

Pi Song – Little Help

ID: 11637

Time Required

15 minutes

Activity Overview

In this activity, students will explore formula that has π in it. Animations and multiple choice, self-check questions, make this activity accessible to Algebra students. The equations make this activity of interest to geometry and physics classes for a short Pi Day activity.

Topic: Literal equations with π

- Formula with pi
- Solving equations

Teacher Preparation and Notes

- It would be beneficial for students to be familiar with navigating between pages (**ctrl ◀** or **ctrl ▶**), toggling (**ctrl tab**) between applications on the same page, and using **menu, Check Answer** on the self-check multiple choice questions.
- This activity reviews formula like $C=2\pi r$, and shows them other formulae where Pi is used..
- The student worksheet provides some instructions to help students explore this activity. Additionally, it provides a place for student to record their answers.
- The Question Document Type can be changed from Self-Check to Exam using the Teacher Tool Palette on a Question page. This tns file in Navigator ready.
- **To download the student TI-Nspire documents (.tns files) and student worksheet, go to**
<http://education.ti.com/educationportal/activityexchange/Activity.do?cid=US&ald=11637>

Associated Materials

- *pi_song.pdf*
- *pi_song_worksheet.doc* and *pi_song_worksheet.pdf*
- *pi_song.tns*

Suggested Related Activities

To download any activity listed, go to education.ti.com/exchange and enter the number in the quick search box.

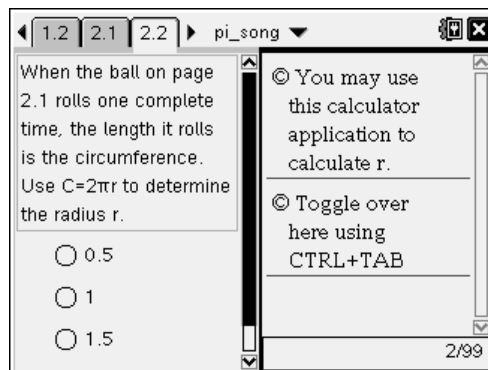
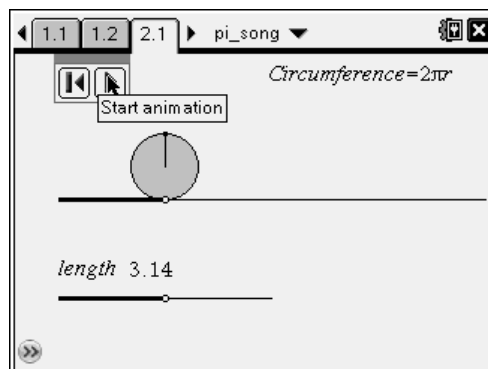
- *Circles, Circles, Everywhere!* (TI-Nspire technology) — 8429
- *Approximating Pi* (TI-Nspire technology) — 9292
- *Pi and Precision* (TI-Navigator) — 9595

Problem 1 – $C=2\pi r$

Page 1.2 has the lyrics for the first verse of the Pi song which is sung to the tune of "With a Little Help from My Friends" by the Beatles. A video and the song can be found at

<http://covenantchristian.org/bird/Smart/Calc1/Pi.WMV>

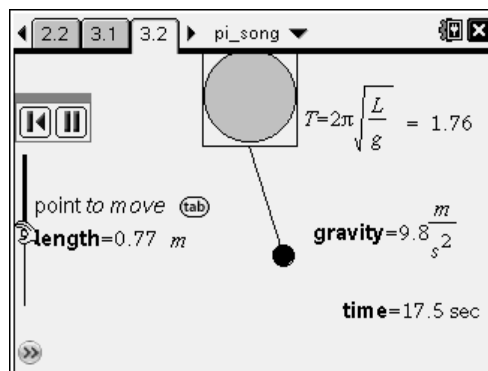
On page 2.1 students can press play to see an animation of a ball rolling. The length is measured. The length of a complete revolution of the ball corresponds to the circumference. So the student solution is 1. $r=C/(2\pi) = 6.28/(2\pi)$



Problem 2 – Period of a pendulum

On page 3.2 is a pendulum. The length can be changed by moving the vertical slider. The value for the acceleration of gravity can also be changed by double-clicking on this value. Page 3.3 and the student worksheet give instruction on how to calculate a formula on a Graphs & Geometry page. Have the students predict what will happen to the period T when the length L is decreased.

The solution to the question on page 3.3 is the length of a grandfather clock (with a period of 2 s) is just under 1 meter. More advanced algebra students can show their work for solving for L .

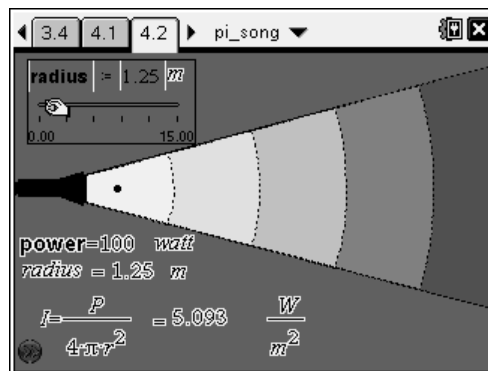


Problem 3 – Intensity of light or sound

Many important physical phenomena are inverse square law relationships, e.g. the Universal Law of Gravity, Coulomb’s Law for electrostatic forces, as well as the intensity of light and sound.

The point in front of the flashlight can be grabbed and moved or the slider can be used to adjust this length.

Students are to observe that doubling the distance causes the intensity to decrease by a factor of 4. Further, tripling the distance results in a change in 1/9. When the radius is four times greater the intensity is 1/16 of what it was.



Extension/Homework – $A = \pi r^2$

Besides being defined as the ratio of the circumference to the diameter, π can also be defined as the ratio of the area of the circle to its radius squared.

On the 5.3, use **menu**, Measurement, and Area and Length to reveal the measurements of the circle’s area and the length of the radius. Then use **menu**, Actions, Calculate to find the ratio of the area to r^2 . A square with length equal to the radius is shaded to draw attention to this relationship.

- When you move the white dot, how does this change the radius? If the radius is increased, what happens to the area of the circle?

The area of the circle and radius increase proportionally.

- Does the ratio of area to r^2 change? What is it this ratio?

This ratio is constant. It is approximately equal to 3.14.

