

Lane Tech College Preparatory High School

Alpha Science and Engineering Curriculum

Vision

The Vision of Lane Tech's Alpha Science and Engineering Program is to provide students with authentic scientific and technological learning experiences through an integrated science, mathematics, technology, and engineering curriculum to empower students in developing lifelong problem-solving, inquiry, and literacy skills.

Mission

The Alpha Science and Engineering Mission includes the following:

1. Providing and supporting integrated curricular offerings and approaches to optimize scientific inquiry and scientific literacy learning.
2. Empowering students to employ problem-solving skills through experimentation.
3. Engaging students by linking science and technology to the real world.
4. Preparing students to compete in Science Fair by providing independent research opportunities.
5. Enlisting university, business, and community partnerships to provide authentic support in the acquisition of students' skills.

Introduction

The Alpha Program at Lane Tech College Prep High School is an intensive honors program focusing on Science Fair, mathematics, engineering, and technology and is a demanding and rewarding academic program.

Alpha students have consistently performed at the Outstanding and Excellent levels in area, city, and state competitions; some have advanced as far as the International level of Science Fair competitions. Alpha students frequently rank in the top 5 percent of their Lane Tech graduating classes and regularly matriculate to the top universities in the country including Harvard, Columbia University, Carnegie Mellon, Georgetown, Brown, Northwestern, and the University of Chicago. They often benefit from full or partial tuition scholarships to these institutions.

The Alpha Program requires students to:

- Work independently
- Be self-motivated and self-starting
- Have a strong self-image and strong desire to excel
- Have strong parental support
- Accept and learn from challenging material and situations.

Participating in the Alpha Program is beneficial to students as they:

- Have the opportunity to compete for honors, scholarships, and monetary awards.
- Receive a cooperative teaching approach that combines several disciplines.
- Receive support and mentoring to participate in Science Fair for 4 years.

FRESHMAN YEAR:

Beginning freshman year, Alpha students embark on competing in the Lane Tech Science Fair. Students who earn top honors have the opportunity to continue competing in area, city, state, and international levels of Science Fair. Lane Tech Alpha Science (Biology), Mathematics (Algebra), English (Survey Literature), and Drafting (CAD and Board) teachers work together as a “team” and employ an integrated curriculum that prepares students to:

- Select a viable science fair project and begin research and experimentation
- Work independently on a science fair project
- Write a scientific paper based on original experimentation
- Employ problem-solving skills and self-assessments
- Develop presentation skills
- Compete in Science Fair

SOPHOMORE YEAR:

Beginning sophomore year, students participate an interdisciplinary Alpha curriculum that enables students to continue their project in the same field of study from freshman year. Lane Tech Alpha Science (Chemistry), Mathematics (Geometry), and English (American Literature) teachers continue working together as a “team” and employ an integrated curriculum that prepares students to:

- Make adjustments from the previous year’s project and continue researching and experimenting in their selected field of study
- Document how additional research is new and different from prior work
- Write a scientific paper based on original experimentation
- Work with experts in a field of study outside of school
- Refine presentation skills
- Compete in Science Fair

JUNIOR YEAR:

Beginning junior year, students participate an interdisciplinary Alpha curriculum that enables students to continue their project in the same field of study from freshman and sophomore years. Lane Tech Alpha Science (AP Physics), Mathematics (AP Advanced Algebra/Trigonometry), and English (AP British Literature) teachers continue working together as a “team” and employ an integrated curriculum that supports students in:

- Reevaluating the previous year’s project to make needed improvements
- Detailing how additional research is new
- Verifying additional research and experimentation in their selected field of study
- Modifying and writing a scientific paper based on original experimentation
- Collaborating with experts in a field of study outside of school
- Enhancing presentation skills
- Competing in Science Fair

SENIOR YEAR:

Concluding senior year, students' interdisciplinary Alpha curriculum focuses on providing students with opportunities to perfect their projects in the same field of study from freshman, sophomore, and junior years. Lane Tech Alpha Science (AP Environmental Science), Mathematics (AP Statistics), and English (AP World Literature) teachers continue working together as a "team" and employ an integrated curriculum that assists students in:

- Reexamining the previous year's project to improve experimental research design
- Providing evidence how additional research is new
- Authenticating research and experimentation in their selected field of study
- Completing a scientific paper based on original experimentation
- Forging partnerships with experts in a field of study outside of school
- Perfecting presentation skills
- Competing in Science Fair

Alpha Integrated Curricular Offerings

The Alpha Science and Engineering program is a rigorous, four-year academic program that engages students by linking science to the real world.

- Students are selected from Lane Tech's Honors Program to participate in Alpha.
- Students enroll in specific science, mathematics, English, and drafting/technology courses.
- Alpha students spend three class periods each day with the same group of peers.
- Alpha teachers work together to produce an integrated curriculum at each grade level.
- The result is an integrated curriculum that supports students in developing critical thinking skills and problem-solving skills they utilize during science fair investigations.

Each Alpha class focuses on Science Fair preparatory curriculum. Alpha teachers work as an integrated "team" at each of the four high school grade levels to ensure students are provided supportive, authentic learning experiences.

- The Alpha science curriculum includes knowledge about independent study habits, using the scientific method, experimental design, and methods for oral and visual presentation of experimental results.
- The Alpha English curriculum stresses scientific writing, library research techniques, public speaking, and critical thinking skills.
- The Alpha Math curriculum addresses proper techniques for presentation of data, analysis, and statistical presentation.