**Lesson Plan**

This lesson plan approach is influenced by Team Based Learning, an active learning approach that combines the flipped classroom and small group discussion.

**Case Study – Preparing to Install Permeable Paving**

In this case study, learners prepare and plan to install permeable paving.

**Objectives:**

* + Plan responsible landscape construction.
  + Recommend the appropriate location within the site for installing permeable pavers based on water flow and land use considerations.
  + Evaluate the integration of permeable pavers with other site elements, such as drainage systems and landscaping.

**Part 1: Prepare learners in advance of the case study activity.**

* Assign reading and video watching to prepare learners. Let the learners know how they will be using the reading in class and provide a brief summary or orientation to the readings. Ideally, learners prepare before class, but this can be adapted to provide class reading time if it is more appropriate in your context.

# [How Does Permeable Pavement Work](https://youtu.be/ERPbNWI_uLw)?

# [Permeable Paving](https://files.cvc.ca/cvc/uploads/2012/02/lid-swm-guide-apdxa-permeable-pavement.pdf)

* + - Lessons Learned in Low Impact Development Construction [12 pages, see the resources].

**Part 2: Assess Readiness**

* Gain the learners attention by outlining your session agenda and share [Permeable Pavement](https://youtu.be/NH1WM_JwNFc)  video.
* Start the session with a readiness assessment. First, have learners complete a quiz individually. Gather the quizzes and mark while learners are completing the next activity, a group quiz.
* Place the class in groups (5 to 7 students), and the learners complete the same quiz collaboratively.
* After the group quiz, the instructor provides the answers.
* Consider the quiz as formative assessment to inform a mini lecture that follows the quiz. Do not review all the reading content, rather focus a short lecture (less than 20 min) to fill in gaps and provide clarification based on the quiz results and group conversations.

**Part 3:** **Applied Activity 1 - Get to know the Land**

* Select an area to install pervious pavers (ideally this is an actual place that you can follow through with an installation in subsequent classes).
* Identify water courses (rivers, wetlands, and ponds) connected to the place. Ask students to seek out the Indigenous names for the watercourses; and to reflect on the current name for that place and its previous Indigenous name. How did the location acquire these names? What are the differences between the two names? Is there any connection between them?
* Study the watershed and site to understand how water flows. Investigate the soils and subsurface to evaluate if the site is suitable for pervious pavers.

**Part 4: Applied Activity 2 – Low Impact Plan**

Learners work in their small groups to plan for pervious paver installation, that highlights the actions they would take for a low impact installation. Use large poster size poster pages, sticky notes, and pens to represent their ideas. Have air photos or plans available to represent the site. Ask learners to make planning decisions by responding to the following questions. Depending on the time you have, you may ask all the questions, or one or two.

* + Anticipate the sequence of construction. Use sticky notes or draw a timeline of effectively construction events.
  + Recommend the five most important measures you will take to maintain a clean worksite to lessen runoff, erosion, and material contamination.
  + Identify the best location to
    - access the site,
    - store materials (soil and aggregate),
    - washout area for trucks, and
    - install pervious pavers.

Groups make poster/maps with notes. Summarize and assess the learning with a gallery walk discussion.

**Readiness Assessment**

1. Which of the following are examples of Low Impact Development (LID) practices?

a) Vegetated roofs

b) Soakaway pits

c) Rain gardens

d) Rain barrels

e) Bioretention

f) All of the above

1. LID requires changes to standard construction practices.

True or False

1. How can understanding LID construction help contractors?

a) Minimize time spent on site

b) Minimize design drawing assumptions on site

c) Minimize site deficiencies

d) Minimize costly repairs

e) Minimize material waste and replacement over the warranty period

f) All of the above

1. What are some key considerations for sequencing construction effectively in LID projects? (Select all that apply)

a) Accounting for weather and material delays

b) Allowing sufficient time to complete the project

c) Avoiding unnecessary movement of materials

d) Ensuring consistent paving direction

e) Implementing proper erosion and sediment control measures

1. How can LID project areas be protected during construction? (Select all that apply)

a) Using signage and fencing

b) Designating routes for heavy equipment and wash-out areas for concrete trucks

c) Maintaining a clean workspace

d) Using stormwater ponds as temporary sediment traps

e) Implementing effective erosion and sediment control measures

1. What is the purpose of a pre-filter strip in an LID project?

a) To trap sediment and debris before it reaches the LID feature

b) To enhance the aesthetics of the project

c) To provide shade for the surrounding area

d) To deter wildlife from entering the infiltration area

1. What is one way to protect the infiltration area of an LID feature?

a) Designate routes for heavy equipment

b) Maintain a clean workspace

c) Use signage and fencing

d) Ensure positive flow to the LID feature

1. How long can bioretention material be stored before they are likely to be contaminated?

a) By preventing compaction and tracking of materials

b) By providing designated wash-out stations for concrete trucks

c) By ensuring positive flow to the LID feature

d) By clearly marking the infiltration area

1. Why is it important to designate routes for heavy equipment and wash-out areas for concrete trucks?

a) To prevent contamination of the LID feature

b) To maintain a clean workspace

c) To ensure proper grading of the LID feature

d) To protect the infiltration area from dirt and dust

1. What can clog infiltration areas and impact the performance of the LID feature?

a) Grading issues

b) Improper materials

c) Lack of signage and fencing

d) Concrete washout from trucks

**Answers:**

1. f) All of the above
2. True
3. f) All of the above
4. a), b) and c)
5. a), b), c), and e)
6. a) To trap sediment and debris before it reaches the LID feature
7. c)
8. a)
9. a)
10. d)