ASSESSMENT IN INQUIRY-BASED LEARNING:
THE RATIONALE AND DESIGN OF A HANDBOOK FOR TEACHING
AND ASSESSING KEY LEARNING FACETS

by

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Abstract

In this project, inquiry-based learning was examined in conjunction with the new British Columbia curriculum. The new curriculum emphasizes the importance of three core competencies that transcend the boundaries of traditional disciplines: Personal and Social Responsibility, Communication, and Critical and Creative Thinking. When viewed through the lens of inquiry-based learning, these competencies formed the background of key learning facets. The question of how best to assess inquiry-based learning in the new curriculum was addressed through a thorough review of current assessment literature. A solution to the problem was proposed through the creation of an assessment handbook for educators. The handbook guides educators through a series of lessons that can explicitly teach the cross-curricular skills embedded in the core competencies of the new curriculum. Teaching the elements of the key learning facets allows both students and educators to have a clear target for achieving success. This model allows for transparency and authenticity of assessment in inquiry-based learning.
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Dedication

This project is dedicated to my family: Ryan, Quayden and Malaya. Thank you for your support during all the times when I had to be in front of the computer or pouring over books instead of playing, hiking and riding bikes with you. Much love and gratitude.
# TABLE OF CONTENTS

Abstract .................................................................................................................. ii
Acknowledgements ............................................................................................... iii
Dedication ............................................................................................................... iv
Table of Contents ................................................................................................ v

## CHAPTER ONE: INTRODUCTION ................................................................. 1

  - Context ........................................................................................................... 3
  - Justification of Project .................................................................................. 4
  - Definition of Terms ....................................................................................... 4
    - Inquiry-based instruction ........................................................................ 4
    - Assessment for learning .......................................................................... 5
  - Brief Overview of Project .......................................................................... 5

## CHAPTER TWO: LITERATURE REVIEW ................................................ 8

  - Historical background ............................................................................... 8
  - Current Context .......................................................................................... 9
  - Assessment in Inquiry-based learning ...................................................... 11
    - Assessment design ............................................................................... 13
    - Communicating student learning ......................................................... 16
  - Significance of issues ............................................................................... 18

## CHAPTER THREE: RATIONALE FOR MY ASSESSMENT MODEL .......... 19

  - The Creation of a New Assessment Model .............................................. 19
  - Assessment strategies that work—rationale for lesson sequences .......... 22
Chapter 1. Introduction

The way that we teach is changing. No longer are we stuck in a production model of education where the desired outcome is skilled workers who need to complete a single task. In today’s classrooms, teachers are tasked with producing thinkers. Society expects that graduates should be able to problem solve, think critically, and contribute productively to a democratic society. To this end, many teachers are beginning to teach in an inquiry-based manner. The trouble arises when we try to apply our traditional methods of assessment to this new way of teaching and learning. This project proposes one solution to the problem of conducting assessment in inquiry-based learning.

There is a growing body of research that indicates students learn more deeply, and perform better on complex tasks, when they have opportunities to engage in a more authentic manner of learning (Darling-Hammond, 2008, Drake et al., 2014, Friesen and Scott, 2013). The movement towards inquiry sees knowledge differently from the subject-based, traditional curriculum (Drake, Reid and Kolohon, 2014). Neil Stephenson writes on his informational blog about inquiry-based instruction that, “Inquiry honours the complex, interconnected nature of knowledge construction, striving to provide opportunities for both teachers and students to collaboratively build, test and reflect on their learning” (Stephenson, 2015). The teaching is rich; the learning is relevant and engaging. There is a positive effect on learning when students have constructed and organized their own knowledge, applied critical thinking processes and had opportunities
to communicate their learning both within and beyond the classroom (Darling-Hammond, 2008, Drake et al., 2014).

However, we fall short when it comes to assessing in this new inquiry-based learning approach. Research has shown that carefully designed and thoughtful assessment practices improve student learning and guide teaching practice (Willms D., Friesen S., Milton, P., 2009). Too often, however, teachers have to boil down a lengthy, creative learning opportunity into a letter grade. Too often there is a test to see if the students “really get it.” Too often students are focused on the value of the outcome rather than the value of the learning process.

There is a current movement that directs teachers away from providing letter grades and puts the emphasis onto providing structured feedback (Barnes, 2015; Kohn, 2011). Kohn argues that giving letter grades causes students to focus on the achievement (or lack there of) rather than the learning itself. If we truly wish to focus education on learning, then we should focus our assessment around providing feedback to students and involving students with the self-assessment of their learning (Barnes, 2015; Kohn, 2011). Black and Wiliam (1998) and Hattie (2009) found that feedback is one of the strongest influences on learning. A recent Norwegian study found that effective feedback is still rarely given, though when it is done well, it can be immensely useful in enhancing learning (Havnes, A., Smith, K., Dysthe, O., and Ludvigsen, K., 2012). Inquiry-based learning lends itself to this non-traditional approach to assessment. The literature review in Chapter Two explores the in-depth theory behind this method of assessment and why it should be the method of assessment used to assess inquiry-based learning.
The goal of this project was to analyze the current research in assessment studies in an attempt to propose a solution to the problem of how to assess learning in inquiry-based instruction. This research has been used to create a handbook on assessment for middle school teachers teaching in an inquiry model. The emphasis was on creating a user-friendly model embedded with the core competencies from the newly drafted British Columbia curriculum. Included in this handbook are several sample lessons to explicitly teach the proposed “Facets of Learning” as well as sections on how to provide structured feedback and enhance student self-evaluation.

Context

Inquiry-based instruction is taking hold in all areas of the education system. One needs only to look at the language in the newly designed B.C. curriculum to see the term inquiry used in subjects from Math to Science to Language Arts and Social Studies. The specific focus of this project has been on creating a resource for middle school teachers who are beginning to teach with an inquiry-based model. Upper elementary teachers may also find this resource useful. Much of the language in the handbook has been taken from the curriculum drafts published by the British Columbia Ministry of Education in August 2015. As the Ministry document is still in draft form, there is a reasonable assumption that there could be some changes to the language used in that document. Where possible, the language and ideas have been cross-referenced with other resources to fully represent the current thinking in assessment theory. As such, the proposed model should provide validity even should the language used in the current curriculum document be altered.
Justification of Project

Inquiry-based instruction complements teaching in a meaningful and authentic way. Ron Ritchhart (2015) writes that teachers are, "... guided profoundly and explicitly by their beliefs…” (p.41). There must be a way to accurately communicate student learning when students are involved in the complex nature of inquiry. This has been a tension in my teaching practice since I began teaching with an inquiry focus a few years ago. Recently, I embarked on an open inquiry project with my grade seven class. The students had to investigate an essential question within an area of personal interest. When the students presented their projects at our classroom symposium, I was impressed with their ideas, their process and the amount of new learning that had taken place. The problem arose when my carefully constructed rubric did not seem to capture the depth and scope of what the students had learned. I had struggled with the assessment of project-based learning tasks in the past, but this experience crystalized the need to create a meaningful assessment of an open-ended task. To give a single letter grade to represent a term’s worth of learning seemed to undermine the rich learning experience of the students.

Definition of Terms

*Inquiry-based instruction* can involve learners investigating real-world problems, developing questioning, research and communication skills, collaborating within and beyond the classroom, and developing a deep understanding of content knowledge. This learning is often integrated into a public setting where the students have the opportunity to contribute to expanding a general knowledge of how the world works (Stephenson,
This method of instruction is often anchored with an essential question that is explored through a guided, partially guided or open inquiry (Wiggins, 2005).

Assessment for learning is defined as the gathering and use of information to adjust teaching and learning as needed to increase academic achievement (Chappuis, 2015). In contrast, “Assessment of Learning” is generally thought of as the result of learning at the end of a learning process or task. Assessment for learning moves beyond the traditional practice of associating an assessment with a test and a test with a letter grade (Chappuis, 2015). Grant Wiggins (2005) states that, “the aim of assessment is primarily to educate and improve student performance; not merely to audit it” (p.7). In the context of this project, assessment for learning will involve teaching students the criteria for ten facets of learning so that they can self-assess as well as understand the teacher-provided feedback. Embedded in this style of assessment is teaching the students to use the structured feedback to improve upon their performance and understanding.

Brief overview of project

The goal of this project is to create an assessment handbook that can be used for middle school educators teaching within an inquiry model. The handbook offers one possible solution to the problem of how to conduct assessment for learning and assessment of learning when teaching in an inquiry-based model of education. Historically, one of the largest barriers to teaching in an inquiry-based model has been a lack of a usable framework with which to assess the learning. This assessment handbook draws on current assessment research, current methods in making thinking visible, and current developments in the British Columbia curriculum to define ten facets of learning. These ten facets form the backbone of the assessment model. The handbook guides
educators through a series of lessons to scaffold instruction in each of the facets of learning with middle school students. Through these lessons the students will become familiar with the language and the increasing complexity of each facet. The handbook supports the growing research in favour of using feedback and self-assessment as well as providing educators with a common language upon which to assess student learning in relation to the ten learning facets. Instead, this model uses indicators of learning on a spectrum where students can self-assess their learning and growth over the course of an inquiry process. Teachers can also use the ten facets to assess students at any point throughout their students’ inquiry. Justification, self-reflection, and feedback are other key elements of this model. As with the ten facets of learning, the concepts of justification, self-reflection and feedback require specific scaffolding and have a lesson sequence in the handbook to teach these key skills.

What makes this handbook different from other resources available is the emphasis on scaffolded instruction. The ten facets of learning have been drawn from the core competencies in the newly drafted British Columbia curriculum and from Grant Wiggin’s Six Facets of Learning. Relevant assessment research was reviewed and embedded into a model that can be used by teachers and students alike. The role of defining a common language around assessment for both teachers and students is important as it has been shown that students experience more academic growth when they clearly understand how the assessment of their learning is taking place (McTighe and O’Connor, 2005). This handbook walks teachers through a series of lessons that have been designed to explicitly teach students about their learning and the importance of feedback and self-assessment. This allows for transparency in the assessment of inquiry-
based learning. The lesson sequence for providing and using structured feedback will build a skill set for students and teachers alike to enhance student performance. The emphasis is on growing in the facets of learning rather than looking to letter grades and numeric values summarize the end of the learning.

Inquiry based instruction offers an opportunity to teach for a society that desires members who can think across disciplines, creatively solve problems and apply knowledge in novel ways. The traditional way of assessment with the emphasis on what is demonstrated on a single test or on a final letter grade does not accurately reflect the complexities of learning that take place through the inquiry model. This project offers one possible solution to the difficulties inherent to assessing inquiry-based instruction.
Chapter 2: Literature Review

The purpose of this project is to create an assessment strategy handbook for educators taking an inquiry-based learning approach to middle school education. A comprehensive search of current research has revealed significant gaps in this area of research. As such, this literature review attempts to answer the question, “What is known about assessment in inquiry-based learning?” by first examining the question, “What is inquiry-based learning?” followed by, “What makes effective assessment?” and finally “How can assessment of inquiry-based learning be communicated to students, parents and other educational stakeholders?”

Historical background

To find the beginning of inquiry-based learning, we must travel at least as far back as Ancient Greece to the time of Socrates. Well-known for his method of questioning his students in the pursuit of knowledge, Socrates can be considered a founding father of inquiry in education (Friesen and Scott, 2013). Through his questioning, Socrates engaged in a shared dialogue where both the teacher and the students asked questions in search of clarifying assumptions and pursued the logical consequences of a certain line of thinking (Ross, 2003). There are a two key elements of the Socratic approach that have found their place modern inquiry-based learning: 1) the ability for a teacher and student to engage in a dialogue to pursue answers to questions that are worth thinking deeply about and 2), to use inquiry, not as a step-by-step methodology, but as a lens to view the world around us (Friesen and Scott, 2013).
In the Renaissance, inquiry-based learning continued with the significant scientific advances of this era. The essential elements of inquiry-based learning, “observation, experimentation and empirical verification” led to the creation of new technologies that explained the world (Friesen and Scott, 2013, p. 6).

Finally, we can look back over one hundred years to the work of philosopher of education and science educator, John Dewey, to see a more modern version of inquiry-based learning. As early as 1910, Dewey wrote that there was too much emphasis on the teaching of science facts without enough teaching of the scientific way of thinking and “attitude of mind” (Barrow, 2006. p. 266). Later, he broadened his scope to include other disciplines beyond science. He firmly believed that students should be engaged in the learning process; Dewey did not want students to be the passive recipients of knowledge transmission from the teacher (Friesen and Scott, 2013).

**Current Context**

Today, an inquiry-based approach to education is one that combines these elements from Socrates, the great thinkers of the Renaissance, and John Dewey. In the new British Columbia curriculum, inquiry is defined in the glossary of terms in a number of ways. For the purposes of this review, however, the following definition of inquiry seems the best suited:

*By actively engaging with the problem, learners develop skills in finding information and in identifying what information they still need and possible sources of that information. Learners are able to connect what they are learning in class to their own lives and important issues in their world.* (BC Ministry of Education, 2015).
By breaking apart this definition we can see the following connections to the history of inquiry-based instruction. “By actively engaging with the problem” is the question as originally posed by Socrates. This can be more or less guided by a teacher, depending on the age and ability of the student. It is important to guide students through the careful judgement of information so that they may conclude what information is needed to answer the question. “…learners develop skills in finding information and in identifying what information they still need and possible sources of that information,” can connect to the observations, experimentation and verification similar to those used by the great thinkers of the Renaissance era. Finally in, “Learners are able to connect what they are learning in class to their own lives and important issues in their world,” we can see the personalized engagement and ownership of a learning that Dewey wrote about one hundred years ago.

With this brief understanding of the evolution of inquiry-based instruction, we can now continue with our understanding of inquiry-based learning and what it means in today’s classrooms.

In the latest curriculum documents from the redesigned British Columbia curriculum (2015), the term inquiry appears everywhere. The following examples are taken from the Grade 8 curriculum, however the term is embedded across the curriculum from Kindergarten to Grade 12. In Mathematics, students are expected to “develop, construct, and apply mathematical understanding through play, inquiry, and problem solving”. In Social Studies, students are expected to “use Social Studies inquiry processes and skills to: ask questions, gather, interpret, and analyze ideas; and communicate findings and decisions.” In Science students are expected to “make
predictions about the findings of their *inquiry.*” In Language Arts, students are expected to “apply appropriate strategies to comprehend written, oral and visual texts, guide *inquiry* and extend thinking.”

For the purposes of this review, the following definition of inquiry will be used going forward:

*Inquiry is the mindset students use to build their own knowledge and understanding through an active, open-minded exploration into a meaningful question, problem, or issue.* (Ministry of Education, 2015)

Further to this definition, inquiry is considered to be a process where the students ask questions, conduct research, and produce an end product that illustrates their understanding (Drake et al., 2014). It is important to also recognize that an inquiry-based approach does not mean that there are “no wrong answers” or “that anything goes.” (Stephenson, 2015). Instead, students are taught how to ask good questions, and design methods of finding the answers. They gather and analyze the information that they collect, then are taught how to effectively communicate what they have learned. Finally, students are taught how to justify their thinking and reflect on their learning process. The processes of inquiry need to be carefully and thoughtfully scaffolded to match the ability level of the students (BC Ministry of Education, 2015; Darling-Hammond, 2008, Friesson and Scott, 2013).

**Assessment in Inquiry-based learning.** If inquiry-based instruction is becoming a key element in how teachers facilitate learning in classrooms around British Columbia, then the next question to ask is: *How do we assess our students when we are teaching with an inquiry-based approach?*
Assessment is often the “elephant-in-the-room” of teaching. Teachers are commonly found around staffroom lunch tables discussing the learning needs of their students, or sharing brilliant lesson plans around the photocopier. However, when it comes to assessment, the conversation too often falls silent. Traditionally in education, assessment was a measure of achieved learning. It was often measured with some sort of summative tool, most commonly, a test. In the days of traditional practices where students memorized facts and figures, it was assumed that a measure of knowing the material was to regurgitate it on a test. If the knowledge was passed back from student to teacher, then it was assumed that the student had learned the required knowledge (Friesson and Scott, 2008).

However, if we take an inquiry-based learning approach, where the facts and figures are not given, but are researched, evaluated and reflected upon, then a simple test of facts and figures does not adequately assess the deeper learning acquired by the process of inquiry. In fact, as Linda Darling-Hammond (2008) suggests, “designing good assessment is an important issue for revealing the benefits of inquiry… as well as for promoting the success of learning. Benefits for inquiry learning emerge when the assessments require application of knowledge and measure quality of reasoning.” (p.14). In her handbook, 10 Tips to Assessing Project-Based Learning, Susan Boss writes that there is ample room for feedback and assessment at all stages of the learning cycle—from the planning to the presentation of the project, but thoughtful assessment design must be implemented at each stage (2011). In short, assessment design is critical to the support and evaluation of the meaningful learning results from the inquiry-based approach.
**Assessment Design.** In the new British Columbia curriculum, there is a brief document entitled: Redesigning Assessment: Building Student Success. This document states:

“Throughout the learning process, teachers and students intentionally gather evidence to inform teaching and learning. The teacher creates rich tasks, engages with the students in setting criteria, establishes exemplars, and leverages the power of questioning to allow for ongoing, timely, descriptive feedback to the student. This process assists students in moving forward toward their learning targets and goals. Students are encouraged to reflect and self-assess to build important meta-cognitive skills. Personalization lends itself to assessment as learning, where students participate in the setting of criteria and the design of inquiries, and self- and peer-assessment.” (B.C. Ministry of Education, 2015).

While far from being a recipe for inquiry-based learning assessment, the above summary from the Ministry of Education website does serve as a jumping-off point to explore current research in the key elements of educational assessment.

In her book, *Seven Strategies of Assessment for Learning*, Jan Chappuis (2015), writes that the primary strategy in assessing for learning is to begin with a clear and understandable vision of the learning target. She suggests that by setting intentional learning goals prior to learning both the student and the teacher experience benefits. For the students, they have an idea of what they will be able to know, do or produce once the learning target has been achieved. For teachers, it allows for the thoughtful structuring of a lesson sequence and predetermines what method of assessment will yield the most accurate indictors that the concept taught has been acquired. Drake et al, (2014), propose
that there are three guiding principles of assessment: validity, reliability, and fairness (p.19-20). Validity is the degree to which the assessment measures what is it is designed to measure. Drake et al. suggest that the best way for teachers to ensure validity in assessments is to always plan assessment tasks at the same time as planning how to teach the curriculum objectives. Wiggins and McTighe (2005) also stress this in their Understanding by Design approach to teaching and learning. The key elements for consideration here are that the assessment tasks are consistent with learning goals and that students will have the opportunity to learn the knowledge and skills that are required to be successful on an assessment task (Black et al., 2003; Cooper, 2006). Another guiding principle in assessment is reliability. In the most straightforward sense, this means the students ability to perform consistently when assessed in different ways (for example, on performance tasks, projects, tests, and oral presentations) and when assessed by different assessors. The assessment results are reliable when we can draw a relatively accurate, though never an exact, conclusion about the student’s learning with respect to the intended outcome (Drake et al., 2014). Finally, assessments should be fair. This means that assessments are unbiased and are based on sound grading practices. Drake et al. suggests that the key to making assessments fair is to clearly outline the assessment criteria when delivering a learning objective (2014).

A further consideration to assessment design in inquiry-based learning is the collection of evidence. Anne Davies (2007) suggests that there are three general sources of evidence: observations of learning, products that students create and conversations where learning is discussed with students (p. 45). Davies encourages educators to use the process of triangulation between making observations, viewing student products and
having conversations to assess how well students are doing in relation to the learning goals. She states that making observations is essential to making reliable and valid assessments of, and for, student learning.

Another key component to designing assessments is authenticity. Wiggins and McTighe (2005), state that an assessment task, problem or project is authentic if it is realistic, requires judgement and innovation, asks the student to “do” the subject, and uses a combination of knowledge and skills (p.154). The importance of authentic assessment boils down to real-life applications; discrete subject knowledge is the foundation upon which larger, problem-solving based assessments are completed (Boss, 2011). These larger scale assessments often draw upon knowledge from a variety of fields and become “more authentic” with the degree to which they emulate the tasks or problems encountered by adults in everyday life (Wiggins & McTighe, 2005).

In addition to creating authentic assessments, additional research shows that involving students in assessment significantly increases student learning (Stiggins, 2005). This is especially true when student self-assessment is combined with descriptive feedback. All students show gains, but the students who typically struggle the most show the largest gains overall (Black and Wiliam, 1998). When students are involved in their own assessment, their mistakes become the feedback they use to adjust what they are doing or how they are doing it. Feedback in the form of letters or numbers does not explain what students can do differently next time (Black and Wiliam, 1998). Black and Wiliam (2002) found that assessment could be used to enhance learning, not just report on it. Countless studies have shown that meaningful feedback can have positive effects on student learning (see, for example, Butler, 1986, 1987, Hattie and Timperley, 2007).
In his synthesis of more than 500 educational studies involving feedback, Hattie (2009) concluded that well-given feedback could more than double the rate of learning. Furthermore, while feedback best supports learning when it is specific and descriptive, evaluative feedback like letter grades and percents can interfere with student learning (Butler, 1987).

Communicating student learning. If the above is what is known about effective assessment, then surely these elements can be applied to the design of an assessment strategy for inquiry-based learning, as is the purpose of this project. However, a discussion of assessment cannot be complete without a look at how this assessment information will be communicated to the students, parents, other educators and other stakeholders in the students’ educational circle.

Report cards with letter grades have long been the communication tool of choice by the education system (Stiggins, 2005, Barnes, 2015). While an in-depth discussion of the rationale of letter grade reporting is beyond the scope of this project, the following is useful as it pertains to how the communication of student ability might look in an inquiry-based learning model. Stiggins (2005) insists that if report card grades will be used to inform others of a student’s achievement, then the most important factor is that the report card grade must “be specific to the material learned, and nothing else” (p. 315). In his book, On Your Mark, Thomas Guskey (2015) thoroughly points out the flaws associated with all of the traditional methodology in calculating grades: percentages are imprecise, bell curves lead to grade inflation, single grades can place too much significance on the insignificant, and mathematical algorithms are arbitrary and can lead to decreased validity. Guskey stops short of providing any fixed solutions to these
problems though he encourages his readers to engage in thoughtful discussions around the purpose of grades and grading. He suggests that a single reporting device is insufficient for effective evaluating and proposes that a system of reporting, using a variety of elements such as conferences, portfolios and report cards (2015, p.111). Others in this field take a more opinionated approach. For example, Alfie Kohn (2011) calls for the elimination of grades all together. Kohn says that grades diminish students’ interest in learning and create a preference for the easiest possible task. He suggests that the student’s ability to reach learning targets should be communicated as feedback and if a grade is a necessity, then it should be arrived at through a conference with the student.

Anti-grade advocate, Mark Barnes (2015) has proposed a solution to the no-grade approach. He created a method that he calls SE2R. This method provides feedback under the headings of Summarize, Explain, Redirect and Resubmit. Instead of a numeric value or letter grade, Barnes recommends that teachers provide SE2R on all assignments, projects or performance tasks. He encourages educators to resist any form of numeric grading, including using a rubric where a point value can be inferred (2015).

One proposed solution to the reporting issue is the use digital portfolios. Digital portfolios have a solid potential to communicate student achievement in an inquiry-based approach to learning (Cassell, 2013). Digital portfolios can show the developmental growth over time and report specifically on what students are able to do with respect to the learning targets. Letter grades and numeric ranking are not necessary when samples of student work are included with clearly defined criteria in the digital portfolio. Other benefits to digital portfolios include encouraging students to take ownership of their learning, helping them to reflect on their learning process and allowing for interactive
feedback between teachers, parents and students (Stiggins, 2005; Butler, 2010; New Zealand Ministry of Education, 2011).

**Significance of Issues**

Upon a thorough review of the literature, it appears that there is not a lot of research available that is specific to the assessment of inquiry-based learning. Hence the aim of this review was to clarify an overall definition of inquiry-based learning, followed by a look at current effective assessment strategies, and finally a brief glance at how these assessments might be communicated to students, parents and other educational stakeholders.

The significance of this project is to fill the gap in assessment of inquiry-based learning as it applies to the new British Columbia curriculum. What follows in Chapter 3 and in Appendix A is one possible solution to making assessment of inquiry-based learning more accessible and meaningful.
Chapter 3: Rationale for My Assessment Model

Imagine a project where students design their own question, conduct their own research, reach a conclusion and share out their learning with their peers. Now imagine that the range of projects extends from building an exemplary pigeon coop to studying the meaning of art to designing a new video game. In the sharing out of the projects, a rambunctious class who couldn’t sit quietly through any teacher-driven lesson, sat captivated, silent and completely engaged in each others stories of learning.

It was the perfect example of personalized learning and of inquiry. The learning was rich and, in some cases, profound. The teacher swelled with pride as she listened to her students describe their experiences. Then the teacher glanced down at her rubric.

Suddenly having to highlight phrases like “somewhat engaging,” “partially communicated,” and “showed strong evidence of critical thinking” seemed like empty notes on the page in comparison to the rich learning being described. If this was the new direction of teaching and learning in the twenty-first century, there had to be a better way to truly value the inquiry learning process.¹

The creation of a new assessment model

The first question we have to ask is, “What is the goal of assessment?” If the goal of assessment is to get a glimpse into the mind of the student and see where they are in relation to a set learning target, then we need the tools that can help us take that snapshot

¹ K. Zumach, personal experience. April 2015
of learning. As Ron Ritchart et al. (2011) state, “Thinking does not happen in a lockstep, sequential manner, systematically progressing from one level to the next. It is much messier, complex, dynamic and interconnected than that” (p. 8). The same can be said of assessment in inquiry- it is a messy, complex and dynamic process.

The research reviewed in Chapter 2 shows that there are some key factors to consider when designing effective assessment: assessments follow from clearly defined learning targets (Chappuis, 2015), assessment must be authentic (Wiggins, 2008), assessment involving student self-reflection is important (Davies, 2007, Stiggins, 2005), and feedback is essential to driving learning forward (Hattie and Timperly, 2007). Also important is that “whatever is to be evaluated needs to have been taught explicitly to the students” (Drake et al., 2014).

When trying to figure out how to best create an assessment model that would work well with an inquiry-based approach to learning, the Core Competencies of the new B.C. curriculum seemed like a logical place to start (Ministry of Education, 2015). Trouble arose around language and measurement. How does one measure effective communication? What does an “exceeding expectations in critical thinking” look like? Should we assess students on their personal and social responsibility? Then the bigger reality set in: If we are going to conduct assessment for learning and of learning in relation to the core competencies, we need to explicitly teach the students what we are looking for. Thus, the idea of creating a handbook to aid middle school teachers in assessment for and of inquiry style of learning was born.
Using the new B.C. draft curriculum language as a guide, the core competencies were reviewed and split into manageable, teachable sections. Language was taken from the curriculum and other researchers and eight definable “facets of learning” were determined.

The core competencies in the new curriculum are Personal and Social (PS), Communication (C) and Thinking (T). They are further split into PS: Personal Awareness and Responsiblity, Positive Personal and Cultural Identity and Social Responsibility, and T: Creative and Critical Thinking (Ministry of Education, 2015).

For the purpose of the handbook, these have been further broken down to the following eight learning facets:

I. Personal Responsibility and Awareness
II. Personal Identity
III. Communication
IV. Critical Thinking
V. Creative Thinking
VI. Reflecting
VII. Collaborating
VIII. Social Responsibility

These eight facets represent a range of skills that can be taught, and then used as an assessment for and of learning, in inquiry projects. These facets transcend disciplines and are the skills we look for in a twenty-first century learner. In her e-manual to assessing project-based learning, Susan Boss states that, “Students also need help developing the so-called soft-skills, such as critical thinking, global awareness, and being able to solve
problems creatively. Projects that deliberately emphasize and assess these skills help students prepare for the complex challenges ahead” (2011, p.4).

In addition, two other learning facets were added to this model to account for more subject or discipline specific learning. In the new B.C. curriculum, previously worded Prescribed Learning Outcomes are now known as Curricular Competencies. At the root of these Curricular Competencies are the subject specific “need-to-knows.” In the handbook for assessing inquiry these have been framed as Learning Facets IX and X: Understand: Explain and Understand: Apply. This language was chosen to represent the wide range of core competencies targeted in the middle school curriculum with the idea that the higher order thinking skills could be assessed through the other Learning Facets, most notably, Critical thinking, Communicating and Collaborating.

Assessment strategies that work- - rationale for lesson sequences

All of the lesson sequences in the handbook follow the same template. The lessons open with a learning outcome and a question, referred to in the handbook as an Enduring Understanding and an Essential Question. This language comes from Wiggins and McTighe (2005) and their work on Understanding by Design. Enduring Understandings are based on the big ideas and they are what you want students to remember long after they have been in your classroom. Essential Questions drive the lesson by posing a question that promotes inquiry and does not have a straightforward answer.
Each of the lesson sequences in the handbook has been designed on the 5E model. This long-standing lesson plan model originated in the sciences but has more recently been used across disciplines, including in inquiry learning. Within this framework, the lessons that teach the learning facets to the students also become a familiarization in inquiry style instruction and learning. According to the Biological Curriculum Study Group who reviewed several decades worth of research on the 5E model, teaching in this model has shown to improve student achievement and engagement (Bybee et al., 2006). The key components of each lesson in the sequence is an Engaging opening activity, an opportunity for the students to Explore in the learning facet, a portion of instruction where the learning facet is Explained to the students, then there is the opportunity to learn more in the Extend phase of the lesson, before a final Evaluation component. In the original 5E model, the fourth stage in the model is referred to as “Elaborate” but the handbook uses the term “Extend” as it appears to have a better relevance and understanding by the students.

The Evaluate section in each of the lesson sequences is comprised of three parts: student self-reflection, teacher feedback, and suggestions for evaluation. Self-assessment is an important part of the lesson sequence as it is a time to teach students about the importance of being able to self monitor their learning. Self-monitoring skills are essential for independent, self-directed, lifelong learners. “When students are involved in their own assessment they are required to think about their learning and articulate their understanding-- which helps them to learn,” says Davies, 2007 (p. 12). In the lesson sequences, a sample of self-assessment language is offered. These are in the form of “I statements…” that are taken, from or adapted, from the Core
Competency Profiles in the new B.C. curriculum (2015). In the model provided in the handbook, students place themselves on a scale from “Never” to “Always” in terms of the “I statements…” For example, in the Personal Responsibility learning facet, students might reflect on the following “I statements”: I ask for help when I need it; I persevere with challenging tasks; I take ownership of my goals, my learning, and behaviour. There is also a line to provide a statement of evidence to justify why the student has marked himself or herself as they did on their self-evaluation. By scaffolding this self-evaluation step through this series of lessons, students will become increasingly familiar with the process of self-evaluating and in turn, be able to enrich their learning experience.

The second component of the Evaluate portion of the lesson sequence is Suggestions for Teacher Feedback. Ideally, the feedback is on-going in an informal manner throughout the course of any lesson sequence, but each lesson sequence in the handbook provides some suggested teacher language that could be used to explain to students what they did well and some suggestions for future improvement. The idea behind including some suggestions is to give teachers an example of what descriptive feedback can look like. All the research shows that providing feedback frequently, using formative assessments, improves student learning. Ideally, feedback from the teacher should address the three major feedback questions of “Where am I going? How am I going? And where to next?” (Hattie and Timperly, 2007). It is in answering these three questions that learning can be enhanced once any discrepancy between what is understood and what is aimed to be understood is made clear. The other major benefit of conducting
ongoing and frequent feedback is that it can guide teachers’ instructional practices throughout the inquiry process (Darling-Hammond, 2008).

Finally, to wrap up the Evaluate stage in each lesson sequence, there is a “Suggestions for evaluation” section. This is meant to offer up suggestions for a more summative evaluation of the lesson sequence. Some lesson sequences have a suggestion of a minor performance task that brings together elements from the whole lesson, while others offer up straightforward activities that can be completed by the students to practice receiving a summative assessment in a particular learning facet. In some instances, a sample rubric is provided to help with the assessment of a given facet. The key element to the summative evaluation is that it needs to be authentic and students need to present evidence of their learning in relation to the Essential question at the beginning of the lesson plan.

**Rationale: Lesson by Lesson**

*What follows is the detailed rationale for five of the handbook lesson sequences. These five sequences are included to provide insight into the methodology and research used to develop the handbook lessons.*

The first sample lesson introduces students to the learning facets of Personal Awareness and Responsibility. This is an aspect of the PS Core Competency that focuses on self-determination, self-regulation and well-being. The main purpose of this lesson sequence is to help the students understand themselves as learners. The other aspect of this lesson is a focus on work habits and organization. The lesson has been designed so that as students travel through the lesson, they will realize that maintaining solid work
habits will become a key component of their success in middle school. Ideally, this lesson would be done at the beginning of a school year or new term so that students would have some language with which to understand some of the strengths they bring with them as a learner and what aspects of themselves they can strive to improve upon.

In the second sample lesson sequence, the focus is on Communication. Being able to communicate through a variety of means is key to being successful in the 21st century. The purpose behind this sequence is to have students become familiar with the essence of effective communication. As educators we often assume that by middle school, students can effectively communicate both orally and in writing. Experience shows that this is not always the case. Important aspects of this lesson sequence are defining the purpose of communicating and emphasising the need to know the intended audience. Audience is extremely important. When learning outcomes are intended for teachers and parents only, the motivation for producing quality work is not as great as when the audience extends to the wider community (Leys, 2008).

The third sample lesson takes the students through learning about the Critical Thinking learning facet. Students will learn what it means to be a “critical thinker” through engaging in problem solving, research, and application of new ideas. They will be guided through the process of critical thinking: developing questions, making a plan, researching, evaluating, and communicating. In this manner, the students will become familiar with what critical thinking may look like and therefore, how they might be assessed in this learning facet.

In the handbook, the fourth sample lesson sequence focuses on the Reflection learning facet. In this lesson sequence, students are guided through the process of
journaling to reflect on their learning. Journaling is a skill that needs to be explicitly taught in order to be effective for enhancing learning. Good journals are indicators of varied thinking skills and strategies and can be places for students to work out speculation, doubt, confusion, questions, new problems and solutions (Countryman, 1992). In his 2011 blog post, Peter Skillen argues that without proper scaffolding and teaching, the act of journaling can become rote and have as little impact as doing a traditional worksheet. Drawing on this thought and the work of other researchers in the field, a lesson sequence has been created to teach students how to be purposefully reflective about their learning. The SEA-change model of reflection as proposed for post-secondary learners by Sen and Ford (2009) has been adapted for middle school students in this lesson. It is only through giving students the language and the scaffolding that educators can feel confident in using reflections as one avenue to assess learning.

The final sample lesson in the handbook features a sequence with the goal of leading students through becoming a strong collaborator. When looking at job posting websites, one of the most common requirements is to be a “team-player.” Many inquiry lessons culminate in some type of collaborative project-based performance task. Similar to the act of reflection, educators often assume that students come into their middle school classrooms with the toolkit they need to be effective collaborators already fully stocked. However, time, experience and research has taught us that that is not the case. It is often not until we assess students in their group work that we realise that many students struggle in this area. In some cases, strong students with leadership potential feel like they have to carry their group. Sometimes, it is assumed that the weaker academic students will be a burden to the group. Many times, the quiet, more introverted students
in our classes lack the skills to contribute much at all. These students may have many meaningful ideas to add, they lack the skills in how to do so. By leading students through a series of sequential activities, students can become familiar with the roles people play in group work and how they can become a positive contributor. Only when armed with this language and knowledge should students be assessed on their ability to collaborate on group inquiry projects.

Suggestions for Evaluation

The final chapter in the handbook is dedicated to some potential responses to the changing nature of evaluation in inquiry-style learning. The first section explores the possibility of using digital portfolios and the second section offers some advice for determining subject specific letter grades.

Digital portfolios. The new age of tracking student progress and communicating it with all of the stakeholders of a student’s education is here. The idea of creating digital portfolios has been circulating for nearly a decade, but it just in the past year or so that the platforms have become user-friendly and cost-effective. Digital portfolios are often cloud-based Internet 3.0 tools that allow parents, students and teachers to be connected online. Students and teachers can upload samples of student work to the portfolio and there is an opportunity to provide feedback in real-time. Research has shown that children achieve more when parents are involved in talking about learning. The more the parents are involved, the higher the student achievement (Henderson and Berla, 1994). Given the complex nature of assessing inquiry, having a digital platform to present artwork, documents, short videos and images is a clever way to address the key inquiry component of sharing out learning. “Students who learn to present themselves as learner are more
prepared to keep families and community informed and involved. Students who know they will be providing proof of learning often assume more responsibility for collecting, reflecting, and organizing the evidence,” (Davies 2007, p. 61). A digital portfolio becomes a history of learning over the course of a term and a year. One of the significant benefits is being about to share out about student successes and struggles on an on-going basis rather than just three times per year at report card time.

The handbook suggests a few ways to get started with using digital portfolios to provide clarity of assessments when communicating with students and parents about student learning in relation to learning goals.

**Letter Grades.** The tradition of providing letter grades to represent learning is at least a century old practice (Moll, 1998). Even as our understanding of learning shifts and we take a more holistic approach to our understandings, the most popular method for communicating how much was learned is the letter grade. In this time of transition, one can only hope that our desire to boil down complex learning to a letter grade will diminish over time, but for now, most schools in British Columbia still have to report out letter grades in subject specific areas. A few leading thinkers have offered solutions to the practice of using summative letter grades. Two methods of determining letter grades for inquiry–based learning are offered in the handbook. Anne Davies (2007, p. 93) suggests taking the following considerations when determining a letter grade or other evaluative assessment: Did this student learn what was set out to be learned? How well did they learn what was expected? To answer this question, she suggests, that we look at all the evidence over time.
Alfie Kohn (2011) and Mark Barnes (2015), however, take a more radical approach and say that grading is no longer needed. In fact, they say that grading is harmful to student learning and that it should be avoided. Assessment should always be formative and given in terms of descriptive feedback to the student. Barnes (2015) states that if a letter grade is a mandatory requirement then conferencing with students should occur and a letter grade should be arrived at in partnership with the student. The feasibility of doing this in middle school is worthy of exploration and so it is explored in the second section of Section 4 of the handbook.

If we return for a moment to the situation at the beginning of this chapter with the teacher in awe over the richness of the learning that had taken place through a personal inquiry process but in despair with respect to how to assess it, hopefully the handbook that follows in the Appendix can offer one possible solution. If we want to truly assess students on their learning we need to be able to give students clear language and learning targets within the different facets of learning. Eight of the learning facets transcend the subject–specific disciplines and are therefore ideally suited to being used as assessment tools in inquiry. By working through thoughtfully planned lessons, students will be able to understand what it takes to be a highly effective communicator, a cooperative team member and a critical thinker. They will have the language and a set of criteria for creative thinking and will be able to self-assess their progress as they learn. For teachers, this handbook will take some of the current research around effective teaching, learning and assessment strategies and put them into a series of lessons that can allow for more comfort with assessment of inquiry projects.
Chapter 4: Conclusion

This project offers a possible solution to the challenge of assessing inquiry-based learning. With the implementation of the new British Columbia curriculum and the increasing prevalence of inquiry-based learning, it seemed relevant to create a handbook that could give educators and students a common language to talk about assessment.

In the creation of the handbook, current research in educational assessment was examined and applied to inquiry-based learning practices. The reviewed research revealed that carefully designed and thoughtful assessment practices improve student learning and guide teaching practice (Willms, et al, 2009). It was also uncovered that there is not a lot of assessment research specific to the inquiry-based approach to teaching and learning.

The Core Competencies of the new B.C. curriculum are cross-curricular traits that align well with an inquiry-based learning approach. The core competencies in the new curriculum are Personal and Social, Communication, and Thinking (B.C. Ministry of Education, 2015). In the handbook, these Core Competencies have been further broken down into ten learning facets: Personal Responsibility and Awareness, Personal Identity, Communication, Critical Thinking, Creative Thinking, Reflecting, Collaborating, Social Responsibility, Understand: Explain and Understand: Apply. Each learning facet can be used as one criterion for assessment, although it is not necessary that all learning facets be covered in a single inquiry task or project.

The goal of the handbook is to provide sample lessons that could be used to teach the learning facets to middle school students. In this manner, when it is time to assess, and communicate, student learning, there is a clear, familiar vocabulary and expectations.
The rationale for this approach is that students can meet our expectations if we lay them out clearly (Stiggins, 2007).

The implications of this project are many. First, with the move towards a greater emphasis on inquiry, it is imperative that there is an efficient tool that can be used to communicate student learning. Communicating student learning is crucial to the student in terms of providing descriptive feedback to extend learning. Additionally, teachers also must communicate to parents and other stakeholders in the student’s education. Secondly, the importance of having a common language around the assessment of inquiry-based learning cannot be understated. By teaching students explicit lessons on each of the learning facets, they are given a tool kit of skills that transcend discipline.

Finally, the richness of learning that occurs through the inquiry process does not deserve to be wrapped up with a single percentage or letter grade. The learning should be celebrated and honoured through providing detailed feedback. Armed with descriptive feedback, students should have the opportunity to improve upon their learning and re-submit their best project. Assessment in this manner becomes more than just “assessment of learning” and “assessment for learning.” The entire learning process can be communicated to students and parents in a manner that is significantly more rich than just a final letter grade.

The handbook created for this project was not designed to be a definitive guide or manifesto on how to assess inquiry-based learning. It is a jumping off point for educators who are mystified by assessing inquiry and are searching for tools to communicate a student’s learning. Educators embracing inquiry-based learning are acting as agents of change in a rapidly shifting educational landscape (Hattie, 2012). This resource will
constantly evolve as teachers become more and more familiar with this way of teaching and learning.

A conversation around assessment without a conversation around evaluation and reporting is incomplete. The handbook has suggested communicating student learning through the use of digital portfolios. Lacking in this handbook is a clear solution to the issue of reporting out using letter grades. Many school districts around the province still require letter grades to be given in isolated discipline areas. This requirement does not meld well with the integrated nature of inquiry-based instruction and will be an on-going discussion in schools around the province as more and more educators embrace an inquiry-based approach.

If indeed educators choose to move away from giving letter grades, then this will have implications for post-secondary education as well. Universities and colleges have long based their program admittance on grade point averages, so if there is going to be a move away from this way of communicating about student learning, then the shift will have to be system-wide and this will take time.

Ideally, this handbook will be modified and improved upon as it is tested out in middle school classrooms around the Greater Victoria School District. Several teachers are interested in piloting these lessons when they introduce inquiry-based learning and assessment with their classes in the 2016-2017 school year. Students will also play a large role in determining the success of this approach. Ideally, our teaching practice should be informed by listening to our learners (Davies, 2007). If teachers decide to embrace assessment more through descriptive feedback than through numeric and letter grade reporting, students will have to undergo a shift in their expectations. Over time,
students will realize the benefits of receiving descriptive feedback in the different learning facets and recognize the overarching importance of the core competencies to their learning.

Looking ahead, it would be excellent to have this handbook become an online resource for educators around the province and perhaps even beyond. With the amount of resources available on the Internet, a website or e-handbook seems like a more useful version as links to resources could be embedded. Collaboration with other teachers using inquiry will continue to make this an increasingly relevant and accurate resource. In order to accomplish this goal, there will need to be time for collaborative planning and discussions throughout the implementation process. Again, an online version of the handbook could facilitate this process. A significant amount of progressive educational thinking is currently being done using online personal learning networks (PLNs) and this approach to assessment in inquiry-based instruction could tap into the wealth of educators who are also dabbling in this approach (Drake, et al, 2014).

This project lays the groundwork for what Ann Davies refers to as creating a culture of assessment in the classroom (2007). Students are taught the learning facets and will gain an understanding of how they will be assessed in each facet. When the students have a clear understanding of what is expected of them, they will have an easier time achieving success. For educators, there will be transparency in the way student learning is communicated. For students they will have greater ownership over what they are able to learn.

An inquiry-based approach to education allows for deep and meaningful learning. Students are connected and engaged, they learn skills that transcend the disciplines and
become tools for the 21st century, and they take pride and ownership of their learning. In a more traditional model of assessment, the process of inquiry was often undermined by the condensation of the learning process into a single mark or letter grade. By valuing each learning facet as a piece of the inquiry-based learning approach, this project offers one way that assessment can contribute to the rich process of inquiry-based learning.
REFERENCES


Appendix A

Assessment in Inquiry Based Learning: A Handbook for Middle School Educators

TABLE OF CONTENTS

Part 1. Background information and rationale ........................................ 42
Part 2. An overview of the framework .................................................... 45
Part 3. Sample lesson sequences for teaching the Learning Facets .......... 49
Part 4. Suggestions for communicating student learning ....................... 76
Part 5. Concluding thoughts ................................................................. 78
Part 1. Background Information

What is inquiry-based learning? The term “inquiry-based” learning is a current buzzword in education. However, it is not actually a new idea. The idea to teach students and enhance learning through creative problem solving has its roots in centuries old practice. It dates back at least as far as Socrates and his work on self-questioning and continued through to John Dewey in the early 1900’s. Inquiry really took off as a focus in science education with the space race of the 1960’s. More recently the work of Sharon Frieson, Linda Darling-Hammond and other researchers have shown students learn more deeply and perform better on complex tasks when they have an opportunity to engage in inquiry style learning. Inquiry learning has the potential to be more authentic and more engaging than a traditional teaching model. Darling-Hammond (2008, p.2) states that the ability to recall disconnected facts and follow steps of rules should be replaced by “learning that enables critical thinking, flexible problem solving, and the transfer of skills and use of knowledge in new situations.”

The new B.C. curriculum (B.C. Ministry of Education, 2015) includes the term inquiry in several areas across the three middle years grades. For example in Social Studies in grades six, seven and eight, the first of the core competencies states, “Use Social Studies inquiry processes and skills to: ask questions; gather, interpret, and analyse ideas; and communicate findings and decisions.” In the Language Arts curriculum, the word inquiry appears again, “Apply appropriate strategies to comprehend written, oral and visual texts, guide inquiry and extend thinking.” There is an element of inquiry in Math, “Develop, construct, and apply mathematical understanding through play, inquiry, and problem solving,” and in Science where the whole curriculum is designed around the
premise of inquiry learning. In addition to the Curricular Competencies of the new curriculum, the word inquiry is also embedded within the Core Competencies of Personal and Social Responsibility, Communication and Thinking.

Within the framework I am developing inquiry-based learning takes the following steps:

1) observe and create questions that come from a problem, issue or exploration
2) conduct investigations and research that foster a deep knowledge and understanding
3) collaborate and share their thinking with peers, and where possible, experts in the field
4) reflect on learning and receive detailed descriptive feedback
5) based on the new learning, take action and try to influence change using a variety of media and/ or public presentations.

(Adapted from: Friesen and Scott, 2013)

Inquiry can take several forms. The most common are referred to as: structured inquiry, controlled inquiry, guided inquiry and student –directed (or free) inquiry. In structured inquiry, the teacher structures the essential questions and leads the class through a collective inquiry. In controlled inquiry, the teacher typically chooses the topic or essential question and provides the resources that the students will use to answer the questions. In guided inquiry, the teacher chooses an essential question then supports the students in designing their own product or solution. Student- directed inquiry allows students to design their own questions, design a plan to uncover the answers, then carry out the plan. The key element that makes inquiry different from other practices in education is the requirement for the students to construct and organize their knowledge, apply critical thinking processes, collaborate with others and share out in an authentic
manner beyond the classroom environment. Some educators, like Neil Stephenson of the Galileo Network, say that inquiry is not projects or posters, but a mindset of curiosity, wondering and thinking.

**Rationale.** The stumbling block for many teachers wishing to embrace an inquiry model of learning is assessment. How does one adequately assess, evaluate and report out on this complex learning? In the more traditional teaching model, teachers used percents and letter grades to report out on specific outcomes in subject-specific disciplines. These standards were heavily weighted for specific knowledge and the application of a certain skill set. Given the specific nature of this style of teaching and learning, it was relatively straightforward to calculate a percent or grade based on the amount of knowledge that was displayed on a test or through written essay or presentation.

Learning in the 21st century looks different and therefore, our methods of assessment should be adjusted to more accurately reflect the complex nature of learning in the present era. This handbook attempts to layout a framework that can be used to assess learning in the 21st century.
Part 2. An Overview of the Framework

The model created for this handbook draws from the expertise of many leading educators: Grant Wiggins, Jay McTighe, Richard Stiggins, Linda Darling-Hammond and Susan Drake to name just a few. The intention of this resource is to summarize the best in current assessment strategies and put them into a useable framework that both aligns with the new BC curriculum and addresses the challenges in assessing inquiry-based learning.

Figure 1 shows a graphic version of the framework
**Planning.** The first step to a successful inquiry unit (or any unit) is to begin with the end in mind. The research has shown that the quality of any assessment depends on how clearly and appropriately you define the target you are assessing (Stiggins, 2005, p. 27). Drawing upon the work of Grant Wiggins and Jay McTighe and their Understanding by Design (2005), we begin with a clear outline of the goals we would like students to accomplish by the end of the unit. These can take the form of an essential question or can be simply the curricular competencies or content from the curriculum. The important piece is that students are clear on what they should know and what they should be able to do by the end of the unit.

The key learning goals form the base of a carefully constructed performance task. The nature of the performance task will vary greatly with the type of inquiry learning that is being delivered. For a guided inquiry, the performance task may offer the students a choice of project to complete that specifically targets subject specific outcomes. In an open inquiry project the performance task may be to engagingly present the information learned through a personal project.

This framework uses the new core and curricular competencies from the BC Curriculum documents as a backbone for assessment. For the middle school classroom, these have been broken down into the following ten learning facets:

I. Personal Awareness and Responsibility
II. Personal Identity
III. Communication
IV. Critical Thinking
V. Creative Thinking
VI. Reflection
VII. Collaboration
VIII. Social Responsibility
IX. Understanding- Explain
X. Understanding- Apply
Each of these ten facets are explicitly taught through a series of lessons (Part 3), so that as the learner progresses through their inquiry learning, they are familiar with the language and skills that make up each facet. Having a comprehensive background in each of the facets gives students a language within which to think about the desired learning targets and provides some basis for self-evaluation.

It is important to note that not all inquiry learning tasks will be assessed on every Learning Facet. Some facets may play a larger role in certain tasks and a lesser role in others. One key goal of this handbook is to providing a common language that teachers and students understand. Research has shown that when students are co-creators of assessment criteria they experience additional engagement and success. Using the Learning Facets as a backbone gives a common language to use in assessments by teachers and students alike.

**Inquiry.** This is not a handbook on designing successful inquiry, though it can be argued that effective assessment of inquiry-based learning relies upon a thoughtfully crafted inquiry lens.

**Reflection and Feedback.** Student self-reflection is an important piece of the assessment process. If the students have a clear understanding of how they will be assessed throughout their inquiry learning experience, they will be able to gauge how successfully they are meeting their learning goals. Research has shown that frequent self-assessment can reduce anxiety and enhance learning. The process of reflecting on their learning allows students to take a greater ownership in their learning.
Current research shows that providing descriptive feedback is one of the most critical influences on student learning. Feedback can also result in higher confidence and a greater investment of effort. In order to have these positive effects, the feedback must go beyond praise or personal feedback. In Part 3, the lesson sequences include possible structured feedback for the lesson sequence. A follow-up lesson on how to teach students to use descriptive feedback to reach their learning potential is also included. An important step of this model is to allow time for students to utilize the feedback provided to further their learning. One downside of grading any assignment too early is to shut down the potential for further learning. Students are keen to accept a mark and call the task done, but by teaching students how to use structured feedback, we can encourage students to extend their thinking therefore deepen their learning.

**Evaluation.** There does come a time when a teacher must report out on student learning. The ways in which teachers are doing this are changing, but we are currently stuck between the traditional reporting methods of the past and a more authentic reporting. Currently in British Columbia, most middle school teachers are bound by Ministry of Education guidelines to report a snapshot of student learning three times per year using a letter grade for each subject area. A couple of school districts around the province have moved to a no-letter grade model, but use a four-point scale to report on whether a student is not yet meeting, minimally meeting, fully meeting or exceeding expectations.

With the formal implementation of the new curriculum in 2016, there are certain to be some shifts in terms of expectations for reporting. During this time of transition, we must walk the balance with one foot in the past (a requirement for subject letter grades) and one foot in the future (meaningful evaluation with evidence of learning).
Part 3. Sample lesson sequences for teaching the learning facets

“Students can hit any target that they know about and that holds still for them.”
~ Rick Stiggins, 2007

Introduction. In this section, a sample lesson sequence for five learning facets is provided. The rationale is to provide example lessons that teach students about the learning facet before they are assessed on that particular facet. Each lesson sequence has been designed through an inquiry lens, so the teacher can teach the learning facets through the framework that will be used for learning larger concepts and ideas.

Each lesson is structured with the following framework:

- Title
- Reference
- Examples of where this Learning Facet could fit into Inquiry
  - A quick view of how a teacher could use this Learning Facet to assess a component of inquiry based learning.
- Enduring understandings
  - The big idea(s). It answers the question: “What do I want my students to understand and use decades from now, after they have forgotten the details?” (Wiggins and McTighe, 2005)
- Essential question(s)
  - These questions guide discussions and learning activities that promote inquiry and “uncoverage” of a subject.
- Lesson plan overview including some suggested teacher talk and student learning activities
  - Lesson plans follow a 5-E framework of Engage, Explore, Explain, Extend and Evaluate
- Suggestions for student self-evaluation
A list of student “I statements…” that are drawn from the language in the Core Competency Portfolios have been put on a scale from “never” to “always”. Students can self-evaluate their performance and mark a line on the scale to represent where they feel they are at in relationship to a statement. There is space below for the students to provide a line of evidence to support their placement on the continuum.

- Suggestions for teacher feedback
  - In this model, feedback has two parts: 1) what the students did well, and 2) suggestions for improvement
  - In the following lesson sequences, the feedback is intentionally vague to give a general idea of how it might be used to follow up a lesson sequence. In practice, providing more specific feedback is better.

- Evaluation ideas
  - There is a huge range of evaluation options for these lesson sequences. With the current theories and research in mind, the evaluation method chosen for the lesson sequences is to use a mastery scale that ranges from not yet meeting, to approaching meeting, to fully meeting, to exceeding expectations. Where possible, the use of exemplars and clear criteria are used to determine where a student falls on this continuum.
Sample Lesson I

**Learning Facet I: Personal Awareness and Responsibility**


**Examples of where this Learning Facet could fit into Inquiry**

- Setting learning goals
- Being organized for learning and managing time
- Taking ownership of goals and behaviours during the learning process.
- Seeking clarification and extra help with any aspect of learning

**Lesson Sequence**

*Enduring understandings*

- Students will better understand themselves as learners
- Students will be able to self-monitor how well they are learning in relation to a particular learning goal and what they can do if they need additional assistance.

*Essential question*

How can learning about myself maximize my learning success?

*Engage*

Have the students respond to the following questions on a piece of paper or in their notebooks.

- How do you learn best?
- What helps you to remember?
- What kind of feedback helps your learning?
- Do you like to learn and practice by yourself or with others?

It may be that students answer, “I don’t know,” to some or all of these questions. Try to prompt them to really think about their responses, but also explain that the whole purpose of this activity is to learn more about themselves as learners, so not knowing at this stage is okay.
Explore

Begin with a discussion around different types of intelligences. Explain that not everyone is “smart” in the same ways. Have students complete a multiple intelligences survey online or on paper. Two good examples of this type of survey can be found here:

Edutopia: Multiple Intelligences
http://www.edutopia.org/multiple-intelligences-assessment

My Personality Info
http://www.mypersonality.info/multiple-intelligences/

Guide students through a reflection of their strengths and areas in which they hope to grow. Also have students reflect on how their strong intelligences influence their learning style.

Explain

Ask students to think of a time when they had to learn something new. Have them share their learning experience with a partner. Next ask the students to share out what made it easy or difficult for them to learn that new thing and have them discuss this with their partner. Some middle school students might benefit from using the following sentence stems to frame their partner talk:

I remember learning about ________________________. This is where I learned how to_________________________________________.

One thing that made my learning easy was ____________________________.

One thing that made my learning difficult was ____________________________.

Ask students to raise their hands if their learning memory was related to something they chose to be able to learn or if it was something they were expected to learn.

On chart paper in groups, have students brainstorm the types of things that make it easier to learn. If they are struggling, prompt with “What are some things you can personally do to make it easier to learn?” (be ready to learn, be organized, have all materials), “What type of environment helps you to learn?” (quiet, collaborative, music on, headphones in), “Who can help you when you get stuck when trying to learn?” (friends, teachers, parents).
Extend

Have students create a visual representation that responds to the essential question of “How can learning about myself maximize my learning success?” Students may wish to include the responses to the following questions into their visual representation.

What is my learning style?
What are some strategies that help me to stay focused?
What organizational tools will I use to help me stay on top of my work?
Why is important for my learning that I live a healthy lifestyle?
When the learning gets challenging, how do I persevere?
What type of feedback do I need to be successful?

Some examples of a visual representation could be a thumbprint portrait, a collage or a comic strip. See the Suggested Resources section for a link to a similar thumbprint portrait activity.

Suggestions for Student Self-Evaluation

<table>
<thead>
<tr>
<th>Personal Awareness and Responsibility Learning Facet</th>
</tr>
</thead>
<tbody>
<tr>
<td>I take responsibility for my work.</td>
</tr>
<tr>
<td>Never ←--------------------------------------------------&gt; Always</td>
</tr>
<tr>
<td>I submit work that I am proud of.</td>
</tr>
<tr>
<td>Never ←--------------------------------------------------&gt; Always</td>
</tr>
<tr>
<td>I hand things in on time.</td>
</tr>
<tr>
<td>Never ←--------------------------------------------------&gt; Always</td>
</tr>
<tr>
<td>I ask for help when I need it.</td>
</tr>
<tr>
<td>Never ←--------------------------------------------------&gt; Always</td>
</tr>
<tr>
<td>I persevere with challenging tasks.</td>
</tr>
<tr>
<td>Never ←--------------------------------------------------&gt; Always</td>
</tr>
<tr>
<td>I take ownership of my goals, my learning, and behaviour.</td>
</tr>
<tr>
<td>Never ←--------------------------------------------------&gt; Always</td>
</tr>
<tr>
<td>I represent my learning in a way that shows the full extent of my understanding.</td>
</tr>
<tr>
<td>Never ←--------------------------------------------------&gt; Always</td>
</tr>
</tbody>
</table>

Evidence:
Suggestions for teacher feedback

This list can be provided as a paper copy and highlighted or copied digitally and adapted in as part of descriptive feedback in a digital portfolio.

**Teacher Feedback: Personal Awareness and Responsibility Learning Facet**

*What you did well:*

- You took responsibility for your work.
- Your assignments and tasks were completed in a timely manner.
- You asked for help when you needed it.
- You persevered with a challenging task.
- You took ownership of your learning goals, your learning and your behavior.
- You chose a way to demonstrate your learning that shows the full extent of your understanding.

*Suggestions for improvement:*

- Focus on organization and time management.
- Hand in the best version of your work that you can produce.
- Ask for clarification if you need assistance.
- Keep working on things; use the strategies if you get stuck.
- Choose to represent your learning in a style that works best for you.

Suggestions for summative evaluation

There is a strong case to be made for not including a Personal Awareness and Responsibility mark in a summative evaluation, like a Performance Task project. For example, the fact that an assignment was handed in late should not negate the content of the assignment. If a student has met the expectations for a task or learning target, then the evaluation should reflect that, not the timeliness of assignment or task completion.
However, by including feedback or even a mastery mark of Not Yet, Approaching, Fully Meeting or Exceeding Expectations for work habits can be a powerful look into how the student is setting up for (or not setting up for), success.

One suggestion for assessing work habits on any given task or project can be found below. Check marks or highlighting could be used to indicate the level of achievement in relation to the components of this Learning Facet.

Personal Awareness and Responsibility

<table>
<thead>
<tr>
<th>Not yet meeting</th>
<th>Meeting Expectations</th>
<th>Exceeding Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsibility was taken for work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assignment/ task was completed in a timely manner.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asked for help when clarification was necessary.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persevered with a challenging task.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ownership of learning goals, learning and behavior was evident.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning was demonstrated in a way to show the full extent of understanding.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sample Lesson II

**Learning Facet Three: Communicating**


**Examples of how this can fit into Inquiry**

- Presenting out inquiry study findings to various audiences
- Working collaboratively with a group or team

**Lesson Sequence**

*Enduring understandings*

Students will learn about connecting and engaging others, presenting information and communicating within groups.

*Essential question:*

What is the essence of effective communication?

**Lesson Sequence:**

*Engage*

This activity is adapted from: [https://www.csbsju.edu/selt/selthistory/12-7-00/lego-replication](https://www.csbsju.edu/selt/selthistory/12-7-00/lego-replication)

Set-up:
Build a Lego model with about 15 pieces and place at one end of the classroom behind a blind (a tri-fold board works well).

Set up a row of desks in the middle of the classroom. This is where the Looker and the Runner meet to talk.

Set up desks (one per group) at the end of the classroom opposite the Lego Model. This is where the Builder for each group will sit.

Sort Lego into bags (one per group) so that each group has enough pieces to build an exact replica of the original model.

Divide students into groups of 4.
Give each student a role and explain each role fully:

Role 1: Builder
The Builder receives the bag of Legos.
The Builder is the only person who may touch the Legos.
The Builder takes direction from the Runner.
The Builder may not speak and may not see the original model.

Role 2: Runner
The Runner tells the Builder what the Looker told him/her.
When the Runner cannot remember any more details or wants to confirm a detail or ask questions, the Runner and Looker may converse freely about the details.
The Runner may not touch the Legos – the Runner may only tell the Builder what to do.

Role 3: Looker
The looker sees the original model.
The Looker looks at the original model and tells the Runner all the details he/she can remember about the model.
The Looker cannot answer questions asked by anyone except for the Runner.

Observers (1 or more per group)
Write down observations from a communication lens. Are there any breakdowns in communication, misunderstandings, frustrations, giving up? Is there anything positive about what is going on?
Observers may only observe – they observe the Looker, Runner, and Builder and write down what they observe.
They may not talk nor answer questions – they are invisible.

Tell the students that the goal is to build an exact replica of the Lego model behind the screen. Start the activity and allow it to run for about 10 minutes.

After 10 minutes or when it is clear that the activity is waning, gather each team together to look at their model as compared to the original.

In their small groups, have students write down:

- discuss what was observed, felt, experienced, and learned.
- how similar is the original model to the newly built model?
- how this activity relates to the importance of being a good communicator.

As a whole class, discuss the highlights of what was learned or observed during this activity. Finally, ask one Observer from each group to give a brief (1 minute or less) overview of what happened in their group.
Explore

What are the different types of communication? As a class, brainstorm the different types of communication (public speaking, informal conversation, gesturing/ body language, eye contact, writing). Give each group a piece of chart paper and a form of communication. Have them make a list of criteria for effective communication for their communication type. Once students are done, have someone share out their criteria to the class. Ask class for suggestions on what else can go onto the posters. These posters can go up around the room to help students remember effective ways to communicate throughout the year.

Explain

In this activity, students will independently create a plan to solve a problem. Each student will have a different problem to solve. They will then have 2 minutes to share a synopsis of their problem as well as their solution to a small group. Emphasize that in presenting a solution to the problem the students must do so in a way so that someone listening would know exactly how to solve the problem. The small group will give them feedback on the ability of the presenter to communicate their ideas. Students will have additional time to make adjustments according to their group’s feedback, then they will present their two minute solution to the class.

Some sample problems:

| Shoelaces are tied in a knot that is impossible to undo. | You can only find one single clean sock. | Your water bottle spills all over your backpack and soaks all of your homework. | You forgot your locker combination and your teacher (who has the code) is away for a week. | You are short one piece of graph paper for your math assignment. |

Extend

To communicate effectively in writing, it is important for students to understanding their audience. Explain that the way to connect and engage with their peers is different from how they may connect and engage with their teacher or the community at large. To help drive home this concept, give the students the following scenario, “The school has decided to make school uniforms mandatory.” Ask the students how they would respond to this idea if they were writing a blog for their peers compared with an article for the community newspaper on this issue or a letter to the principal to urge him to reconsider. Brainstorm some ideas around effective communication strategies for different formats and audiences. Have the students write a resolution to this scenario in two different formats for two different audiences.
Evaluate

Suggestions for Student self-evaluation

Student self-evaluation: Communication Learning Facet

I am an active listener; I acknowledge what has been said.
Never ←_______________________________________________> Always

I recognize that there are different points-of-view and I can disagree respectfully.
Never ←_______________________________________________> Always

I present information clearly and in an organized way.
Never ←_______________________________________________> Always

I can represent my learning, and tell how it connects to my experiences and efforts.
Never ←_______________________________________________> Always

Evidence: _______________________________________________________

Suggestions for teacher feedback

Teacher Feedback: Communication Learning Facet

Things you did well:

- You were an active listener
- You acknowledged what was said by your partner/group/teacher/guest
- You were able to see a problem from another point of view
- Any disagreements were respectful and resolved peacefully
- Your information was organized and your ideas flowed together
- You spoke and/or wrote with clarity and unity in your ideas
- You connected your learning with your experiences
- You were able to demonstrate your learning through your chosen medium

Suggestions for improvement

- You can work on listening more attentively to your partner/group/audience/teacher/guest
- You can work on acknowledging what has been said during a conversation or presentation
- You can work towards seeing different perspectives from your own.
• When disagreements occur, you can use the strategies brainstormed in class to move forward rather than give up/get stuck
• The organization of your ideas can improve through adding a clear beginning, middle and conclusion to your writing or speaking
• Practice your oral speaking before presenting to the group/class/recording
• Look for additional ways to connect your learning to your prior experiences
• Choose a method of sharing your understanding that works for you and your subject/topic/content

Suggestions for evaluation:

• build a speaking and listening rubric with your class
• review the criteria in the B.C. Performance Standards for written communication. Have the students help you turn it into more “kid-friendly” language.
Sample Rubric For Communication: Speaking and Listening  

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Not yet meeting expectations</th>
<th>Approaching meeting expectations</th>
<th>Meeting expectations</th>
<th>Exceeding expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening</td>
<td>Did not make eye contact with the speaker. Did not ask questions or did not ask any relevant questions. Behaviour interrupted the conversation, presentation or activity.</td>
<td>Did not make eye contact with the speaker on a regular basis. Did not ask questions or did not ask any relevant questions. Maintained proper audience behaviour.</td>
<td>Made eye contact with the speaker. Asked relevant questions. Maintained proper audience behaviour.</td>
<td>Made eye contact with the speaker. Asked relevant questions and ignited a relevant discussion. Maintained proper audience behaviour.</td>
</tr>
<tr>
<td>Language</td>
<td>Language choice is unclear. Language used detracts from the effectiveness of the presentation. Language in presentation is not appropriate to audience.</td>
<td>Language choice is commonplace. Language used may detract from the effectiveness of the presentation. Language in presentation is appropriate to audience.</td>
<td>Language choices are thoughtful and support the effectiveness of the presentation. Language in presentation is appropriate to audience.</td>
<td>Language choices are imaginative, memorable and thoughtful. Language supports the effectiveness of the presentation. Language in presentation is appropriate to audience.</td>
</tr>
<tr>
<td>Delivery</td>
<td>Posture, gesture, eye contact, and vocal expressiveness make the conversation or presentation difficult to understand. The speaker appears uncomfortable/nervous.</td>
<td>Posture, gesture, eye contact, and vocal expressiveness make the conversation or presentation understandable. The speaker appears shy/tentative.</td>
<td>Posture, gesture, eye contact, and vocal expressiveness make the conversation or presentation interesting. The speaker appears comfortable.</td>
<td>Posture, gesture, eye contact, and vocal expressiveness make the conversation or presentation compelling. The speaker appears well rehearsed and professional</td>
</tr>
<tr>
<td>Flow/Organization</td>
<td>Ideas are jumbled together and it is difficult to identify the beginning, middle and end.</td>
<td>Ideas flow together with a predictable beginning, middle and end.</td>
<td>Ideas flow together with a clear introduction, middle and end.</td>
<td>Ideas flow together with an engaging and clear introduction, a supported middle and strong conclusion.</td>
</tr>
<tr>
<td>Meaning</td>
<td>There is a central idea with little supporting connections and /or little evidence.</td>
<td>There is a central idea with some supporting connections and / or some evidence.</td>
<td>There is a central idea with clear supporting connections and evidence.</td>
<td>There is a central idea with strongly supported connections and evidence.</td>
</tr>
<tr>
<td>Problem Solving/Group Dynamics</td>
<td>Communication is ineffective in the group and minor disagreements expand into major ones. Adult assistance is required for the group to complete the task.</td>
<td>Communication is effective for overcoming minor disagreements. Disagreements may be frequent and people have trouble fulfilling their role in a group.</td>
<td>Communication is effective for overcoming minor disagreements and people fulfill their role in their group.</td>
<td>Communication is strong with no unresolvable issues. Group functions well as a team.</td>
</tr>
</tbody>
</table>
Sample Lesson III

**Learning Facet Four: Critical Thinking**


**Examples of where this Learning Facet could fit into Inquiry**

- Problem solving in mathematics
- Application of mathematics to real-world and financial literacy scenarios
- Defend a controversial topic in writing or oral debate
- Create a novel way of solving a problem

**Lesson Sequence**

*Enduring understandings*

Students will learn what makes a good question to investigate.
Students will learn how to view multiple perspectives on a given task or issues
Students will gather evidence to support a way or thinking or point of view.
Students will develop and design something new.

*Essential question*

What are the key traits of a strong critical thinker?

*Prepare:*

To prepare for this lesson, gather a collection of random objects or tools, the more obscure the better. Some suggestions might be tools: tile cutter, leather punch, old-fashioned meat grinder, or machine parts- gears, switches, filters, or items from the junk drawer- knobs, fuses, clips. If an assortment of 6-8 random items cannot be found, images of vintage items work just as well. Most museum websites have an image gallery of mystery objects or a quick Google search of “vintage mystery objects” can bring some up.

*Engage*

Have students make their best guesses as to what the object is and its function. Make sure they justify their thinking. This can be done in writing or as a partner talk and share out activity.
Explore

In partners, have students select one item or image. Their next task is to brainstorm all the questions they have about the object. Encourage students to go beyond “on-the-line” type questions using a framework like the one below.

**Question Matrix**

<table>
<thead>
<tr>
<th></th>
<th>Who…</th>
<th>What…</th>
<th>Where…</th>
<th>When…</th>
<th>How…</th>
<th>Why…</th>
</tr>
</thead>
<tbody>
<tr>
<td>is…</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>did…</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>can…</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>would…</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>will…</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>might…</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Adapted from Koechlin and Zwaan, 2014, p. 82)

Have partners share out their questions to the class. Depending on the class, teachers may wish to give students some time to conduct some on-line research to try to find the answers to some of their questions.

**Explain**

Provide the students with the following list of “I statements…” based on the Critical Thinker Core Competency from the new B.C. Curriculum.

Have the students highlight the circle beside each statement with a colour to signify where they are currently at with their Critical Thinking Skills. Instruct the students to use green if they agree with the statement, yellow if they are developing in the area suggested by the statement and red/pink if they know they have work to do in the area suggested by the statement.

**Critical thinker Learning Facet:**

*analyze and critique, question and investigate, develop and design*

- I can ask open-ended questions and gather information.
- I can consider more than one way to proceed in an investigation.
- I can determine if something is a reliable source of information.
- I can tell the difference between facts and interpretations, opinions, or judgments.
- I can develop criteria for evaluating design options.
- I can make choices that will help me create my intended impact on an audience or situation.

**Extend**
Have each student choose one of the mystery objects from the earlier activities, or have them find their own. Instruct the students to keep the criteria for being a critical thinker in mind while they complete the following assignment on their mystery object.
Mystery Object Assignment: Practice with Critical Thinking

My mystery object looks like this:

Some questions I have about my mystery object are:

Some places I am looking for information are:
(remember to correctly reference your sources)

I know my sources are providing valid information because:

Some facts about my object are:

Some thoughts or interpretations about my object are:

Some ways my object could be improved are:

My plan for sharing out about my object to the class is:
Have the students share out information about their mystery object to the class. They could do an oral presentation, a power-point or prezi or make a short video.

Evaluate

Student self-evaluation:

Have students re-assess themselves on the criteria provided earlier for the Critical Thinking Learning Facet using the three highlighter colours. This time, have the students add one sentence of evidence from their Mystery Object Assignment to justify their reasoning.

Suggestions for teacher feedback:

Teacher Feedback: Critical Thinking Learning Facet

Things you did well:

- You asked open-ended questions
- You gathered information from a variety of reliable sources.
- You considered more than one way to proceed in an investigation.
- You noted the difference between facts and interpretations, opinions, or judgments.
- You developed criteria for evaluating design options.
- You presented your thinking in a way that resulted in your intended impact on an audience or situation.

Suggestions for improvement:

- Try to ask more open-ended questions, rather than questions that can be easily answered; what specific information would you need to collect to answer your question?
- Make sure to gather information from a variety of sources.
- Make sure your resources are reliable.
- Consider other points of view or look for other ways to proceed in an investigation.
- Make sure you can distinguish between what is a fact and what is an interpretation, opinion, or judgment.
- Think through a range of criteria for evaluating design options.
- Focus on what you want your audience to know about your topic. Make sure you are creating your intended impact.

Suggestions for evaluation:

Using the “I statements…” for the Critical Thinking Learning Facet, create a rubric with the students to evaluate their learning in this area.
<table>
<thead>
<tr>
<th>Aspect</th>
<th>Not Yet Meeting Expectations</th>
<th>Minimally Meeting Expectations</th>
<th>Fully Meeting Expectations</th>
<th>Exceeding Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questioning</td>
<td>- does not identify the main questions and/or is unable to create open-ended questions</td>
<td>- identifies some of the main questions and/or may struggle to create open-ended questions</td>
<td>- identifies the main questions and/or creates a spectrum of open-ended questions</td>
<td>- identifies the main questions and/or creates a spectrum of open-ended questions that show a sophisticated level of curiosity</td>
</tr>
<tr>
<td>Planning</td>
<td>- struggles to create a plan to investigate the topic, question, problem</td>
<td>- proposes only one way to investigate the topic, question/problem</td>
<td>- considers more than one way to investigate the topic, question/problem</td>
<td>- several avenues are explored in planning how to investigate the topic, question/problem</td>
</tr>
<tr>
<td>Perspective</td>
<td>- investigates the topic, problem or question from only one perspective</td>
<td>- may consider more than one point of view, but lacks detail/description</td>
<td>- thoughtfully considers more than one point of view; can provide evidence to support point of view</td>
<td>- investigation, topic, or problem is carefully considered from several points of view; is able to justify decisions from multiple perspectives.</td>
</tr>
<tr>
<td>Gathering Information</td>
<td>- information is gathered from a limited number of sources -information is not referenced properly.</td>
<td>- information is gathered but some sources may be unreliable -all information is references properly.</td>
<td>- information is gathered from a number of reliable sources -all information is references properly.</td>
<td>- information is gathered from a variety (books, articles, internet) of reliable sources, -all information is references properly.</td>
</tr>
<tr>
<td>Evaluating</td>
<td>- lacks evidence required to justify choices -is unable to complete some revisions on drafts, designs or solutions</td>
<td>- recognizes the need for evidence -choices are justified, though may lack sufficient evidence -is able to do complete some revisions on drafts, designs or solutions with guidance</td>
<td>- recognizes the need for strong evidence -choices are justified with evidence -revises inadequate drafts, designs or solutions as necessary</td>
<td>- recognizes the need for strong evidence and evaluates the evidence for validity and relevance -choices are thoroughly justified with strong evidence -revises inadequate drafts, designs or solutions as necessary</td>
</tr>
<tr>
<td>Communicating</td>
<td>- chosen medium is inefficient for delivering information to the audience - struggles to explain the topic and/or solutions to the problem/ task</td>
<td>- chooses a medium that is not best suited for the intended impact on the audience - with guidance can explain the topic and/or solutions to the problem/ task</td>
<td>- chooses a medium that will have the intended impact on the audience - can explain the topic and/or solutions to the problem/ task</td>
<td>- chooses the best medium to make the intended impact on the audience - can explain the topic and/or solutions to the problem/ task – can recognize limitations of work completed</td>
</tr>
</tbody>
</table>

An example of a generic Critical Thinking Learning Facet Rubric
Sample Lesson IV

**Learning Facet Six: Reflecting**


**Examples of where this Learning Facet could fit into Inquiry**

- As a pre-learning and post-learning activity to any unit or lesson.
- To track growth over the course of a longer-term project.
- To reflect on the strategies that make learning easier when presented with multiple options for approaching a task or problem.
- Keeping a journal through a project or inquiry can be a safe place to track questions, ideas, struggles and successes.

**Lesson Sequence**

**Enduring understandings**

Students will have a common vocabulary around what it means to be reflective.
Students will be able to reflect purposefully on their learning.

**Essential question**

What does it mean to be a reflective learner?

**Engage**

Post the following quote on the whiteboard, “An event is not an experience until you reflect upon it.” Michael Fullan.

Have students use the Chalk Talk strategy to brainstorm on the board what they think this quote means and what it means to them. In the Chalk Talk strategy, students are invited to write their feelings, connections, questions, and thoughts on the whiteboard, but they may not speak. They can interact with other writings on the board through drawing connection lines. Once the writing is complete, the teacher can guide a class discussion about what is on the board.

**Explore**

Ask the students to think of a time when they struggled to learn something but they were eventually successful. Some ideas could be learning to ride a bike, learning a new concept in math or learning to bake a perfect cake.
Instruct the students to write a half-to-one page journal style entry about this experience. Have them frame their journal in the SEA style of reflection: SEA is an acronym for Situation, Evidence and Action. Start with describing the situation, then have them detail the evidence of their struggles with the learning event, then have them describe the action they took to become successful (Sen & Ford, 2009).

**Explain**

Once the students have completed their journal entries, provide them with the following “I statements” sheet. Have the students use their journal entry to complete the handout.

---

**Being a Reflective Learner**

The first time I tried to learn to __________________, this happened:
______________________________.

To help me improve, I did this: ________________________________.

I knew I had succeeded in my learning when:
___________________________________________________________.

Explain how this experience has helped you learn something else:

How might this experience help you to learn other new things in the future:

Why is it important to reflect upon our learning experiences?

---

Next, have students share out their learning experiences and their guided reflections in small groups of 3-4 students. Challenge them to look for similarities and differences in their responses.
Extend

Explain that there are several ways to practice being a reflective learner: through partner-talk, small group discussions and through journaling. Create an anchor chart to hang in the classroom with the characteristics of a reflective learner. Have students in small groups brainstorm traits, then combine with one other group. Have each group of 5-6 students create a list of 4-5 traits of a reflective learner to share with the class. Add these to the anchor chart.
If students need guidance, teachers can support the discussions by asking what a reflective learner sounds like during partner-talk or small group discussions or what they might write down in a journal entry.

Evaluate

Student self-evaluation:

The following can be used as a Ticket-out the Door style self-evaluation strategy and formative assessment strategy after any lesson or during any point of the inquiry process:

<table>
<thead>
<tr>
<th>Name: ________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reflection:</strong> journal, self-assess, grow</td>
</tr>
<tr>
<td>Today my learning situation involved:</td>
</tr>
<tr>
<td>.................................................................................................................................</td>
</tr>
<tr>
<td>One piece of evidence of my learning today is:</td>
</tr>
<tr>
<td>.................................................................................................................................</td>
</tr>
<tr>
<td>One piece of action I will take based on my learning today is:</td>
</tr>
<tr>
<td>.................................................................................................................................</td>
</tr>
</tbody>
</table>

Suggestions for teacher feedback:

When providing feedback on student reflections the most important piece is to look for evidence of deep thinking and growth. Here are some suggestions for feedback.

What you did well:

You clearly detailed your learning situation, your successes and your struggles. You used examples to provide clear evidence of your learning.
You described what actions you will take next to continue or improve upon your current learning.

Suggestions for improvement:

It is important in reflecting that you accurately describe your learning situation. This will allow you to make connections to other similar learning situations in the future. Remember to provide clear evidence of your learning. If you are having difficulties, provide clear descriptions of what you are struggling with. This can help you isolate the problem and allow for others to help you. Remember to make a plan to take action as result of your learning.

Suggestions for evaluation:

In long-term inquiry projects, teachers may wish the students to keep a reflective journal of their learning process. A reflective journal could be evaluated on a rubric similar to the one below:

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Not Yet Meeting Expectations</th>
<th>Minimally Meeting Expectations</th>
<th>Fully Meeting Expectations</th>
<th>Exceeding Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situation</td>
<td>A simple description of the task; does not describe the learning that is taking place.</td>
<td>A limited description of the learning situation; includes a list of associated events.</td>
<td>Full description of learning situation; includes some interpretation of events.</td>
<td>Full description of learning situation; includes a thorough interpretation of events.</td>
</tr>
<tr>
<td>Evidence</td>
<td>Provides little evidence of learning or struggles with learning.</td>
<td>Provides some evidence with examples of learning or struggles with learning.</td>
<td>Provides clear evidence with examples of learning or struggles with learning; makes connections to prior experiences/learning.</td>
<td>Provides clear evidence with examples of learning or struggles with learning; is insightful when connecting current learning to past experiences.</td>
</tr>
<tr>
<td>Actions</td>
<td>Lacks a clear plan of what step to take next.</td>
<td>Has a plan of what step to take next based on their evidence, though the plan may lack clarity.</td>
<td>Has a clear plan of what step to take next based on their evidence.</td>
<td>Has a detailed plan of what step to take next based on their evidence; plan is realistic and links to past experience.</td>
</tr>
</tbody>
</table>

Adapted from Sen and Ford, 2009.

Sample Lesson V
Learning Facet Seven: Collaboration


Examples of where this Learning Facet could fit into Inquiry

- Any time partner or group work is involved with an inquiry project or task.

Lesson Sequence

Enduring understandings

Students will learn the roles people can take in partner or group work.
Students will have a common vocabulary around effective collaboration.
All students can be positive collaborators.

Essential question

What does positive collaboration look like?

Engage

Start this lesson of with the Marshmallow Challenge. In this task, students would, in groups of four, collaborate to build the tallest free-standing structure that can support a single marshmallow. Each group has 20 sticks of uncooked spaghetti, a meter of masking tape, and a meter of string. They have 18 minutes to create their structure. More details about the Marshmallow Challenge can be found at: http://www.tomwujec.com/design-projects/marshmallow-challenge/

Explore

Once the students have completed the challenge, have them reflect on the role they played within their group on this activity.
Exploring Collaboration:

Reflect on your ability to collaborate in the Marshmallow Challenge. Put a check mark beside any of the boxes that represent the role you played in this challenge and give a brief statement of evidence of how you fulfilled your role.

<table>
<thead>
<tr>
<th>Role</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiator: proposes new or different ideas or approaches</td>
<td></td>
</tr>
<tr>
<td>Information seeker: asks for facts or clarification</td>
<td></td>
</tr>
<tr>
<td>Opinion seeker: Asks for values and opinions</td>
<td></td>
</tr>
<tr>
<td>Facilitator: attempts to summarize and keeps the group focused on the task</td>
<td></td>
</tr>
<tr>
<td>Encourager: Offers praise and acceptance</td>
<td></td>
</tr>
<tr>
<td>Harmonizer: mediates disagreements</td>
<td></td>
</tr>
<tr>
<td>Compromiser: attempts to resolve conflicts</td>
<td></td>
</tr>
<tr>
<td>Put-downer: puts other people down</td>
<td></td>
</tr>
<tr>
<td>Blocker: negative, stubborn and difficult</td>
<td></td>
</tr>
<tr>
<td>Dominator: tries to take over the group</td>
<td></td>
</tr>
<tr>
<td>Sitter: does little to help the group</td>
<td></td>
</tr>
<tr>
<td>Joker: tries to de-rail the group by being funny and off-task</td>
<td></td>
</tr>
</tbody>
</table>

(List adapted from: Roberts, 2012)
**Explain**

Once students have reflected on the role they played, have them work as a group to highlight which of the roles are helpful roles in terms of collaborating with a group, and which roles are unhelpful to collaboration.

Next, break down the skill of being a strong collaborator into the following aspects: Focus and Participation, Dependability and Shared Responsibility, Listening and Discussing, Problem-Solving and Teamwork.

Split the class into five groups and have each group create a poster to display around the room on one aspect of collaboration. Have each group share out their poster. It may be helpful to guide students to include what the aspect of collaboration looks like, sounds like and feels like.

Have each student create an action plan to become a more helpful collaborator. Instruct the students to share out their action plans.

**Extend**

Complete the Marshmallow Challenge again in the same teams. Then have students reflect on their ability to be a strong collaborator- what changed and what was the same? Was the group more successful this time? Why or why not?

**Student self-evaluation:**

Students can self-evaluate their ability to be effective collaborators by providing justification for the following “I statements.”

*Collaboration Learning Facet*

When working with a group, I can clarify problems, consider alternatives, and evaluate strategies to make my group run smoothly.

Never ➔ Always

Justification:

When working with a group, I use a positive and respectful tone of voice.

Never ➔ Always

Justification:

I build and sustain positive relationships with diverse people.

Never ➔ Always

Justification:
Suggestions for teacher feedback:

What you did well:

When working with your group, you fulfilled a positive role by…
You were focused and participated well in your group.
You were a dependable group member.
You were a good listener.
You used a positive tone and were respectful with your group members.

Suggestions for improvement:

When working with your work, you can play a more positive role by…
It is important to stay focused and participate in all aspects of group work.
It is important that you remember to use a positive tone and be respectful of all members of your group.
You need to put more effort into being a dependable group member.
Suggestions for evaluation:

A rubric may be used to evaluate collaboration on an inquiry task. One possible version could look like this:

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Not Yet Meeting Expectations</th>
<th>Minimally Meeting Expectations</th>
<th>Fully Meeting Expectations</th>
<th>Exceeding Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus and Participation</td>
<td>Needs regular reminders to stay focused on the task and what needs to be done. With guidance can contribute positively to the group.</td>
<td>Mainly stays focused on the task and what needs to be done. Contributes some effort, and mostly encourages and supports the efforts of others in the group.</td>
<td>Stays focused on the task and what needs to be done. A team member who contributes effort, and encourages the efforts of others in the group.</td>
<td>Stays focused on the task and what needs to be done. A true team member who contributes a lot of effort, and encourages and supports the efforts of others in the group.</td>
</tr>
<tr>
<td>Dependability and Shared Responsibility</td>
<td>Sometimes follows through on assigned tasks. Often depends on others to do the work.</td>
<td>Mostly follows through on assigned tasks and does not depend on others to do the work. Tries to ensure responsibility for tasks is shared evenly.</td>
<td>Follows through on assigned tasks and does not depend on others to do the work. Ensures responsibility for tasks is shared evenly.</td>
<td>Consistently follows through on assigned tasks and does not depend on others to do the work. Ensures responsibility for tasks is shared evenly by demonstrating positive leadership.</td>
</tr>
<tr>
<td>Listening and Discussing</td>
<td>Struggles to respectfully listen, interact, and discuss with other members of the team during discussions. Often de-rails discussions.</td>
<td>Most of the time, respectfully listens, interacts, discusses and poses questions to all members of the team during discussions and often helps direct the group in reaching consensus.</td>
<td>Respectfully listens, interacts, discusses and poses questions to all members of the team during discussions. Helps direct the group in reaching consensus.</td>
<td>Consistently listens respectfully, interacts, discusses and poses questions to all members of the team during discussions. Demonstrates positive leadership in directing the group in reaching consensus.</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>Struggled to look for and suggest solutions to problems.</td>
<td>Sometimes looks for and suggests solutions to problems.</td>
<td>Actively looks for and suggests solutions to problems.</td>
<td>Consistently looks for and suggests solutions to problems.</td>
</tr>
<tr>
<td>Teamwork</td>
<td>Struggled to perform all duties of assigned team role and did not contribute much in the way of knowledge, opinions, and/ or skills to share with the team. Needed frequent reminders to interact in a positive way with all other team members.</td>
<td>Performed most of the duties of assigned team role and contributed some knowledge, opinions, and skills to share with the team. Interacted in a mostly positive way with all other team members.</td>
<td>Performed all duties of assigned team role and contributed knowledge, opinions, and skills to share with the team. Interacted in a positive way with all other team members.</td>
<td>Consistently performed all duties of assigned team role and contributed significant knowledge, opinions, and skills to share with the team. Consistently interacted in a positive way with all other team members.</td>
</tr>
</tbody>
</table>

(Adapted from: [https://www2.uwstout.edu/content/profdev/rubrics/secondaryteamworkrubric.html](https://www2.uwstout.edu/content/profdev/rubrics/secondaryteamworkrubric.html))
Part 4. Suggestions for Communicating Student Learning

Using digital portfolios as reporting tools. It is becoming increasingly easy to create, manage and store evidence of student learning online. Here are some key tips to making digital portfolios a success:

1) involve students in being responsible for the evidence-- they can upload their own work
2) include more than just written work as evidence-- include video clips of oral presentations, film students demonstrating a skill in Physical Education
3) provide detailed feedback using the terminology: Things you did well/
   Suggestions for improvement
4) allow students to re-submit samples of their learning to indicate they have taken and applied the suggested feedback
5) keep it simple and provide time to store the evidence-- with any marking system, timeliness in giving feedback is essential to student learning
6) help students and parents understand why the evidence is important

Communication with parents is paramount to making digital portfolio a success. Below is a sample letter than can be sent home to inform parents of the rationale behind using digital portfolios. Depending on the digital platform, parents will also need to know how to access their child’s portfolio and depending on local regulations will likely have to sign a release of information agreement stating that they agree for their child’s information to be stored online.
Sample Parent Letter

This year, we have chosen to track and share student learning using a digital portfolio. There is a growing body of research that shows significant benefits to this more fluid and formative reporting system.

Benefits to student learning include:
- improved skills in literacy and communication
- a greater sense of pride and accomplishment
- a greater personal understanding of strengths and areas for improvements
- improved skills in problem solving
- improved skills in technology
- enhanced engagement and motivation in reflection and self evaluation
- increased ability to accept and continue learning due to applying descriptive feedback

In order for the potential of this portfolio system to have the maximum benefits, it is important that both students and parents are frequently visiting the student portfolio page. If you are having trouble accessing the page, please email your child’s advisory teacher for another invite.

When reviewing your child’s portfolio, please notice the descriptive feedback given in terms of: what you did well and how you can improve. Major assignments are marked on a mastery scale that ranges from: not yet meeting expectations to approaching expectations to meeting expectations to exceeding expectations. Minor assignments are are marked as complete/incomplete or posted as a record of learning.

The primary purpose of providing descriptive feedback is to allow for students to improve upon their learning. Students are always encouraged to apply the feedback they are given and resubmit an improved version of their assignments. In this way, digital portfolios encourage ongoing learning.

Specific learning outcomes are labeled within each major activity or assignment. If you would like to see what big ideas/curricular competencies and core competencies we focused on for a particular assignment, please click on the “show” button for that assignment.

The teachers are still learning how best to use the digital portfolio system. We are eager to hear from parents about what is working and what is not working for you and your child with the digital portfolio. Please email your child’s teacher we any specific feedback and/or suggestions.

Sincerely,

The Teachers
Part 5. Concluding thoughts

This handbook was designed to propose one solution to the challenge of assessing learning in an inquiry-based model. Given the changes that are looming in the new British Columbia curriculum, this handbook provides a place to start when looking at teaching through the lens of inquiry. The sample lessons provided are a good place to start, even before beginning an inquiry project so that teachers and students alike will have a common language to discuss the learning that is taking place. With this common language, students will have a better understanding of the skills and knowledge needed to thrive in an inquiry-based learning environment.

As will all aspects of education, this handbook will be continually evolving and changing to meeting the needs of the students, the educators, and the current beliefs in educator. It was created with the idea of being shared and being an open source for inspiration. It is a jumping off point for exploring assessment in inquiry-based learning that is grounded in current assessment research and a solid understanding of inquiry education but it can grow and adapt with the educators who would like to experiment with this style of teaching and learning.

Feedback, suggestions and questions are welcome at: kzumach@sd1.bc.ca