bie.org

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Project Based Teaching Practice	Beginning PBL Teacher	Developing PBL Teacher	Gold Standard PBL Teacher
Build the Culture <i>continued</i>	<ul style="list-style-type: none"> ▲ Students feel like there is a “right answer” they are supposed to give, rather than asking their own questions and arriving at their own answers; they are fearful of making mistakes. ▲ Value is placed on “getting it done” and time is not allowed for revision of work; “coverage” is emphasized over quality and depth. 	<ul style="list-style-type: none"> ▲ Students understand there is more than one way to answer a driving question and complete the project, but are still cautious about proposing and testing ideas in case they are perceived to be “wrong.” ▲ The values of critique and revision, persistence, rigorous thinking, and pride in doing high-quality work are promoted by the teacher but not yet owned by students. 	<ul style="list-style-type: none"> ▲ Students understand there is no single “right answer” or preferred way to do the project, and that it is OK to take risks, make mistakes, and learn from them. ▲ The values of critique and revision, persistence, rigorous thinking, and pride in doing high-quality work are shared, and students hold each other accountable to them.
Manage Activities	<ul style="list-style-type: none"> ▲ The classroom features some individual and team work time and small group instruction, but too much time is given to whole group instruction. ▲ Classroom routines and norms for project work time are not clearly established; time is not used productively. ▲ Schedules, checkpoints, and deadlines are set, but they are loosely followed or unrealistic; bottlenecks impede workflow. ▲ Teams are formed using either a random process (e.g., counting off) or students are allowed to form their own teams with no formal criteria or process. 	<ul style="list-style-type: none"> ▲ The classroom features individual and team work time, whole group and small group instruction, but these structures are not well-balanced throughout the project. ▲ Classroom routines and norms are established for project work time, but are not consistently followed; productivity is variable. ▲ Realistic schedules, checkpoints, and deadlines are set, but more flexibility is needed; bottlenecks sometimes occur. ▲ Generally well-balanced teams are formed, but without considering the specific nature of the project; students have too much voice and choice in the process, or not enough. 	<ul style="list-style-type: none"> ▲ The classroom features an appropriate mixture of individual and team work time, whole group and small group instruction. ▲ Classroom routines and norms are consistently followed during project work time to maximize productivity. ▲ Project management tools (group calendar, contract, learning log, etc.) are used to support student self-management and independence. ▲ Realistic schedules, checkpoints, and deadlines are set but flexible; no bottlenecks impede workflow. ▲ Well-balanced teams are formed according to the nature of the project and student needs, with appropriate student voice and choice.
Scaffold Student Learning	<ul style="list-style-type: none"> ▲ Students receive some instructional supports to access both content and resources, but many individual needs are not met. 	<ul style="list-style-type: none"> ▲ Most students receive instructional supports to access both content and resources, but some individual needs are not met. 	<ul style="list-style-type: none"> ▲ Each student receives necessary instructional supports to access content, skills, and resources; these supports are removed when no longer needed.

Project Based Teaching Practice	Beginning PBL Teacher	Developing PBL Teacher	Gold Standard PBL Teacher
Scaffold Student Learning <i>continued</i>	<ul style="list-style-type: none"> ▶ Teacher may “front-load” content knowledge before the project launch, instead of waiting for “need to know” points during the project. ▶ Students gain key success skills as a side effect of the project, but they are not taught intentionally. ▶ Students are asked to do research or gather data, but without adequate guidance; deeper questions are not generated based on information gathered. 	<ul style="list-style-type: none"> ▶ Scaffolding is guided to some extent by students’ questions and “need to know” but some of it may still be “front-loaded.” ▶ Key success skills are taught, but students need more opportunities to practice success skills before applying them. ▶ Student inquiry is facilitated and scaffolded, but more is needed; or, teacher may over-direct the process and limit independent thinking by students. 	<ul style="list-style-type: none"> ▶ Scaffolding is guided as much as possible by students’ questions and needs; teacher does not “front-load” too much information at the start of the project, but waits until it is needed or requested by students. ▶ Key success skills are taught using a variety of tools and strategies; students are provided with opportunities to practice and apply them, and reflect on progress. ▶ Student inquiry is facilitated and scaffolded, while allowing students to act and think as independently as possible.
Assess Student Learning	<ul style="list-style-type: none"> ▶ Student learning of subject-area standards is assessed mainly through traditional means, such as a test, rather than products; success skills are not assessed. ▶ Team-created products are used to assess student learning, making it difficult to assess whether individual students have met standards. ▶ Formative assessment is used occasionally, but not regularly or with a variety of tools and processes. ▶ Protocols for critique and revision are not used, or they are informal; feedback is superficial, or not used to improve work. ▶ Students assess their own work informally, but the teacher does not provide regular, structured opportunities to do so. ▶ Rubrics are used to assess final products, but not as a formative tool; or, rubrics are not derived from standards. 	<ul style="list-style-type: none"> ▶ Project products and other sources of evidence are used to assess subject-area standards; success skills are assessed to some extent. ▶ Individual student learning is assessed to some extent, not just team-created products, but teacher lacks adequate evidence of individual student mastery. ▶ Formative assessment is used on several occasions, using a few different tools and processes. ▶ Structured protocols for critique and revision and other formative assessments are used occasionally; students are learning how to give and use feedback. ▶ Opportunities are provided for students to self-assess their progress, but they are too unstructured or infrequent. ▶ Standards-aligned rubrics are used by the teacher to guide both formative and summative assessment. 	<ul style="list-style-type: none"> ▶ Project products and other sources of evidence are used to thoroughly assess subject-area standards as well as success skills. ▶ Individual student learning is adequately assessed, not just team-created products. ▶ Formative assessment is used regularly and frequently, with a variety of tools and processes. ▶ Structured protocols for critique and revision are used regularly at checkpoints; students give and receive effective feedback to inform instructional decisions and students’ actions. ▶ Regular, structured opportunities are provided for students to self-assess their progress and, when appropriate, assess peers on their performance. ▶ Standards-aligned rubrics are used by students and the teacher throughout the project to guide both formative and summative assessment.

Project Based Teaching Practice	Beginning PBL Teacher	Developing PBL Teacher	Gold Standard PBL Teacher
<p>Engage & Coach</p>	<ul style="list-style-type: none"> ▶ The teacher has some knowledge of students' strengths, interests, backgrounds, and lives, but it does not significantly affect instructional decision-making. ▶ Project goals are developed without seeking student input. ▶ Students are willing to do the project as if it were another assignment, but the teacher does not create a sense of ownership or fuel motivation. ▶ The driving question is presented at the project launch and student questions are generated, but they are not used to guide inquiry or product development. ▶ Expectations for the performance of all students are not clear, too low, or too high. ▶ There is limited relationship-building in the classroom, resulting in student needs that are not identified or addressed. ▶ Students and the teacher informally reflect on what and how students are learning (content and process); reflection occurs mainly at the end of the project. 	<ul style="list-style-type: none"> ▶ The teacher has general knowledge of students' strengths, interests, backgrounds, and lives and considers it when teaching the project. ▶ Project goals and benchmarks are set with some input from students. ▶ Students are excited by the project and motivated to work hard by the teacher's enthusiasm and commitment to their success. ▶ Students' questions guide inquiry to some extent, but some are answered too quickly by the teacher; students occasionally reflect on the driving question. ▶ Appropriately high expectations for the performance of all students are set and communicated by the teacher. ▶ Student needs for further instruction or practice, additional resources, redirection, troubleshooting, praise, encouragement, and celebration are identified through relationship-building and close observation and interaction. ▶ Students and the teacher occasionally reflect on what and how students are learning (content and process). 	<ul style="list-style-type: none"> ▶ The teacher's knowledge of individual student strengths, interests, backgrounds, and lives is used to engage them in the project and inform instructional decision-making. ▶ Students and the teacher use standards to co-define goals and benchmarks for the project (e.g., by co-constructing a rubric) in developmentally appropriate ways. ▶ Students' enthusiasm and sense of ownership of the project is maintained by the shared nature of the work between teachers and students. ▶ Student questions play the central role in driving the inquiry and product development process; the driving question is actively used to sustain inquiry. ▶ Appropriately high expectations for the performance of all students are clearly established, shared, and reinforced by teachers and students. ▶ Individual student needs are identified through close relationships built with the teacher; needs are met not only by the teacher but by students themselves or other students, acting independently. ▶ Students and the teacher reflect regularly and formally throughout the project on what and how students are learning (content and process); they specifically note and celebrate gains and accomplishments.

P B L S C H O O L R U B R I C

Essential Element of a PBL School	Beginning PBL School <i>School leaders have begun taking steps to establish the culture and practices that support PBL, but important challenges remain to be addressed.</i>	Needs Further Development <i>School leaders have taken some steps to establish the culture and practices that support PBL, but the school still has some areas for growth.</i>	Promotes and Sustains Best Practices of a PBL School <i>School leaders have established the culture and practices that support PBL across the school.</i>
Significant Content	<ul style="list-style-type: none"> ▶ The school leadership has a general vision for implementing PBL, but has not established a PBL Implementation Plan to clarify the vision, craft goals, and outline actions to sustain PBL. Training is in progress, but teachers are not clear about "next steps," how they will be supported, or how the various initiatives are linked. ▶ Some teachers are beginning to implement PBL. ▶ Teachers are developing awareness of how to use the 8 Essential Elements to define quality project design. Teachers are beginning to transition to main course projects that meet the 8 Essential Elements. 	<ul style="list-style-type: none"> ▶ The school leadership has developed a PBL Implementation Plan. However, some stakeholders lack understanding of the plan and how PBL and other initiatives are mutually supportive. The plan may focus on too few, too many, or less important actions and staff is experiencing difficulty executing aspects of the plan. ▶ PBL is a method of instruction in most of the targeted content areas as defined in the PBL Implementation Plan. ▶ Most teachers use the 8 Essential Elements to define quality project design. Most projects are main course projects that meet the 8 Essential Elements. 	<ul style="list-style-type: none"> ▶ The school leadership has developed a PBL Implementation Plan to realize the articulated vision, meet achievement goals, and sustain PBL. All stakeholders show an understanding of the plan and how PBL and other initiatives are mutually supportive. Staff is experiencing success in executing the plan and maintains a focus on student learning. ▶ PBL is a method of instruction in all of the targeted content areas as defined in the PBL Implementation Plan. ▶ All teachers use the 8 Essential Elements to define quality project design. All projects are main course projects that meet the 8 Essential Elements.
21st Century Competencies	<ul style="list-style-type: none"> ▶ School leadership does not explicitly promote, recognize, and model the use of the 4 C's. ▶ There are few opportunities for staff to demonstrate the 4 C's: <ul style="list-style-type: none"> • <i>Communication:</i> Although there may be a feeling of collegiality among some staff members, staff would benefit from the development of norms to build trust and ensure balanced participation during meetings. • <i>Collaboration:</i> Although it is more commonplace for teachers to work in isolation, staff is beginning to work in collaborative teams that employ the skills of all group members. • <i>Critical Thinking:</i> Staff may explore simple problems, but is not afforded opportunities to think critically to analyze complex problems related to PBL implementation and effectiveness for student learning. • <i>Creativity & Innovation:</i> Staff may lack clarity about how they can go about putting a new idea into practice. (There may be a feeling that too much "red tape" exists or that staff members do not have the authority to truly innovate.) 	<ul style="list-style-type: none"> ▶ School leadership is beginning to promote, recognize, and model the use of 4 C's. ▶ There are some opportunities for staff to demonstrate the 4 C's: <ul style="list-style-type: none"> • <i>Communication:</i> Staff has established norms to build trust and ensure balanced participation during meetings; staff is beginning to practice effective communication; norms are usually, but not consistently honored. • <i>Collaboration:</i> Most staff work in collaborative teams that employ the skills of all group members. • <i>Critical Thinking:</i> Staff is beginning to think critically to analyze complex problems related to PBL implementation and effectiveness for student learning, but does not consistently use reasoning to identify the best solution, nor use systems thinking to consider how the various components that make up the school system will be impacted by the proposed solution. • <i>Creativity & Innovation:</i> Staff are beginning to create original ideas that have value and put new ideas into practice. 	<ul style="list-style-type: none"> ▶ School leadership explicitly and consistently promotes, recognizes, and models the use of the 4 C's. ▶ There are consistent opportunities for staff to demonstrate the 4 C's: <ul style="list-style-type: none"> • <i>Communication:</i> Staff uses agreed-upon norms to build trust and ensure balanced participation during meetings. Staff shares ideas, gives and receives feedback respectfully, listens actively, and communicates that other opinions are valued. • <i>Collaboration:</i> All staff regularly work in collaborative teams (sometimes with external partners and the community at large) that employ the skills of all group members. • <i>Critical Thinking:</i> Staff regularly think critically to analyze complex problems related to PBL implementation and effectiveness for student learning, use reasoning to identify the best solution, and use systems thinking to consider how the various components that make up the school system will be impacted by the proposed solution. • <i>Creativity & Innovation:</i> Systems are in place that allow staff to innovate, and school culture encourages innovation.

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DISCOVER/CREATE/SHARE - SKETCHNOTE

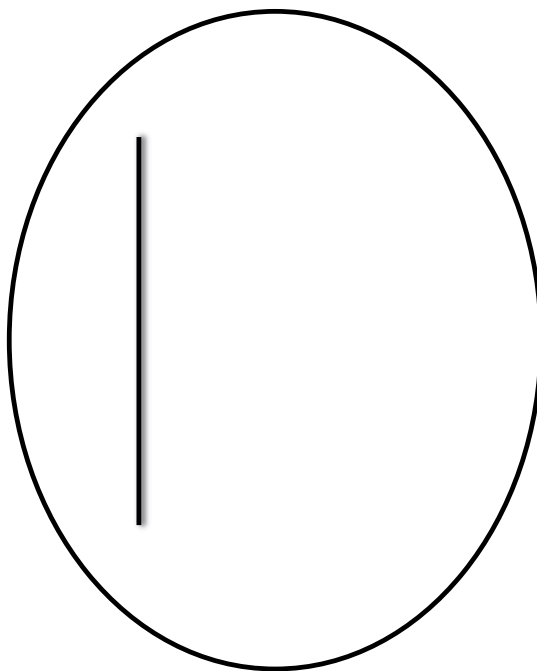
HOOK	EXPERT	PRODUCT	AUDIENCE
Model building	Academic	Video (draw my life/paper slide/minicraft screencast)	Principal/HT/teachers
Watching YouTube	Author	Documentary	Class within school
Drama activities	Director (film /theatre)	Film	Class in another school (face to face or online via skype)
Taking students outside	Celebrity	Website (weebly, wix)	Whole school
Garden health assessment and revamp	Engineer	Picture book	Grandparents
Tasting foods	Journalist	Novel/novella	Local politician
Classroom cinema	Game designer	Book/iBook	Nursing home
Guest expert talk	Artist/ Musician	Graphic novel	Preschool
6 word story/memoir/play	Business person	Exhibition	Online
Twitter Q&A with expert	Community clubs/organisations	Food stall	Local/state library
Art - painting	Chef/Baker	Innovative design and prototype (loom band)	Local art gallery
Celebrity head/match the pictures	Fashion designer	Video game design	University campus
Introductory video from expert	Politician	Poetry performance/reading	Youth workers
Skype call with expert	Sportsperson	Horrible Histories episode	Expert (see other column)
Playing video games	Gardener	Interpretive dance	Parents and friends
Scavenger hunt	NGO representative	Stage performance	Charity representatives

YEAR 7 CROSS-FACULTY PROJECTS

Name of project:			Duration:				
Subjects:			Year level:				
Project idea: (summary of the challenge, investigation, scenario, problem or issue):							
Driving question:							
Outcomes: (content, cross-curricula priorities, general capabilities):							
Hook lesson (to launch inquiry and engage students):							
		T+A	E		T+A	E	
Proficiencies (explicitly taught and assessed 'T+A' or encouraged 'E'):	Collaboration	<input type="radio"/>	<input type="radio"/>	Creative Thinking	<input type="radio"/>	<input type="radio"/>	
	Reflective, self-directed learning	<input type="radio"/>	<input type="radio"/>	Time Management & Organisation	<input type="radio"/>	<input type="radio"/>	
	Critical Thinking	<input type="radio"/>	<input type="radio"/>	Presentation skills	<input type="radio"/>	<input type="radio"/>	
Culminating products and performances:	Individual:				Project audience (please add specific details): <input type="radio"/> school <input type="radio"/> community <input type="radio"/> experts <input type="radio"/> web <input type="radio"/> other:		
	Group:						
GATS strategies embedded in teaching & learning:	(check all that will be used)	Student-led discussions	<input type="radio"/>	Individual research	<input type="radio"/>	William's model	<input type="radio"/>
		Curriculum compacting (basic skills/content – individual/group)	<input type="radio"/>	Differentiation	<input type="radio"/>	Open-ended tasks	<input type="radio"/>
		Problem-solving	<input type="radio"/>	Pre-testing	<input type="radio"/>	Blooms taxonomy	<input type="radio"/>
		Contract work	<input type="radio"/>	Learner outcomes	<input type="radio"/>	Maker modifications	<input type="radio"/>
Assessments:	Assessment for Learning: (during project)	Concept maps/notes	<input type="radio"/>	Practice presentations		<input type="radio"/>	
		Quiz	<input type="radio"/>	Preliminary plans/prototypes		<input type="radio"/>	
		Online tests/exams	<input type="radio"/>	Rough drafts		<input type="radio"/>	
	Assessment as Learning: (during project)	Learning journal/blog	<input type="radio"/>	Checklists		<input type="radio"/>	
		Goals/Medals/Missions	<input type="radio"/>	SOLO taxonomy		<input type="radio"/>	
		KWL table	<input type="radio"/>	Punk Learner rubric		<input type="radio"/>	
	Assessment of learning: (end of project)	Written product with rubric:	<input type="radio"/>	Peer evaluation		<input type="radio"/>	
		Oral presentation with rubric	<input type="radio"/>	Multiple choice/short answer test		<input type="radio"/>	
Essay test		<input type="radio"/>	Other:		<input type="radio"/>		
End of project evaluation methods:	(check all that will be used)	Journal/Learning log/Blog	<input type="radio"/>	Focus group	<input type="radio"/>		
		Whole-class discussion	<input type="radio"/>	Fishbowl discussions	<input type="radio"/>		
		Survey	<input type="radio"/>	Other:	<input type="radio"/>		

<http://projectbasedlearningmsc.weebly.com/>

Literacy Links	<div>_____ Links</div>	Assessment for learning
		Assessment as learning
		Assessment of learning
Numeracy Links	<div>_____ Links</div>	Key inquiry Questions
<div>_____ Links</div>	<div>_____ Links</div>	Cross curriculum priorities
		General Capabilities
		Other learning across the curriculum areas



Cross Curriculum Priorities

Aboriginal and Torres Strait Islander histories and cultures

Aboriginal and Torres Strait Islander communities have diverse cultures, social structures and a history of unique, complex knowledge systems. The *Science K–10 (Incorporating Science and Technology K–6)* Syllabus provides students with opportunities to learn about how Aboriginal and Torres Strait Islander peoples have developed and refined knowledge about the world through observation, making predictions, testing (trial and error) and responding to environmental factors within specific contexts. Students will investigate examples of Aboriginal and Torres Strait Islander peoples' understanding of the environment and the ways that traditional knowledge and western scientific knowledge can be complementary.

Asia and Australia's engagement with Asia

Asia and Australia's engagement with Asia provides rich and engaging contexts for developing students' science and technology skills, knowledge and understanding. The *Science K–10 (Incorporating Science and Technology K–6)* Syllabus provides students with opportunities to recognise that the Asian region includes diverse environments. Students appreciate how interactions within and between these environments and the impacts of human activity influence the region, including Australia, and have significance for the rest of the world.

The Asian region plays an important role in scientific and technological research and development in areas such as medicine, natural resource management and natural disaster prediction and management.

Sustainability

Sustainability is concerned with the ongoing capacity of the Earth to maintain all life. It provides authentic contexts for exploring, investigating and understanding systems in the natural and made environments. The *Science K–10 (Incorporating Science and Technology K–6)* Syllabus provides students with opportunities to investigate relationships between systems and system components, to consider how systems respond to change and to develop appreciation for the interconnectedness of the Earth's spheres.

Relationships, cycles and cause and effect are explored, and students develop observation and analytical skills to examine these relationships in the world around them to design solutions to identified sustainability problems.

General Capabilities

Critical and creative thinking

Critical and creative thinking are integral to activities where students learn to generate and evaluate knowledge, clarify concepts and ideas, seek possibilities, consider alternatives and solve problems. Critical and creative thinking are embedded in the skills and processes of Working Scientifically and Working Technologically. The *Science K–10 (Incorporating Science and Technology K–6) Syllabus* provides students with opportunities to develop critical and creative thinking skills through asking and posing questions, making predictions, engaging in first-hand investigations and design projects, problem solving, making evidence-based decisions, and analysing and evaluating evidence.

Ethical understanding

Students develop the capability to behave ethically as they identify and investigate the nature of ethical concepts, values and principles, and understand how reasoning can assist ethical judgement. The *Science K–10 (Incorporating Science and Technology K–6) Syllabus* provides opportunities for students to form and make ethical judgements in relation to scientific investigations, design, codes of practice, and the use of scientific and technological information and applications. Students explore what integrity and honesty mean in using the processes of Working Scientifically and Working Technologically. They apply ethical guidelines in their investigations and design projects, particularly in their implications for others and the environment.

Information and communication technology capability

Information and communication technology (ICT) can be used effectively and appropriately to access, create and communicate information and ideas, solve problems and work collaboratively. The *Science K–10 (Incorporating Science and Technology K–6) Syllabus* provides students with opportunities to develop ICT capability when they develop design ideas and solutions, research science concepts and applications, investigate science phenomena, and communicate their scientific and technological understandings. In particular they learn to access information, collect, analyse and represent data, model and interpret concepts and relationships, and communicate scientific and technological ideas, processes and information. Digital technologies and aids, such as animations and simulations, provide opportunities to view phenomena and test predictions that cannot be investigated through practical experiences in the classroom, and may enhance students' understanding and engagement with science and technology.

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Intercultural understanding

Students develop intercultural understanding as they learn to understand themselves in relation to others. This involves students valuing their own cultures and those of others, and engaging with people of diverse cultures in ways that recognise commonalities and differences, create connections and cultivate respect. The *Science K–10 (incorporating Science and Technology K–6)* Syllabus provides opportunities for students to appreciate the contribution that diverse cultural perspectives have made to the development, breadth and diversity of scientific and technological knowledge and applications. Students learn about and engage with issues requiring cultural sensitivity, and learn that scientists work in culturally diverse teams to address issues and solve problems of national and international importance.

Literacy

Literacy is the ability to use a repertoire of knowledge and skills to communicate and comprehend effectively, using a variety of modes and media. Being 'literate' is more than the acquisition of technical skills – it includes the ability to identify, understand, interpret, create and communicate effectively using written, visual and digital forms of expression and communication for a number of purposes. The *Science K–10 (incorporating Science and Technology K–6)* Syllabus provides students with the opportunities to understand that language varies according to the context. The language of science and technology is often technical and includes specific terms for concepts, processes and features of the world. Students learn that scientific and technological information can be presented in the form of diagrams, flowcharts, tables and graphs, and that specific text types are used to link information and ideas, give explanations, formulate questions, hypotheses, draw conclusions and construct evidence-based arguments.

Numeracy

Numeracy involves students in recognising and understanding the role of mathematics in the world. Students become numerate as they develop the confidence, willingness and ability to apply mathematics in their lives in constructive and meaningful ways. The *Science K–10 (incorporating Science and Technology K–6)* Syllabus provides students with opportunities to develop numeracy skills through practical measurement and the collection, representation and interpretation of data from first-hand investigations and secondary sources. Initially students make measurements using informal units, then they apply the formal units of measurement. Students consider issues of uncertainty and reliability in measurement and learn data-analysis skills, identifying trends and patterns from numerical data and graphs.

Personal and social capability

Students develop personal and social capability as they learn to understand and manage themselves, their relationships and their lives more effectively. This includes establishing positive relationships, making responsible decisions, working effectively individually and in teams and constructively handling challenging situations. The *Science K–10 (incorporating Science and Technology K–6)* Syllabus provides students with opportunities, through applying processes of Working Scientifically and Working Technologically, to learn how scientific and technological knowledge informs and is applied in their daily lives. They develop skills in communication, initiative taking, goal setting, interacting with others, decision making, and the capacity to work independently and collaboratively. The study of Science and Technology enhances personal and social capability by expanding students' capacity to question, solve problems, explore and display curiosity. Students use their scientific and technological understanding to make informed choices about issues that impact on their lives and consider how the use and application of science and technology meet a range of personal and social needs.

Other learning across the curriculum areas

Civics and citizenship

Civics and citizenship content involves knowledge and understanding of how our Australian society operates. The *Science K–10 (incorporating Science and Technology K–6)* Syllabus provides students with opportunities to broaden their understanding of aspects of civics and citizenship in relation to the application of science ideas and technological advances, including ecological sustainability and the development of environmental and sustainable practices.

Difference and diversity

Difference and diversity comprise gender, race and socio-economic circumstances. The *Science K–10 (incorporating Science and Technology K–6)* Syllabus provides opportunities for students to understand and appreciate the difference and diversity they experience in their everyday lives. Working Scientifically and Working Technologically provide opportunities for students to work collaboratively, where they can develop an appreciation of the values and ideas of all group members. This also enables them to identify individual rights, challenge stereotypes and engage with opinions different to their own.

Work and enterprise

Students develop work-related skills and an appreciation of the value of working individually and collaboratively when conducting investigations and design tasks. The *Science K–10 (incorporating Science and Technology K–6)* Syllabus provides opportunities for students to prioritise safe practices and understand the potential risks and hazards present when conducting investigations and constructing design solutions. They safely use materials, electrical devices, classroom equipment and specialised tools.

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Type of

Driving Question: Examples:

**Abstract,
Conceptual**

*(answered by conceptual
analysis and logical
argument)*

What makes a book a classic?
What is a hero?
What is justice?
When do we grow up?
When is war justified?
Should U.S. foreign policy be pragmatic or idealistic?
Should art be censored?
Should President Truman have dropped the atomic bomb on Japan?

More Concrete

*(answered mainly by
the analysis of empirical
evidence)*

Why did the dinosaurs become extinct?
Are amusement park rides safe?
Is our water safe to drink?
Why don't I fall off my skateboard?
What effect does population growth have on our society?
Can DNA evidence be trusted in criminal trials?
Is watching TV beneficial or harmful to teenagers?

Problem-Solving

*(answered by offering a
reasonable solution)*

How can we decrease the amount of pollutants in the water that runs off our city's streets into the river?
How can the federal government use monetary and fiscal policy to address an economic crisis?
How can a local business attract more customers?
How can we create an effective networking system for a client?
How can we improve traffic flow around our school?
How can we experimentally and mathematically model a landing sequence like that of the Pathfinder mission to explore Mars?

Design Challenge

*(answered by
creating—and often
executing—a design
that effectively meets
requirements)*

How can we design a community theatre that meets size limits and seats the most people?
How can we build a website to share information and opinions about novels that teenagers might like?
How would we design a museum exhibit about the Vietnam War so that it appeals to diverse groups in our community?
How can we produce a video of a soap opera in Spanish?
How can we create a (work of art/piece of media) to express our thoughts about diversity in our community?

- 1. How do we use our senses to discover the world?**
- 2. How does climate affect the way we live?**
- 3. How do drugs affect our health?**
- 4. What makes a school safe?**
- 5. How does our school impact the environment?**
- 6. How can we redesign our school to meet the needs of 21st century learners?**
- 7. How can we create a picturebook that will interest preschoolers?**
- 8. How can we promote reading in our school?**
- 9. What makes us happy?**
- 10. How can we encourage our community to live more sustainable lives?**

What impact is **environmental degradation** having on us in terms of our **mental** and **spiritual wellbeing**?

How do we become **naturally smart** and share what we learn to enhance **wellbeing**?

How do **new encounters** change us?

What kinds of tasks do human beings perform *better than machines*?

What kinds of tasks do machines perform *better than human beings*?

What kind of **knowledge and skills** do humans need to shape and direct that computing power to **productive ends**?

How can people be best prepared to ***learn and relearn*** the skills to do **human work**?

Why pay to listen to a local musician when you can hear the world's leading musicians for next to nothing on your *smartphone*?

Why go to the mall when you can sit in the comfort of your own home, comparison *shop worldwide* for the product you are looking for at a great price delivered to your door for nothing?

What does it mean to be **human**?

In an era dominated by the internet, mobile devices and screens, ***why would one need to physically attend school***?

If technology can make **society safer**, is it not worth the **invasion of our privacy**?

Is our privacy invaded when only **an algorithm and not a person** looks at our data?

How do we know when to trust a *machine*?

What information provided by machines can we trust?

Will we perhaps trust machines *too much*?

Is a **technological arms race** between parties to target voters
destructive to democracy?

If we use algorithms to *influence voters*, does it threaten our very
democracy?

Who or what is **responsible** for the messages that machines produce?

How free is **human speech** when it is drowned in a **sea of machine
voices**?

How do we build robots that behave **ethically**?

Who is responsible for robots' actions?

How do we prevent **robots** from being hacked to **behave unethically**?

Should machines be given the right to make *life or death decisions*?
Should there also be a human "in the loop"?

4

[Wild Card]

Real-World Problem

For a Public Audience

For a School

For a Classroom

For an Online Audience

3

[Wild Card]

Build... Create... Make...

Design... Plan...

Solve...

Write...

Propose... Decide...

2

[Wild Card]

I We

We as, [Roles] [Occupations]

[Town] [City] [County]

[State] [Nation]

[Community] [Organization]

1

[Wild Card]


How can...

How do...


Should...

Could...

What...



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TUBRIC™ | bie.org

Assembly required.
Instructions not included.
Application open-ended
It's Project Based Learning.

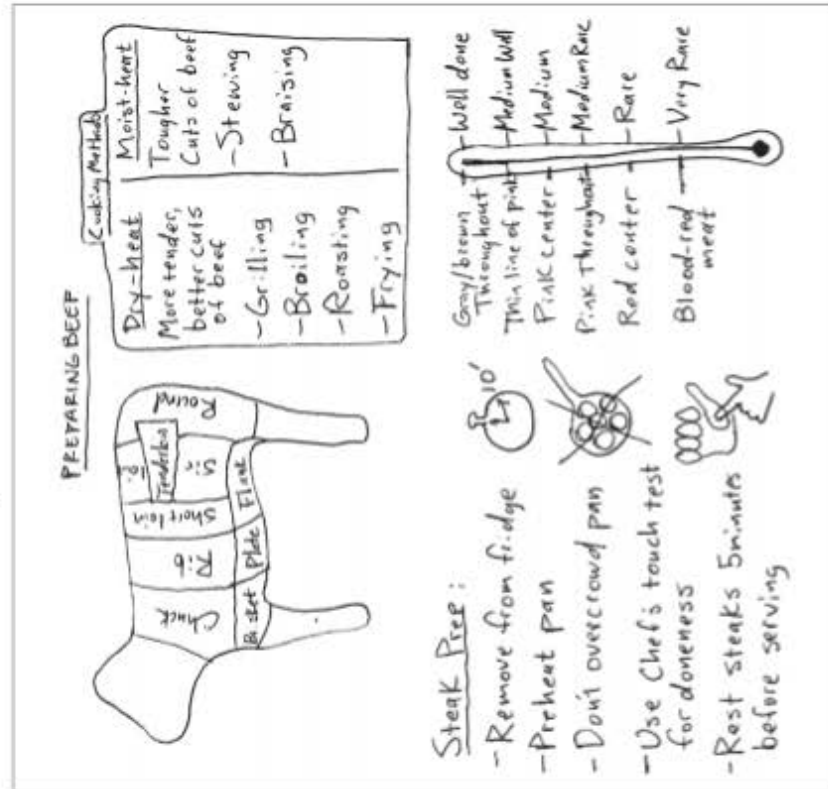
Framing Words	Person or Entity	Action or Challenge	Audience or Purpose
<div>TUBRIC™ bie.org</div>			

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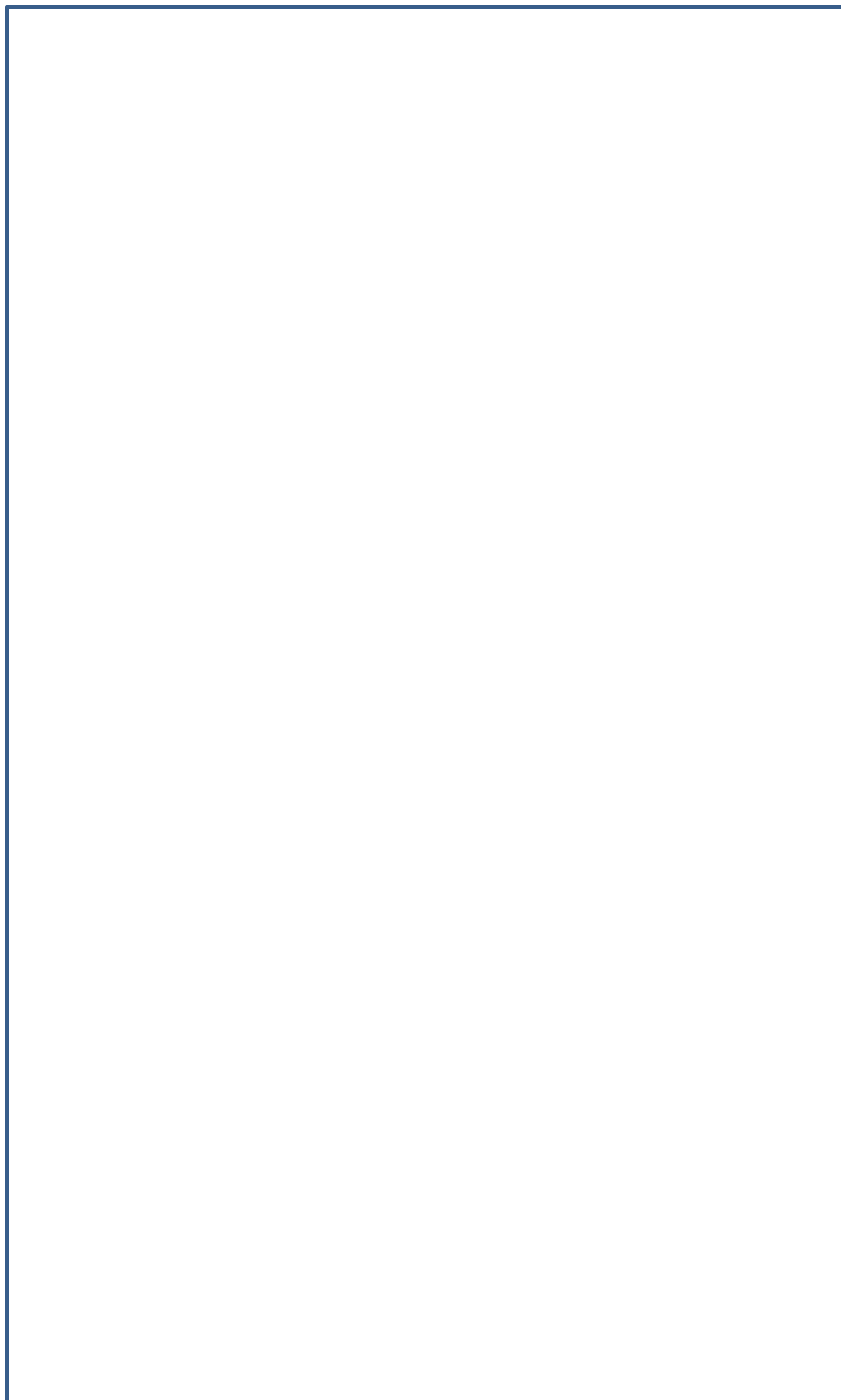
Driving question:	Share:	Assessment:
	Create:	Assessment:
	Discover:	Assessment:

Create a Session One Memory Box

1. In your scrapbooks draw a box and fill it with everything they can remember about our first opening session. You might like to:
 - List, define, or describe relevant terms.
 - Summarize key concepts and ideas.
 - Record important names, dates, and formulas.
 - Draw maps, timelines, symbols, and other images.
 - Use sketches and pictures to show what they know



INTRO TO PBL - MEMORY BOX



P R O J E C T M A N A G E M E N T L O G : T E A M T A S K S	
Project Name:	
Team Members:	

Task	Who Is Responsible	Due Date	Status	Done
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DISCUSSION STRATEGIES FOR THE CLASSROOM – VIA THE CULT OF PEDAGOGY BLOG
GALLERY WALK > a.k.a. Chat Stations

Basic Structure: Stations or posters are set up around the classroom, on the walls or on tables. Small groups of students travel from station to station together, performing some kind of task or responding to a prompt, either of which will result in a conversation.

Variations: Some Gallery Walks stay true to the term *gallery*, where groups of students create informative posters, then act as tour guides or docents, giving other students a short presentation about their poster and conducting a Q&A about it. In Starr Sackstein’s high school classroom, her stations consisted of video tutorials created by the students themselves. Before I knew the term Gallery Walk, I shared a strategy similar to it called Chat Stations, where the teacher prepares discussion prompts or content-related tasks and sets them up around the room for students to visit in small groups.

PHILOSOPHICAL CHAIRS > a.k.a. Values Continuum, Forced Debate, Physical Barometer, This or That

Basic Structure: A statement that has two possible responses—agree or disagree—is read out loud. Depending on whether they agree or disagree with this statement, students move to one side of the room or the other. From that spot, students take turns defending their positions.

Variations: Often a Philosophical Chairs debate will be based around a text or group of texts students have read ahead of time; students are required to cite textual evidence to support their claims and usually hold the texts in their hands during the discussion. Some teachers set up one hot seat to represent each side, and students must take turns in the seat. In less formal variations (which require less prep), a teacher may simply read provocative statements students are likely to disagree on, and a debate can occur spontaneously without a text to refer to (I call this variation This or That in my classroom icebreakers post). Teachers may also opt to offer a continuum of choices, ranging from “Strongly Agree” on one side of the room, all the way to “Strongly Disagree” on the other, and have students place themselves along that continuum based on the strength of their convictions.

PINWHEEL DISCUSSION >

Basic Structure: Students are divided into 4 groups. Three of these groups are assigned to represent specific points of view. Members of the fourth group are designated as “provocateurs,” tasked with making sure the discussion keeps going and stays challenging. One person from each group (the “speaker”) sits in a desk facing speakers from the other groups, so they form a square in the center of the room. Behind each speaker, the remaining group members are seated: two right behind the speaker, then three behind them, and so on, forming a kind of triangle. From above, this would look like a pinwheel. The four speakers introduce and discuss questions they prepared ahead of time (this preparation is done with their groups). After some time passes, new students rotate from the seats behind the speaker into the center seats and continue the conversation.

Variations: When high school English teacher Sarah Brown Wessling introduced this strategy in the featured video (click Pinwheel Discussion above), she used it as a device for talking about literature, where each group represented a different author, plus one provocateur group. But in the comments that follow the video, Wessling adds that she also uses the strategy with non-fiction, where students represent authors of different non-fiction texts or are assigned to take on different perspectives about an issue.

SOCRATIC SEMINAR > *a.k.a. Socratic Circles*

Basic Structure: Students prepare by reading a text or group of texts and writing some higher-order discussion questions about the text. On seminar day, students sit in a circle and an introductory, open-ended question is posed by the teacher or student discussion leader. From there, students continue the conversation, prompting one another to support their claims with textual evidence. There is no particular order to how students speak, but they are encouraged to respectfully share the floor with others. Discussion is meant to happen naturally and students do not need to raise their hands to speak. This overview of Socratic Seminar from the website *Facing History and Ourselves* provides a list of appropriate questions, plus more information about how to prepare for a seminar.

Variations: If students are beginners, the teacher may write the discussion questions, or the question creation can be a joint effort. For larger classes, teachers may need to set up seminars in more of a fishbowl-like arrangement, dividing students into one inner circle that will participate in the discussion, and one outer circle that silently observes, takes notes, and may eventually trade places with those in the inner circle, sometimes all at once, and sometimes by “tapping in” as the urge strikes them.

AFFINITY MAPPING > *a.k.a. Affinity Diagramming*

Basic Structure: Give students a broad question or problem that is likely to result in lots of different ideas, such as “What were the impacts of the Great Depression?” or “What literary works should every person read?” Have students generate responses by writing ideas on post-it notes (one idea per note) and placing them in no particular arrangement on a wall, whiteboard, or chart paper. Once lots of ideas have been generated, have students begin grouping them into similar categories, then label the categories and discuss why the ideas fit within them, how the categories relate to one another, and so on.

Variations: Some teachers have students do much of this exercise—recording their ideas and arranging them into categories—*without* talking at first. In other variations, participants are asked to re-combine the ideas into new, different categories after the first round of organization occurs. Often, this activity serves as a good pre-writing exercise, after which students will write some kind of analysis or position paper.

CONCENTRIC CIRCLES > *a.k.a. Speed Dating*

Basic Structure: Students form two circles, one inside circle and one outside circle. Each student on the inside is paired with a student on the outside; they face each other. The teacher poses a question to the whole group and pairs discuss their responses with each other. Then the teacher signals students to rotate: Students on the outside circle move one space to the right so they are standing in front of a new person (or sitting, as they are in the video). Now the teacher poses a new question, and the process is repeated.

Variations: Instead of two circles, students could also form two straight lines facing one another. Instead of “rotating” to switch partners, one line just slides over one spot, and the leftover person on the end comes around to the beginning of the line. Some teachers use this strategy to have students teach one piece of content to their fellow students, making it less of a discussion strategy and more of a peer teaching format. In fact, many of these protocols could be used for peer teaching as well.

CONVER-STATIONS >

Basic Structure: Another great idea from Sarah Brown Wessling, this is a small-group discussion strategy that gives students exposure to more of their peers' ideas and prevents the stagnation that can happen when a group doesn't happen to have the right chemistry. Students are placed into a few groups of 4-6 students each and are given a discussion question to talk about. After sufficient time has passed for the discussion to develop, one or two students from each group rotate to a different group, while the other group members remain where they are. Once in their new group, they will discuss a different, but related question, and they may also share some of the key points from their last group's conversation. For the next rotation, students who have not rotated before may be chosen to move, resulting in groups that are continually evolving.

FISHBOWL >

Basic Structure: Two students sit facing each other in the center of the room; the remaining students sit in a circle around them. The two central students have a conversation based on a pre-determined topic and often using specific skills the class is practicing (such as asking follow-up questions, paraphrasing, or elaborating on another person's point). Students on the outside observe, take notes, or perform some other discussion-related task assigned by the teacher.

Variations: One variation of this strategy allows students in the outer circle to trade places with those in the fishbowl, doing kind of a relay-style discussion, or they may periodically "coach" the fishbowl talkers from the sidelines. Teachers may also opt to have students in the outside circle grade the participants' conversation with a rubric, then give feedback on what they saw in a debriefing afterward, as mentioned in the featured video.

HOT SEAT >

Basic Structure: One student assumes the role of a book character, significant figure in history, or concept (such as a tornado, an animal, or the *Titanic*). Sitting in front of the rest of the class, the student responds to classmates' questions while staying in character in that role.

Variations: Give more students the opportunity to be in the hot seat while increasing everyone's participation by having students do hot seat discussions in small groups, where one person per group acts as the "character" and three or four others ask them questions. In another variation, several students could form a panel of different characters, taking questions from the class all together and interacting with one another like guests on a TV talk show.

SNOWBALL DISCUSSION > *a.k.a. Pyramid Discussion*

Basic Structure: Students begin in pairs, responding to a discussion question only with a single partner. After each person has had a chance to share their ideas, the pair joins another pair, creating a group of four. Pairs share their ideas with the pair they just joined. Next, groups of four join together to form groups of eight, and so on, until the whole class is joined up in one large discussion.

Variations: This structure could simply be used to share ideas on a topic, or students could be required to reach consensus every time they join up with a new group.

Whereas the other formats in this list have a distinct shape—specific *activities* you do with students—the strategies in this section are more like plug-ins, working discussion into other instructional activities and improving the quality and reach of existing conversations.

ASYNCHRONOUS VOICE >

One of the limitations of discussion is that rich, face-to-face conversations can only happen when all parties are available, so we're limited to the time we have in class. With a tool like Voxer, those limitations disappear. Like a private voice mailbox that you set up with just one person or a group (but SOOOO much easier), Voxer allows users to have conversations at whatever time is most convenient for each participant. So a group of four students can "discuss" a topic from 3pm until bedtime—asynchronously—each member contributing whenever they have a moment, and if the teacher makes herself part of the group, she can listen in, offer feedback, or contribute her own discussion points. Voxer is also invaluable for collaborating on projects and for having one-on-one discussions with students, parents, and your own colleagues. Like many other educators, Peter DeWitt took a while to really understand the potential of Voxer, but in this *EdWeek* piece, he explains what turned him around.

BACKCHANNEL DISCUSSIONS >

A *backchannel* is a conversation that happens right alongside another activity. The first time I saw a backchannel in action was at my first unconference: While those of us in the audience listened to presenters and watched a few short video clips, a separate screen was up beside the main screen, projecting something called TodaysMeet. It looked a lot like those chat rooms from back in the day, basically a blank screen where people would contribute a few lines of text, the lines stacking up one after the other, no other bells or whistles. Anyone in the room could participate in this conversation on their phone, laptop, or tablet, asking questions, offering commentary, and sharing links to related resources without ever interrupting the flow of the presentations. This kind of tool allows for a completely silent discussion, one that doesn't have to move at a super-fast pace, and it gives students who may be reluctant to speak up or who process their thoughts more slowly a chance to fully contribute. For a deeper discussion of how this kind of tool can be used, read this thoughtful overview of using backchannel discussions in the classroom by *Edutopia's* Beth Holland.

TALK MOVES > *a.k.a. Accountable Talk*

Talk moves are sentence frames we supply to our students that help them express ideas and interact with one another in respectful, academically appropriate ways. From kindergarten all the way through college, students can benefit from explicit instruction in the skills of summarizing another person's argument before presenting an alternate view, asking clarifying questions, and expressing agreement or partial agreement with the stance of another participant. Talk moves can be incorporated into any of the other discussion formats listed here.

TEACH-OK >

Whole Brain Teaching is a set of teaching and classroom management methods that has grown in popularity over the past 10 years. One of WBT's foundational techniques is *Teach-OK*, a peer teaching strategy that begins with the teacher spending a few minutes introducing a concept to the class. Next, the teacher says *Teach!*, the class responds with *Okay!*, and pairs of students take turns re-teaching the concept to each other. It's a bit like think-pair-share, but it's faster-paced, it focuses more on re-teaching than general sharing, and students are encouraged to use gestures to animate their discussion. Although WBT is most popular in elementary schools, this featured video shows the creator of WBT, Chris Biffle, using it quite

successfully with college students. I have also used Teach-OK with college students, and most of my students said they were happy for a change from the sit-and-listen they were used to in college classrooms.

THINK-PAIR-SHARE >

An oldie but a goodie, think-pair-share can be used any time you want to plug interactivity into a lesson: Simply have students *think* about their response to a question, form a *pair* with another person, discuss their response, then *share* it with the larger group. Because I feel this strategy has so many uses and can be way more powerful than we give it credit for, I devoted a whole post to think-pair-share; everything you need to know about it is right there.

Source: <https://www.cultofpedagogy.com/speaking-listening-techniques/>

53 WAYS

To Check for Understanding

1. Summary Poem Activity:

- List 10 key words from an assigned text.
- Do a free verse poem with the words you highlighted.
- Write a summary of the reading based on the words you highlighted.

2. Invent the Quiz

- Write 10 higher-order text questions related to the content. Pick 2 and answer them in half a page.

3. The 411

- Describe the author's objective.

4. Opinion Chart

- List opinions about the content in one half of a T-chart, and support your opinions in the right column.

5. So What? Journal

- Identify the main idea of the lesson. Why is it important?

6. Rate Understanding

7. Clickers (Response System)

8. Teacher Observation Checklist

9. Explaining

- Explain the main idea using an analogy.

10. Evaluate

- What is the author's main point? What are the arguments for and against this idea?

11. Describe

- What are the important characteristics or features of the main concept or idea of the reading?

12. Define

- Pick out an important word or phrase that the author introduces. What does this word or phrase mean?

13. Compare & Contrast

- Identify the theory or idea the author is advancing. Then identify an opposite theory. What are the similarities and differences between these ideas?

14. Question Stems

- I believe that _____ because _____.
- I am confused by _____.

15. Mind Map

- Create a mind map that represents a concept using a diagram-making tool (like Gliffy). Provide your teacher / classmates with the link to your mind map.

16. Intrigue Journal

- List the five most interesting, controversial, or resonant ideas you found in the readings. Include page #s and a short rationale (100 words) for your selection.

17. Advertisement

- Create an ad, with visuals and text, for the newly learned concept.

18. 5 Words

- What 5 words would you use to describe _____? Explain and justify your choices.

19. Muddy Moment

- What frustrates and confuses you about the text? Why?

20. Collage

- Create a collage around the lesson's themes. Explain your choices in one paragraph.

21. Letter

- Explain _____ in a letter to your best friend.

22. Talk Show Panel

- Have a cast of experts debate the finer points of _____.

23. Study Guide

- What are the main topics, supporting details, important person's contributions, terms, and definitions?

24. Illustration

- Draw a picture that illustrates a relationship between terms in the text. Explain in one paragraph your visual representation.

25. KWL Chart

- What do you know, what do you want to know, and what have you learned?

26. Sticky Notes Annotation

- Use sticky notes to describe key passages that are notable or that you have questions about.

27. 3-2-1

- 3 things you found out, 2 interesting things, and 1 question you still have.

28. Outline

- Represent the organization of _____ by outlining it.

29. Anticipation Guide

- Establish a purpose for reading and create post-reading reflections and discussion.

30. Simile

- What we learned today is like _____.

31. The Minute Paper

- In 1 minute, describe the most meaningful thing you've learned.

32. Interview You

- You're the guest expert on *60 Minutes*. Answer:
 - What are component parts of _____?
 - Why does this topic matter?

33. Double Entry Notebook

- Create a two-column table. Use the left column to write down 5–8 important quotations. Use the right column to record reactions to the quotations.

34. Comic Book

- Use a comic book creation tool like Bitstrips to represent understanding.

35. Tagxedo

- What are key words that express the main ideas? Be ready to discuss and explain.

36. Classroom TED Talk

37. Podcast

- Play the part of a content expert and discuss content-related issues on a podcast, using the free Easypodcast.

38. Create a Multimedia Poster

39. Twitter Post

- Define _____ in under 140 characters.

40. Explain Your Solution

- Describe how you solved an academic solution step-by-step.

41. Dramatic Interpretation

- Dramatize a critical scene from a complex narrative.

42. Ballad

- Summarize a narrative that employs a poem or song structure that using short stanzas.

43. Pamphlet

- Describe the key features of _____ in a visually and textually compelling pamphlet.

44. You've Got Mail

- Each student writes a question about a topic on the front of an envelope; the answer is included inside. Questions are then "mailed" around the room. Each learner writes her answer on a slip of scratch paper and confirms its correctness by reading the "official answer" before she places her own response in the envelope. After several series of mailings and a class discussion about the subject, the envelopes are deposited in the teacher's letterbox.

45. Bio Poem

- To describe a character or a person, write a poem that includes:
 - Line 1) First Name
 - Line 2) 3–4 adjectives that describe the person
 - Line 3) Important relationship
 - Line 4) 2–3 things, people, or ideas that the person loved
 - Line 5) 3 feelings the person experienced
 - Line 6) 3 fears the person experienced
 - Line 7) Accomplishments
 - Line 8) 2–3 things the person wanted to see happen or wanted to experience
 - Line 9) His or her residence
 - Line 10) Last name

46. Sketch

- Visually represent new knowledge.

47. Top 10 List

- What are the most important takeaways, written with humor?

48. Color Cards

- Red = Stop, I need help.
- Green = Keep going, I understand.
- Yellow = I'm a little confused.

49. Quickwrite

- Without stopping, write what most confuses you.

50. Conference

- A short, focused discussion between the teacher and student.

51. Debrief

- Reflect immediately after an activity.

52. Exit Slip

- Have students reflect on lessons learned during class.

53. Misconception Check

- Given a common misconception about a topic, students explain why they agree or disagree with it.

C R I T I C A L T H I N K I N G R U B R I C f o r P B L <small>©2013 BUCK INSTITUTE FOR EDUCATION</small>				
<i>Critical Thinking Opportunity at Phases of a Project</i>	Below Standard	Approaching Standard	At Standard	Above Standard ✓
<i>Launching the Project:</i> Analyze Driving Question and Begin Inquiry	<ul style="list-style-type: none"> • I cannot explain what I would need to know to be able to answer the Driving Question • I still need to learn how another person might think differently about the Driving Question • I still need to learn how to ask questions about what our audience or product users might want or need 	<ul style="list-style-type: none"> • I can identify a few things I would need to know to be able to answer the Driving Question • I can understand that another person might think differently about the Driving Question • I can ask a few questions about what our audience or product users might want or need 	<ul style="list-style-type: none"> • I can explain what I would need to know to be able to answer the Driving Question • I can explain how different people might think about the Driving Question • I can ask lots of questions about what our audience or product users might want or need 	
<i>Building Knowledge, Understanding, and Skills:</i> Gather and Evaluate Information	<ul style="list-style-type: none"> • I still need to learn how to use information from different sources to help answer the Driving Question • I still need to learn how to think about whether my information is relevant or if I have enough 	<ul style="list-style-type: none"> • I can use information from different sources to help answer the Driving Question, but I may have trouble putting it together • I can think about whether my information is relevant and if I have enough, but I don't always decide carefully 	<ul style="list-style-type: none"> • I can use information from different sources to help answer the Driving Question • I can decide if my information is relevant and if I have enough 	
<i>Developing and Revising Ideas and Products:</i> Use Evidence and Criteria	<ul style="list-style-type: none"> • I still need to learn how to identify the reasons and evidence an author or speaker uses to support a point 	<ul style="list-style-type: none"> • I can identify some of the reasons and evidence an author or speaker uses to support a point • I can tell when an idea for a 	<ul style="list-style-type: none"> • I can explain how an author or speaker uses reasons and evidence to support a point that helps me answer the Driving Question 	

	<ul style="list-style-type: none"> • I still need to learn how to decide if an idea for a product or an answer to the Driving Question is a good one • I still need to learn how to use feedback from other students and adults to improve my writing or my design for a product 	<p>product or an answer to the Driving Question is a good one, but cannot always say why</p> <ul style="list-style-type: none"> • I can sometimes use feedback from other students and adults to improve my writing or my design for a product 	<ul style="list-style-type: none"> • I can explain how to decide if an idea for a product or an answer to the Driving Question is a good one • I can use feedback from other students and adults to improve my writing or my design for a product 	
<p><i>Presenting Products and Answers to Driving Question:</i></p> <p>Justify Choices</p>	<ul style="list-style-type: none"> • I still need to learn how to explain my ideas in an order that makes sense • I still need to learn how to use appropriate facts or relevant details to support my ideas 	<p>☐ I can explain my ideas, but some might be in the wrong order</p> <ul style="list-style-type: none"> • I can use some facts and details to support my ideas, but they are not always appropriate and relevant 	<ul style="list-style-type: none"> • I can explain my ideas in an order that makes sense • I can use appropriate facts and relevant details to support my ideas 	

COLLABORATION RUBRIC for PBL: <i>Individual Performance</i>				
	Below Standard	Approaching Standard	At Standard	Above Standard ✓
Takes Responsibility	<ul style="list-style-type: none"> • I need to prepare for and join team discussions • I need reminders to do project work • My project work is not done on time • I need to learn how to use feedback from others 	<ul style="list-style-type: none"> • I am usually prepared for and join team discussions • I do some project work, but sometimes need to be reminded • I complete most project work on time • I sometimes use feedback from others 	<ul style="list-style-type: none"> • I am prepared for work with the team; I have studied required material and use it to explore ideas in discussions • I do project work without having to be reminded • I complete project work on time • I use feedback from others to improve my work 	
Helps the Team	<ul style="list-style-type: none"> • I need to cooperate with my team and help the team solve problems • I need to learn how to help make discussions effective • I need to learn how to give useful feedback to others • I need to learn to offer to help others if they need it 	<ul style="list-style-type: none"> • I cooperate with the team but do not help it solve problems • I usually help make discussions effective, but do not always follow the rules, ask enough questions, or express ideas clearly • I give feedback to others, but it may not always be helpful • I sometimes offer to help others if they need it 	<ul style="list-style-type: none"> • I help the team solve problems and manage conflicts • I help make discussions effective by following agreed-upon rules, asking and answering questions, clearly expressing ideas • I give helpful feedback to others • I offer to help others do their work if needed 	
Respects Others	<ul style="list-style-type: none"> • I am sometimes impolite or unkind to teammates (may interrupt, ignore others' ideas, hurt feelings) • I need to learn how to listen to other points of view and disagree kindly 	<ul style="list-style-type: none"> • I am usually polite and kind to teammates • I usually listen to other points of view and disagree kindly 	<ul style="list-style-type: none"> • I am polite and kind to teammates • I listen to other points of view and disagree kindly 	

C R E A T I V I T Y & I N N O V A T I O N R U B R I C f o r P B L				
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P R O C E S S				
<i>Creativity & Innovation Opportunity at Phases of a Project</i>	Below Standard	Approaching Standard	At Standard	Above Standard ✓
<i>Launching the Project</i> Define the Creative Challenge	<ul style="list-style-type: none"> • I may just “follow directions” without understanding why something needs to be created • I still need to learn how to think about what people might need or like when they use or see what is created 	<ul style="list-style-type: none"> • I know that something needs to be created but cannot give detailed reasons why • I have a basic idea of what people might need or like when they use or see what is created 	<ul style="list-style-type: none"> • I understand the reasons why something needs to be created • I understand the needs and interests of the people who will use or see what is created 	
<i>Building Knowledge, Understanding, and Skills</i> Identify Sources of Information	<ul style="list-style-type: none"> • I use only the usual sources of information (website, book, article) 	<ul style="list-style-type: none"> • I find one or two sources of information that are unusual 	<ul style="list-style-type: none"> • I find unusual ways to get information 	

<i>Developing and Revising Ideas and Products Generate and Select Ideas</i>	<ul style="list-style-type: none"> • I think of ideas for the product that are not new or original • I pick an idea without deciding which one is best • I still need to learn how to improve on the idea • I still need to learn how to use feedback from others to improve written products 	<ul style="list-style-type: none"> • I think of some new ideas for the product • I quickly decide which idea is best • I might think about how to improve on the idea, but might not • I use some feedback to make small changes in written products 	<ul style="list-style-type: none"> • I think of many new ideas for the product • I carefully decide which idea is best • I ask new questions and think about how to improve on the idea • I use feedback from others to improve written products 	
<i>Presenting Products and Answers to Driving Question Present Work to Users/Target Audience</i>	<ul style="list-style-type: none"> • I present ideas and products in just the regular ways (show PowerPoint slides, read notes, have no audience involvement) 	<ul style="list-style-type: none"> • I try to add some interesting touches to visual aids but they may not add much, or they may be distracting • I try to involve the audience actively in the presentation but it is very quick or does not work well 	<ul style="list-style-type: none"> • I create visual aids that are interesting to see and hear • I involve the audience actively in the presentation (ask them questions, have them do an activity) 	
PRODUCT				
	Below Standard	Approaching Standard	At Standard	Above Standard ✓
Originality	<ul style="list-style-type: none"> • My product looks like things that have been seen before; it is not new or unique 	<ul style="list-style-type: none"> • My product has some new ideas, but it still looks mostly like things that have been seen before 	<ul style="list-style-type: none"> • My product is new, unique, surprising; shows a personal touch 	
Value	<ul style="list-style-type: none"> • My product is not useful or valuable by the people who use or see it • My product would not work in the real 	<ul style="list-style-type: none"> • My product is somewhat useful but it may not exactly meet the needs of people who use or see it 	<ul style="list-style-type: none"> • My product is seen as useful and valuable by the people who use or see it 	

	world	<ul style="list-style-type: none"> • My product might work in the real world, but might have problems 	<ul style="list-style-type: none"> • My product would work in the real world (not too hard, expensive, time-consuming to create) 	
Style	<ul style="list-style-type: none"> • My product looks like other things like this; it is made in a traditional style • My product has several pieces that do not fit together; it is a mish-mash 	<ul style="list-style-type: none"> • My product has some interesting touches • My product has some pieces that may be too much or do not fit together well 	<ul style="list-style-type: none"> • My product is well-made, impressive, designed with style • My product's pieces all go well together 	

P R E S E N T A T I O N R U B R I C f o r P B L				
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	Below Standard	Approaching Standard	At Standard	Above Standard ✓
Explanation of Ideas & Information	<ul style="list-style-type: none"> uses inappropriate facts and irrelevant details to support main ideas 	<ul style="list-style-type: none"> chooses some facts and details that support main ideas, but there may not be enough, or some are irrelevant 	<ul style="list-style-type: none"> chooses appropriate facts and relevant descriptive details to support main ideas and themes 	
Organization	<ul style="list-style-type: none"> does not include everything required in presentation presents ideas in an order that does not make sense does not plan timing of presentation well; it is too short or too long 	<ul style="list-style-type: none"> includes almost everything required in presentation tries to present ideas in an order, but it doesn't always make sense presents for the right length of time, but some parts may be too short or too long 	<ul style="list-style-type: none"> includes everything required in presentation presents ideas in an order that makes sense organizes time well; no part of the presentation is rushed, too short or too long 	
Eyes & Body	<ul style="list-style-type: none"> does not look at audience; reads notes fidgets or slouches a lot 	<ul style="list-style-type: none"> makes some eye contact, but reads notes or slides most of the time fidgets or slouches a little 	<ul style="list-style-type: none"> keeps eye contact with audience most of the time; only glances at notes or slides has a confident posture 	
Voice	<ul style="list-style-type: none"> speaks too quietly or not clearly does not speak appropriately for the situation (may be too informal or use slang) 	<ul style="list-style-type: none"> speaks loudly and clearly most of the time speaks appropriately for the situation most of the time 	<ul style="list-style-type: none"> speaks loudly and clearly speaks appropriately for the situation, using formal English when appropriate 	

Presentation Aids	<ul style="list-style-type: none"> • does not use audio/visual aids or media • uses inappropriate or distracting audio/visual aids or media 	<ul style="list-style-type: none"> • uses audio/visual aids or media, but they sometimes distract from the presentation, or do not add to ideas and themes 	<ul style="list-style-type: none"> • uses well-produced audio/visual aids or media to add to main ideas and themes 	
Response to Audience Questions	<ul style="list-style-type: none"> • does not answer audience questions 	<ul style="list-style-type: none"> • answers some audience questions, but not clearly or completely 	<ul style="list-style-type: none"> • answers audience questions clearly and completely 	
Participation in Team Presentations	<ul style="list-style-type: none"> • Not all team members participate; only one or two speak 	<ul style="list-style-type: none"> • All team members participate, but not equally 	<ul style="list-style-type: none"> • All team members participate for about the same length of time, and are able to answer questions 	

PROJECT PRESENTATION AUDIENCE FEEDBACK

Student Team:

Project Name:

Date:

Thank you for attending our project presentations and taking the time to write thoughtful answers to the following questions:

1. What did you learn from this presentation, or what did it make you think about?

2. What did you like about this presentation?

3. Do you have any questions about the topic or about how the project was done?

4. Any other comments about this presentation?

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Appendix VIII.1 Assessing Projects

Reflective Questions

1. Of your work so far, what are you most proud of? Why?
2. What project did you most enjoy? Why?
3. What is the most valuable thing you have learned this year? Why?
4. What is the most interesting thing you have learned this year? Why?
5. Why did you choose this project for today's presentation?
6. How does this project show mastery in HTH Learning Goals: communication, art, design, teamwork, technology, and responsibility?
7. How does _____ project connect to the real world outside the classroom?
8. Why is _____ project important/ relevant?
9. How does _____ project include multiple perspectives? How did it help you better understand a different perspective?
10. What specific subject matter does this piece address? How does this piece demonstrate your understanding of that subject matter?
11. What evidence do you have to support the conclusions you came to in _____ project?
12. What skills (HTH Learning Goals) do you think are the most important and why?
13. What piece would you like to share with me/ a classmate/ a visitor? Why?
14. How much did you know about this subject before you studied it?
15. What process did you go through to produce this piece?
16. Have you done a similar kind of work in the past (earlier in the year or in a previous grade; in or out of school)?
17. In what ways have you gotten better at this kind of work?
18. In what ways do you think you need to improve?
19. What problems did you encounter while you were working on this piece? How did you solve them?
20. What resources did you use while working on this piece? Which ones were especially helpful? Which ones would you use again?
21. How do you feel about this piece of work? What parts of it do you particularly like? Dislike? Why? What did/do you enjoy about this piece or work?
22. Did you meet your standards?

23. What set of skills did you use to accomplish this project?
24. What were your goals in creating this piece of work?
25. Did your goals change as you worked on it? Did you meet your goals?
26. What were your standards for this piece of work? Did you meet your standards?
27. What was especially satisfying to you about either the process or the finished project?
28. What did/do you find frustrating about it?
29. Do you feel this project was worthwhile? Why?
30. What does this piece reveal about you as a learner?
31. What did you learn about yourself as you worked on this piece?
32. Have you changed any ideas you used to have on this subject?
33. Think of another piece of work that you did at the beginning of the year to compare and contrast with this. What changes do you notice? How did those changes come about? What does this tell you about yourself and how you learn?
34. Did you do your work the way other people did theirs?
35. In what ways did you do it differently?
36. In what ways was your work or process similar?
37. If you were the teacher, what comments would you make about this piece?
38. What grade would you give it? Why?
39. What is the one thing you particularly want people to notice when they look at your work?
40. What do your classmates particularly notice about your piece when they look at it?
41. Which of these projects would you take with you on an interview? Why?
42. In what ways did your work meet the standards for this assignment? In what ways did it not meet it?
43. If someone else were looking at the piece, what might they learn about it?
44. Who are you as a learner? As a person?
45. What work would you save to remind you or someone else of what you are like now?
46. One thing I would like to improve upon is...
47. What would you change if you had a chance to do this piece over again? What would you change in the next revision of this piece?
48. What's the one thing that you have seen in your classmates' work or process that you would like to try in your next piece?

49. As you look at this piece, what's one thing that you would like to try to improve upon?
50. How does this project demonstrate that you are ready to do further study? Pursue career goals?
51. What's one goal you would like to set for yourself for next year?
52. What would you like to spend more time on in school?
53. What might you want next year's teacher to know about you (what things you're good at, what things you might want more help with)?
54. What work would you show her/him to help her understand those things?

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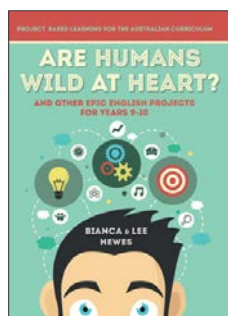
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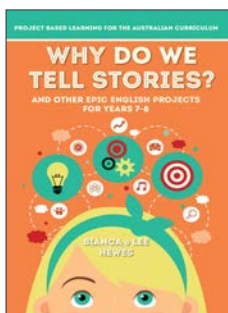


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