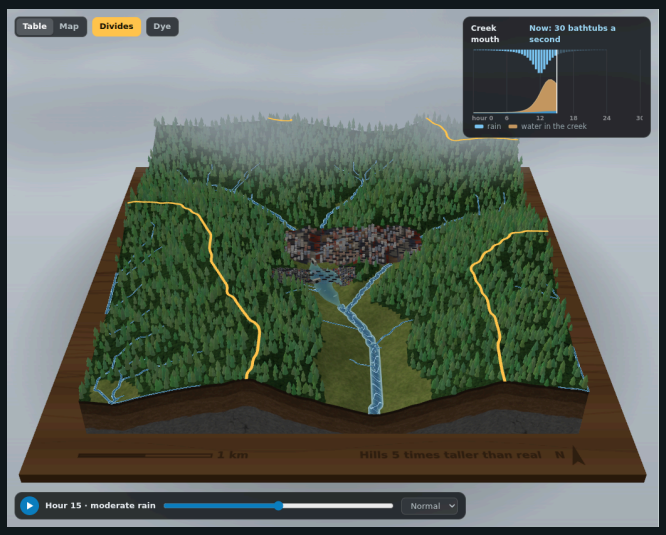
mytekDev

Watershed Lab: Forest or Parking Lot?

Grades 6-8 · 45 minutes

Earth science



Slides, rubric and answer key **Print and go** **No student accounts**

Chromebook friendly

What's included

- A one-page overview: objectives, essential question, vocabulary, standards and assessment
- A 45-minute lesson sequence: warm-up, direct instruction, guided practice, independent practice, closure
- Slides for the board: a PowerPoint file that also opens in Google Slides
- A student worksheet with a QR code and a storm table
- A 3-question exit ticket, two to a page, with an answer key
- A rubric: 3 criteria, 4 levels, scored out of 12
- Differentiation for English learners, students with IEPs or 504 plans, and students who need more support or more challenge
- Cross-curricular extensions, and notes for teaching it in grades 4 and 5 and in high school environmental science
- Standards: NGSS

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Students rain a storm on a forest valley and read the gauge. Then they paint a town and a parking lot where the forest was and rain the same storm again: far more runs off, and the creek rises higher. They change one thing at a time, the cover and then the soil, and explain each result with what the ground lets in.

At a glance

ESSENTIAL QUESTION

The same storm falls on a forest and on a town. Why does the creek below the town rise higher?

OBJECTIVES

Students will be able to:

- compare runoff from forest, farmland, a town and pavement in the same storm
- explain runoff with how much water each kind of ground lets in
- read a storm graph: the rain, the creek's rise and its peak
- run a fair test, changing one thing at a time

VOCABULARY

Land cover, Impervious surface, Runoff, Peak flow, Fair test

STANDARDS

MS-ESS3-3

TIME AND MATERIALS

45 minutes, grades 6-8.

- One computer or Chromebook per student
- A projector
- The worksheet and exit ticket, one copy each per student
- The rubric, one copy per student if you grade the work

PREP

Make copies of the worksheet and exit ticket. Before class, open mytekdev.com/try/watershedlab?lesson=forest-or-parking-lot&ref=tpt-watershedlab-2 once on a student computer: it opens on Millbrook Valley in Cover the land. Run it yourself, about ten minutes: Rain the Big storm on the forest, paint a town and a parking lot across the valley above the creek, Rain again, then change the soil to Clay and Rain once more.

ASSESSMENT

- Formative: the questions under What to look for, asked while students work, and the exit ticket (answer key included).
- Summative: the worksheet, scored with the rubric.

TECHNOLOGY AND PRIVACY

Runs in any browser, Chromebooks included, with nothing to install. Students need no account and no email: the link works signed out, and nothing they do is stored on our server unless they choose to save.

Lesson sequence

MINUTES	STAGE	WHAT YOU DO	WHAT STUDENTS DO
0 to 5	**Warm-up** Hook	Show the title, essential question and Today I can slides (about 1 minute). Then the warm-up: forest or parking lot, where does more rain reach the creek? Write the reasons on the board.	Answer the warm-up on the worksheet.
5 to 12	**Direct instruction (I do)** Model it	Project the app with the starter open. Press Rain and read the gauge aloud: the rain bars, the creek curve, the peak about two hours after the heaviest rain. Show The Big storm on loam: 7, 38 and 92 of every 100 drops. > **It's working when:** Ask why the creek peaks after the rain does. The water has to run down the valley to the mouth first.	Watch, and fill in the vocabulary on the worksheet.
12 to 22	**Guided practice (We do)** Pave it together	Students open the link or scan the QR code. A short guide walks them through: Rain, Town, paint across the valley, Rain the same storm again. Check every screen shows a higher peak the second time. > **Watch for:** Students who change the storm as well as the cover. The test is fair only if the storm stays the Big storm.	Fill in the first two rows of the storm table: the cover, the soil, how much ran off, and the peak.
22 to 38	**Independent practice (You do)** One change at a time	Students add a parking lot and rain, then change the soil to Clay and rain again. Those who finish try a cornfield, or meadow in place of the town. Walk the room with the What to look for questions. > **If they ask:** "Clay under the forest made more run off too. What is it about clay?" Soil	Fill in the storm table for every run, one change on each line.
38 to 45	**Closure** Showcase and exit ticket	Show the Showcase slide. Two students say what the mall would do to the creek and one thing the town could do about it. Hand out the exit ticket.	Answer the exit ticket.

Before you teach: a ten-minute walkthrough

Open mytekdev.com/try/watershedlab?lesson=forest-or-parking-lot&ref=tpt-watershedlab-2. A short guide opens over the app, on Millbrook Valley with Cover the land open.

1. **The forest.** Press `Rain` with the Big storm. The card says 93% soaked in and 7% ran off, and the gauge peaks about two hours after the heaviest rain.

2. **The town.** Pick `Town` and drag across the valley above the creek. `Rain` again: more runs off and the peak is higher. The card compares the two storms.
3. **The parking lot.** Pick `Parking lot` and paint a patch. Almost all the rain on it runs off.
4. **The soil.** Change `Soil under it all` from Loam to Clay and rain: more runs off from every cover.

> The moment that lands is the second gauge. Students expect a difference; the size of it surprises them.

Background for the teacher

How much of a storm runs off depends on the ground. Engineers give each kind of land cover and soil a curve number: near 100 the ground holds almost nothing, lower numbers hold more. A forest on loam soaks in most of an ordinary storm. Roofs and pavement let almost nothing in, so nearly all the rain on them runs off, and fast, through gutters and storm drains.

More runoff, arriving sooner, means a higher peak at the creek mouth: more flooding downstream and more scouring of the creek banks. Soil matters too: sand takes water in quickly; clay's tiny spaces let it in slowly. The valley is a model with numbers of the right size, not a real place. The runoff uses the curve numbers engineers use, and the storms are real ones for central Iowa.

Common mistakes: thinking pavement makes rain disappear; thinking the forest stops all runoff (on clay or in the hundred year storm, a third can run off even a forest); and changing the storm and the cover at once.

What to look for

Ask these while students work. A student who has understood the lesson can answer them without help:

- What did you keep the same between the two storms?
- Why did more water run off the town?
- Where does the rain on a roof go?
- Why did the creek peak higher, and not only later?
- Why did clay make a difference under the forest too?

> The first question is the real test of the method: a student who names the storm and the soil as what stayed the same can run a fair test.

Cross-curricular extensions

- Math: a parking lot of one acre gets 3.04 inches of rain. How many gallons is that? (One inch on an acre is about 27,000 gallons.)
- Civics: find your town's stormwater rules for new buildings, and what they ask a builder to do with the rain.
- Engineering: design a rain garden for the school's parking lot and say where the water goes.

- English: write a letter to the town council about the mall on the forest, using two numbers from your storm table.

Vocabulary

Land cover	What covers the ground: forest, grass, crops, roofs, pavement.
Impervious surface	Ground water cannot soak into, like roofs, streets and parking lots.
Runoff	Rain that runs over the ground instead of soaking in.
Peak flow	The most water passing the creek mouth at once during a storm.
Fair test	An experiment that changes only one thing, so the result shows what that one thing does.

Differentiation

ENGLISH LEARNERS

- Keep the vocabulary slide up, and point at the screen as you say each word: the yellow line, the creeks and the gauge carry the meaning.
- Pair each learner with a partner; the card's bar shows soaked in and ran off as two colors.
- Accept the storm table as more or less than the run before, without sentences.

STUDENTS WITH IEPS OR 504 PLANS

- Pair students for the independent part, one painting and one filling in the table.
- Zoom the browser to 125%; the card and the gauge stay readable.
- Allow the guided runs and one change, where the IEP allows a modified assignment.

STUDENTS WHO NEED MORE SUPPORT

- A sentence starter: "More water ran off because ___."
- A check-in after the guide: every student has a second storm with a higher peak before anyone moves on.
- Ask only whether the second peak was higher or lower.

STUDENTS READY FOR MORE

- Pick the Once in a hundred years storm: does the forest still hold most of it? Explain.
- Find the smallest town that doubles the peak.
- Turn half the town into houses and lawns, and compare the peak.

Adapting for other grades

Younger students: In grades 4 and 5, open Setup and pick grades 2 to 5: readings are in words and pictures and the sheet asks the simpler questions. Do the guide together and stop there; skip the third rubric row; total 8, and 6 meets the objectives.

Older students: In high school, pick high school in Setup: the cards show the curve numbers. Students explain the 92 and the 7 with the runoff equation, S = 1000/CN - 10 inches of storage.

Student worksheet

Name: _____ Date: _____

Open the app: scan the QR code, or go to mytekdev.com/try/watershedlab?lesson=forest-or-parking-lot

Essential question: The same storm falls on a forest and on a town. Why does the creek below the town rise higher?

Warm-up: Where does more rain reach the creek, a forest or a parking lot, and why? _____

1. **Vocabulary.** Land cover, impervious surface, runoff, peak flow, fair test: write each in your own words.

2. **The storm table.** For each run: the cover _____; the soil ____; the storm _____; ran off ____%; the peak _____. One run on each line.

1. How did the town change the creek in the same storm? Use two numbers from your table.

2. Why does more rain run off a town than a forest?

Watershed Lab: Forest or Parking Lot?

Exit ticket

Name: _____

1. More rain runs off a parking lot than a forest because (A) parking lots are flatter (B) water cannot soak into pavement (C) more rain falls on parking lots

2. To test what a town does to the creek, you should (A) change the town and the storm together (B) keep the storm the same and change only the land (C) use the biggest storm

3. A forest above a creek is cut down for a town. Predict what happens to the creek in the next big storm, and explain.

Watershed Lab: Forest or Parking Lot?

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Answer key: exit ticket

QUESTION	ANSWER	WHY
1	B	Roofs and pavement let almost no water in, so nearly all of it runs off.
2	B	Changing one thing at a time is a fair test.
3	It rises higher, and sooner	More of the rain runs off roofs and streets instead of soaking in, so more reaches the creek at once. A prediction without the reason is half.

Rubric

Score each row from 1 to 4.

Name: _____

CRITERIA	4 EXCEEDS	3 MEETS	2 APPROACHING	1 BEGINNING
The storm table	Every run recorded with the cover, the soil, how much ran off and the peak, one change at a time with the same storm.	Every run recorded with the cover and how much ran off.	Some runs recorded.	No runs recorded.
Explaining runoff	Explains each result with how much water the ground lets in: roofs and pavement almost none, forest soil a lot, clay slowly.	Explains that pavement lets less water in than forest.	Says the town made more runoff, with no reason.	No explanation.
The fair test	Names what stayed the same and what changed in each run, and why that makes the comparison fair.	Kept the same storm for every run.	Changed more than one thing at a time.	No comparison.

Total: ____ / 12. A score of 9 or more meets the objectives.

Standards

The lesson is built for MS-ESS3-3: students measure a human impact on a creek, building over a forest, and test ways to make it smaller.

FRAMEWORK	CODE	GRADES	STANDARD	HOW THE LESSON MEETS IT
NGSS	**MS-ESS3-3**	6-8	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	Students measure what urban development does to runoff and the creek's peak, and test changes that reduce it.

Checked November 2026 against: NGSS MS-ESS3-3, Earth and Human Activity.

Optional: save student work in a free class

The whole lesson runs at the link on the worksheet, with no accounts and no sign-up.

To keep students' work, and see it all in one place, make a free class. It takes about ten minutes, once, and covers every lesson in this series: mytekdev.com/tools/class-setup

Students in a class open mytekdev.com/tools/watershed-lab/lessons/forest-or-parking-lot/start instead of the worksheet link. Each one gets their own copy of the starter, and the same link reopens it next time.

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