



Ford PAS Student Prerequisite Knowledge and Skills

Ford PAS modules are designed to fit together to build students' knowledge, skills, and understanding. Each module introduces new skills and also builds on prior skills. The modules can be taught alone or in different sequences: all modules include background material if needed for review, and modules do not require activities or material in other modules.

For details on module sequencing, see *Ford PAS Implementation Options* (on the **Ford PAS Web site**).

Guidelines

The academic rigor of the Ford PAS curriculum should not limit access for interested students who may not meet the prerequisites. Though such students may need additional support to complete the modules, all students can benefit from Ford PAS learning experiences. In fact, current Ford PAS students include young people with a wide range of academic achievement levels.

Prerequisites by Module

Requirements for each module follow. The modules are grouped by themes for the ease of educators who wish to teach a series of related modules (such as modules on global business, or on energy and sustainability).

Note: Modules appear more than once if they are suitable for teaching within more than one theme. For example, *Media and Messages: Building a Foundation of Communication Skills* may be taught in either of two themes: Foundations in 21st Century Skills or Getting Smart About Business.

Foundations in 21st Century Skills (4 modules)
<p><i>From Concept to Consumer: Building a Foundation in Problem-Solving</i></p> <ul style="list-style-type: none">• Make slides in PowerPoint• Note: This module is recommended (through not required) to be the first module taught in any sequence. It introduces business ideas such as how new products are invented, what goes into production and manufacturing, how companies function, and the role of marketing. The activities introduce 21st century skills such as teamwork, research, understanding complex systems, solving problems and making decisions, conveying ideas in writing, and making presentations.
<p><i>Media and Messages: Building a Foundation of Communication Skills</i></p> <ul style="list-style-type: none">• None
<p><i>People at Work: Building a Foundation of Research Skills</i></p> <ul style="list-style-type: none">• Develop simple Web pages or create PowerPoint presentations
<p><i>Careers, Companies, and Communities</i></p> <ul style="list-style-type: none">• None

Working Toward Sustainability (5 modules)

We All Run on Energy

- Have knowledge of and experience with laboratory safety procedures
- Recognize that humans need to harness and use energy to live and do work
- Understand the concept of *energy transfer*
- Know that atoms are made up of smaller particles (electrons, protons, and neutrons)

Energy from the Sun: Biomass

- Have knowledge of and experience with basic laboratory safety procedures
- Be able to explain what a *molecule* is
- Understand that energy is stored in substances (such as coal or atoms) and can be released and used
- Recognize that the sun is the major source of energy on Earth
- Understand that plants capture the energy of the sun through the process of photosynthesis
- Interpret diagrams of simple molecules and simple molecular formulas such as H_2O or $C_6H_{12}O_6$

Is Hydrogen a Solution?

- Have experience following basic laboratory safety procedures
- Know that atoms are made up of smaller particles (electrons, protons, and neutrons)
- Understand that energy is stored in substances (such as coal or atoms) and can be released and used
- Understand how bonds store energy and release that energy when broken
- Explain the difference between an *atom* and a *molecule*
- Explain the difference between an *element* and a *compound*

The Nuclear Revolution

- Have knowledge of and experience with basic laboratory safety procedures
- Know that atoms are made up of smaller particles (electrons, protons, and neutrons)
- Know that an element is made up of only one type of atom
- Understand that energy is stored in substances (such as coal or atoms) and can be released and used

Closing the Environmental Loop

- Have some familiarity with researching information and evaluating its reliability
- Be able to read and interpret line graphs
- Enter data in a spreadsheet program (such as Microsoft[®] Excel) and create simple formulas

Energy for the Future

- Represent quantities as decimals, percents, and fractions
- Solve problems of proportion using fractions
- Use symbols to represent variables, and solve equations involving a single variable

Data, Decisions, and Design (3 modules)
<p><i>From Data to Knowledge</i></p> <ul style="list-style-type: none"> • Organize data in a spreadsheet
<p><i>Reverse Engineering</i></p> <ul style="list-style-type: none"> • Have some experience with any of the following: drafting, drawing, or computer-aided design • Know that atoms are made up of smaller particles (electrons, protons, and neutrons) • Some knowledge of chemistry, for example, knowing that atoms can form various kinds of chemical bonds, and that such bonds can also be broken
<p><i>Different by Design</i></p> <ul style="list-style-type: none"> • Have some experience with any of the following: drafting, drawing, or computer-aided design

Manufacturing for Tomorrow (4 modules)
<p><i>From Concept to Consumer: Building a Foundation in Problem-Solving</i></p> <ul style="list-style-type: none"> • Make slides in PowerPoint
<p><i>Closing the Environmental Loop</i></p> <ul style="list-style-type: none"> • Have some familiarity with researching information and evaluating its reliability • Be able to read and interpret line graphs • Enter data in a spreadsheet program (such as Microsoft® Excel) and create simple formulas
<p><i>Planning for Efficiency</i></p> <ul style="list-style-type: none"> • Develop flowchart of a multistep process
<p><i>Ensuring Quality</i></p> <ul style="list-style-type: none"> • Calculate measures of central tendency and spread • Have some familiarity with experimental design, including variables, sampling, and data analysis • Have some familiarity with the data analysis functions of a statistics software package such as Minitab, or a spreadsheet application such as Microsoft® Excel • Represent quantities as fractions, decimals, and percents • Use symbols to represent variables, and solve equations containing one variable • Create and use graphs to represent relationships between variables • Have some familiarity with marketing concepts, such as the importance of identifying the needs and wants of customers (the target audience) and the elements of a marketing campaign

Getting Smart About Business (5 modules)		
<i>From Concept to Consumer: Building a Foundation in Problem-Solving</i>		
<ul style="list-style-type: none"> • Make slides in PowerPoint 		
<i>Media and Messages: Building a Foundation of Communication Skills</i>		
<ul style="list-style-type: none"> • None 		
<i>Careers, Companies, and Communities</i>		
<ul style="list-style-type: none"> • None 		
<i>Calculating Your Future: Personal Finance</i>		
<ul style="list-style-type: none"> • Represent quantities as decimals, percents, and fractions • Have some familiarity with exponents (for example, knowing 3×3 can be written 3^2) • Use symbols to represent variables, and solve equations involving a single variable • Interpret graphs that describe a relationship between two variables • Enter data and create simple formulas (for example, add or multiply data) in a Microsoft® Excel spreadsheet 		
Either of the following modules:		
<i>Planning for Business Success</i> <ul style="list-style-type: none"> • Enter data and create formulas in a Microsoft® Excel spreadsheet • Use symbols to represent variables • Solve equations involving one variable • Find and interpret measures of central tendency (mean, median, and mode) for a data set • Interpret and create graphs that describe a relationship between two variables 	OR	<i>Planning for Business Success (Math-Enriched)</i> <ul style="list-style-type: none"> • Enter data in an Excel spreadsheet • Find and interpret measures of central tendency (mean, median, and mode) for a data set • Use symbols to represent variables • Solve equations involving one variable

Living in a Global Economy (3 modules)

The Wealth of Nations

- Be able to read and interpret graphs such as line and bar graphs
- Create spreadsheets and graphs using Microsoft® Excel
- Have some familiarity with researching information and evaluating its reliability

Markets Without Borders

- Understand GDP, inflation, and other basic economic indicators
- Understand the economic principles of opportunity cost and comparative advantage

Global Citizens

- Have experience researching information and evaluating its reliability
- Have experience making presentations to groups of people
- Have some experience analyzing data from surveys
- Ideally, have done *Markets Without Borders*

Note: We generally recommend that this module be taught last in a sequence of Ford PAS modules (whether a short sequence of two modules or a full two-year course). In the module, students apply what they have learned about research, data, business, economics, and sustainability. They examine the interplay of factors in companies that succeed or fail, and research choices that global companies face. They design surveys, contact company representatives, and collect data.

Students with some knowledge of economics and business operations will have more context for the decision-making activities in the module, and be prepared to create survey instruments, analyze data, and justify choices. That said, teaching this module last is not a requirement. The teacher is the best judge of what will fit a particular classroom and students—including teaching the module in a different order or even independently of other modules.

Putting Math to Work (3 modules)

Calculating Your Future: Personal Finance

- Represent quantities as decimals, percents, and fractions
- Have some familiarity with exponents (for example, knowing 3×3 can be written 3^2)
- Use symbols to represent variables, and solve equations involving a single variable
- Interpret graphs that describe a relationship between two variables
- Enter data and create simple formulas in a Microsoft® Excel spreadsheet

Planning for Business Success (Math-Enriched)

- Create and use spreadsheets, including creating formulas in spreadsheets
- Use basic statistics to find measures of central tendency for a data set
- Understand the concept of functions
- Represent functions by equations and graphs
- Make and read graphs

Ensuring Quality

- Calculate measures of central tendency and spread
- Have some familiarity with experimental design, including variables, sampling, and data analysis
- Have some familiarity with the data analysis functions of a statistics software package such as Minitab, or a spreadsheet application such as Microsoft® Excel
- Represent quantities as fractions, decimals, and percents
- Use symbols to represent variables, and solve equations containing one variable
- Create and use graphs to represent relationships between variables
- Have some familiarity with marketing concepts, such as the importance of identifying the needs and wants of customers (the target audience) and the elements of a marketing campaign