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MODULE LEARNING GOALS

The following is a summary of the learning goals for *Different by Design*. The academic standards and core skills referenced are directly taught and assessed in this module. The table provides a number and/or letter designation for each skill and standard that corresponds to the full text of the standards and skills, available on the [Ford PAS Web site](#).



Activity	Learning Goals	National Academic Standards	Core Skills	How Assessed
1	1.1 Determine the aspects of a product's design that are important to consumers, producers, and other stakeholder groups.	McREL: 14 ISTE: 1d ITEA: 3, 6, and 13	B3: Use Logical Reasoning	Quiz 1
	1.2 Analyze customer feedback to determine product features.	NRC: U5 NBEA: MGT 4 McREL: 14 and 19 ITEA: 11	B2: Solve Problems and Make Decisions	Test, Product Assessment
	1.3 Apply appropriate techniques for idea generation in a team.	NCTE/IRA: 4 NCEE/Pitt: 3b ISTE: 2d	B4: Think Creatively C4: Guide Others E4: Practice Leadership Skills	Self-Assessment
2	2.1 Given a set of product needs, generate several design concepts for a product.	NRC: U5 and E1 McREL: 14 ISTE: 1a ITEA: 10 and 11	B4: Think Creatively	Product Assessment
	2.2 Survey competitive products to analyze their features.	McREL: 14 ISTE: 1a ITEA: 10 and 11	D3: Learn Through Research	Quiz 1
3	3.1 Analyze product concepts to identify which concepts to develop further.	McREL: 14 ISTE: 3b ITEA: 10 and 13	B2: Solve Problems and Make Decisions	Product Assessment
	3.2 Assess the financial outlook for a new product design, including development, production, and marketing costs.	NCTM: 1.3, 6.2, 9.1, and 10.1 NBEA: COMP 6 and ENTP 3	B1: Use Math to Solve Problems and Communicate	Quiz 2
	3.3 Use decision-making methods to choose among several desirable options.	NCEE/Pitt: 3b ISTE: 4d	B2: Solve Problems and Make Decisions C1: Cooperate with Others	Self-Assessment

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Activity	Learning Goals	National Academic Standards	Core Skills	How Assessed
4	4.1 Identify and describe the successful use of industrial design techniques.	McREL: 19 ITEA: 9	A3: Interpret and Convey Ideas Visually	Quiz 2
	4.2 Use industrial design techniques to create a unique identity for a product.	McREL: 14 and 19 ITEA: 10 and 11	B4: Think Creatively	Test, Product Assessment
5	5.1 Create a technical drawing of a product to scale.	NCTM: 3.3, 3.4, 9.1, and 10.3 McREL: 12 and 13	A3: Interpret and Convey Ideas Visually	Product Assessment
	5.2 Create visual representations of a product that are appropriate for specific audiences.	McREL: 13 ITEA: 11	A3: Interpret and Convey Ideas Visually	Test, Product Assessment
6	6.1 Create a redesign proposal for a product.	McREL: 14 ITEA: 9 and 11	B4: Think Creatively	Product Assessment
	6.2 Design and deliver an effective presentation of a product redesign proposal, including visual representations.	NCTE/IRA: 4 NCEE/Pitt: 3c ISTE: 2b	A3: Interpret and Convey Ideas Visually A4: Speak So Others Can Understand	Peer Assessment, Self-Assessment

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CORRELATION WITH ACADEMIC STANDARDS AND CORE SKILLS

The following standards and core skills include those that are directly taught and assessed in *Different by Design* (and appear in the Learning Goals) as well as those that students apply in the course of their work in the module—work that helps students achieve the standards and master the skills. This list provides a brief description of each standard and skill, along with the number and/or letter designation that corresponds to the full text of the standards and skills, available on the **Ford PAS Web site**. Note: As national standards are revised periodically, check the **Ford PAS Web site** to obtain the most up-to-date list for *Different by Design*.



English Language Arts: Standards for the English Language Arts

National Council of Teachers of English (NCTE) and the International Reading Association (IRA)

4. Adjust spoken, written, and visual language to communicate effectively with a variety of audiences and for different purposes.
5. Write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.
7. Gather, evaluate, and synthesize data from a variety of sources to communicate a particular purpose or to a particular audience.
8. Gather and synthesize information and create and communicate knowledge, using a variety of technological and information resources.
11. Participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities.

English Language Arts: New Standards Performance Standards, English Language Arts

National Council on Education and the Economy (NCEE) and the University of Pittsburgh (Pitt)

1. Reading

- 1c: Read and comprehend informational materials and produce written or oral work that summarizes information.

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New Standards Performance Standards: English Language Arts (continued)

2. Writing

2a: Write a report appropriate for a purpose, audience, and context, with an organizing structure, appropriate facts and details, and a sense of closure.

3. Speaking, Listening, and Viewing

3a: Participate actively in one-on-one conferences or interviews with adults by initiating new topics, asking and answering questions, and confirming understanding by paraphrasing.

3b: Participate actively in group meetings, displaying appropriate turn-taking behaviors, offering and soliciting comments or opinions, responding appropriately, giving reasons, and expanding on responses when asked.

3c: Prepare and deliver a presentation that shapes information to achieve a particular purpose and to appeal to the interests and knowledge of audience members.

4. Conventions, Grammar, and Usage of the English Language

4a: Habitually understand the rules of the English language in written and oral work, selecting appropriate structures and features of language and demonstrating control of grammar, paragraph structure, punctuation, sentence construction, spelling, and usage.

4b: Analyze and revise work to clarify it or make it more effective in communicating the intended message for a particular purpose, audience, and context.

7. Functional Documents

7a: Critique functional documents, demonstrating awareness of such strategies as visual appeal, the logic of the sequence in which directions are given, and anticipation of possible reader misunderstandings.

7b: Produce functional documents appropriate for an audience and purpose; organizing and conveying information and ideas accurately; including relevant details; anticipating readers' problems, mistakes, and misunderstandings; and employing effective word choices.

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Mathematics: Principles and Standards for School Mathematics

National Council of Teachers of Mathematics (NCTM)

1. Number and Operations

1.3: Compute fluently and make reasonable estimates.

3. Geometry

3.1: Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.

3.2: Specify locations and describe spatial relationships using coordinate geometry and other representational systems.

3.3: Apply transformations and use symmetry to analyze mathematical situations.

3.4: Use visualization, spatial reasoning, and geometric modeling to solve problems.

5. Data Analysis and Probability

5.1: Formulate questions that can be addressed with data, and collect, organize, and display relevant data to answer them.

5.2: Select and use appropriate statistical methods to analyze data.

5.3: Develop and evaluate inferences and predictions that are based on data.

6. Problem-Solving

6.2: Solve problems that arise in mathematics and in other contexts.

6.3: Apply and adapt a variety of appropriate strategies to solve problems.

8. Communication

8.2: Communicate mathematical thinking coherently and clearly to peers, teachers, and others.

8.3: Analyze and evaluate the mathematical thinking and strategies of others.

9. Connections

9.1: Recognize and apply mathematics in contexts outside of mathematics.

9.2: Recognize and use connections among mathematical ideas.

10. Representation

10.1: Create and use representations to organize, record, and communicate mathematical ideas.

10.3: Use representations to model and interpret physical, social, and mathematical phenomena.

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Science: National Science Education Standards

National Research Council (NRC)

Unifying Concepts and Processes

U2: Understand evidence, models, and explanation.

U5: Understand form and function.

E. Science and Technology

E1: Develop abilities for technological design.

Economics: Voluntary National Content Standards in Economics

National Council on Economic Education (NCEE)

2. Understand that effective decision-making requires comparing the additional costs of alternatives with the additional benefits.

7. Understand that markets exist when buyers and sellers interact, which determines market prices and thereby allocates scarce goods and services.

14. Understand that entrepreneurs take the risks of organizing productive resources to make goods and services and that profit is an important incentive that leads entrepreneurs to accept the risks of business failure.

Business Education: National Standards for Business Education

National Business Education Association (NBEA)

Career Development

CD 2: Utilize career resources to develop a career information database that includes international career opportunities.

Communications

COMM 1: Communicate in a clear, complete, concise, correct, and courteous manner on personal and professional levels.

COMM 2: Apply basic social communication skills in both personal and professional settings.

COMM 3: Incorporate appropriate leadership and supervision techniques, customer service strategies, and personal ethics standards to communicate effectively with various business constituencies.

COMM 4: Use technology to enhance the effectiveness of communication.

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National Standards for Business Education (continued)

Computation

COMP 1: Apply basic mathematical operations to solve problems.

COMP 4: Use common international standards of measurement when solving problems.

COMP 6: Use mathematical procedures to analyze and solve business problems.

Entrepreneurship

ENTP 3: Apply economic concepts when making decisions for an entrepreneurial venture.

Information Technology

IT 4: Use various input technologies to enter and manipulate information appropriately.

IT 8: Gather, evaluate, use, cite, and disseminate information from technology sources.

Management

MGT 4: Develop personal management skills to function effectively and efficiently in a business environment.

MGT 10: Analyze financial data influenced by internal and external factors in order to make short-term and long-term decisions.

Marketing

MKT 1: Recognize the customer-oriented nature of marketing and analyze the impact of marketing activities on the individual, business, and society.

MKT 3: Analyze the influence of external factors on marketing.

Engineering: Standards for Engineering Education

Mid-continent Research for Education and Learning (McREL)

12. Understands the techniques, tools, and technologies related to the production of technical drawings

13. Understands applications of technical drawing skills.

14. Use the design process to solve problems.

19. Understand the interrelationship of manufacturing and society.

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Educational Technology: National Educational Technology Standards

International Society for Technology in Education (ISTE)

1. Creativity and Innovation

1a. Apply existing knowledge to generate new ideas, products, or processes.

1d. Identify trends and forecast possibilities.

2. Communication and Collaboration

2a. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.

2b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats.

2d. Contribute to project teams to produce original works or solve problems.

3. Research and Information Fluency

3b. Locate, organize, analyze, evaluate, and ethically use information from a variety of sources and media.

4. Critical Thinking, Problem-Solving, and Decision-Making

4b. Plan and manage activities to develop a solution or complete a project.

4c. Collect and analyze data to identify solutions and/or make informed decisions.

4d. Use multiple processes and diverse perspectives to explore alternative solutions.

6. Technology Operations and Concepts

6b. Select and use applications effectively and productively.

Technological Literacy: Standards for Technological Literacy

International Technology Education Association (ITEA)

3. Understand the relationships among technologies and the connections between technology and other fields of study.

6. Understand the role of society in the development and use of technology.

9. Understand engineering design.

10. Understand the role of troubleshooting, research and development, invention and innovation, and experimentation in problem-solving.

11. Apply the design process.

13. Assess the impact of products and systems.

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Core Skills

Based on Equipped for the Future (EFF), National Institute for Literacy (NIFL), SCANS 2000, The Secretary's Commission on Achieving Necessary Skills, U.S. Department of Labor, and Linking Leadership to Instruction, Leadership for the 21st Century, Virginia Board of Education

A–Communication Skills

A2–Convey Ideas in Writing: Determine writing purpose, organize and present information with appropriate usage and spelling, seek feedback, and revise to enhance effectiveness.

A3–Interpret and Convey Ideas Visually: Interpret and construct visual representations, including symbols, pictures, graphs, blueprints, schematics, flow charts, and concept maps.

A4–Speak So Others Can Understand: Determine communication purpose; organize and relay information, paying attention to proper usage, pace, and gesture; and monitor comprehension.

A5–Listen Actively: Attend to oral communication, clarify purpose, use listening strategies, monitor comprehension, and integrate information with prior knowledge.

B–Thinking and Decision-Making Skills

B1–Use Math to Solve Problems and Communicate: Understand and communicate using mathematical representations; solve problems, using mathematical concepts and quantitative, algebraic, or geometric procedures; and verify reasonableness of results.

B2–Solve Problems and Make Decisions: Identify problems, understand root causes, generate and evaluate consequences of alternative solutions, and establish criteria for evaluating effectiveness.

B3–Use Logical Reasoning: Discover rules or principles underlying relationships among objects or situations, draw conclusions, apply to new situations, and evaluate correctness of conclusions.

B4–Think Creatively: Use imagination, combine ideas or information in new ways, reshape goals to reveal new possibilities, and make connections between seemingly unrelated ideas.

B6–Plan: Set and prioritize goals; develop an organized approach; prepare budgets, schedules, and work plans; track and monitor progress; and evaluate effectiveness.

C–Interpersonal Skills

C1–Cooperate with Others: Interact with respect for others' ideas and contributions, seek and offer clear input, and adjust actions in order to jointly accomplish a task.

C2–Advocate and Influence: Define objectives, gather facts to build a case, assess and take into account others' interests and resources, present a clear case, and revise it in response to feedback.

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Core Skills (continued)

C4–Guide Others: Assess needs, knowledge, and skills of colleagues; arrange opportunities for learning that take into account the learner’s strengths, skills, and learning styles; evaluate performance and provide feedback; seek feedback; and revise learning strategies.

D–Lifelong Learning Skills

D3–Learn Through Research: Pose questions to be answered, use multiple approaches to find information, and organize, evaluate, analyze, interpret, and report on findings.

D4–Use Information and Communications Technology: Use computers, the Internet, and other technology tools to acquire, process, and manage information, and learn and practice skills.

E–Leadership Skills

E3–Developing Leadership Skills and Practices: Working with others, develop a vision, set goals, and facilitate the development of additional leaders.

E4–Practice Leadership Skills and Practices: Working with various people, motivate others, take initiative, communicate effectively, make decisions, and manage resources.