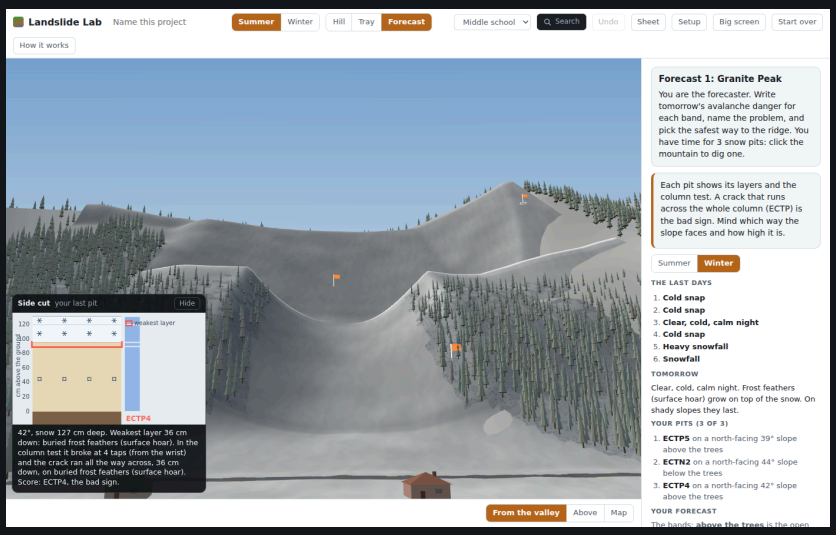
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# Landslide Lab: Forecast Tomorrow

## 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 forecast log
- 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 earth science
- Standards: NGSS

# Landslide Lab: Forecast Tomorrow

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Students act as forecasters. With only three checks, they dig snow pits on a mountain they have not seen, rate the danger in three bands, name the problem and pick a route, then publish. Tomorrow plays and the app names the pit that showed the danger or the one they missed. Then they forecast a storm on a hillside, choose which houses to warn, and weigh a missed house against a false alarm.

## At a glance

### ESSENTIAL QUESTION

**How can people forecast a natural hazard from a few pieces of evidence, and what does a wrong forecast cost?**

### OBJECTIVES

Students will be able to:

- gather evidence with a limited number of checks and choose where to look
- make a forecast from the evidence: a danger rating, the problem and a safe route
- compare a forecast with what happened and explain what evidence was missing
- weigh a missed warning against a false alarm

### VOCABULARY

Forecast, Evidence, Danger rating, False alarm, Mitigation

### STANDARDS

MS-ESS3-2

### 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/landslidelab?lesson=forecast-tomorrow&ref=tpt-landslidelab-4 once on a student computer: it opens on the winter forecast, and every student gets forecasts of their own. Make one winter forecast and one summer forecast yourself, about ten minutes. To give the whole class the same forecasts, open Setup in the app and pick the same for everyone, then hand that project out from a free class.

### 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**<br>Hook | Show the title, essential question and Today I can slides (about 1 minute). Then the warm-up about the town and its warnings. | Answer the warm-up on the worksheet. |
| 5 to 12 | **Direct instruction (I do)**<br>Model it | Project the app with the starter open. Read the last days of weather aloud and ask where the trouble might be. Dig one pit together and read it. Show A forecaster's evidence and Two ways to be wrong. Read the danger words in the forecast panel.<br><br>> **It's working when:** Do not publish the class forecast. Every student has a different mountain, so the guided forecast is theirs to make. | Watch, and fill in the vocabulary on the worksheet. |
| 12 to 22 | **Guided practice (We do)**<br>The first forecast | Students open the link or scan the QR code. A short guide walks them through three pits and publishing. Walk the room and ask where each pit is and why.<br><br>> **Watch for:** Students who dig all three pits in one place. The check will tell them; ask before they publish what a pit somewhere else could show. | Make the first forecast and fill in the first line of the forecast log from the check. |
| 22 to 38 | **Independent practice (You do)**<br>More forecasts | Students press Next forecast for two more winter forecasts, then pick Summer at the top of the panel: walk the hill or read a soil sensor, mark the houses to leave, and send the warnings. Walk the room with the What to look for questions.<br><br>> **If they ask:** "The check named a pit you did not dig. Where would you dig next time?" Evidence | Log every forecast: bands right, the problem, the route, and in summer the houses warned, missed and false alarms. |
| 38 to 45 | **Closure**<br>Showcase and exit ticket | Show the Showcase slide. Two students answer from their logs, then go back to the warm-up. Hand out the exit ticket. | Answer the exit ticket. |

## Before you teach: a ten-minute walkthrough

Open mytekdev.com/try/landslidelab?lesson=forecast-tomorrow&ref=tpt-landslidelab-4. A short guide opens over the app on the winter forecast. The panel on the right lists the last days of weather, tomorrow's weather, your pits, and your forecast.

1. **Dig.** Click the mountain to dig a pit. The pit shows in the corner with its layers and column test score. Three checks are allowed.

2. **Call it.** Pick a danger for above the trees, near the tree line and below the trees, the problem (storm slab, wind slab or persistent slab, or none), and one of three routes.
3. **Publish.** Press `Publish the forecast`. Tomorrow plays. The check marks each band right, close or wrong, names the pit that showed the danger or says none did, and says whether your route was safe.
4. **Summer.** Pick `Summer` at the top of the panel. Walk the hill or read a soil sensor, pick `Mark houses`, click the houses to leave, and press `Send the warnings`. The check counts the houses reached that you warned, the ones you missed, and the false alarms.

> The moment that lands is the first check. Students who dug three pits side by side see the danger was in a place they never looked.

## Background for the teacher

Avalanche centers publish a danger rating for three bands, above, near and below the tree line, from field observations, weather and snow pits. Forecasters never see the whole mountain; they choose where to look. A forecast also names the avalanche problem, because a storm slab heals in days while a persistent slab on a buried weak layer can last for weeks.

Every warning system weighs two errors. A missed hazard can cost lives; a false alarm costs a night away and makes the next warning easier to ignore. The app counts both. That trade is MS-ESS3-2: data on a hazard used to forecast it and to decide what to do.

The forecasts come from the app's own rules and cutoffs. The app is a model of a made-up hill and mountain. It is not a tool for judging a real slope.

## What to look for

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

- Why did you dig that pit there?
- Which pit showed the danger? What did its column test say?
- Which band did you get wrong, and what evidence would have changed your call?
- How many false alarms did you send in summer?
- If you had only two checks, where would you look?

> The third question is the real test: a student who names the evidence they were missing is thinking like a forecaster.

## Cross-curricular extensions

- Math: from the whole class's logs, find the share of bands rated right, and the share of warnings that were false alarms.
- Social studies: read how a county decides on an evacuation order before a storm, and who pays for it.
- English: write tomorrow's forecast as a public message, short enough to read on a phone.
- Weather: compare the danger scale with a weather forecast's chance of rain: how is each one judged right or wrong?

## Vocabulary

| | |
|---|---|
| **Forecast** | A call about what will happen, made from the evidence you have now. |
| **Evidence** | What you observed or measured that supports a claim: here, a pit, a walk or a sensor reading. |
| **Danger rating** | A word from a scale, Low, Moderate, Considerable, High, that says how likely avalanches are and how big. |
| **False alarm** | A warning for something that did not happen. |
| **Mitigation** | What people do to make a hazard do less harm, like closing a road or asking families to leave. |

## Differentiation

### ENGLISH LEARNERS

- Keep the vocabulary slide up, and point at the screen as you say each word: the side cut, the colors and the pit carry the meaning.
- Pair each learner with a partner; the danger words have colors and the check names each band.
- Accept the forecast log as ticks and crosses, without sentences.

### STUDENTS WITH IEPS OR 504 PLANS

- Pair students, one digging and one recording the pits.
- Zoom the browser to 125%; the forecast panel and the pit stay readable.
- Allow one winter and one summer forecast, where the IEP allows a modified assignment.

### STUDENTS WHO NEED MORE SUPPORT

- A sentence starter: "I rated it ___ because my pit on ___ showed ___."
- A check-in after the first forecast: every student has read a check before going on.
- Suggest one pit high, one near the trees and one below them.

### STUDENTS READY FOR MORE

- Switch the level to high school, where Extreme is on the scale, and make five forecasts.
- Set the checks to 2 in Setup and compare your score with 3 checks.
- Write the forecast for a real mountain from its avalanche center's weather, and compare it with the one they published.

## Adapting for other grades

**Younger students:** In grades 4 and 5, do the summer forecast only, together: walk the hill, mark the houses, and talk about why a false alarm matters. Skip the first rubric row; total 8, and 6 meets the objectives.

**Older students:** In high school, pick High school in the level menu: Extreme joins the danger scale and the pit shows layer strengths. Students write a short forecast discussion for each band, the way avalanche centers publish them.

# Student worksheet

Name: _____ Date: _____

Open the app: scan the QR code, or go to mytekdev.com/try/landslidelab?lesson=forecast-tomorrow

Essential question: How can people forecast a natural hazard from a few pieces of evidence, and what does a wrong forecast cost?

Warm-up: A town warns of a storm three times and nothing happens. What will people do the fourth time?

_____

1. **Vocabulary.** Forecast, evidence, danger rating, false alarm, mitigation: write each in your own words.

2. **The forecast log.** For each winter forecast: where I dug _____; my ratings _____; bands right ____ of 3; the problem right? ____; my route safe? ____; the evidence I missed _____. One forecast on each line.

3. **Summer.** Houses warned that the slide reached: ____. Houses missed: ____. False alarms: ____.

1. Which pit or walk was the most useful evidence you found today? Why?

2. Which is worse, a missed house or a false alarm? Use your log.

## Exit ticket

Name: _____

1. A forecaster digs all three pits on one slope. What is the problem? (A) too few pits (B) no evidence from other heights and slopes (C) nothing

2. A false alarm is (A) a warning for something that did not happen (B) a hazard nobody warned about (C) a forecast that came true

3. Why can too many false alarms be dangerous?

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3. Why can too many false alarms be dangerous?

# Answer key: exit ticket

| QUESTION | ANSWER | WHY |
|---|---|---|
| 1 | B | Danger changes with height and the way a slope faces. Spreading the checks gives evidence from more of the mountain. |
| 2 | A | A missed hazard is B. |
| 3 | People stop believing warnings | After many false alarms people ignore the next warning, which may be real. Saying it wastes time is half. |

## Rubric

Score each row from 1 to 4.

Name: _____

| CRITERIA | 4 EXCEEDS | 3 MEETS | 2 APPROACHING | 1 BEGINNING |
|---|---|---|---|---|
| **Evidence** | Pits or walks spread over heights and slopes, with a reason for each, in every forecast. | Pits or walks spread out in most forecasts. | All checks in one place. | No checks recorded. |
| **The forecast log** | Three forecasts or more logged with the check, and the missing evidence named for each miss. | Three forecasts logged with the check. | One or two logged. | No log. |
| **Misses and false alarms** | Weighs both costs with examples from the log and says what a forecaster can do to make fewer of each. | Explains the cost of both a miss and a false alarm. | Explains one cost only. | No explanation. |

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

## Standards

The lesson is built for MS-ESS3-2: data on a natural hazard used to forecast it and decide on mitigation.

| FRAMEWORK | CODE | GRADES | STANDARD | HOW THE LESSON MEETS IT |
|---|---|---|---|---|
| NGSS | **MS-ESS3-2** | 6-8 | Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. | Students gather evidence on avalanches and landslides in a model, forecast them, compare with what happened, and decide which warnings to give. |

Checked November 2026 against: NGSS MS-ESS3-2, 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/landslide-lab/lessons/forecast-tomorrow/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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