Construction Trades 11

Guide

NOVA SCOTIA
NOUVELLE-ÉCOSSE

2015

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Construction Trades 11

Prepared by the Department of Education and Early Childhood Development

This is the most recent version of the current curriculum materials as used by teachers in Nova Scotia.

Construction Trades 11

Draft, Sept 2015

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Construction Trades 11, Draft, June 2015

Prepared by the Department of Education and Early Childhood Development

Please note that all attempts have been made to identify and acknowledge information from external sources. In the event that a source was overlooked, please contact Education Innovation, Programs and Services, Nova Scotia Department of Education and Early Childhood Development, eips@novascotia.ca.

Acknowledgement

Skilled Trades courses are designed to give students the most realistic and current picture of what a career in the trades would be like. They are designed to be both true to the trades and pedagogically sound.

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The Red Seal endorsement is administered by the Canadian Council of Directors of Apprenticeship. It signifies a standard of professional competency that is recognized by peers within the trade, employers, and the public. The Red Seal provides a certified uniform standard of performance that allows tradespeople greater mobility throughout Canada.

Students who successfully complete Construction Trades 11 under the supervision of a certified journeyperson teacher are eligible for apprenticeship hours for actual time in class upon registration as an apprentice or youth apprentice.

Construction Trades 11, as is the case with all Skilled Trades courses, is designed to be taught by a certified journeyperson in a skilled trade. These people have acquired key competencies and core knowledge required to adequately portray the trades and the knowledge, skills, and attitudes necessary to be successful as a tradesperson.

The Construction Trades 11 curriculum is not prescriptive. It is a tool for the students to achieve the outcomes and provides the teacher a framework on which to 'hang' his or her actual trades experiences. Both the curriculum and the journeyperson's experiences form the teaching plan.

The motto for all the skilled trades courses offered in Nova Scotia high school is “Hands on-Head’s in”. “Hands on-Head’s in” describes the unique combination of physical and intellectual demands that skilled trades work requires, and evokes the poetry and the craftsmanship that are at its core. For many talented people, “Hands on-Heads in” work is the only kind of work that they have an affinity for; that they can be happy doing. For them “Hands on-Heads in” is a vocational calling that a career in the trades can satisfy.

Before skilled trades course were introduced to Nova Scotia high schools, successful students had no way of experiencing “Hands on-Head’s in” work as part of their academic program. Because of this, a four-year degree was the only path most capable students were aware of upon graduating from high school. Few of them knew anything about, or ever got a chance to directly experience and to determine, whether a life in the skilled trades might be their true vocational calling.

What this led to were several generations of students never becoming aware and pursuing careers in the skilled trades even though this is where their passion and interest for “Hands on-Head’s in” work might have found its greatest fulfillment. Over the years, negative perceptions and myths about the skilled trades further ensured that very few students ever came to know about the well paid, rewarding careers that were available.

By making skilled trades an area of learning in Nova Scotia’s Public School Program, students can now experience the joys of “Hands on-Heads in” work and become aware of a career path that better matches their interests and desires. Students also can directly experience the high levels of professionalism and integrity that are demanded of certified journeypersons. They quickly discover that “Hands on-Heads in” work requires care, precision, and a wide range of essential skills such as reading, document use, writing and numeracy. Myths about low pay, poor working conditions, and uninteresting work are shattered and walls that hid the possibility of a career in the skilled trades from students are finally torn down.

Background to Construction Trades 11

Construction Trades 11 provides students who successfully completed Skilled Trades 10 with an opportunity for a detailed exploration of six construction trades:

- Carpenter
- Plumber
- Construction electrician
- Lather (Interior systems mechanic)
- Painter and Decorator
- Floor covering installer

Working from a detailed set of plans, and a Gantt chart providing a detailed learning timeline for 110 hours of instruction, students complete essential tasks from each trade to construct most elements of a 3 to 4-unit building.

To successfully complete their building units, students must draw extensively from skills and knowledge gained in Skilled Trades 10. Hand tool use, safety practices, and the basics of framing, plumbing, and electrical work, which were learned to build a small section of wall in Grade 10, prepare students to use power tools, and to build a much larger, more complex structure.

The table below highlights the increasing demands that Construction Trade 11 places upon students, and why Skilled Trades 10 is an essential pre-requisite.

Learning	**Skilled Trades 10**	**Construction Trades 11**
Tools	Use basic hand tools.	Use power Tools.
Project	Build 4' x 6' walls.	Build most elements of a 3-to-4 unit building.
Carpenter	Learn simple framing basics.	Learn to build floors and stairs; frame, sheath, and erect walls; install and strap ceiling joists; install intersecting and partition blocking; build partition walls; install building wrap and vapour barrier; install windows and doors; trim windows, doors, and baseboards.
Plumber	Layout, install, and pressure test short sections of pipe.	Layout and install drains and vents; layout, install, inspect, and pressure test domestic water lines for a fully functional bathroom; attach fixtures, drains, and water

Learning	Skilled Trades 10	Construction Trades 11
		supplies; check installation for leaks, and fully commission.
Construction Electrician	Layout and install boxes and wiring for a basic circuit.	Run cables; install cables in boxes; support cables; install devices and fixtures; install panel and circuit breakers; commission electrical system.
Lather	Hang drywall, fill, and sand joints for a very small section of a 4' x 6' wall.	Hang, fill, and sand joints for an entire wall.
Painter/ Decorator	Apply primer to small section of wall.	Prime, and paint an entire wall.
Floor Covering Installer	N/A	Install sections of ceramic tile in bathroom, and sections of vinyl tile in bedroom.

Along with enriching the depth of knowledge students have regarding building practices, Construction Trades 11provides a wealth of opportunities for students to learn essential workplace skills. Reading text, document use, writing, numeracy, oral communication, and problem-solving, which Human Resources and Skills Development Canada (HRDSC) defines as essential for work in the construction trades, are consistently emphasized.

By the end of Construction Trades 11, students have been completely immersed in many of the realities of construction trades work. They have gained real experience, and began developing the foundational skills required for success, in six well-known construction trades. Because students are provided with such a comprehensive introduction to life and work in the construction trades, they should know if it is a career path they want to pursue.

Students who successfully complete Construction Trades 11 can continue their path towards a career in the trades by enrolling in Skilled Trades 12. Skilled Trades 12 is a co-op program that offers students on-the-job training opportunities with local construction companies.

Students completing Construction Trades 11 are also well-prepared to work on summer construction projects, and to continue studying a trade at college, or to become an apprentice, after graduating from high school. They know how to safely use common hand and power tools, have experienced the challenge of completing a real construction project to a tight timeline, and know which construction trades they prefer. Students who complete Construction Trades 11 with a teacher who has trade certification will be awarded apprenticeship time for course hours logged in their Learning Logbooks.

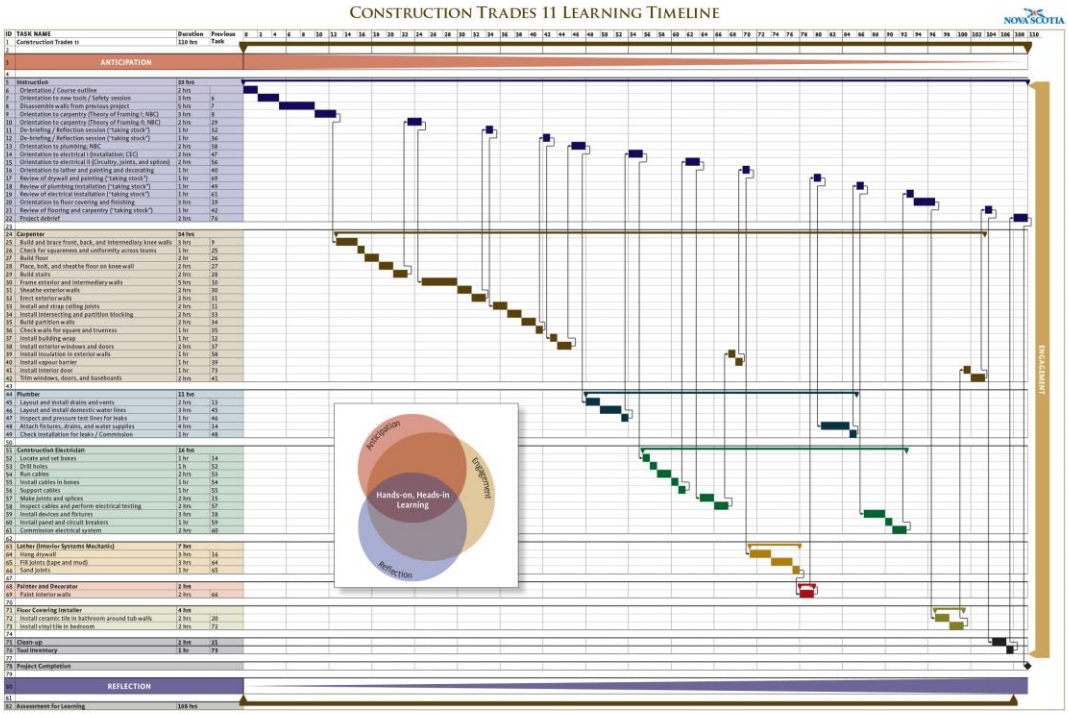
The Nature of Construction Trades 11

Construction Trades 11 is an extremely demanding course that immerses students in the day-to-day realities of completing a real construction project to a very tight timeline.

Working in teams of four, students must build one unit of a 3 to 4-unit building in just 110 hours. Completing the project requires carrying out almost 60 tasks from six different trades:

- Carpenter
- Plumber
- Construction electrician
- Lather
- Painter and Decorator
- Floor Covering Installer

Students work from a detailed set of drawings and specifications, to which their completed building units must conform. They also map their progress on a Gantt chart, a professionally recognized, and widely used project management and scheduling tool that provides an extensive timeline for the entire project.

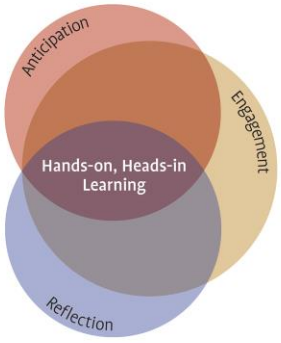


Because the Construction Trades 11 curriculum involves constructing a 3 to 4-unit building inside the Skilled Trades Centre, instructional and construction space need to become merged into a single, organic, just-in-time learning environment. Within this environment, students can immediately shift from understanding a building practice to applying it, and teachers can immediately tie important lessons to construction activities being completed.

Within the Skilled Trades Centre, students in Construction Trades 11 focus on four topical areas as they learn, and apply the techniques required to build their building units:

1) Construction Trades Realities
2) Safety
3) Measurement and Calculation for Construction Trades
4) Tools and Materials of the Construction Trades

Every day, students are guided through a learning process that is labeled on the course Gantt chart as the Construction Trades 11 Learning Model.



The Learning Model's three interlocking gears- Anticipation, Engagement, and Reflection- reflect the daily habits, and thought processes, of an experienced journeyperson. Students are taught to "anticipate", or plan, the steps, tools and materials required, safety considerations, and potential challenges of each trades-related task. After planning their work, students "engage" in the tasks they need to complete each day. As tasks are completed, students are encouraged to "reflect" upon what they learned, and how they will translate this knowledge into their "anticipation" of, and "engagement" in, future tasks.

At the beginning of Construction Trades 11, students are given a Learning Logbook. The Learning Logbook keeps student operating at peak capacity by providing space for planning, recording, and reflecting upon completed tasks. As students work through the project, "anticipation" time shrinks, and "reflection" time grows, as students' knowledge of the construction trades increases.

Students will find Construction Trades 11 very different from previous courses they have taken. While they all will have completed smaller projects like the 4' x 6' wall in Skilled Trades 10, or handyperson jobs around their homes, few will have been responsible for constructing an entire building unit from beginning to end within a limited time frame.

Successfully completing all elements of the project, will require students to work much closer to the pace of a professional journeyperson than they have in the past. They also must maintain stricter safety standards working with power tools and perform a much broader, more challenging, array of construction tasks.

Because Construction Trades 11 is such a demanding course, students who eventually register for apprenticeship training will be awarded full credit for their hours worked in the Skilled Trades Centre if their teacher is a certified journeyperson in a designated trade.

Embedding Literacy in Construction Trades 11

Most students in Construction Trades 11 are unaware of the critical role literacy plays in the construction trades. Unlike Human Resources and Skills Development Canada (HRDSC), they would not define reading text, writing, document use, and oral communication as essential, or even important, skills. Anyone who has taught trades in high school or college will have heard statements like these:

> "Reading and writing skills are a waste of time when you're learning a trade."
>
> "Learning to be a carpenter, no one cares about your skills in English."
>
> "Practical experience is more important than reading."
>
> "Employers don't care about how well I can read and write. They just want somebody who can get the job done."

Students holding these beliefs, who have a long history of struggling in Language Arts courses, will immediately resist any attempts to teach literacy in what they perceive as a "school-like" manner. They will remain skeptical about how essential literacy is for building a successful career in the construction trades.

To overcome these obstacles in Construction Trades 11, literacy skills are not highlighted or discussed in separate lessons and assignments, but embedded directly into daily construction activities. Students are made aware of, and given direct instruction in, authentic, trades-related literacy skills, as they occur. The table below highlights many tasks within the course where literacy is required:

Literacy Tasks Required in Construction Trades 11
Reading and interpreting product labels
Reading Materials Safety Data Sheets (MSDS) to identify the chemical composition of materials, how to use them safely, and emergency first-aid procedures
Reading and interpreting project drawings for size, location, and types of material
Reading the Gantt chart to plan work tasks
Reading project specifications to understand project requirements
Maintaining a job diary (Learning Logbook) to record job information and the relevant details of each day's work such as problems encountered and resolved, hours of work, and tasks completed
Interpreting Isometric drawing to install plumbing

Literacy Tasks Required in Construction Trades 11
Reading and interpreting building codes, regulations, and standards to comply with national, provincial, and municipal regulations
Interacting with other tradespeople to allocate work tasks, discuss safety concerns, and share ideas
Communicating with the Project Leader (Teacher) to report on work progress and troubleshoot problems
Communicating with team members
Leading and participating in Toolbox meetings
Completing Job Safety Analysis forms as part of the Job Safety Analysis (JSA) process
Reading occupational health and safety regulations to determine correct and safe procedures for fall protection, and the use of scaffolding
Reading instructions for installing equipment such as light fixtures, toilets, sinks, and bath tubs
Reading digital displays, gauges, and dials on measuring devices

Students are also taught essential vocabulary and terminology from every trade they encounter in Construction Trades 10. Every week students define and visually represent key terms in their Learning Logbooks to reinforce how critical a strong vocabulary is to success in the construction trades.

Another critical literacy skill that is prominently featured in Construction Trades 11 is writing. Besides defining key vocabulary terms, students "anticipate," "engage," and "reflect" upon different trades, and trades-related tasks, in their Learning Logbooks every week.

Throughout Construction Trades 11, emphasis is also placed on the broader role that literacy can play in construction trades careers by opening doors to:

- supervisory roles
- contractor/ project management positions
- entrepreneurial opportunities
- teaching positions

Students learn that without solid literacy skills, even the most technically proficient journeyperson, cannot pursue any of these options.

Construction Trades 11 ultimately expands conventional notions of literacy. It opens doors to literacy development for reluctant readers and writers, by making them aware of how essential literacy will be to their future success in the construction trades. For many students, this new understanding of literacy can be a life changing event.

Welcoming Diversity in the Skilled Trades Centre

Construction Trades 11 is designed to support the range of abilities and talents students bring to their consideration of a career in the trades. It is important, therefore, that teachers foster a Skilled Trades Centre environment that recognizes and welcomes diversity. Women and visible minorities have traditionally been underrepresented in the skilled trades. Therefore, teachers should take special care to create learning situations that will allow female and visible minority students to participate fully in the course.

In a learning community characterized by mutual trust, acceptance, and respect, student diversity is both recognized and valued. All students are entitled to have their personal experiences and their racial and ethnocultural heritage valued within an environment that upholds the rights of each student and requires students to respect the rights of others. Teachers have a critical role in creating a supportive learning environment that reflects the particular needs of all students. Educators should ensure that classroom practices and resources positively and accurately reflect diverse perspectives and reject prejudice attitudes and discriminatory behaviours.

Following are some recommendations for fostering a learning environment that honours diversity:

1. Accommodate various learning styles and levels of skill development. While Construction Trades 11 is largely a "hands-on" course, not all students are hands-on learners. When it comes to learning how to use a table saw, for instance, some students learn best by watching the instructor use the tool, but others learn more readily by viewing a diagram or listening to oral directions. Teachers should provide instructions in more than one way so as to reach students with different learning preferences. For more guidance on how to adapt to various learning styles, see the "Contexts for Learning and Teaching" section.

The spectrum of pre-existing competencies among students entering Construction Trades 11 is broad. Some students come to the course with significant experience working on home or summer construction projects, whereas others have only completed the wall building project from Skilled Trades 10. Teachers need to keep in mind the various developmental levels that students are at when creating project work teams.

2. Use a variety of assessment techniques. Students can successfully demonstrate their mastery of a concept of skill when the form of assessment matches their strengths. Just as teachers should accommodate various learning preferences when teaching, they should also accommodate various assessment preferences when they give feedback and assign grades. Teachers should be flexible in their approaches to assessment and use a variety of assessment methods, including observation and oral testing.

3. Communicate with all students. In the Skilled Trades Centre, eye contact can be a simple but effective way to engage all learners, not just the talkative or obviously interested students. Teachers should be conscious of the way they use both body language and voice when addressing a class. They can encourage everyone to participate by using open gestures, making direct eye contact, and calling on individual students. If possible, teachers should set up the Skilled Trades Centre so that they can circulate easily among the students when they are completing activities. That way, they can provide individual guidance and respond to individual questions as needed.

Outside of the Skilled Trades Centre, teachers can keep the lines of communication open by providing frequent, individualized feedback. This does not necessarily have to mean formal assessment; meaningful feedback can be as simple as a few informal comments on a completed task or a brief response to an entry in the Learning Logbook. The point is to let each student know that he or she is a valued member of the Construction Trades 11 learning community.

4. Recognize ELL (English Language Learner) challenges. It is not always obvious at first glance that a student faces ELL challenges. Difficulties with comprehension and writing are not unique to new Canadians. Many students who seem to be able to communicate effectively in conversation experience "interference" from their native language when attempting to shape their ideas into written form. They may also have difficulty interpreting pieces of writing that require an understanding of the Canadian cultural context.

In the Skilled Trades Centre, teachers can help ELL students overcome their communication challenges by speaking slowly and using short, simple sentences, particularly when giving instructions. They can also clarify cultural references and explain slang terms and jargon that come up during class discussion.

When grading written work, teachers should be aware of common ELL problems (such as troubles with articles, verb tense, and prepositions) so that they can point out patterns of errors for students to correct. Noting the number of different types of errors that a writer makes helps keep ELL issues in perspective. Whereas many of the errors ELL students make tend to leap out at readers as indicators of weak writing, the number of types of errors that an ELL writer makes is often similar to the number of types of errors that a native English speaker makes. It is important for teachers to bear this in mind when they design assessment methods and instruments.

5. Avoid stereotypical assumptions. Stereotypes based on gender and race can be very subtle, so it can take deliberate effort to avoid them. At the same time, unconscious stereotyping can seriously undermine the confidence of female students. Following are

some common stereotypical assumptions concerning gender that teachers of Construction Trades 11 will want to be aware of:

- Women are weak. This stereotype has traditionally prevented women from pursuing careers in the skilled trades, which are often seen as physically demanding.

- Women are nervous around technology. This stereotype assumes that women do not "naturally" understand tools or feel comfortable using them.

- Women play a subordinate role in marriage and society. This stereotype occurs when people assume that tradespersons serve as the main breadwinners in their families. References to "the wife and I" (rather than "my wife and I") reinforce the stereotype because they give the impression that women are primarily objects, rather than partners, in a marriage.

- Women are primarily sex objects. This stereotype is perpetuated when people assume that any reference to a woman should mention her physical attractiveness.

Since many older classroom resources include stereotypical content, teachers may need to supplement or adapt them. To encourage students to think about diversity, they may also wish to draw attention to missing or stereotypical elements and ask students to suggest changes.

6. Model inclusive language. Language that is free from gender and racial bias conveys the message that all students are welcome in the Skilled Trades Centre. Language that puts the person ahead of a disability also communicates that students with diverse abilities are valued. Following are some specific suggestions for modelling the use of inclusive language in the Skilled Trades Centre.

> ***a) Avoid gender bias***. To steer away from language that has a gender bias, teachers can avoid using *he* as a generic pronoun. Although it was once widely assumed that *he* could be used to refer to both men and women, research has shown that readers who encounter male pronouns and nouns picture only male subjects. To enable girls to picture themselves pursuing a career in the skilled trades, then, teachers need to pay careful attention to the language they use.
>
> To make female students feel welcome in the Skilled Trades Centre, teachers can refer to both men and women in examples and instructions. Instead of using *he* to describe a process or deliver instructions, they can use *he and she* or use a plural form (*e.g.,* "Skilled tradespeople need to take care of their tools" rather than "A skilled tradesman needs to take care of his tools.")

Whereas it is a fairly straightforward matter to avoid the generic *he*, it can be more difficult to find gender-neutral terms for many of the words common in the skilled trades environment. Below are some suggested substitutions for words that have inherent gender bias:

Biased term	Gender-neutral term
Tradesman	Tradesperson
Foreman	Supervisor, foreperson
Workmanship	Quality of work
Manpower	Employees, resources
Man hours	Person hours, worker hours
Lady	Woman
Girl (to refer to a grown woman)	Woman
Chairman	Chairperson
Handyman	Repairer
Businessman	Business person
Man (noun)	Person, individual
Man (verb)	Staff, operate, use, direct, work
Mankind	Humankind, humanity
Man-made	Synthetic, artificial, handmade
Draftsman	Draftsperson
The wife	My wife, his wife
Journeyman	Journeyperson

b) Avoid racial bias. Teachers can avoid racial bias by respecting the terms that ethnic groups use to refer to themselves. They can also make their language inclusive by avoiding the use of ethnicity as a descriptor, unless there is a

legitimate need for it. For example, rather than referring to Harry Thompson as a "black carpenter," in most cases one could simply refer to him as "a carpenter."

c) Put the person ahead of the disability. Rather than referring to people as products of a disability or illness, teachers can use the expression "a person with…." For example, rather than referring to a person as "an epileptic," teachers can use the term "a person with epilepsy."

7. Refer to diverse role models. Because few women have traditionally chosen a skilled trade as a career, female students can find it difficult to imagine themselves as successful tradespeople. For this reason, it is important to include women in the course when mentioning historical and contemporary role models and when inviting guest speakers to address the class. Teachers may find it useful to connect with professional groups that promote women in the skilled trades, such as Techsploration, Women Unlimited, and WITT (Women in Trades and Technology). Besides including women as role models, it is equally important to include role models who come from various ethnic backgrounds as well as role models with disabilities.

8. Structure group activities to enable all students to participate. In group situations, some students are more likely than others to voice their opinion and volunteer for tasks. Girls in particular may be hesitant to express their ideas or try hands-on activities.

To encourage girls to participate actively in the Skilled Trades Centre, it is important that the teacher structure group activities so that everyone has a turn. For instance, a teacher can use a "talking stick" to facilitate group discussion. (Students pass the stick from one to another; only the person holding the stick can speak, while the others listen.) Teachers can also design group activities with rotational roles. For example, each student in a project group might take a turn being the "supervisor."

9. Cultivate a learning community. When teachers include team-building activities in their lessons, everyone in the course benefits from the resulting sense of solidarity. For female students, the sense of being part of a learning community can be vital to their success.

Girls tend to thrive in classroom environments that emphasize cooperation, rather than competition. They tend to be relational learners, which means that they place a high value on relationships with their peers. Group learning experiences, like the building construction project in Construction Trades 11, can therefore be very meaningful for female students, provided the activities are properly managed.

To make sure that group activities cultivate a sense of community, teachers can allow ample time for members of student work groups to get to know each other and engage in teambuilding exercises. They can also enable students to reflect on team dynamics and

explore different roles within a group, keeping in mind that many girls enjoy some of the less visible roles, such as helping others, organizing materials, or mediating disputes. Many girls enjoy mentoring others, a talent that the skilled trades teacher can draw out by providing opportunities for students to demonstrate skills and techniques to each other.

10. Encourage reflective and affective learning. One of the mandates of Construction Trades 11 is to empower students to envision themselves living the life of a skilled tradesperson. To achieve that goal, teachers need to enable students to connect what they learn in the Skilled Trades Centre to the skills, knowledge, and experiences they already possess. In this regard, reflective learning activities and activities that engage students emotionally can prove effective.

Reflective learning activities—such as the Learning Logbook and LifeWork Porfolio—enable students not only to review their development during the course but also understand how their new knowledge acts as an extension of their previous knowledge. When students "stand back" from their work, they gain a sense of achievement and are able to set goals for future growth.

Journaling and other activities that call for introspection are especially appealing to girls, who learn best when their emotions are engaged. Besides reflecting on their own emotional reactions to class activities and themes, female students enjoy hearing stories about the experiences of other people, particularly women. Documentary films, interviews, autobiographical accounts, and guest speakers can help girls connect emotionally with the course material and develop positive attitudes toward careers in the skilled trades.

Essential Graduation Learnings

Aesthetic Expression

Experienced tradespeople develop an instinctive understanding of the rhythm of the construction site. In Construction Trades 11, students are immersed in this unique rhythm everyday as they construct their building units. Working in teams of four, like members of a jazz ensemble or a rock band, students must discover and maintain this rhythm, as it is crucial to transforming the basic notes they learned as soloists in Skilled Trades 10 into the music of a complete song. Working with a Gantt chart as the score, a detailed set of drawings, and an experienced journeyperson, each student "combo" is challenged to develop its own "sound"; to find the timing, timbre, and tone for their project that produces the construction trades' essential soundtrack.

Citizenship

Construction Trades 11 is essentially an educational form of "barn raising"; a popular tradition in 18th and 19th century rural communities where everyone came together to construct a barn for one or more of its households. Because the survival of the community depended upon every family having a barn for storing hay and sheltering livestock, everyone was expected to participate. Like these early settlers, students in Construction Trades 11 can only complete their building units and fully explore construction trades career opportunities if other team members show up every day ready to contribute. As a result, students quickly realize the tremendous challenges, responsibilities, and benefits that come from being part of a larger group or community. Working to meet the building project's challenges, students directly experience how critical actively engaged individuals are to meeting society's needs; to raising the barns that need to be raised.

Communication

Strong literacy skills are essential to succeeding in the construction trades. For this reason, students are challenged to engage in a series of authentic literacy tasks embedded throughout Construction Trades 11. These tasks include:

- Reading a Gantt chart to plan work tasks
- Reading and interpreting project drawings for size, location, and types of material
- Reading project specifications to understand project requirements
- Reading and interpreting product labels
- Reading Materials Safety Data Sheets (MSDS) to identify the chemical composition of materials, how to use them safely, and emergency first-aid procedures

Working as part of a team, students are challenged on a daily basis to communicate with one another to allocate project tasks, address safety concerns, and discuss solutions to problems that occur. Students also need to communicate regularly with the Project Leader (Teacher) to report on work progress and to troubleshoot problems.

Besides, reading and speaking, students write extensively in a Learning Logbook that is used for planning construction activities (anticipation), recording details of daily work,

problems encountered and resolved, hours of work, tasks completed(engagement), and weekly reflections upon course experiences.

Personal Development

Construction Trades 11 provides students with tremendous opportunities for personal development by immersing them in the day-to-day realities of a real construction project. Faced with a tight timeline, and the challenges of completing tasks from six different trades, students must stay focused, take responsibility for their work, and develop additional reserves of patience and discipline to be successful.

The project deliberately pushes students beyond their "comfort" zones, but rewards them with the immense satisfaction of being able to point to a full-scale building project at the end and say with pride, "I did that." By challenging students to achieve what they may not have thought was possible, students develop confidence to tackle any big projects that life presents to them, no matter what career path they ultimately pursue.

Problem Solving

Work in the construction trades constantly involves solving problems. For the building unit project in Construction Trades 11, students must translate project specifications from a detailed set of drawings; establish tool, material, and safety requirements; make accurate measurements; and carry out challenging tasks from six different trades.

Whatever construction trades task, or activity, students are engaged in their biggest challenge will be determining which of the many different ways of completing a task is the right way. Many times, students will find themselves halfway through a task only to discover that there is a better way to get the job done. Incorrect measurements, or a building technique not completely understood will require going back to original drawings, retracing steps taken, determining what went wrong, and finding a way to resolve the situation. To an even greater extent than the skill building exercises and wall-building project from Skilled Trades 10, the building project in Construction Trades 11 generates experiential learning opportunities so that students learn as much, if not more, from their mistakes as they do from their successes.

Technological Competence

To complete Construction Trades 11, students learn how to safely use a number of standard power tools. These include:

- Nailer
- Power screwdriver
- Cordless drill
- Hammer drill
- Circular saw
- Reciprocating saw
- Jig saw
- Power wrench
- Table saw
- Mitre saw
- Bench grinder
- Air compressor

Students also make extensive use of the computer to view an interactive, three-dimensional, mock-up of drawings for the building unit. Using this mock-up, students can view their building units from a variety of angles and add or subtract multiple layers to view the project at different stages of completion.

Construction Trades 11 Outcomes

Students will be expected to

Cluster 1: Construction Trades Realities

- **SCO 1** demonstrate an understanding of the nature of work and working conditions in the construction trades
- **SCO 2** identify the work of carpenters, plumbers, construction electricians, lathers, painters and decorators, and floor covering installers; and the roles and responsibilities of people working in those trades
- **SCO 3** demonstrate an ability to sequence trade-related tasks and schedule different trades to complete a construction project
- **SCO 4** recognize established work standards in the construction trades and perform work reflecting those standards
- **SCO 5** model the employability skills required for successful employment in the construction trades
- **SCO 6** produce appropriate artifacts for their LifeWork Portfolio to demonstrate learning throughout Construction Trades 11

Cluster 2: Safety

- **SCO 7** demonstrate an understanding of and apply workplace health and safety practices and procedures
- **SCO 8** identify safety risks and hazards in the workplace
- **SCO 9** demonstrate knowledge of how to use tools and equipment safely
- **SCO 10** know how to use and maintain personal protective equipment
- **SCO 11** demonstrate an ability to work safely at levels above grade

Cluster 3: Measurement and Calculation for Construction Trades

- **SCO 12** scale, convert, and interpret trades-related documents and drawings
- **SCO 13** demonstrate an ability to estimate length, area, and volume
- **SCO 14** perform trades-related calculations
- **SCO 15** apply various systems of measurement

Cluster 4: Tools and Materials of the Construction Trades

- **SCO 16** demonstrate an ability to use and maintain tools and machines in a safe, accurate, and appropriate manner
- **SCO 17** demonstrate the ability to demolish existing structures in a safe and environmentally sustainable manner
- **SCO 18** demonstrate the ability to identify, select, use, and store construction-related materials in a safe and environmentally sustainable manner.

Teaching Occurrences.

# 1	Reading and Using the Construction Trades 11Gantt Chart
Background:	Few of your students will have ever seen a Gantt Chart before. You will need to spend some time explaining the basic mechanics of reading, interpreting, and using it to complete the 4-unit building project. The Gantt Chart also provides a perfect opportunity to introduce the reality that construction trades work is performed to tight deadlines. You can use the chart to stress to your students that building three or four building units in just 110 hours is a very real, very ambitious construction project.
Key Threads:	Literacy, Numeracy, Trades Characteristics, Essential Skills
Activity:	Gather students around the wall-sized version of the Gantt Chart provided for you Skilled Trades Centre. *Identify the six trades* Start by explaining that the text running down the right side of the chart highlights all of the essential tasks from six different trades that must be completed to construct the building units. Ask your students to read the chart, and identify the six trades. *Identify project tasks and the time budgeted for completing them* Write down a handful of different project tasks on the white board in your classroom and have your students identify how much time is budgeted for completing them. *Identify a handful of tasks, and their "Precedents"* Highlight the fact that there is a definite sequence to which the tasks on the chart must be completed, and that this reflects the realities of most construction trades projects. Point to a task such as Task #31- Sheath exterior walls, and ask students to determine what its "Precedent" task is and to point to where the two tasks are graphically represented on the Gantt Chart. Ask students to note where the two tasks fall on the timeline running across the top of the chart. Repeat this exercise for a handful of different tasks until you are confident your students understand how to read, and interpret the information presented.

	Briefly explain the Construction Trades 11 Learning Model *Anticipation* Get your students to locate the green "Anticipation" arrow at the top of the chart, and the red "Reflection" arrow at the bottom of the chart. Ask them to describe the difference between these two arrows (i.e. the green arrow gets smaller, and the red arrow gets bigger as the project continues). Explain that before completing project tasks, you will be asking students to "anticipate" the tools, techniques, and potential challenges involved. Describe how this will become quicker, and easier as they gain experience and begin to master the essential thought processes of a skilled tradesperson. *Reflection* Contrast the shrinking green arrow with the red "reflection" arrow and explain that after project tasks are completed, you will be asking students to "reflect" on how things went, what they experienced, and what they might do differently in the future. Note that this arrow grows as students become more experienced and gain more and more knowledge that can be reflected upon. *Engagement* Finally, ask your students to locate the blue "Engagement" arrow on the chart. Explain that "engagement" simply involves actually carrying out all of the project tasks that students will "anticipate" and "reflect" upon throughout Construction Trades 11.
When:	Include as part of Task # 6- Orientation/ Course Outline

# 2	**Reviewing Tools from Skilled Trades 10/ Introducing New Tools for Construction Trades 11**
Background:	Students will be making extensive use of power tools in Construction Trades 11. During the first week of class, you should briefly show students these tools, and discuss which parts of the project they will be used to complete.

Key Threads:	Safety, Skilled Trades 10, Construction Techniques/ Best Practices, Trades Characteristics
Activity:	Check to make sure that all of the students are equipped with the basic set of tools and PPE that they were assigned in Skilled Trades 10. Take a few minutes to introduce some of the power tools that you will be demonstrating in upcoming classes. Emphasize that, like Skilled Trades 10, safety will continue to be the #1 priority in Construction Trades 11, especially when working with such powerful equipment. Explain to students that rigorous safety requirements will be followed at all times, and no exceptions will be tolerated
When:	Include as part of Task # 7- Orientation to new tools/ Safety

#3	**Introducing the Learning Logbook**
Background:	Every student in your class will be given a Learning Logbook. The Learning Logbook provides student's with daily opportunities to demonstrate their participation in the course's "anticipate", "engage", and "reflect" learning cycle. Space is provided for writing down the steps and the tools required to complete construction tasks, and for logging and reflecting upon daily activities completed. It is important that you take some time during the first few sessions of Construction Trades 11 to walk your students through the Learning Logbook, and explain how to use it.
Key Threads:	Literacy, Trades Characteristics
Activity:	Pick a task that you will be completing very early on during Construction Trades 11. Perform a "think aloud" to model for your students the thought processes involved in completing the "anticipation" section of the Learning Logbook. Task 8 from the Gantt chart, disassemble walls built in Skilled Trades 10, which is the first trades-related task that students must perform in Construction Trades 11, might be a good place to start. Tell students that you are going to spend a few minutes demonstrating how to fill out the "anticipation" section of the Learning Logbook. Explain

	that you are going to "Think out loud" so that students can understand the thought processes that a professional trades person would go through in preparing to disassemble a wall. Using the white board in the Skilled Trades Centre, start thinking out loud, and writing out and "anticipating" the tools, the steps, and any other questions or considerations you think might be important when tearing down the walls from Skilled Trades 10. You could start like this: "The first thing I am thinking about is my main objective in disassembling the wall, which is to recycle as much of the material as I possibly can. I will start filling out the "Anticipation" section of the Learning Logbook by writing: 'I want to recycle, reuse as much of the wall as I possibly can.' Next, with the 'reuse, recycle' goal in mind, I am going to think through the sequence of tasks for disassembling the wall, and the tools and safety considerations required. Write the steps, the tools and the safety considerations down as you think out loud about completing the task. When you have written out the steps, tools, and safety considerations for disassembling the wall, you may want to write out any other thoughts you might have about the project such as: "Working effectively as team is going to be very important to completing this task quickly and efficiently. We will need to think through the best way to do this." You may also wonder aloud about how to dispose of any parts of the wall that cannot be recycled or reused, and anything else that seems relevant that you think should be noted in the Learning Logbook. Explain to students that this section of the Learning Logbook will be more time consuming and difficult to write at the beginning of the course. Tell them that as they gain experience, they will become more quick and efficient at anticipating and planning project tasks. Thinking aloud may be difficult at first, but if you start making it a part of your teaching practice early on it will become a natural part of what you do. Think alouds are a simple, direct approach for modeling the learning and construction tasks that you want students to complete.
When:	Include as part of Task #6- Orientation/ Course outline or Task #7- Orientation to new tools/ Safety session

#4	**Highlighting Construction Trades Realties- The Importance of Showing Up for Work on Time**

Background:	Within the construction industry, workers who constantly show up late, or do not show up at all, have become a big problem. You need to stress from the beginning of Construction Trades 11 that showing up on time is extremely important. As the Gantt chart for Construction Trades 11 demonstrates, there is a lot to get done and only 110 hours of class time available. Student teams with someone who is always late, or chronically absent, will definitely start to fall behind and may not be able to complete all of the project's tasks.
Key Threads:	Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Pick a day near the beginning of the course to reinforce how critical showing up on time is to having a successful and a long term career in the construction trades. For dramatic effect, you could start off a session by pausing for a few seconds and then stating: " Congratulations, you have just fulfilled the first requirement of being a skilled tradesperson- being in time." Explain that workers who show up for work everyday, and are on time, are highly valued within the construction industry; That as much as employers are looking for skill and talent, they are also looking for employees who are reliable and committed. Tell a brief story, if you have one, that you think would grab the students attention, about the consequences of showing up late, or provide some background about this issue based upon your own experience within the construction industry. Discuss how challenging it will be to complete the Construction Trades 11 project if everyone does not show up on time. Stress the fact that beside being accountable to you as the teacher that students are also accountable to each other. Communicate that the bottom line is that if you are absent, or late without a good reason, you let everyone down including yourself.
When:	Include as part of Task #6- Orientation/ Course outline, Task #9 &10- Orientation to Carpentry, Task # 13- Orientation to Plumbing, Task #14- Orientation to Electrical I, Task # 16-Orientation to Lather, and Painting and Decorating, or Task #20- Orientation to Floor Covering and finishing

#5	**Demonstrating the Safe Use of New Tools Using the Job Safety**

<table>
<tr><th></th><th>Analysis (JSA) Process</th></tr>
<tr><td>Background:</td><td>Your students will be using a number of new tools in Construction Trades 11. You need to budget time throughout the course to ensure that all of your students know how to safely use every tool.

The Job Safety Analysis (JSA) process and the Job Safety Analysis worksheet provides a rigorous approach for teaching tool safety. Students were introduced to both this process, and the worksheet in Skilled Trades 10.

The process takes time to complete, but the worksheets generated provide an excellent way of confirming that your students know all the steps required to safely operate new tools.</td></tr>
<tr><td>Key Threads:</td><td>Safety, Literacy, Trades Characteristics, Construction Techniques/ Best Practices, Skilled Trades 10</td></tr>
<tr><td>Activity:</td><td>Pick three or four tools that students will be using to complete upcoming project tasks and perform a demonstration or “think aloud” using the Job Safety Analysis (JSA) process.

Students were introduced to the Job Safety Analysis Worksheet below in Skilled Trades 10 and may already be knowledgeable about how to fill it out for the tasks or tools you will be demonstrating.

Job Safety Analysis Worksheet

<table><tr><th>Task/ Tool</th><th>Essential Steps</th><th>Potential Hazards</th><th>Preventative Measures</th></tr><tr><td></td><td></td><td></td><td></td></tr></table>Source: Canadian Centre for Occupational Health and Safety

Explain to students that there are no “short cuts” where safety is concerned, and insist that they all properly fill out a JSA worksheet before using a new tool.

You should also closely supervise students, especially when they first start using a new tool, to confirm that they are working safely.</td></tr>
<tr><td>When:</td><td>Include as part of Task #7- Orientation to new tools/ Safety session, and before any tasks throughout the course where new tools will be required.</td></tr>
</table>

#6	**Reviewing Basic Procedures for Using Personal Protective Equipment (PPE)**
Background:	Students will be familiar with PPE from Skilled Trades 10, but you should review basic procedures for using PPE, especially the PPE required for any new tools.
Key Threads:	Safety, Trades Characteristics, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Demonstrate how to safely use any new PPE required to complete project tasks.
When:	Include as part of Task #7- Orientation to new tools/ Safety session, before Task #8- Disassemble walls from previous project, as part of Task #9 &10-Orientation to Carpentry, Task # 13- Orientation to Plumbing, Task #14-Orientation to Electrical I, Task # 16-Orientation to Lather, and Painting and Decorating, or Task #20- Orientation to Floor Covering and finishing

#7	**Explaining how to read, interpret, and use the project drawings**
Background:	Reading and interpreting drawings is an essential skill that all construction tradespeople must master. In Construction Trades 11, you and your students have been provided with a detailed set of drawings for building a 3 or 4-unit building. Students were introduced to scaled drawings in Skilled Trades 10, but most will not have worked with such a detailed set of drawings. You will need to spend some time, before students begin to build their building units, explaining how to read, interpret, and use the project drawings.
Key Threads:	Literacy, Numeracy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices
Activity:	Before students embark upon the first major building tasks for the project, tasks 25 to 29 from the Gantt chart, "think aloud" about how a professional tradesperson reads and works from drawings like those provided for the 4-unit building . Below are a few questions to get you started. You may think of many

	other issues to discuss with your students regarding the use of plans? • What information do you look for first? • What questions does a drawing help you answer? • How do you actually use the drawings when planning your work for a particular task? • Do you make notes on the drawing or mark them up in any way? • Are there any conversions that you typically have to make? Ask students to write about the role that the drawings played in building and bracing the knee walls, and in building the floor. Tell students they can comment upon the role the drawing played in planning or completing these tasks, or reflect upon how the drawings were used to complete these tasks.
When:	Include as part of Task #6- Orientation/ Course outline, Task #25- Build and brace front, back, and intermediary knee walls, Task #29- Build Stairs, Task #30- Frame exterior and intermediary walls, Task #35- Build partition walls, Task # 45- Layout and install drains and vents, Task #52- Locate and set boxes, Task #64- Hang drywall, or Task # 72- Install ceramic tile in bathroom around tub walls

#8	**Reviewing Construction Trades Vocabulary and Terminology**
Background:	To become a qualified construction tradesperson involves mastering a rich, technical vocabulary. As students prepare for, engage in, and reflect upon the carpentry tasks involved in building their building units, be sure to highlight, discuss, and track essential terms.
Key Threads:	Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Build a Construction Trades Word Wall at the front of your class. Add new terms to the wall that are associated with project tasks that are about to be, or have just been, completed. You could potentially divide the Word Wall into sections for the different trades that students will encounter such as carpentry, plumbing, construction electrician, later, painter/ decorator, and floor installer. You could also label the large poster sized drawing of the project with key terms wherever appropriate. Here are just a handful of terms you could add to the Word Wall when building and bracing the knee walls, building the floor, and the temporary

	set of stairs: Stud Sill plate Stringer 16 on centre Sheath Day by day as the word wall grows, pick 1 or 2 key terms that you ask students to define in the section of their dedicated to construction trades vocabulary.
When:	Include as part of the orientation, or of the review, for each of the six trades (Tasks 9 to 21)

#9	**Discussing Trades Integration and Scheduling Challenges- Challenge #1: Time to Start Laying Tile?**
Background:	Throughout Construction Trades 11, it is important to remind students that on a typical construction project, seven different tradespeople would be involved in completing the tasks outlined on the Gantt Chart. Be sure to take some time, as the project shifts from one trade to another to discuss the order in which trades are traditionally scheduled, and any potential conflicts, challenges or misunderstandings that can arise.
Key Threads:	Construction Techniques/ Best Practices
Activity:	Share and discuss the following scenario with your students after the floor has been completed: You have just finished bolting and sheathing your newly built floor onto the knee wall. The floor installer you have scheduled for later in the project phones to tell you he has just finished and has a couple days available. Do you tell him to stop by and lay the tiles planned for the floor, or tell him that you are not ready yet? Ask students to explain why they asked, or did not ask, the floor installer to start laying tile. Discuss the challenges of scheduling trades and why certain trades and tasks can only be scheduled and completed at very specific points in a project's evolution.
When:	Include after Task #28- Place, bolt, and sheath floor on knee wall.

#10	**Reviewing the Math for Building Stairs- Calculating Stringers, Treads, and Risers**
Background:	Numeracy skills are critical to successfully performing in each of the construction trades. Whenever possible, highlight the important role that math plays in completing project tasks. Ensure your students understand that they need to develop excellent math skills to succeed in any of the construction trades.
Key Threads:	Numeracy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices
Activity:	Take a few extra minutes before students begin build stairs for their building units, to review how to calculate, and make the measurements required, for stringers, treads, and risers.
When:	Include as part of Task #29- Build Stairs

#11	**Reviewing Fall Protection Basics**
Background:	In building the walls, and installing the ceiling joists for the building units, students will need to work at heights for which provincial fall protection regulations apply. Students did a brief review of the Occupational Health and Safety act in Skilled Trades 10, but the need for fall protection provides a perfect opportunity to demonstrate how the act applies to a real life construction situation.
Key Threads:	Safety, Literacy, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Make copies of Part II, section 7 from the Occupational Health and Safety Act. Take a few minutes and read through the first one or two parts of section 7 with your students. Discuss how the act applies to the work they must complete in building the building units. You might want to perform a "think aloud" to demonstrate how construction trades professional approach a document like the OHSA, and the information it contains. Because students will be using scaffolding to complete the project, you could also make copies of the first 3 or 4 pages from Part III Scaffolds and Work Platforms. In their Learning Logbooks, you could ask students

	to provide evidence that the scaffold they are using meets with provincial regulations.
When:	Include before Task # 30- Frame exterior and intermediary walls

#12	**Discussing Trades Integration and Scheduling Challenges- Challenge #2: Time to Call a Plumber?**
Background:	Throughout Construction Trades 11, it is important to remind students that on a typical construction project, seven different tradespeople would be involved in completing the tasks outlined on the Gantt Chart. Be sure to take some time, as the project shifts from one trade to another to discuss the order in which trades are traditionally scheduled, and any potential conflicts, challenges or misunderstandings that can arise.
Key Threads:	Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices
Activity:	Share and discuss the following scenario with your students after the exterior walls have been erected: You have just finished erecting the exterior walls (task #32 on the project Gantt chart) for the hotel unit. The contractor for the project is worried that the units will not be completed in time for spring and summer which is the peak tourist season. He asks you to do whatever you can to speed up completion of the project. You know an excellent plumber and a superb electrician who could start work right away. Do you give them a call and get them started or wait until you have completed these remaining carpentry tasks: • Install and strap ceiling joists • Install intersecting & partition blocking • Build partition walls • Install building wrap • Install exterior doors & windows Work through the implications of waiting, or calling a plumber or

	electrician, and decide how to proceed.
When:	Include as part of Task #32- Erect exterior walls

#13	**Highlighting Construction Trades Realties- The Importance of True and Square**
Background:	"True" and "square" are a professional carpenter's mantra; the exacting standard that must be met everyday. These terms are what separate him or her from the amateur handyperson. Students will already be familiar with "true" and "square" from Skilled Trades 10, but it is important for you to continue to stress the importance of "true" and "square" throughout Construction Trades 11. As students work through the many tasks involved in the project, they will gain a deeper appreciation of the professional standard defined by the words "true" and "square", and the challenges involved in achieving it
Key Threads:	Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Discuss the importance of "true" and "square" with your students, and some of the consequences of not building "true" and "square" such as: • Difficulties getting molding to fit • Challenges installing flooring • Problems putting on a roof or adding an additional story Review some of the techniques that professional carpenters use to ensure that everything they build is "true" and "square". • Making sure a frame is straight before nailing it place • Measuring diagonally from one corner of a framing unit to the other • Using a plumb line Explain that "true" and "square" are ultimately about doing a job the right way, and taking pride in your work.
When:	Include as part of Task # 26- Check for squareness and uniformity across teams

#14	**Discussing Trades Integration and Scheduling Challenges- Challenge #3: Time to Hang Some Drywall?**
Background:	Throughout Construction Trades 11, it is important to remind students that on a typical construction project, seven different tradespeople would be involved in completing the tasks outlined on the Gantt Chart. Be sure to take some time, as the project shifts from one trade to another to discuss the order in which trades are traditionally scheduled, and any potential conflicts, challenges or misunderstandings that can arise.
Key Threads:	Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Share and discuss the following scenario with your students after you have checked and inspected the walls for "true" and "square and have supervised the installation of building wrap, exterior doors, and windows. The lather you had scheduled for later in the project shows up and says his last job finished early and he would be happy to start hanging some drywall. You would love to put him to work as he is one of the fastest most reliable lathers you know. You are also worried about the project falling behind schedule and it would be great to have drywall installed on some of the walls. Discuss what the implications are of putting the lather to work and whether this would be a good or bad decision to make.
When:	Include as part of Task #36- Check walls for square and trueness

#15	**Highlighting Construction Trades Realties- What is It Like to Be a Carpenter?**
Background:	After students have completed most of the first round of carpentry work, and you have determined that their walls are "true" and "square", provide students with some time to reflect upon what they liked and didn't like about carpentry work.
Key Threads:	Literacy, Trades Characteristics, Essential Skills, Skilled Trades 10
Activity:	Write down Human Resources and Skills Development Canada's list of nine essential skills: • Reading text • Document use • Numeracy

	• Writing • Oral communication • Working with others • Continuous learning • Thinking skills • Computer use Ask students which of these skills they think were most important based upon their experiences working as carpenters. Encourage students to provide as many examples as they can of where these skills were required to complete their building units. Students can share these examples as part of the class discussion and in their Learning Logbooks.
When:	Include as part of Task #11- De-briefing/ Reflection session "Taking Stock"

#16	**Explaining How to Read the Material Safety Data Sheet (MSDS) for Insulation**
Background:	Reading Material Safety Data Sheets is a high stakes form of literacy that can potentially save you from serious injury and even death. However, recent studies have shown that the language in used in most MSDSs exceeds the average worker's literacy capabilities. You need to work with your students to develop strategies for reading, and extracting essential information from MSDS sheets.
Key Threads:	Safety, Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices
Activity:	Provide students with copies of the MSDS for the insulation being used for the building rooms. Read through the MSDS for insulation with students, explaining the strategies you use to extract essential information. Tell students not to become frustrated if, even after you have worked through the MSDS together, they are still confused. Explain that even experienced tradespeople have difficulties reading MSDS sheets and need to ask a foreman or supervisor for help or confirmation as to how to proceed. A study completed by the U.S. Navy revealed that may workers become

	more capable using MSDS sheets if they are taught analogies for some of the more difficult technical terms that are typically used. The article below provides 10 helpful analogies for common MSDS terms that were successfully used in the U.S. Navy study. You could potentially share this article with students, and work through some of the analogies. You could also use the analogies from the article as a starting point for developing your own analogies for some of the difficult terms from the MSDS for insulation. How to Decipher Material Safety Data Sheets: Analogies Help Workers Remember Complex Technical Information http://www.ishn.com/Articles/Feature_Article/0d59afadc9fb7010VgnVCM100000f932a8c0____ Industrial Safety and Hygiene News Dean Larson & Susan Boyd May 5, 2000
When:	Include as part of Task #39- Install insulation in exterior walls

#17	**Discussing Trades Integration and Scheduling Challenges- Challenge #4: Who Drills the Holes to Install the Plumbing?**
Background:	Throughout Construction Trades 11, it is important to remind students that on a typical construction project, seven different tradespeople would be involved in completing the tasks outlined on the Gantt Chart. Be sure to take some time, as the project shifts from one trade to another to discuss the order in which trades are traditionally scheduled, and any potential conflicts, challenges or misunderstandings that can arise.
Key Threads:	Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	When you have arrived at the point in building the building units where you are about to make the transition from carpentry to plumbing ask the following question: Who lays out and drills the holes for the plumbing? The answer is not obvious as the holes need to be drilled through the studs that were initially installed by the carpenter. It is natural to assume that any alterations or additional work that must be done to a building's

	structure be completed by the carpenter. Lead students in a discussion of the pros and cons for each these two trades laying out and drilling the holes for the plumbing. Ask students which trade they think should complete this task, and discuss potential conflicts between carpenters and plumbers concerning this issue.
When:	Include before Task #45- Layout and install drains and vents

#18	**Reviewing the Math for Calculating Fitting Allowances**
Background:	As you orient students to the basic techniques required to install the plumbing for their building units, highlight the important role fractions play in calculating fitting allowances when cutting and sweating pipe.
Key Threads:	Numeracy, Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	When you begin cutting and installing domestic waterlines, you will likely need to take a few minutes to review the steps required to calculate fitting allowances. Walk students step by step through the calculation of the first fitting allowance required to install domestic waterlines in their building unit's bathroom
When:	Include as part of Task #46- Layout and install domestic water lines

#19	**Highlighting Construction Trades Realities: Comparing Carpentry and Plumbing**
Background:	Like Skilled Trades 10, Construction Trades 11 is ultimately about exploring life and potential careers in a number of different trades. Throughout the course, you need to encourage students to reflect on some of the similarities and differences between trades, and things they like, and don't like, about the tasks they complete from different trades.
Key Threads:	Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Ask students to take some time to reflect upon some of the similarities and differences between carpentry and plumbing.

	Here are some questions you can use to help them get started: What skills sets do great plumbers and carpenters share? Do plumbers cut pipe as accurately as carpenters cut studs and the other pieces of wood required to frame walls, doors, and windows? How does the pace and rhythm of plumber's work differ from that of a carpenter? If a plumber and a carpenter had to switch jobs for a month, what challenges would each tradesperson face in adapting to the demands of their new role? Which trade do you prefer? Why? Ask students to reflect upon the differences between carpentry and plumbing in their Learning Logbooks.
When:	Include after Task #49- Check installation for leaks/ Commission or as part of Task #18-Review of plumbing installation "Taking Stock"

#20	**Explaining How to Read Isometric Drawings**
Background:	Before students begin the plumbing phase of the project, you will need to help them understand how a plumber reads and works from isometric drawings like those provided for building .
Key Threads:	Literacy, Numeracy, Trades Characteristics, Construction Techniques/ Best Practices, Essential Skills
Activity:	Make sure all of your students have copies of the isometric drawings for the project's plumbing. Talk through the drawings with your students, thinking out loud about where you begin, and how you process and interpret the information they provide. Below are a few questions to get you started. You may think of many other issues to discuss with your students regarding the use of isometric drawings? • How do isometric drawings work? • What essential information do they convey? • Is their a standard approach for reading an isometric drawing?

	• What questions do isometric drawings help you answer? • How do isometric drawings actually get used when planning and undertaking a plumbing project? • Do you make notes on the drawing, or mark them up in any way? • Are there any conversions that you typically have to make? Ask students to write about the role that the isometric drawings played in laying out, and installing, the drains, vents, and domestic waterlines for their building unit. Tell students they can comment upon the role the isometric drawings played in planning the project, or reflect upon how the drawings were used to carry out the work.
When:	Include as part of Task #13- Orientation to Plumbing (NBC)

#21	**Explaining How to Read the Material Safety Data Sheet (MSDS) for Flux**
Background:	Reading Material Safety Data Sheets is a high stakes form of literacy that can potentially save you from serious injury and even death. However, recent studies have shown that the language in used in most MSDSs exceeds the average worker's literacy capabilities. You need to work with your students to develop strategies for reading, and extracting essential information from MSDS sheets.
Key Threads:	Safety, Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Provide students with copies of the MSDS for Flux Read through the MSDS for Flux with students, explaining the strategies you use to extract essential information. Tell students not to become frustrated if, even after you have worked through the MSDS together, they are still confused. Explain that even experienced tradespeople have difficulties reading MSDS sheets and need to ask a foreman or supervisor for help or confirmation as to how to proceed. A study completed by the U.S. Navy revealed that may workers become more capable using MSDS sheets if they are taught analogies for some of the more difficult technical terms that are typically used. The article below provides 10 helpful analogies for common MSDS terms that were successfully used in the U.S. Navy study. You could potentially share this article with students, and work through some of the analogies.

	You could also use the analogies from the article as a starting point for developing your own analogies for some of the difficult terms from the MSDS for insulation. How to Decipher Material Safety Data Sheets: Analogies Help Workers Remember Complex Technical Information http://www.ishn.com/Articles/Feature_Article/0d59afadc9fb7010VgnVCM100000f932a8c0____ Industrial Safety and Hygiene News Dean Larson & Susan Boyd May 5, 2000
When:	Include as part of Task # 46- Layout and install domestic waterlines

#22	**Reviewing Electrical Vocabulary and Terminology**
Background:	To become a qualified construction tradesperson involves mastering a rich, technical vocabulary. As students prepare for, engage in, and reflect upon the electrical work required to complete their building units, be sure to highlight, discuss, and track essential terms.
Key Threads:	Safety, Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Electrical work comes with it own set of unique terms that need to be learned by construction trades professionals. If you started a Construction Trades Word Wall at the beginning of the project, you can start adding all of the new electrical terms students will encounter as you orient them to a new trades. Here are just a handful of terms connected to basic electrical work that you could add to the Word Wall: Ground fault Circuit Switch Arc fault Low voltage Day by day as the word wall grows, pick 1 or 2 key terms that you ask students to define in the section of their Learning Logbook dedicated to construction trades vocabulary.
When:	Include as part of Task #14- Orientation to Electrical I and Task #15- Orientation to Electrical II, or Task #19- Review of electrical installation "Taking Stock"

#23	**Reviewing Plumbing Vocabulary and Terminology**
Background:	To become a qualified construction tradesperson involves mastering a rich, technical vocabulary. As students prepare for, engage in, and reflect upon the plumbing tasks involved in completing their building units, be sure to highlight, discuss, and track essential terms.
Key Threads:	Safety, Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Plumbing comes with it own set of unique terms that need to be learned by construction trades professionals. If you started a Construction Trades Word Wall at the beginning of the project, you can start adding all of the new plumbing terms students will encounter as you orient them to a new trades. Here are just a handful of terms connected to basic plumbing that you could add to the Word Wall: Supply line Trap Fitting Coupling Flux Day by day as the word wall grows, pick 1 or 2 key terms that you ask students to define in the section of their Learning Logbook dedicated to construction trades vocabulary.
When:	Include as part of Task # 13- Orientation to Plumbing or Task #18- Review of plumbing installation

#24	**Discussing Trades Integration and Scheduling Challenges: Challenge #5: Can Electrical Work Be Done Before Plumbing?**
Background:	Throughout Construction Trades 11, it is important to remind students that on a typical construction project, seven different tradespeople would be involved in completing the tasks outlined on the Gantt Chart. Be sure to take some time, as the project shifts from one trade to another to discuss the order in which trades are traditionally scheduled, and any potential conflicts, challenges or misunderstandings that can arise.
Key Threads:	Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Share the following scenario with your students at the beginning of your introduction to electrical work: The plumber scheduled to complete the plumbing for your building units has been held up completing another job, and will be unable to work on

	your project for at least a week. It is an extremely busy time of year and no other qualified plumbers are available. Do you sit and wait or get the electrician, who can start any time, to spend the week you will be waiting, completing all of the preliminary electrical work? Work with your class to think through the implications of completing the electrical work before installing plumbing and make a decision. Is this a good approach to take or will it simply lead to complications later on that will slow work down and potentially compromise the quality of the work?
When:	Include before Task #45- Layout and install drains and vents

#25	**Reviewing How to Convert Between Metric and Imperial Measurements**
Background:	Converting between metric and imperial measurements is a skill that becomes second nature to successful construction electricians. You need to ensure that students practice this skill, and learn to make their conversions correctly.
Key Threads:	Numeracy, Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Explain to students that the electrical measurements for the project are only provided using metric dimensions and that they need to converted. Work through several examples to demonstrate the mathematical steps involved in carrying out a conversion.
When:	Include as part of Task #52- Locate and set boxes

#26	**Highlighting Construction Trades Realities: Comparing Electrical Work to Carpentry and Plumbing**
Background:	Like Skilled Trades 10, Construction Trades 11 is ultimately about exploring life and potential careers in a number of different trades. Throughout the course, you need to encourage students to reflect on some of the similarities and differences between trades, and things they like, and don't like, about the tasks they complete from different trades.
Key	Literacy, Trades Characteristics, Essential Skills, Construction

Threads:	Techniques/ Best Practices, Skilled Trades 10
Activity:	As students prepare for, engage in, and complete the electrical work for their building unit, encourage them to think about how it compares to the carpentry and plumbing work completed earlier. Ask students if they find electrical work harder or easier than work in the other trades and to highlight any specific tasks that they enjoyed or found frustrating. Students can record their observations about the similarities and differences between electrical work, and plumbing and carpentry, in their Learning Logbooks.
When:	Include as part of Task #19- Review of electrical installation "Taking Stock"

#27	**Reviewing Electrical Safety**
Background:	Electrical work has a unique set of safety concerns that students need to understand before wiring their building units.
Key Threads:	Safety, Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Make a list of the key tasks and tools required to complete the project's electrical work. Work with your students to complete Job Safety Analysis Worksheets for each electrical task and tool. **Job Safety Analysis Worksheet** Task/ Tool | Essential Steps | Potential Hazards | Preventative Measures | | | | *Source: Canadian Centre for Occupational Health and Safety*
When:	Include as part of Task #14- Orientation to Electrical I

#28	**Discussing Trades Integration and Scheduling Challenges- Challenge #6: The Lather's Dilemma- To Hang or Not to Hang?**

Background:	Throughout Construction Trades 11, it is important to remind students that on a typical construction project, seven different tradespeople would be involved in completing the tasks outlined on the Gantt Chart. Be sure to take some time, as the project shifts from one trade to another to discuss the order in which trades are traditionally scheduled, and any potential conflicts, challenges or misunderstandings that can arise.
Key Threads:	Safety, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Describe the following scenario to students and ask them to think about what they would do if confronted with a similar situation: You have been hired as a lather to hang drywall in a new office building. After completing a review of the job site, you have discovered that carpenters did not create the following two rooms/ locations square: • President's office • Supply room What do you do? Report these irregularities to the foreman, take corrective action, or just leave each room as it is and do the best you can. Ask students to discuss what they think some of the key factors to consider are in this situation (i.e. how far from square the rooms are, the nature and function of the rooms being constructed, the time and money to implement possible solutions)
When:	Include as part of Task #16- Orientation to Lather and Painting and Decorating

#29	**Discussing Trades Integration and Scheduling Challenges- Challenge #7: The Painter/ Decorator's Dilemma- To Paint or Not to Paint?**
Background:	Throughout Construction Trades 11, it is important to remind students that on a typical construction project, seven different tradespeople would be involved in completing the tasks outlined on the Gantt Chart. Be sure to take some time, as the project shifts from one trade to another to discuss the order in which trades are traditionally scheduled, and any potential conflicts, challenges or misunderstandings that can arise.
Key Threads:	Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10

Activity:	Describe the following scenario to students and ask them to think about what they would do if confronted with a similar situation: You are a painter and have been asked to paint several rooms in a new hotel complex that is being installed. You discover when you arrive at the job site that a number of rooms have not been sanded and prepared properly by the lather. Do you notify the foreman and take corrective action, billing for the additional time it will take or do just forge ahead and paint the rooms because you are running low on cash and want to complete this project as quickly as possible so you can get paid? If you do forge ahead and slap some paint on, what will happen if the client or foreman notices the same problems you noticed at the start of the project. Who do you think will be responsible for fixing these surface irregularities, you or the lather whose sloppy work originally created them?
When:	Include as part of Task #16- Orientation to Lather and Painting and Decorating

#30	**Highlighting Construction Trades Realities: How Working as a Lather or a Painter/ Decorator Compares to Other Construction Trades**
Background:	Like Skilled Trades 10, Construction Trades 11 is ultimately about exploring life and potential careers in a number of different trades. Throughout the course, you need to encourage students to reflect on some of the similarities and differences between trades, and things they like, and don't like, about the tasks they complete from different trades.
Key Threads:	Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	As students prepare for, engage in, and complete the drywall and painting for their building unit, encourage them to think about how the lather and painter/ decorator trades differ from, and are similar to the carpentry, plumbing, and electrical trades. Ask students if they find the work in these two trades harder or easier than in the other three trades and to highlight any specific drywall or painting tasks they did or didn't enjoy. Ask students to record their observations about the similarities and differences between drywall and painting , and carpentry, plumbing, and

	electrical n their Learning Logbooks.
When:	Include as part of Task # 17- Review of drywall and painting “Taking Stock”

#31	**Reviewing Lather and Painter/ Decorator Terminology**
Background:	To become a qualified construction tradesperson involves mastering a rich, technical vocabulary. As students prepare for, engage in, and reflect upon the lather and painter/ decorator tasks involved in completing their building units, be sure to highlight, discuss, and track essential terms.
Key Threads:	Safety, Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	The Lather and Painter/Decorator trades each come with their own set of unique terms that need to be learned by construction trades professionals. If you started a Construction Trades Word Wall at the beginning of the project, you can start adding all of the new lather and painter/decorator terms students will encounter as you orient them to these new trades. Here are just a few terms from the lather and painter/ decorator trades that you could add to the Word Wall: Skim coat Adhesive Drywall Mud Seam Spotting Coat Additive Primer Latex Cut-in Feathering Day by day as the word wall grows, pick 1 or 2 key terms that you ask students to define in the section of their Learning Logbook dedicated to construction trades vocabulary.
When:	Include as part of Task #16- Orientation to Lather and Painting and Decorating or Task #17- Review of drywall & painting “Taking Stock”

#32	**Reviewing How to Estimate the Amount of Paint Required for Interior Walls**
Background:	Estimating is a classic skill that all construction people need to master. Any time new materials such as drywall, floor tiles, insulation, wood, cable, or pipe are required to complete a task, you can challenge your

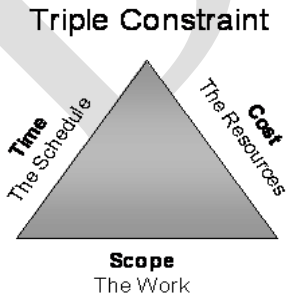
	students to estimate how much to order. Painting a wall provides a classic opportunity for you to challenge your students estimating abilities.
Key Threads:	Numeracy, Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Ask students to calculate the area of the interior walls they are responsible for painting. When they have calculated the area of the walls, give them with a can of primer or paint. Get students to read the label and determine how much area a single can will cover, and whether a single can will be sufficient to complete the job. If one can of paint is not sufficient, ask students how many more cans need to be ordered, and to predict if any paint will be left over.
When:	Include as part of Task # 69- Paint interior walls

#33	**Reading the Electrical Code**
Background:	When orienting students to electrical work, take a few minutes to discuss the electrical code and the tremendous impact that it has upon how the work is completed.
Key Threads:	Safety, Literacy, Numeracy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Provide students with photocopies of a page or two from the electrical code that are relevant to the building building project. Explain that everything from the number of wires you can place in a box, to the type and size of wire you can use for different applications, is spelled out within the electrical code. [Note for John, Do you have one or two examples in mind? If so, should we spell out the exact pages from the code and the applicable examples] Ask students to highlight one or two examples of where the code has dictated the specifications required for the project. Discuss what could potentially happen if code was not followed for each of these examples.

When:	Include as part of Task #14- Orientation to Electrical I and Task #15- Orientation to Electrical II

#34	**Highlighting Construction Trades Realities: Taking Responsibility for the Quality of Your Work**
Background:	Taking responsibility for your work is critical to establishing a successful career in the construction trades. Throughout the project, push your students to take responsibility for their work on the building units. Be sure to share any stories you have that highlight how going the extra mile usually pays off in the end.
Key Threads:	Safety, Literacy, Numeracy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Describe the following scenario to students and ask them to think about what they would do if confronted with a similar situation: You are working on a building project as a construction electrician. You are running late for another important job but have almost finished commissioning the electrical system and circuits. Everything works fine, but you realize that the sheet pasted inside the panel door, identifying which circuit breakers correlate with different parts of the building, has been completely mislabeled. Given that everything works exactly as it is supposed to and you are running late, do you take the time to re-label all of the circuit breakers correctly, or simply close the panel and head to your next job Anybody providing electrical service in the future will clearly see the panel has been mislabeled, and can make the necessary corrections. Discuss the potential consequences of taking either action, and potential approaches for dealing with this situation.
When:	Include as part of Task #26- Check for squareness and uniformity across teams, Task #31- Sheath exterior walls, Task # 38- Install exterior windows and doors, Task #47- Inspect and pressure test lines for leaks, Task #61- Commission electrical system, or Task #66- Sand joints

#35	**Demonstrating the Mathematical Secret for Laying Tile in a Room that is Not Square**
Background:	When faced with a room that is not square, experienced Floor Installers do not panic, they call upon their superior math skills to get the job done quickly and efficiently. You can use this example with students to highlight how critical math skills are to success in the construction trades.
Key Threads:	Numeracy, Literacy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Demonstrate how to use Pythagoras theorem to prepare the floor of a room that is not square for laying tiles. Explain that you will need to cut perimeter tiles to fill whatever gaps are left due to the room's less than perfect dimensions.
When:	Include as part of Task #73- Install vinyl tile in bedroom

#36	**Discussing the Relationship Between Quality, Time, Cost, and Scope for a Construction Project**
Background:	Every project a construction trades professional complete is inevitably performed and delivered under the constraints of quality, time, cost, and scope. Students need to be aware of these constraints and the tremendous impact that they have upon construction trades work.
Key Threads:	Numeracy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Draw the triple constraint diagram below on a whiteboard  Define each of the three constraints using the Construction Trades 11 project as your example. Sccope = the work that must be performed to produce the building units

	specified in the drawings. Time = the 110 hours of class time scheduled for Construction Trades 11. Cost = the building materials and hardware required to construct the building units specified in the plans. Write the word "Quality" in the middle of the triangle and explain that it can be considered a fourth constraint. Explain that none of the constraints can be changed without impacting the others. Here are some questions you can ask to get your students to explore the relationship between quality, and the three constraints: What happens if the owner of the building decides to add a second story to the original plans? Which constraint has increased? What changes to the other constraints would occur, if this decision were made? Why were pre-hung doors chosen for your building unit even though they are slightly more expensive then standard doors? Explain why this decision was likely made. Why are some parts of the building not being completed during Construction Trades 11? What would happen to the triple constraint model if a decision was made to upgrade from a low budget building to a 4-star hotel? What are some actions you can take if your building project is costing more than you initially thought it would? What if a decision is made that the building needs to be completed a month earlier than originally specified with no compromises to the quality of its construction? Discuss the positive, or negative impact that constraints might have upon your work as a tradesperson. Work through as many of these questions as you can until you are confident students understand that all projects, including their building units, are performed and delivered under certain constraints.
When:	Include as part of Task #42- Trim windows, doors, and baseboards

#37	**Discussing Trades Integration and Scheduling Challenges- Challenge #8: The Floor Installer's Dilemma- Installing a Floor Without Enough Tiles**

Background:	Throughout Construction Trades 11, it is important to remind students that on a typical construction project, seven different tradespeople would be involved in completing the tasks outlined on the Gantt Chart. Be sure to take some time, as the project shifts from one trade to another to discuss the order in which trades are traditionally scheduled, and any potential conflicts, challenges or misunderstandings that can arise.
Key Threads:	Literacy, Numeracy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Describe the following scenario to students and ask them to think about what they would do if confronted with a similar situation: You are a floor installer working to a tight deadline on a project. Not enough tiles have been ordered to complete the job. You have checked with the supplier, and additional tiles you need are on backorder and will not be available for over two weeks. Ask students to think through what the potential options are and how to handle this situation with the client or contractor in charge of the project. Some possible options include: • Rescheduling to a date when the tiles will be available • Modifying the design to accommodate more than one style of tile (i.e. introducing a pattern) • Re-doing the job with materials that are readily available Emphasize that a successful floor installer, confronted with this situation, would approach the client or contractor with potential solutions to the problem already worked out; not just note the problem and say, "So what do you want me to do now?"
When:	Include as part of Task # 20- Orientation to Floor Covering and finishing

#38	**Highlighting Construction Trades Realities: Ranking the Trades Featured in Construction Trades 11**
Background:	Like Skilled Trades 10, Construction Trades 11 is ultimately about exploring life and potential careers in a number of different trades. Throughout the course, you need to encourage students to reflect on some of the similarities and differences between trades, and things they like, and don't like, about the tasks they complete from different trades.

Key Threads:	Safety, Literacy, Numeracy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10, Green Construction
Activity:	In their Learning Logbook, have students rank all of the trades experienced during Construction Trades 11 from their most favourite to their least favourite. Ask students to explain some of the reasons behind their most favourite, and least favourite, selections, and to discuss whether there were any other trades that almost ended up at the top or bottom of their list.
When:	Include as part of Task # 22- Project Debrief

#39	**Highlighting Construction Trades Realities: Reflecting Upon the Hardest and Easiest Parts of the Project**
Background:	Like Skilled Trades 10, Construction Trades 11 is ultimately about exploring life and potential careers in a number of different trades. Throughout the course, you need to encourage students to reflect on some of the similarities and differences between trades, and things they like, and don't like, about the tasks they complete from different trades.
Key Threads:	Safety, Literacy, Numeracy, Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10, Green Construction
Activity:	In their Learning Logbook, ask students to reflect upon which part of the project they found the hardest, and which part they found the easiest.
When:	Include as part of Task # 22- Project Debrief

#40	**Highlighting "Green" Construction Practices: Reusing Materials, Sorting and Disposing of Construction Waste**
Background:	Students will be re-using materials from the walls they built in Skilled Trades 10. This presents a tremendous opportunity to discuss how re-using building materials is a growing trend that makes sense from both a financial and environmental perspective.
Key Threads:	"Green" Construction, Construction Techniques/ Best Practices

Activity:	As students disassemble their walls, get them to place everything that can be salvaged into neat piles at the back or the side of the Skilled Trades Centre. When the task is complete, get them to take a picture to document the significant amount of building material that their hard work has saved from the landfill.
When:	Include as part of Task #6-Orientation/ Course outline, Task #7-Orientation to new tools/ Safety session, and Task #8- Disassemble walls from previous project

#41	**Highlighting "Green" Construction Practices: Thermal Bridging- An Energy Efficient Technique for Constructing a Building's Corners**
Background:	The drawings for the building units specify that the building unit's corners be constructed using an energy efficient technique called thermal bridging. This technique has become standard construction industry practice, so you should set aside a few minutes for an explanation of why it is used.
Key Threads:	"Green" Construction, Trades Characteristics, Construction Techniques/ Best Practices
Activity:	Ask one of your student groups to research "thermal bridging" on the Internet a few days before beginning to frame the exterior and intermediary walls of their building unit. Tell the students that you want them to briefly explain "thermal bridging", and it advantages, to the other students in the class, when the exterior and intermediary walls are being framed.
When:	Include as part of Task # 30- Frame exterior and intermediary walls

#42	**Highlighting "Green" Construction Practices: Installing Oriented Strand Board (OSB)**
Background:	Plan for the building specify that the exterior walls are to be sheathed using Oriented Strand Board (OSB). OSB is becoming more commonly used on many building projects. Be sure to set aside a few minutes for an explanation of why it is becoming a popular alternative to conventional plywood.
Key Threads:	"Green" Construction, Trades Characteristics, Construction Techniques/ Best Practices, Skilled Trades 10

Activity:	Ask one of your student groups to research the advantages of Oriented Strand Board (OSB) and other engineered wood products on the Internet. Tell the students that you want them to report on some of the key benefits that OSB and engineered wood have to offers. Here are some of the key benefits you should expect them to find: Extra strong, Consistent quality, Easy to work with, Highly durable, Defective free, Environmentally sustainable (uses 80% of the tree it is harvested from, as opposed to conventional plywood which uses 40% of the harvested tree)
When:	Include as part of Task #31- Sheath exterior walls

#43	**Highlighting "Green" Construction Practices: Placing Vapour Barriers Around Installed Boxes**
Background:	Your student's building units should employ the "green" building practice of placing vapour barriers around the installed electrical boxes. Be sure to take a minute to highlight this energy saving practice.
Key Threads:	"Green" Construction, Trades Characteristics, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Ask to students to pause for a minute before they place vapour barriers around installed electrical boxes. Explain why this is a green building practice.
When:	Include as part of Task #52- Locate and set boxes

#44	**Highlighting "Green" Construction Practices: Sealing Wires from Floor-to-Floor and Floor-to-Ceiling**
Background:	Your student's building units should employ the "green" building practice of sealing wires from floor-to-floor, and ceiling to ceiling. Be sure to take a minute to highlight this energy saving practice.
Key Threads:	"Green" Construction, Trades Characteristics, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Ask to students to pause for a minute before they seal wires for their

	building unit. Explain why this is a green building practice.
When:	Include as part of Task # 54- Run cables

#45	**Highlighting "Green" Construction Practices: Installing Low-Flow Toilets**
Background:	Low-flow toilets are becoming an increasingly popular alternative to conventional flow toilets. Be sure to set aside a few minutes for a discussion of low-flow toilets when students are attaching the fixtures for their building units.
Key Threads:	"Green" Construction, Trades Characteristics, Construction Techniques/ Best Practices, Skilled Trades10
Activity:	Ask one of your student groups to research the pros and cons of low-flow toilets on the Internet. Tell the students that you want them to briefly present the pros and cons of low-flow toilets during the completion of Task #48- Attach fixtures, drains, and water supplies Here are some of the pros and cons you should expect them to find: *Pros* Conserve water, Smaller, and more attractive *Cons* Inability to handle large amounts of water, More expensive
When:	Include as part of Task #48- Attach fixtures, drains, and water supplies

#46	**Highlighting "Green" Construction Practices: Using Low VOC Paint**
Background:	Low VOC paint is becoming a popular alternative to traditional paint for both residential, and commercial construction projects. Be sure to set aside a few minutes for a discussion of low VOC paint when students are painting the interior walls of their building units.
Key Threads:	"Green" Construction, Trades Characteristics, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Assign a student group to investigate low VOC paint. Here are some

	potential questions for your students to investigare: What makes low VOC paint different from regular paint? Does low VOC paint cost more than regular paint of similar quality? Does low VOC paint perform as well as regular paint? Schedule students to deliver a brief presentation to the class during Task #69 or Task #73.
When:	Include as part of Task #69- Paint interior walls or Task #73- Install vinyl tile in bedroom

#47	**Highlighting "Green" Construction Practices: Investigating the Quality and Cost of Energy Efficient Materials**
Background:	Energy efficient building materials cost more than regular building materials. However, in the long run, the energy savings they generate more than make up for their higher purchase price. Students entering the construction trades in the next few years will likely end up working extensively with "green" building materials. Construction Trades 11 provides an excellent opportunity to provide your students with some insight into why energy efficient materials are becoming more a more popular choice for commercial and residential building projects.
Key Threads:	"Green" construction, Literacy, Construction Techniques/ Best Practices
Activity:	Because "green" construction" practices will likely be a huge part of the construction industry in the coming year, you should consider scheduling someone from a building materials supplier, a contractor who has completed "green" building projects, or anyone else you can think of from the construction industry who knows about energy efficient materials. Ask your guest to speak about the quality and cost of energy efficient materials, and the many benefits they have offer. You could also assign a student group to visit your local building supplies store, complete research on the Internet, or make some call to building materials manufacturers to learn more about the quality, costs, and benefits of energy efficient building materials.

When:	Include as part of Task #6- Orientation/ Course outline, Task #9- Orientation to Carpentry (Theory of Framing I), or Task #13-Orientation to Plumbing

#48	**Developing "Safety Sense" With Noise Recognition Exercises**
Background:	Most experienced construction tradespeople have a built-in "safety-sense". They always know what is taking place in their immediate vicinity, and immediately recognize anything that sounds, looks, or smells out of the ordinary. You need to work with your Construction Trades 11 students to help them begin to develop their own "safety-sense."
Key Threads:	Safety, Literacy, Trades Characteristics, Essential Skills
Activity:	Choose a number of different objects such as a bag of nails, a hammer, a piece of wood, a hard hat, or a saw blade. Once a week, before class starts, choose an object and, after asking students to turn their backs to you, or close their eyes, drop the object on the floor. Ask your students to identify the dropped object. Explain that always being aware of your immediate surroundings, and developing a built-in "safety sense" is critical to staying safe on the job.
When:	At regular interval throughout Construction Trades 11

#49	**Highlighting Construction Trades Realities: Getting Re-assigned to a New Team or Work Group After a Job Has Started**
Background:	The constantly shifting demands of construction projects often require tradespeople to be reassigned to different project teams. If the original work teams you select are not productive, because of mismatches in knowledge and skills, you may need to introduce students to this reality.
Key Threads:	Trades Characteristics, Essential Skills, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	After your student teams complete Task # 26, carefully evaluate the quality of their work, and the capabilities of each team member. If you have an exceptionally strong or weak team, you should reassign some students to ensure teams are more evenly balanced.

When:	Include as part of Task #26- Check for squareness and uniformity across teams

#50	**Demonstrating the Safe Use of New Tools Using Toolbox Meetings**
Background:	Your students will be using a number of new tools in Construction Trades 11. You need to budget time throughout the course to ensure that all of your students know how to safely use every tool. Toolbox Meetings and Toolbox Meeting Checklists provide a rigorous approach for teaching tool safety. Students were introduced to Toolbox Meetings in Skilled Trades 10. The process takes time to complete, but the checklists generated provide an excellent way of confirming that your students know everything required to safely operate new tools.
Key Threads:	Safety, Literacy, Trades Characteristics, Construction Techniques/ Best Practices, Skilled Trades 10
Activity:	Pick three or four tools that students will be using to complete upcoming project tasks and perform a demonstration or "think aloud" using the Toolbox Meeting process. Students were introduced to the Toolbox Meeting process in Skilled Trades 10, and may already be knowledgeable about how to prepare checklists for the tasks or tools you will be demonstrating. You can design your own checklists and guides or use the excellent materials provided by Work Safe BC as models. Work Safe BC Tool Box Meeting Check list www2.worksafebc.com/i/construction/toolbox/dfs/TG06-00_Checklist.pdf Work Safe BC Tool Box Meeting Guides You may want to create a Toolbox Meeting schedule at the beginning of the course, and assign students to work with you to demonstrate and review the safe use of new tools that are about to be used. Explain to students that there are no "short cuts" where safety is concerned, and insist that detailed Toolbox Meetings and Toolbox Meeting checklists are always held before using a new tool. You should also closely supervise students, especially when they first start using a new tool, to confirm that they are working safely.

When:	Include as part of Task #7- Orientation to new tools/ Safety session, and before any tasks throughout the course where new tools will be required.