

Program overview

Today's farms are beginning to look a lot more like smart cities. Growers are using cutting-edge tools like sensors, computer vision, and artificial intelligence to acquire a deeper understanding of their crops. These methods help them use data to make better decisions, discover inefficiencies, and unlock new insights into food production and resource management. The FarmBeats for Students program brings these modern techniques into the hands of today's learners.

The program combines an affordable hardware kit with curated curriculum and activities designed to give students hands-on experience in applying precision agriculture techniques to food production. The learning progression enables students to easily see the impact of modern tools and the opportunities within agriculture.

Precision agriculture curriculum for K–12

Learn more at www.aka.ms/FBFS



Learning progression

Using the FarmBeats for Students program, students learn about AI, machine learning, and the Internet of Things (IoT) by building a garden monitoring system.



FarmBeats for Students learning kit

Section 1: Gathering data through sensors

Students assemble a plant monitoring kit, consisting of a Raspberry Pi mini-computer equipped with atmospheric and environmental sensors. The kit enables them to gather data about the health of their crops. Using Microsoft Excel, they analyze their sensor data and construct a system to react to soil conditions.

Section 2: Analyzing "big data"

Next, students are introduced to data visualization tools in Excel. They engage with big data sets to extract intelligence and make decisions about the best locations for a greenhouse.

Section 3: Unlocking data insights with AI

Finally, students build their own machine learning models, applying the technique to predict nutrient imbalances in their plants and identify pests in their garden.

The course ends by introducing Microsoft's Responsible AI Framework and presents discussions about some of the social and ethical challenges raised by this new technology.



Academic alignment

The FarmBeats for Students curriculum is aligned to the Al4K12 9th–12th grade guidelines that define what every student should know about artificial intelligence (Al). The curriculum is also aligned to the following standards, agricultural concepts, and performance objectives:

- CSTA Standards
- National AFNR Common Career Technical Core Standards
- Next Generation Science Standards
- Common Core State Standards for high school math



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Technical requirements: Data Streamer for Microsoft Excel (enables real-time data streaming and visualization in customized Excel workbooks); Excel M365 Desktop (students and teachers are eligible for free Microsoft 365 Education, which includes online Word, Excel, PowerPoint, and OneNote); Windows 10 (this project requires a PC running Windows 10)



