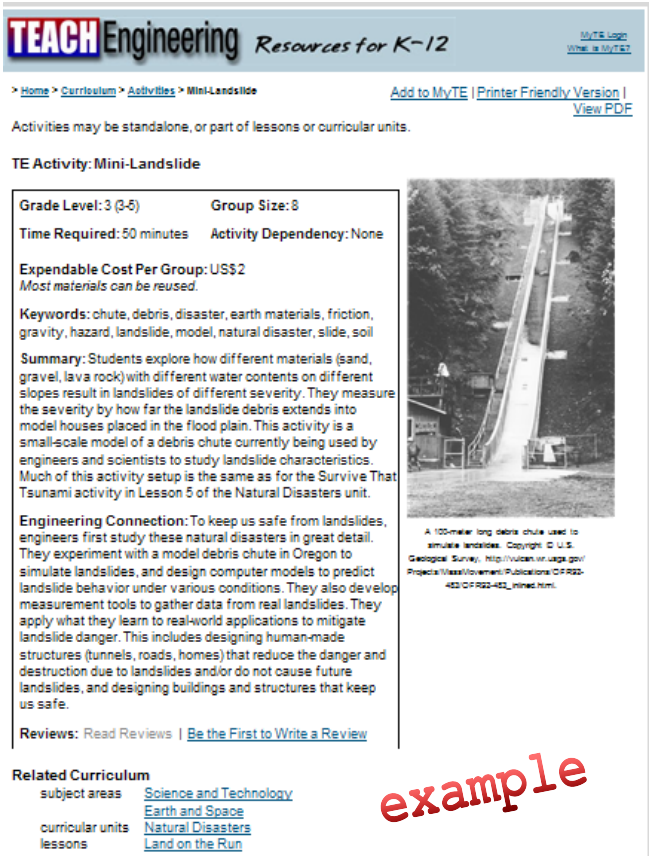
Activity Template

A published activity on *TeachEngineering* might look like this example ➔


TEACHEngineering Resources for K-12

> Home > Curriculum > Activities > Mini-Landslide

Add to MyTE | Printer Friendly Version | View PDF

Activities may be standalone, or part of lessons or curricular units.

TE Activity: Mini-Landslide

Grade Level: 3 (3-5) **Group Size:** 8

Time Required: 50 minutes **Activity Dependency:** None

Expendable Cost Per Group: US$2
Most materials can be reused.

Keywords: chute, debris, disaster, earth materials, friction, gravity, hazard, landslide, model, natural disaster, slide, soil

Summary: Students explore how different materials (sand, gravel, lava rock) with different water contents on different slopes result in landslides of different severity. They measure the severity by how far the landslide debris extends into model houses placed in the flood plain. This activity is a small-scale model of a debris chute currently being used by engineers and scientists to study landslide characteristics. Much of this activity setup is the same as for the Survive That Tsunami activity in Lesson 5 of the Natural Disasters unit.

Engineering Connection: To keep us safe from landslides, engineers first study these natural disasters in great detail. They experiment with a model debris chute in Oregon to simulate landslides, and design computer models to predict landslide behavior under various conditions. They also develop measurement tools to gather data from real landslides. They apply what they learn to real-world applications to mitigate landslide danger. This includes designing human-made structures (tunnels, roads, homes) that reduce the danger and destruction due to landslides and/or do not cause future landslides, and designing buildings and structures that keep us safe.

Reviews: Read Reviews | Be the First to Write a Review

A 100-meter long debris chute used to simulate landslides. Copyright © U.S. Geological Survey. http://vulcan.wr.usgs.gov/Projects/Mass/Movement/Publications/OFR92-453/OFR92-453_minec.html.

Related Curriculum

subject areas: Science and Technology; Earth and Space
curricular units: Natural Disasters
lessons: Land on the Run

example

Notice the "information box" on the first page (➔); it provides teachers with key information to quickly review the activity to see if it meets their needs, before they look at the rest of the activity write-up.

From this point on, this template describes the **required** and optional components for all activities published in the TE digital library collection.

Visit http://TeachEngineering.org to see examples of activity content and how they render on the website.

Subject Area(s) [Choose from: algebra , biology, chemistry, computer science, data analysis & probability, earth & space, geometry, life science, measurement, number & operations, physical science, physics, problem solving, reasoning & proof, science & technology]

Associated Unit _____
[To what unit does this belong? Leave blank if does not apply.]

Associated Lesson _____
[To what lesson does this activity belong? Leave blank if it is a standalone activity.]

Activity Title_____ [Provide a catchy activity title]

Header *Example*: Insert Image 1 here, right justified to wrap
[(optional) Insert images or other text that you want to appear at the beginning of the document, near the document's information box.]

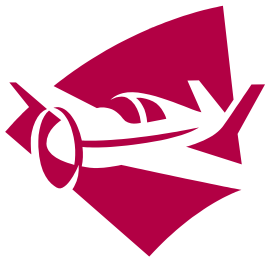
Image 1

ADA Description: Graphic of a propeller plane.

Caption (optional): none

Image file name: cub_airplanes_lesson03_activity2_image1.jpg

Source/Rights: Copyright © 2004 Microsoft Corporation, One Microsoft Way, Redmond, WA 98052-6399 USA. All rights reserved.



Grade Level __ (__-__)
[What grade(s) is (are) targeted in this activity? "It is targeted for grade _, but could work for

grades __ to __." *Example*: 8 (7-9) or 8 (8-8) for just eighth grade, or 8 (5-9) if it also works for lower-grade students.]

Activity Dependency

[(optional) Does this activity depend on another *TeachEngineering* lesson or activity? If so, list the title(s) in the order you would like them to appear on the website.]

Time Required ___minutes, hours, days or weeks *Example:* 50 minutes

[To help in teacher planning, provide an estimate of time to complete the activity. Cannot be a time range, however you may include an optional text note for a brief explanation. We often find that lessons take 15-20 minutes, and associated activities take longer, often totaling one class period, ~50 minutes.]

Group Size ___

[(optional) Are students working alone, in pairs, groups of three, etc.? This must be one number, not a range. If working alone, group size is 1. If a class activity, group size is 28. Unable to include a text note with this component, so if an explanation of group size is required ("This is a demonstration for the entire class") or you want to suggest a range ("Divide the class into teams of three or four students each."), put it in the Procedure section.

Expendable Cost per Group US$___ *Example:* US$.50

[(optional) What material costs are associated with this activity that cannot be re-used in another activity? (For example, do not include the cost of a microscope, scissors, paper or other items available in a typical classroom.) We strive to meet the "engineering on a shoestring" approach of no more that $20 per activity (= group size x cost per group). Must be an amount in U.S. dollars, not a range, however you may include an optional text note for a brief explanation.]

Summary

[Provide a brief paragraph summarizing the activity and topics students learn about. Must be one paragraph of plain text, which means no images or formatting. Write in present tense, not future.]

Engineering Connection

[Provide 60-100 words or ~3 sentences clarifying how the scientific and mathematical concepts being studied in this activity pertain to real-world engineering. Do not recap the activity. It often works to associate activity concepts to particular fields of engineering. For example, if the activity is about tension and compression, you might say that mechanical engineers use these principles when they design structures such as bridges and roller coasters. Must be one paragraph of plain text, which means no images or formatting.]

Engineering Category

[(required for activities; optional for lessons and units) Indicate which of the following four engineering categories best describes this curricular document's amount or depth of engineering content:

1. relates science concept to engineering,
2. relates math concept to engineering,
3. provides engineering analysis or partial design
4. provides complete engineering design process.

Anecdotally, categories 1 and 2 are primarily science/math with some engineering, category 3 items are primarily engineering with some science/math, and category 4 presents full engineering design. For more complete descriptions of each category, ask to see the TE Engineering

Categories Description document. In most cases, lessons and units will either not have a category or use the category of the most relevant lessons and activities below them. In rare instances, activities will work as a whole, in terms of their level of engineering design content, so that the lesson or unit will actually have a different category than the activities below it. For example, a unit might be category 4 because its lessons and activities contain all of the steps in the engineering design process even though none of those individual lessons and activities is categorized as providing the complete engineering design process.

Keywords

Example: compression, force, marshmallow, mechanics, tension, pasta, skyscraper, structure

[Provide 4-10 keywords. They should be words the layperson and a K-12 teacher would know and **might use to search** for the activity. List in A→ Z order, lower-case unless proper nouns. Avoid highly technical or lingo words. It is likely you have used these words in the summary. For example, keywords might be concepts (tension, photosynthesis) or key materials (marshmallows, pasta). Usually, make nouns singular. Even though TE provides a full text search capability, often these become the few keywords that are seen by other websites that search the *TeachEngineering* collection.]

Educational Standards

[List the educational standards addressed in the activity from the state and national standards available at the online ASN viewer at http://www.jesandco.org/asn/viewer/default.aspx. These should be **specific standards, not just the broader objectives of the standards**. Please include the source, standard number(s) and text of each standard. *Example:*]

North Carolina, science, 2004, 1.01: Identify and create questions and hypotheses that can be answered through scientific investigations.

[Special note for Massachusetts: The middle school science standards are written in the same format except that instead of a "strand" there is a number: 1 for Earth and Space Science, 2 for Life Science and 3 for the Physical Science strand. For example, 1.12 stands for the "Relate the extinction of species to a mismatch of adaptation and the environment" standard in the earth and space science strand.]

Pre-Requisite Knowledge

[(optional)What does the student need to know to be successful in this activity (a previous lesson, a certain topic, specific math skills)? *Examples*: A familiarity with north, south, east, west compass directions. A basic understanding of gravity and friction. Ability to calculate averages.]

Learning Objectives

After this activity, students should be able to:

- Describe, list, relate, define…

[In statement form, identify **2-4 main** intended goal(s) or student outcome(s) of the activity in science, math and any other standards covered. Learning objectives often come from the educational standards you identified.]

Materials List

[A list of materials that each group needs for this activity (including where to find or purchase unusual items). Please provide measurements in **metric units**, as **required** by our NSF-funded TE grant; it is okay to provide both metric and English units, for *example*, string, 2 m (6 ft).]

Each group needs: (suggested subheading)

- xxx

For the entire class to share: (suggested subheading)

- xxx

Introduction / Motivation

[***Write this section as if you were directly talking to the students***. Suggest how the teacher might prepare the students for the activity. Provide an engineering context. How do you grab the students' interest? This could be a demo, an example or real-world context. Ask questions of the students to engage them. Create a storyline that flows with the objectives to make the activity more challenging and exciting. Suggested half-page minimum. Address the learning objectives identified earlier. Include teacher instructions and answers in parentheses, such as: (write on the classroom board) or (Possible answers: xxx, yyy, zzz.).]

Vocabulary / Definitions

[(optional) Define unusual or probably unknown words, including unclear keywords, for the target grade level, plus any engineering words that are used in the activity. Only capitalize terms if they are proper nouns. Write definitions in sentence format, even phrases (begin with capital letter; end with a period).]

Word	Definition

Procedure

[Clearly explain the step-by-step procedure to follow to conduct the hands-on activity. ***Make sure to include connections to engineering and address activity objectives***. To clarify the activity set-up and procedure, place **images**, photographs and diagrams throughout this section and the activity write-up. Use figure numbers if the image is referenced in the text and has a caption. Remember to use metric units.]

Background [(suggested subheading, if needed) Clearly explain any essential background information the teacher may need to know to successfully complete this activity. Usually in paragraph format.]

Before the Activity (suggested subheading)

- *Example*: Gather materials and make copies of the worksheet.
- Describe any other pre-activity preparation here…
- Bullet format suggested.

With the Students (suggested subheading)

1. *Example*: Divide the class into groups of three or four students each.
2. Describe step-by-step procedures here…
3. Numbered list format suggested.

Image Insert Image # or Figure # here, [note position: left justified, centered or right justified]

Figure 1

ADA Description: Photo shows a two liter bottle with two straws sticking through the cap with balloons held on the straw ends with rubber bands. The bottle bottom is cut off and replaced with another balloon stretched over the bottle opening

Caption: Figure 1: Example lung/diaphragm model made by students.

Image file name: cub_biotech_lesson04_activity1_figure1.jpg

Attachments

[(optional) List activity attachments, such as handouts, worksheets, worksheet answers, quizzes, data sheets, readings, graphics, visual aids, etc., in digital format (see Introductory Notes for details). In addition to PDF versions, provide original format versions (Word, Excel, PowerPoint) so teachers can modify. In listing the attachment names, include the file format (see example, below), to help teachers choose what to download/print. When naming files for attachments, use lower-case letters only – no caps! This includes file extensions: jpg, .doc, pdf, ppt, etc. Also, leave no spaces in the file names. Use underscores instead. On TE, attachments listed will be hot-linked directly to the file.]

Examples:

Pair of Chutes Worksheet (pdf)
Pair of Chutes Worksheet (doc)
Pair of Chutes Worksheet Answers (pdf)
Pair of Chutes Worksheet Answers (doc)

Safety Issues

[(optional) What safety measures must be considered for this activity? *Example:*]

- Use eye protection (goggles or safety glasses) during this activity.
- Bullet format suggested.

Troubleshooting Tips

[(optional) Think through likely common snags that might be encountered while conducting the activity. Suggest solutions, approaches to avoid pitfalls, etc. What should you consider if the activity does not work right the first time? What could you change? Providing hints to students at the appropriate time in the procedures?]

Investigating Questions

[(optional) Provide questions for the teacher to pose to students that require them to figure out the meaning of something. Students may come to somewhat different conclusions. The questions could serve as a brainstorming session or a quick wrap-up to the activity.]

Assessment

[***Provide assessment tools/activities for teachers to assess the learning objectives described earlier.*** How do you know if the students "got it" during the activity and after the activity? Provide active and embedded ways for the teacher to gauge what the students know about the topic at the beginning, and whether the students met the learning objectives at the end. For examples of assessment tools, feel free to browse the *TeachEngineering* collection.]

Pre-Activity Assessment (suggested subheading)
Descriptive Title: Describe the assessment procedure so the teacher knows what to do…

Activity Embedded Assessment (suggested subheading)
Descriptive Title: Describe the assessment procedure so the teacher knows what to do…

Post-Activity Assessment (suggested subheading)
Descriptive Title: Describe the assessment procedure so the teacher knows what to do…

Activity Extensions

[(optional) Provide suggestions of additional activities that explore the activity topic further, and suggestions for thought-provoking questions for the students in the weeks ahead.]

Activity Scaling

[(optional) Explain modifications or suggestions to activities that would make them more or less challenging for use at various grade levels, or within one grade for class groups who are more advanced or behind. For example: reducing or increasing the number of redesign steps, shorter time period to complete the activity, graphing the collected data, etc. *Example lead-ins*:]

- For lower grades,
- For younger students,
- For upper grades,
- For older students,
- For more advanced students,

Additional Multimedia Support

[(optional) Provide ideas and sources for additional information to support the activity, such as online animations, video/DVDs or attached PowerPoint slide presentations, etc.]

References

[(optional) List all references used to create the activity. Also include suggested good resources. Use MLA format (see below). Provide in A → Z order according to authors' last names or website banner page name, whichever appears first in citation.]

For books:
Lastname, Firstname. Book Title. City, ST: Publisher Name, year.

For websites:
Author(s) [Lastname, Firstname]. BannerPageName. LastUpdated/Posted/RevisedDate. OwnerName, Organization. Accessed January 20, 2009. http://www.colorado.edu

Examples:

Dictionary.com. Lexico Publishing Group, LLC. Accessed Accessed January 20, 2009. (Source of some vocabulary definitions, with some adaptation) http://www.dictionary.com

Rocks, USGS Geology in the Parks. Updated January 13, 2004. U.S. Geological Survey, U.S. Department of the Interior. Accessed Accessed January 20, 2009. http://geology.wr.usgs.gov/docs/usgsnps/rxmin/rock.html

For magazine articles:
Doe, Jane Q. "Title of an Article." Title of a Magazine. 12 August 1999: 23.

For journal articles:
Doe, John R. "Title of an Article." Title of a Scholarly Journal. 18 (1987): 112-28.

Other
[(optional) This component is available for information that doesn't seem to fit in anywhere else.]

Redirect URL
[(optional) If the activity is also available at a non-TE/originator website, such as the Adventure Engineering curricula, list the alternate URL at which users may find this curricular write-up, often presented in a non-TE/originator format.]

Owner
[Briefly provide the name and organization of the source/owner of this curricular content.]

Example: Integrated Teaching and Learning Program, College of Engineering, University of Colorado at Boulder

Contributors
[(optional) List the name(s) of who contributed to developing, testing, reviewing and editing this activity. We usually list the primary creator first. Role and organization may be included, too.]

Example: Jay Shah, Malinda Schaefer Zarske, Janet Yowell

Copyright
[(optional) To include a brief copyright citation for the source/owner of this curricular content, provide a copyright year and owner name. Further description may be included, as well.]

Example: This digital library content was developed by the Integrated Teaching and Learning Program under National Science Foundation grant no. 0338326.

Version: May 2009