

## Jicama High needs a track!

As you know, our high school does not have a running track of its own. Right now, we just have a basic football field with a couple of temporary bleachers on either side. The Jicama school board has approved the funding for building a new sports complex that includes a full football field, an Olympic-sized running track, new concession booths, and some larger bleachers.

**Objective:** To design the layout of the new sports complex.

**Outcome:** Each team is to submit a paper thoroughly describing their project and present a visual presentation to the class. The visual presentation should include statistics about the anticipated usage as well as a mock-up of their design. The mock-up can be a scale model, a Google Sketchup 3D CAD model, an artist rendering of no less than three unique views, or any combination of these.

Each group's project will be presented to the student body, who will then vote for the best project, knowing the project could become a reality. The winning team's project will get to be presented to the school board as a formal building proposal, alongside the professional architects' and contractors' proposals. The school board will then choose the best plan for the school. If the winning team's proposal is selected, a plaque with the students' names and dates will be permanently placed in the new sports complex, as well as *any* item of merchandise free from the Jicama's Hawkings school store.

**Teams:** Students will be divided into groups of about five. Each team member is to be the head of a certain area of the project. They will research their own part of the project and present the research and recommendations to the rest of the team for final acceptance into the proposal. The teams will decide for themselves how the workload is to be divided and hold each other accountable for their workload.

Here are just a (very) small sample of issues that you may need to address through the development of your proposal:

- Precise measurements of size and shape of field and track
- Materials
- Anticipated attendance
- Anticipated volume of traffic to the concessions
- Rainwater drainage, and weather effects
- Weight limits and distribution of bleachers

**Project Duration:** 12 weeks, in addition to regular daily class load (which will compliment your research).

# Jicama High needs a track!

(Teacher Guide)

**Class:** Honors Junior Math classes

**Objective:** The learner will co-design a real-life sports complex for their school.

**Time:** 12 weeks plus presentation to school and board

**Evaluation:** Each group will submit one written paper in MLA format describing their team's vision for the school's new track, indicating academic research and creative design work. The paper should include at least some basic measurements, sizes, statistics, etc. Each group will also develop and present a visual presentation (PowerPoint, Keynote, Prezi, video, etc.) that summarizes their plan and persuades the audience to want to select their plan to build. Group projects will be judged by their peers, who want to select the best stadium for their own school. Grades will be assigned according to the standard rubric. [See student page for more info.]

**Basic questions/skills the students will research, discover, calculate:**

## **Geometry**

- What is the size of an Olympic running track? What are the radii of the corners?
- What are the dimensions of a full football field, including end zones and areas for the sidelines?
- Is the size of the track large enough to accommodate the area of the football field?
- What does the slope of the field need to be in order to ensure rainwater does not pool?
- Where should stadium lighting be placed to ensure maximum coverage?

## **Statistics/Algebra**

- What is the average attendance of football games? Of track meets?
- What is the percentage of those who use (or would use) a concession stand?
- How many customers can a concession stand serve in the least amount of time? How many workers does the stand need to handle the expected volume?
- What is the weight limit of a set of bleachers? Does the material change that limit? How many persons does that weight limit permit? How many sets will be required?
- What is the smallest numbers of lights the school can purchase to achieve maximum coverage?
- Does the type of material change the basic cost of the track installation?

## **Tools**

Spreadsheet, Google Sketchup, presentation software, Internet research, live data collection (measurements, usage statistics, etc.), personal interviews (other schools, design engineers, etc.), design software (e.g. Photoshop), digital photography, movie and video editing (optional)

**Grading Rubric - Paper**

	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Accuracy	Addresses more than the expected issues and calculations and conclusions are correct.	Does not address a few minor issues or calculations or conclusions have minor errors.	One or more major issues are not discussed or most calculations and conclusions are incorrect.	Major issues not addressed or attempted, calculations not attempted.
Mechanics	Follows MLA format; has fewer than 3 spelling, grammar, or word choice errors.	Has minor MLA disagreements; has 3-5 spelling, grammar, or word choice errors.	Has major MLA disagreements; has 5-10 spelling, grammar, or word choice errors.	Does not follow MLA format; has greater than 10 spelling, grammar, or word choice errors.
Professionalism	Addresses correct audience; uses formal language;			Does not address the audience; uses informal language;

**Grading Rubric - Presentation**

	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Information	Data presented in an easily understood manner, is accurate,	Data is accurate, but omits a few minor issues, or is difficult to understand.	Data is misleading, or omits several key areas.	Data is missing, confusing, or incorrect; key issues were not addressed.
Marketing	Captures core audience to purpose.			Does not communicate correct message to audience.
Professionalism	Equal or greater than professional presentation	Addresses correct audience but does not convey confidence in project	Ineffective use of technology, or confused audience	Does not address the correct audience; uses technology inappropriately