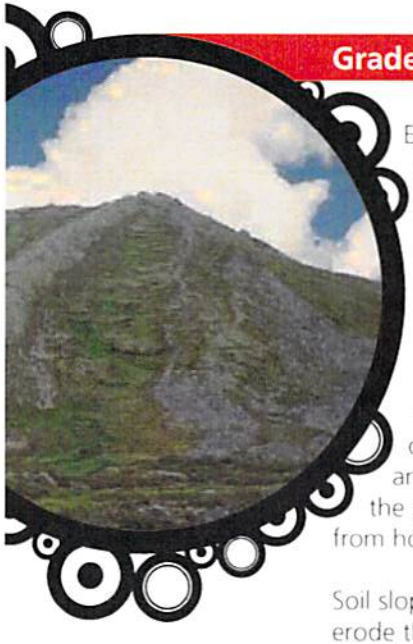
SEPTEMBER 2012

LEARNING ACTIVITY:

FINDING SLOPE



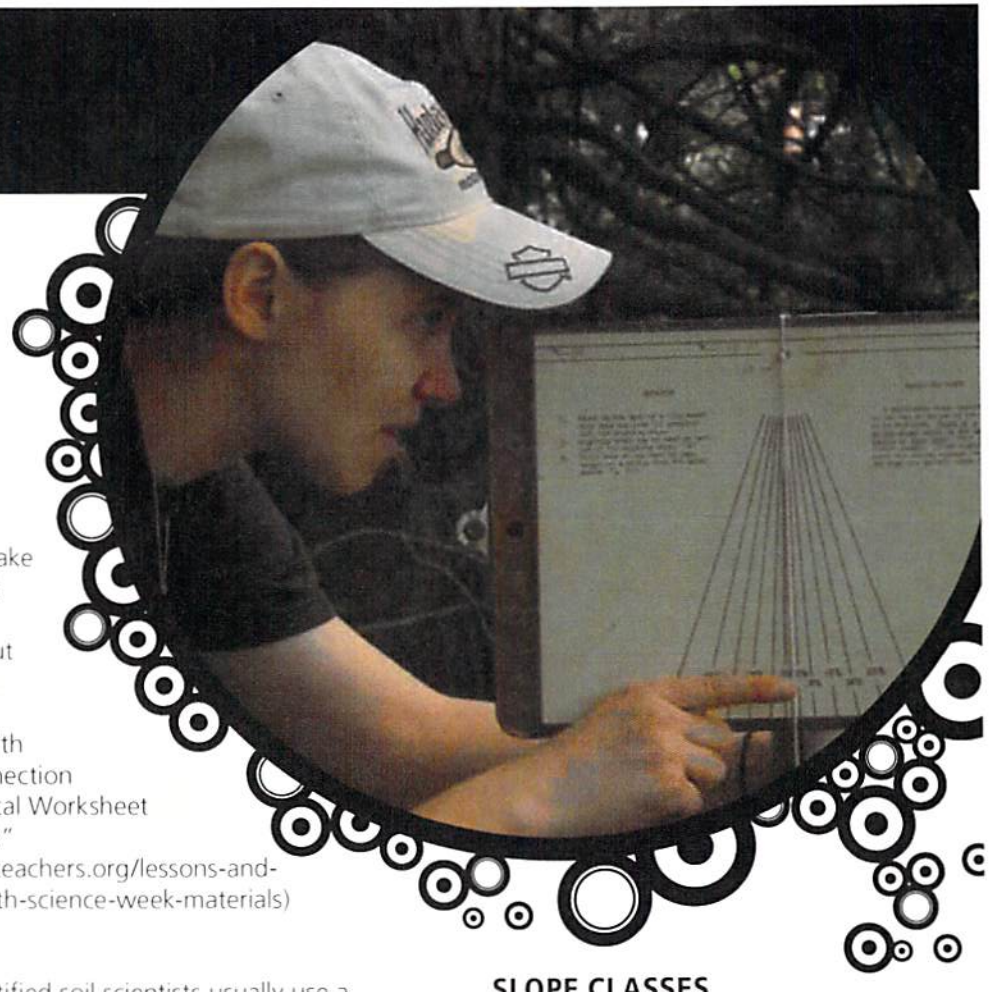
Grades 6–12

Earth scientists play an important, if largely invisible, role in many aspects of our daily lives, such as building homes or growing food. For example, geoscientists help determine which locations would be best for undertaking these vital activities.

The slope of the soil is an important soil property to consider when building or planting. The slope gradient is the angle of incline or decline, expressed in the percent of rise or fall of the soil surface from horizontal over a distance of 100 feet.

Soil slope affects the flow of water that can erode the soil. It also affects machinery use, building construction, plantings, maintenance, and on-site waste disposal systems using septic tanks (because seepage can occur down-slope of an absorption field).

Various activities are best suited to specific slope classes (see sidebar). For home construction, for instance, a "gently sloping" slope of 2-6% is preferred. If the slope is too flat, water doesn't drain away from the house. If the slope is too steep, erosion and soil stability can be a problem.



Materials

- Calibrated stake
- String (about 12 inches)
- Washer or nut
- Tack
- Clip board
- Computer with Internet connection
- "Supplemental Worksheet (slope finder)" (www.soils4teachers.org/lessons-and-activities/earth-science-week-materials)

Procedure

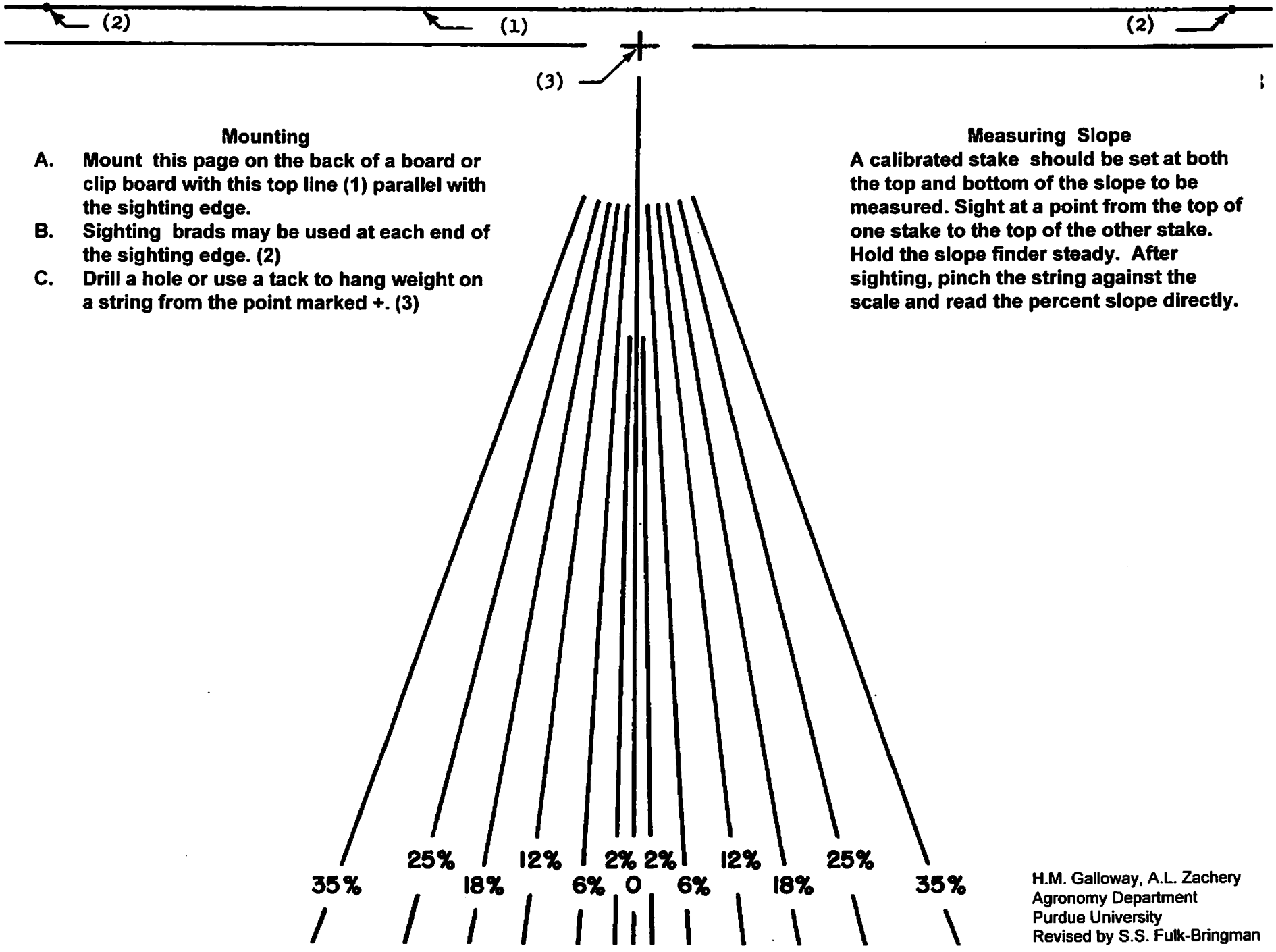
1. Discuss: Certified soil scientists usually use a Clinometer or Abney level to determine slope. You can make a slope finder using the "Supplemental Worksheet (slope finder)" to determine the approximate slope of landscapes around you.
2. Find a slope to measure.
3. Mount the slope finder on the back of a board or clip board with the top line parallel with the sighting edge. Drill a hole and tie a string, or use a tack to attach a string from the point marked with a plus sign, and tie a washer about the size of a quarter or a half-inch nut to the other end of the string.
4. Set a calibrated stake at both the top and bottom of the slope to be measured.
5. Sight at a point from the top of one stake to the top of the other stake. Hold the slope finder steady.
6. After sighting, pinch a string against the scale and read the percent slope directly.
7. Discuss: Would this slope be a good one on which to build a house? For what activities do you think this sloped soil would be useful?

SLOPE CLASSES

A	0-2%	Nearly level
B	2-6%	Gently sloping
C	6-12%	Moderately sloping
D	12-18%	Strongly sloping
E	18-25%	Moderately steep
F	25-35%	Steep
G	35-100%	Very steep

Soil Science Society of America

Source: Soil Science Society of America. H.M. Galloway, A.L. Zachery, Agronomy Department, Purdue University, Revised by S.S. Fulk-Bringman. Adapted with permission.



Mounting

A. Mount this page on the back of a board or clip board with this top line (1) parallel with the sighting edge.

B. Sighting brads may be used at each end of the sighting edge. (2)

C. Drill a hole or use a tack to hang weight on a string from the point marked +. (3)

Measuring Slope

A calibrated stake should be set at both the top and bottom of the slope to be measured. Sight at a point from the top of one stake to the top of the other stake. Hold the slope finder steady. After sighting, pinch the string against the scale and read the percent slope directly.

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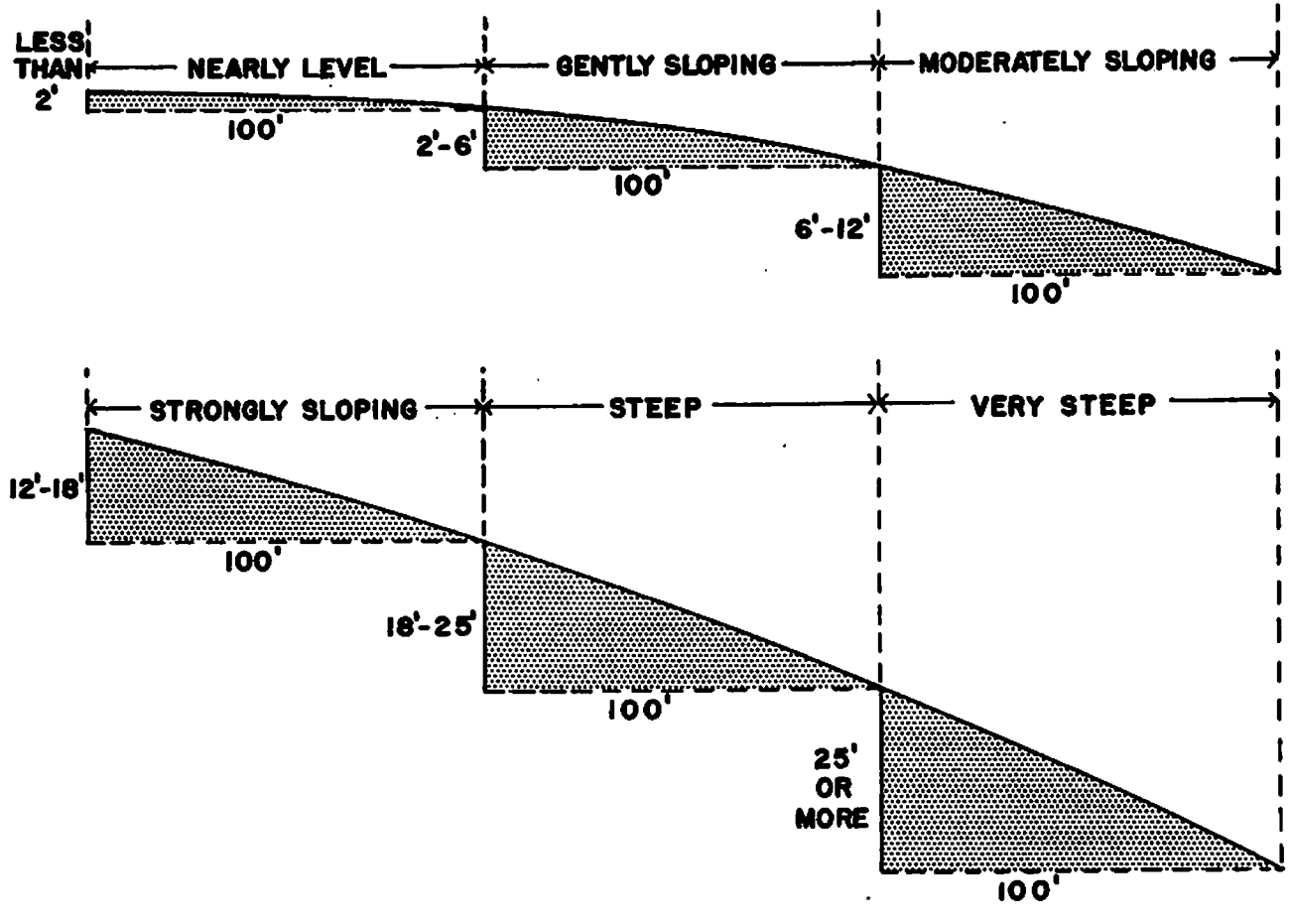
Revised by S.S. Fulk-Bringman

The slope of the soil is an important soil property to consider when building a home or growing food.
The slope gradient is the angle of incline or decline, expressed in the percent of rise or fall of the soil surface from horizontal over a distance of 100 ft. It affects the flow of water that can erode the soil.
Soil slope affects machinery use, building construction, plantings and maintenance. It also affects on site waste disposal systems using septic tanks because seepage may occur down-slope of an absorption field.
Slope classes range from A 0 - 2 % as nearly level

B 2 - 6 % gently sloping
C 6 - 12 % moderately sloping
D 12 - 18 % strongly sloping
E 18 - 25% moderately steep
F 25 -35 % Steep
To G greater than 35% very steep

For home construction a slope of 2 -6 % is preferred. If the slope is flat the water doesn't drain away from the house. If it's sloping to steep, erosion and soil stability can be a problem.

Certified Soil Scientists usually use a Clinometer or Abney level to determine slope. You can make a slope finder using this slope graph and instructions to get an approximate slope for the landscapes around you.



This diagram shows the vertical drop in 100 feet of horizontal distance for a typical slope in each slope group used in soil judging