OnInnovation presents Innovation 101

Innovation 101
Key to Success in the 21st Century!

Innovation 101 is a unique and dynamic online education module that uses oral history interviews and assets of **The Henry Ford's** OnInnovation resource for active teaching and learning!

Innovation 101 is designed to be an introductory module that can be used primarily by secondary level (grades 5-12) teachers in the classroom and by youth service providers. This can also be used in a scalable manner by instructors in colleges and universities as well as trainers in a corporate setting.

This five-day, 45-minutes-a-day easy-to-implement module is geared toward introducing participants to the basic tenets of innovation as they explore various traits and processes used by innovators, past and present. Toward the conclusion of the module, participants can focus on the core principles of innovation that can inspire them to be innovative in their own lives.

This unique teaching and learning tool creatively utilizes oral history interview segments of some of America's iconic innovators (past and present) and actively engages participants in critical 21st century skills, such as critical thinking, problem solving and creativity fueling a spirit of entrepreneurship and digital literacy.

Supporting participant worksheets, glossaries of terms, inspiring quotes and project ideas offer an unduplicated learning opportunity combining theory with practice.

Alignment with national standards in the subject areas of Social Studies, English Language Arts, Educational Technology, Science, Technology, Engineering and Math (STEM), Career and Employability and 21st Century Skills makes this module a win-win for the education sector.

Innovation 101
Format and Methodology

Format of the Module

This is an online module or unit plan that teachers/instructors can use over a week-long period anytime during the year and/or in conjunction with related topics they are teaching.

Chapters of the module are designed as lesson plans to be taught in class for 45 minutes each day. Total suggested length of unit is 25 minutes (5 days of 45 minutes each day in class). Educators have the option to teach the unit over two weeks versus the suggested one week, or they can use lesson plans individually. Optional follow-up student projects can be given out by the teacher over the following week upon conclusion of the classroom unit.

The module is organized under the following daily topics with a core overarching question:

- What is Innovation? Why is Innovation necessary in our lives and the world around us?
- What is the Process of Innovation? What is the relation between the process of innovation and design-thinking?
- What are some of the Traits of an Innovator? Are there commonalities or congruencies?
- What are the core Keys of Innovation? Can an innovative mind-set be cultivated and practiced?
- Is Intellectual Property protection an integral part of Innovation? How can we be protective of our innovative ideas yet ignite others to learn and expand from the same?

Methodology

The module is designed to use the following multi-pronged learning engagement approach each of the days to impact ALL types of learners:

- Audio-Visual Context Setter - Watching the interview collage clips.
- Debate and Dialogue - Instructor engages group in group discussion to evaluate pros and cons.
- Reflection and Reiteration - Participants will get an opportunity individually, with deeper probes to get clarity on facts. Teachers can use student worksheets for assessment.
- Personal Connections - Participants will get ample opportunities to make relevant connections with their own lives.
- Building Empathy - Participants will explore real-world problems/real-world innovative solutions.
- Post-Unit Research and Reflective Writing - Participants are encouraged to look further into the OnInnovation web resource/interviews and develop their own papers, presentations or blogs around topics they want to tackle, do comparative papers on historic and current-day innovators, etc.

Social Studies

Innovation and National Curriculum/Standards Alignment

Economics Standards

Content Standard 14: Profit and Entrepreneur

Grades 5-8

Entrepreneurs are people who take the risks of organizing productive resources to make goods and services. Profit is an important incentive that leads entrepreneurs to accept the risks of business failure.

- Entrepreneurs compare the expected benefits of entering a new enterprise with the expected costs. (1)
- Entrepreneurs organize resources to produce goods and services because they expect to earn profits. (2)
- Entrepreneurs (as well as other sellers) earn profits when the revenues they receive from selling the products they sell are greater than the costs of production. (3)
- Entrepreneurs (as well as other sellers) incur losses when the revenues they receive from selling the products they sell do not cover the costs of production. (4)
- In addition to profits, entrepreneurs respond to other incentives, including the opportunity to be their own boss, the chance to achieve recognition and the satisfaction of creating new products or improving existing ones. In addition to financial losses, other disincentives to which entrepreneurs respond include the responsibility, long hours and stress of running a business. (5)

Grades 9-12

Entrepreneurs are people who take the risks of organizing productive resources to make goods and services. Profit is an important incentive that leads entrepreneurs to accept the risks of business failure.

- Entrepreneurial decisions affect job opportunities. (1)
- Entrepreneurial decisions are influenced by government tax and regulatory policies. (2)

Content Standard 14: Economic Growth

Grades 5-8

Investment in factories, machinery and new technology, and in the health, education and training of people, can raise future standards of living.

- Technological change results from an advance in knowledge leading to new and improved goods and services and better ways of producing them. (3)
- Increases in productivity result from advances in technology or increases in physical or human capital. (4)

Grades 9-12

Investment in factories, machinery and new technology, and in the health, education and training of people, can raise future standards of living.

- The rate of productivity increase in an economy is strongly affected by the incentives that reward successful innovation and investments (in research and development, and in physical and human capital). (5)

Social Studies

Innovation and National Curriculum/Standards Alignment

Geography Standards

Content Standard 4: Human Systems

Grades K-12

All students should:

- Understand the patterns and networks of economic interdependence on Earth's surface. (11)

Content Standard 5: Environment and Society

Grades K-12

All students should:

- Understand how human actions modify the physical environment. (14)
- Understand how physical systems affect human systems. (15)
- Understand the changes that occur in the meaning, use, distribution and importance of resources. (16)

U.S. History Standards

ERA 6: The Development of the Industrial United States (1870-1900)

Standard 1A: The student understands the connections among industrialization, the advent of the modern corporation and material well-being.

Grades 5-12

- Explain how organized industrial research produced technological breakthroughs, especially the Bessemer steel process, conversion to electrical power and telephonic communication, and how these innovations transformed the economy, work processes and domestic life.
- Evaluate the careers of prominent industrial and financial leaders.

Grades 9-12

- Examine how industrialization made consumer goods more available, increased the standard of living for most Americans and redistributed wealth.
- Compare the ascent of new industries today with those of a century ago.

Sources:

The Index of Standards, The National Council on Economic Education.

The National Standards for History, The National Center for History in the Schools.

The National Geography Standards, The National Geographic Society.

English Language Arts

Innovation and National Curriculum/Standards Alignment

Grades 5-12

English Language Arts Standards

Standard 2. Understanding the Human Experience

Students read a wide range of literature from many periods in many genres to build an understanding of the many dimensions (e.g., philosophical, ethical, aesthetic) of human experience.

Standard 7. Researching and Communicating

Students conduct research on issues and interests by generating ideas and questions and by posing problems. They gather, evaluate and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.

Standard 11. Participating in Society

Students participate as knowledgeable, reflective, creative and critical members of a variety of literacy communities.

Sources:

Standards for the English Language Arts, National Council of Teachers of English and International Reading Association.

21st Century Skills

Innovation and National Curriculum/Standards Alignment

Learning and Innovation Skills

Creativity and Innovation

Think Creatively

- Use a wide range of idea creation techniques (such as brainstorming).
- Create new and worthwhile ideas (both incremental and radical concepts).
- Elaborate, refine, analyze and evaluate one's own ideas in order to improve and maximize creative efforts.

Work Creatively with Others

- Develop, implement and communicate new ideas to others effectively.
- Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work.
- Demonstrate originality and inventiveness in work and understand the real-world limits to adopting new ideas.
- View failure as an opportunity to learn; understand that creativity and innovation are long-term, cyclical processes with small successes and frequent mistakes.

Critical Thinking and Problem Solving

Use Systems Thinking

- Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems.

Make Judgments and Decisions

- Synthesize and make connections between information and arguments.
- Interpret information and draw conclusions based on the best analysis.
- Reflect critically on learning experiences and processes.

Solve Problems

- Solve different kinds of non-familiar problems in both conventional and innovative ways

Communication and Collaboration

Communicate Clearly

- Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts.

Collaborate with Others

- Demonstrate ability to work effectively and respectfully with diverse teams.
- Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal.
- Assume shared responsibility for collaborative work and value the individual contributions made by each team member.

21st Century Skills

Innovation and National Curriculum/Standards Alignment

Information, Media and Technology Skills

Information Literacy

Access and Evaluate Information

- Evaluate information critically and competently.

Use and Manage Information

- Use information accurately and creatively for the issue or problem at hand.

Information and Communications Technology (ICT) Literacy

Apply Technology Effectively

- Use technology as a tool to research, organize, evaluate and communicate information.
- Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy.

Life and Career Skills

Flexibility and Adaptability

Be Flexible

- Incorporate feedback effectively.
- Deal positively with praise, setbacks and criticism.

Initiative and Self-Direction

Be Self-Directed Learners

- Reflect critically on past experiences in order to inform future progress.

Social and Cross-Cultural Skills

Interact Effectively with Others

- Know when it is appropriate to listen and when to speak.
- Conduct self in a respectable, professional manner.

Work Effectively in Diverse Teams

- Respect cultural differences and work effectively with people from a range of social and cultural backgrounds.
- Respond open-mindedly to different ideas and values.
- Leverage social and cultural differences to create new ideas and increase both innovation and quality of work.

21st Century Skills

Innovation and National Curriculum/Standards Alignment

Leadership and Responsibility

Guide and Lead Others

- Use interpersonal and problem-solving skills to influence and guide others toward a goal.
- Leverage strengths of others to accomplish a common goal.
- Inspire others to reach their very best via example and selflessness.
- Demonstrate integrity and ethical behavior in using influence and power.

Be Responsible to Others

- Act responsibly with the interests of the larger community in mind.

Source:

Framework for 21st Century Learning, The Partnership for 21st Century Skills (P21).

Educational Technology

Innovation and National Curriculum/Standards Alignment

Grades 5-12

Educational Technology Standards

Creativity and Innovation (1)

Students demonstrate creative thinking, construct knowledge and develop innovative products and processes using technology.

- Apply existing knowledge to generate new ideas, products or processes. (A)
- Create original works as a means of personal or group expression. (B)

Communication and Collaboration (2)

Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

- Interact, collaborate and publish with peers, experts or others, employing a variety of digital environments and media. (A)
- Contribute to project teams to produce original works or solve problems. (D)

Critical Thinking, Problem Solving and Decision Making (4)

Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources.

- Identify and define authentic problems and significant questions for investigation. (A)
- Plan and manage activities to develop a solution or complete a project. (B)
- Collect and analyze data to identify solutions and/or make informed decisions. (C)
- Use multiple processes and diverse perspectives to explore alternative solutions. (D)

Digital Citizenship (5)

Students understand human, cultural and societal issues related to technology and practice legal and ethical behavior.

- Exhibit a positive attitude toward using technology that supports collaboration, learning and productivity. (B)
- Demonstrate personal responsibility for lifelong learning. (C)

Sources:

The Technology Standards, The International Society for Technology in Education (ISTE).

Science

Innovation and National Curriculum/Standards Alignment

Grades 5-12

Science Standards

Content Standard 5: Science and Technology

Grades 5-12

- Abilities of technological design
- Understandings about science and technology

Content Standard 6: Personal and Social Perspectives

Grades 5-8

- Populations, resources and environments
- Risks and benefits
- Science and technology in society

Grades 9-12

- Personal and community health
- Natural resources
- Environmental quality
- Natural and human-induced hazards
- Science and technology in local, national and global challenges

Content Standard 7: History and Nature of Science

Grades 5-8

- Science as a human endeavor
- Nature of science
- History of science

Grades 9-12

- Science as a human endeavor
- Nature of scientific knowledge
- Historical perspectives

Source:

The National Science Education Standards, National Committee on Science Education Standards and Assessment & The National Research Council.

Lesson 1 - What is Innovation?

approximately 45 minutes

Lesson Plan

Step	Approach	Activity	Duration
A	Overarching Question of the Day	Teacher posts the overarching question of the day for consideration: "What is innovation?" Students define innovation in their own words using *Activity Sheet #1, column one – What do I know?*	5 Minutes
B	Context-Setting Activity	Watch the overview video on innovation from OnInnovation website at: http://www.oninnovation.com/about/about-oninnovation.aspx	5 Minutes
C	Small Group Activity	Assemble students into cooperative groups of no more than four. Their task is to define innovation in one of the following ways: • A sentence • List of five to ten words • Pictorial representation • Other way of their choosing	10 Minutes
D	Report Out	Do a "gallery walk" to allow students to see other groups' work.	5 Minutes
E	Explore More Individual Activity	Look at the list of innovators featured on the overview video. Use *Activity Sheet #2* to record what you think or learned that they do. How do the featured innovators describe innovation? Jot down what you remember from watching or listening, use *Resource Sheet #1* to confirm or modify your observations	10 Minutes
F	Review	Create class definition by combining various definitions of innovation. Use middle column of *Activity Sheet #1 – What did I learn?*	5 Minutes
G	Inquiry	Use last column of *Activity Sheet #1 – What more do I want to know?* Build your innovation vocabulary by using *Resource Sheet #2 – Master Glossary for Innovation.*	5 Minutes

Lesson 1 - What is Innovation?

What do I know about innovation?	What did I learn about innovation?	What more do I want to know about innovation?

Lesson 1 - What is Innovation?

What did these innovators say in the overview video?
In the end, check your answers with Resource Sheet #1

Innovator	What are they known for?	What did they say?
 Toshiko Mori		
 Elon Musk		
 William McDonough		
 Mitchell Baker		

Lesson 1 - What is Innovation?

What did these innovators say in the overview video?
In the end, check your answers with Resource Sheet #1

Innovator	What are they known for?	What did they say?
 Steve Wozniak		
 Don Chadwick		
 Pierre Omidyar		
 Lyn St. James		

Lesson 1 - What is Innovation?

Overview Video Inspiring Innovation - Innovator Quotes

Innovator	What does the innovator do?	Inspiring quotes from the innovator
Toshiko Mori	Architect	"Innovation is the combination of creativity and imagination."
Elon Musk	Founder: PayPal, Tesla Motors and SolarCity	"I would just question, question things. Maybe it's built in - to question things. It would infuriate my parents that I would not just believe them when they said something."
William McDonough	Architect and Designer	"It has been said that you don't glide from success to success. You lurch from failure to failure."
Mitchell Baker	Chairperson: Mozilla Foundation	"It is easy to stifle innovation, first of all. So, the first thing you have to do is not stifle imagination."
Steve Wozniak	Co-Founder: Apple Computer	"I told my dad that dream. And he said, 'Well, these little minicomputers would cost as much as a house.' That's what he said. I said, 'Well, I'll live in an apartment.' "
Don Chadwick	Product Designer	"First of all, you have to be curious. You have to have the tenacity to stay with something you believe in."
Pierre Omidyar	Founder: eBay, Omidyar Network	"You need to be passionate about what you work on and don't take no for an answer when people out there are giving you advice and saying, 'No, this will never work.' "
Lyn St. James	Auto Racing Record Breaker; Businesswoman	"I wanted to demonstrate my skills and to test my skills and challenge my skills, and sometimes you have to go outside your comfort zone to do that."
Pierre Omidyar	Founder: eBay, Omidyar Network	"There's something about an entrepreneur that is somewhat sort of antiestablishment, somewhat disrespectful of the previous generation."

Lesson 1 - What is Innovation?

Overview Video Inspiring Innovation - Innovator Quotes

Innovator	What does the innovator do?	Inspiring quotes from the innovator
Toshiko Mori	Architect	"That's what sustains young architects who work for me - that they make a difference in the world. It is always about humanity."
Stan Ovshinsky	Inventor and Businessman	"I think about things very deeply, and I analyze what I believe the problems of the planet will be, and then I build new industries as solutions to what those problems are."
William McDonough	Architect and Designer	"We give people a lot of responsibility and encourage them to create new things, and anything they can bring to the enterprise that improves us is delightfully entertained."
Steve Wozniak	Founder: Apple Computer	"What you do for work should be fun. So I made the Apple II a very fun machine."
Elon Musk	Founder: PayPal, Tesla Motors and SolarCity	"I think it is possible for ordinary people to choose to be extraordinary."

Lesson 1 - What is Innovation?
Master Glossary for Innovation

Term	Definition
Adaptive	Able to adjust oneself to different conditions or able to make suitable to requirements or conditions
Antiestablishment	Opposed to or working against the existing power structure or mores, as of society or government
Artistic	Conforming to the standard of art; satisfying aesthetic requirements
Challenging	Arousing competitive interest, thought or action to cause provocation
Collaboration	Working jointly with others or together, especially in an intellectual endeavor
Competitive	Inclined, desiring or suited to compete
Concept oriented	Inclined toward something conceived in the mind
Connectivity	The quality, state or capability of being connected; ability to communicate with a computer
Copyright	A type of protection given for original works of authorship such as literary, dramatic, musical, artistic and other intellectual works
Creative	The quality of having the ability or power to create
Creative barriers	Things that prevent or inhibit the ability or power to create
Creative processes	Steps or series of actions or operations leading to the power to create
Curiosity	The desire to know or having interests or passions leading to inquiry
Determination	A firm or fixed intention to achieve a desired end or action
Discipline	Orderly or prescribed conduct or pattern of behavior or system of rules governing activity
Discovery	The act or process of discovering or exploring
Egotistical	Having an exaggerated sense of self-importance or ability
Empathetic	Someone who is sensitive to or understands the needs or states of others
Empowering	Giving power or authority to; to enable or permit

Lesson 1 - What is Innovation?
Master Glossary for Innovation

Term	Definition
Engineering	The application of science and mathematics by which the properties of matter and the sources of energy in nature are made useful to people
Entrepreneur	One who organizes, manages and assumes the risks of business or is enterprising
Experimentation	To carry out an experiment or try out new procedures, ideas or activities
Failure	An omission of occurrence or performance; failing to perform a duty or expectation
Feedback	The transmission of evaluative or corrective information about an action
Flat world	Concept that the world is an even playing ground for all
Hardworking	Someone who works diligently and often long hours
Imagination	The act or power of forming a mental image of something not present to the senses or never before wholly perceived in reality
Individuality	Total character peculiar to and distinguishing one individual from another
Influence	The act or power of producing an effect without apparent exertion of force or direct exercise of command
Innovation	The introduction of something new or a new idea, method, device or method of doing something
Innovative	Characterized by, tending to, or introducing innovation or complete new methods of doing something
Inspiration	The act or power of moving the intellect or emotions
Intellectual property	Works created by the mind such as processes, tools, equipment, literary and artistic efforts, etc., that may be protected by copyrights, trademarks or patents
Invention	A product, device, contrivance or process originated after study and experiment
Motivation	The act or influence of causing a person to act
Opportunistic	Taking advantage of opportunities as they arise
Organization	An administrative and functional structure or the personnel of such a structure

Lesson 1 - What is Innovation?
Master Glossary for Innovation

Term	Definition
Passion for excellence	Intense, driving or overwhelming feeling or conviction to be excellent or do a superior job
Patent	Issued by the U.S. Patent and Trademark Office, a patent gives the inventor the right to exclude others from making, using, offering for sale or selling the invention in the United States. There are three types of patents: • A plant patent is given to anyone who invents, discovers and asexually reproduces a new and distinct variety of plant • A utility patent is given to anyone who invents, discovers or improves a process, machine or thing • A design patent is given to anyone who invents a new design or look for a product
Persistence	The action or fact of persisting; going on resolutely or stubbornly in spite of opposition, importunity or warning
Positive minded	Having an optimistic view about one's self, life, living and other people
Preparation	The action or process of making something ready for use or service; getting ready for an occasion, test or duty
Process	A series of actions or operations conducting to an end; a continuous operation
Prototype	An original model on which something is patterned; a first full-scale functional form of a new type or design of a construction
Radical	Marked by a considerable departure from the usual or traditional
Radical thinking	Thoughts or thinking that tend toward making extreme changes in existing views, habits, actions or institutions
Risk taker	Someone who is not fearful of uncertainty and may even enjoy risky, speculative situations
Search for perfection	To strive toward an exemplification of supreme excellence
Sense of concept	Ability to think of an abstract or generic idea generalized from particular instances
Simplistic	Of or relating to, or characterized by, a simple concept
Solution	The act or process of solving a problem

Lesson 1 - What is Innovation?
Master Glossary for Innovation

Term	Definition
Solution oriented	Intellectually or functionally directed toward an action or process of solving a problem
Solution set	Group of possible means or methods of solving a problem
Structure	Something arranged in a definite pattern of organization
Success	The attainment of a favorable or desired outcome
Synthesis	The composition or combination of parts or elements so as to form a whole
Team player	Someone who willingly works or plays in cooperation with others
Trademark	A brand name; a word, symbol or name that is used to identify and differentiate the products or services of manufacturers or sellers
Unconventional	Being out of the ordinary; not bound by or in accordance with convention
Venture capital	Capital or money invested or available for investment in the ownership element of a new or fresh enterprise
Visionary	Having or marked by foresight and imagination

Lesson 2 - Process of Innovation

approximately 45 minutes

Lesson Plan

Step	Approach	Activity	Duration
A	Overarching Question of the Day	Is there a process of innovation?	2 Minutes
B	Explore More Individual Activity	Compare and contrast Steve Wozniak and Don Chadwick, two current-day innovators – one who is a tinkerer and one who is very methodical and uses a step-by-step process. Find out about the different processes used by these innovators: *Tinkerer: Steve Wozniak - Accidents Led to Innovation:* *http://www.oninnovation.com/videos/detail.aspx?video=1355* *Methodical: Don Chadwick, Product Designer - What Is Design?* *http://www.oninnovation.com/videos/detail.aspx?video=1157*	10 Minutes
C	Individual Analysis Activity	The process of design is closely related to the process of innovation. Not all innovators use the exact same process or sequence when innovating, but they do use some of the same steps. Explore the following documents and related links and then make a list of steps you feel are essential to the process of innovation. *Activity Sheet #2 – Innovation and the Design – Thinking Process*	10 Minutes
D	Inquiry	What are the differences between invention, innovation and discovery? Watch these videos to learn how these innovators talk about and define some of these terms: *William McDonough* *http://www.oninnovation.com/videos/detail.aspx?video=1190* *Steve Wozniak* *http://www.oninnovation.com/videos/detail.aspx?video=1389* *Toshiko Mori* *http://www.oninnovation.com/videos/detail.aspx?video=1242*	15 Minutes
E	Reflection/ Critical Thinking	*Complete Activity Sheet #3 – Invention, Innovation and Discovery*	5 Minutes
F	Debate and Dialogue	Based on what you learned today, which of the three concepts do you believe is the most difficult to achieve and why?	3 Minutes

Lesson 2 - Process of Innovation

Process Comparison

Activity Sheet 1

1. Wozniak and Chadwick have used very different methods to arrive at innovative ideas. List some of the terms they use to describe their process.

Wozniak	Chadwick

2. Chadwick refers to experimenting as a path to innovation. In what way is this process similar to what a scientist does in a laboratory?

3. Wozniak describes a process similar to tinkering, making changes and trying new things here and there. How is Wozniak's process the same as Chadwick's? How is it different?

4. If you were an innovator, which process do you think would suit you better and why?

Aeron Chair Designed by Don Chadwick

Lesson 2 - Process of Innovation

Innovation and the Design-Thinking Process

Activity Sheet 2

1. Explore these resources:

- The Henry Ford Academy and the Henry Ford Learning Institute use a design-thinking skills model designed by the Hasso Plattner Institute of Design at Stanford University and IDEO to teach the process of innovation to their students. Their design-thinking process consists of the following steps:

1. Understand
2. Observe
3. Point of View
4. Visualize
5. Prototype
6. Test
7. Iterate

- Find out how engineers design something by viewing the video *"What is the process of design?"* at: *http://www.teachersdomain.org/resource/phy03.sci.engin.design.desprocess.* The design-thinking process described in this video consists of the following steps:

1. Identify the Challenge
2. Research and Brainstorm
3. Design a Solution
4. Test Ideas
5. Evaluate
6. Build It

2. After conducting your own research and analysis, list the essential steps in the process of innovation in your order of priority. Write a few sentences about the reason you selected your proposed steps and sequence in the process of design-thinking and innovation:

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....

Lesson 2 - Process of Innovation
Invention, Innovation and Discovery

Activity Sheet 3

View the video segments on William McDonough, Steve Wozniak and Toshiko Mori where they express their views on invention, innovation and discovery.

1. What are the basic differences in the processes of invention, innovation and discovery?

2. Think about the three processes of invention, innovation and discovery that we have been studying. Who comes to mind as you think of invention, innovation and discovery? Name and discuss the contributions of your favorite or most interesting person for each category:

	Person	Contribution	Why did you choose him or her?
Invention			
Innovation			
Discovery			

3. Based on the concepts of invention, innovation and discovery, in which of the three do you see yourself working and why?

Lesson 3 - Traits of an Innovator

approximately 45 minutes

Lesson Plan

Step	Approach	Activity	Duration
A	Overarching Question of the Day	Do innovators share common traits?	2 Minutes
B	Brainstorm	• What do you know about Henry Ford? • What do you know about Steve Wozniak? Use *Activity Sheet#1* and fill out first section.	8 Minutes
C	Context-Setting Activity (In Computer Lab)	Watch: Steve Wozniak Highlight video at http://www.oninnovation.com/innovators/detail.aspx?innovator=Wozniak Use *Activity Sheet#1* – Take notes to fill out second section of Ford/Wozniak Chart.	5 Minutes
D	Context-Setting Activity	View: The Life of Henry Ford at http://www.thehenryford.org/exhibits/hf/default.asp Use *Activity Sheet #1* – Take notes to fill out second section of Ford/Wozniak Chart.	5 Minutes
E	Small Group Activity	Place Ford's unique traits under Ford and Wozniak's unique traits under Wozniak. Place those traits shared by both in the center. *Use Activity Sheet # 2 – Common Traits*	5 Minutes
F	Report Out	Whole group share-time of Venn Diagram information. Teacher transcribes information onto chart-paper-size Venn Diagram for class display.	5 Minutes
G	Individual Activity	Identify the traits that you personally share with innovators. Use *Activity Sheet #3 – Personal Traits Shared with Innovators*	8 Minutes
H	Class Dialogue	Form a class consensus of what are the three indispensable traits of an innovator using *Activity Sheet #3*	6 Minutes

Lesson 3 - Traits of an Innovator

Chart for Comparing Traits of Henry Ford and Steve Wozniak

Activity Sheet 1

Henry Ford
What you already know …

Steve Wozniak
What you already know …

List what you learned about the traits of Henry Ford and Steve Wozniak from www.OnInnovation.com

Henry Ford

Steve Wozniak

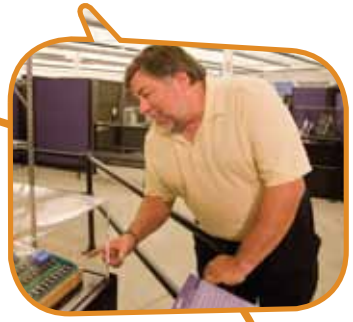
Lesson 3 - Traits of an Innovator

Common Traits

Activity Sheet 2

Henry Ford

Steve Wozniak



Lesson 3 - Traits of an Innovator

Personal Traits Shared with Innovators

Activity Sheet 3

Innovator Trait Bank

Refer to "Master Glossary of Innovation" to learn more.

Complete the following chart describing five of your personal traits from the above "Innovator Trait Bank" and the innovator you identify that trait with:

Personal Innovator Trait	Innovator Who Shares This Trait
1.	
2.	
3.	
4.	
5.	

What are the three indispensable traits of an innovator?

1. .....

2. .....

3. .....

Lesson 3 - Traits of an Innovator
Master Glossary for Innovation

Term	Definition
Adaptive	Able to adjust oneself to different conditions; able to make suitable to requirements or conditions
Antiestablishment	Opposed to or working against the existing power structure or mores, as of society or government
Artistic	Conforming to the standard of art; satisfying aesthetic requirements
Challenging	Arousing competitive interest, thought or action, to cause provocation
Competitive	Inclined, desiring or suited to compete
Concept oriented	Inclined toward something conceived in the mind
Creative	The quality of having the ability or power to create
Curiosity	The desire to know or having interests or passions leading to inquiry
Determined	A firm or fixed intention to achieve a desired end or action
Egotistical	Having an exaggerated sense of self-importance or ability
Empathetic	Someone who is sensitive to or understands the needs or states of others
Empowering	Giving power or authority to; to enable or permit
Entrepreneur	One who organizes, manages and assumes the risks of business or is enterprising
Hardworking	Someone who works diligently and often long hours
Imaginative	The act or power of forming a mental image of something not present to the senses or never before wholly perceived in reality
Individuality	A total character peculiar to and distinguishing one individual from another
Influencing	The act or power of producing an effect without apparent exertion of force or direct exercise of command
Innovative	Characterized by, tending to or introducing innovation or complete new methods of doing something

Lesson 3 - Traits of an Innovator
Master Glossary for Innovation

Term	Definition
Motivational	The act or influence of causing a person to act
Opportunistic	Taking advantage of opportunities as they arise
Passion for excellence	Intense, driving or overwhelming feeling or conviction to be excellent or do a superior job
Persistent	The action or fact of persisting; going on resolutely or stubbornly in spite of opposition, importunity or warning
Positive minded	Having an optimistic view about one's self, life, living and other people
Radical	Marked by a considerable departure from the usual or traditional
Risk taker	Someone who is not fearful of uncertainty and may even enjoy risky, speculative situations
Sense of concept	Ability to think of an abstract or generic idea generalized from particular instances
Simplistic	Of or relating to, or characterized by, a simple concept
Solution oriented	Intellectually or functionally directed toward an action or process of solving a problem
Team player	Someone who willingly works or plays in cooperation with others
Unconventional	Being out of the ordinary; not bound by or in accordance with convention
Visionary	Having or marked by foresight and imagination

Lesson 4 - Keys to Innovation
approximately 45 minutes

Step	Approach	Activity	Duration
A	Overarching Question of the Day	What are the keys to innovation?	2 Minutes
B	Context-Setting Activity	Read the excerpt from speech by Patricia Mooradian, President of **The Henry Ford**, entitled, "Advancing the Culture of Innovation," to find out about the five keys to innovation. http://oninnovation.com/templates/_pdf/THF_OnInnovation_Advancing_A_Culture_of_Innovation.pdf	3 Minutes
C	Independent Activity	Select one of the five suggested keys to innovation that you think is indispensable for innovation. Watch the suggested video clips of the innovators discussing one of the essential keys to innovation. Complete *Activity Sheet #1.* **Curiosity** • *Mitchell Baker: Mozilla Culture* http://www.oninnovation.com/videos/detail.aspx?video=1483 • *William McDonough: Childhood* http://www.oninnovation.com/videos/detail.aspx?video=1185 • *Bill Gates: Inspirations* http://www.oninnovation.com/videos/detail.aspx?video=1681 **Break the Rules** • *Pierre Omidyar: Advice* http://www.oninnovation.com/videos/detail.aspx?video=1270 • *Elon Musk: Curiosity* http://www.oninnovation.com/videos/detail.aspx?video=1251 • *Rosa Parks: Read about Rosa Parks at* http://www.oninnovation.com/innovators/detail.aspx?innovator=Parks	20 Minutes

Lesson 4 - Keys to Innovation
approximately 45 minutes

Step	Approach	Activity	Duration
C Continued	Independent Activity Continued	**Collaboration Is Power** • *Toshiko Mori: Collaboration for Innovation* http://www.oninnovation.com/videos/detail.aspx?video=1223 • *Thomas Edison: Read from Menlo Park to the end of the article to learn about how Thomas Edison collaborated with numerous people* http://edison.rutgers.edu/biogrphy.htm **Meet True Needs** • *William McDonough: America as a Place for Innovation* http://www.oninnovation.com/videos/detail.aspx?video=1202 • *Steve Wozniak: Anticipating Needs* http://www.oninnovation.com/videos/detail.aspx?video=1387 • *Pierre Omidyar: What Drives Me* http://www.oninnovation.com/videos/detail.aspx?video=1272 • *Dean Kamen:* *Babies and Business* http://www.oninnovation.com/videos/detail.aspx?video=1837 *Life is Short* http://www.oninnovation.com/videos/detail.aspx?video=1838 **Embrace Risk and the Lessons of Failure** • *Elon Musk: Risk Failure* http://www.oninnovation.com/videos/detail.aspx?video=1262 • *Pierre Omidyar: Message to the Future* http://www.oninnovation.com/videos/detail.aspx?video=1276 • *Lyn St.James: Learning from Mistakes* http://www.oninnovation.com/videos/detail.aspx?video=1332	

Lesson 4 - Keys to Innovation
approximately 45 minutes

Step	Approach	Activity	Duration
C Continued	Independent Activity Continued	• *Thomas Edison: Inventor, Leader (Read quote)* http://www.oninnovation.com/innovators/detail.aspx?innovator=Edison • *Buckminster Fuller: Visionary Thinker, Serial Entrepreneur* http://www.oninnovation.com/innovators/detail.aspx?innovator=Fuller Traits Activity	
D	Report Out	One person from each team shares their findings and opinion on each of the five keys to innovation.	8 Minutes
E	Personal Connectivity	Select one innovator out of the featured innovators that you would identify as your role model and watch their highlight video at http://www.oninnovation.com/innovators.aspx	5 Minutes
F	Reflection Activity	Answer the questions on *Activity Sheet #2* and reflect on the innovator who is your role model.	7 Minutes

Lesson 4 - Keys to Innovation

Keys to Innovation Activity

Activity Sheet 1

Individually or with a partner select one of the five suggested Keys to Innovation that you think is the most indispensable for innovation:

- Curiosity
- Break the Rules
- Collaboration Is Power
- Meet True Needs
- Embrace the Risk and Lessons of Failure

Answer the questions below concerning your choice from the five Keys to Innovation:

1. Discuss the Key to Innovation that you chose and why that key is indispensible. Try to support your statement with at least five reasons. This may include a quote from an innovator or your personal conclusion.

2. Which innovator do you think best represents or supports this Key to Innovation?

3. How did the innovator you selected overcome obstacles while he/she was using that particular key to innovate?

4. How do you think you might apply one of these five keys to your life?

Get ready to report out and share your findings.

Lesson 4 - Keys to Innovation

Me and My Role Model Innovator

Activity Sheet 2

Go to: http://www.oninnovation.com/innovators.aspx. Select one of these innovators that you think you can relate to or admire the most. Watch the video clip or readings suggested for that person. Then discuss your views on the following questions:

1. Why do you admire or relate to this innovator the most?

2. What common interests do you share with this innovator?

3. What common traits do you share with this innovator?

4. What is the next innovation you would expect or would have expected (in case you choose a legendary innovator like Henry Ford or Thomas Edison) from your role model innovator?

Lesson 5 - Innovation, Intellectual Property Rights and More
approximately 45 minutes

Step	Approach	Activity	Duration
A	Overarching Question of the Day	Is intellectual property protection an integral part of innovation?	2 Minutes
B	Individual Activity	Read the document and explore the links provided to learn more about intellectual property, copyright, patents and trademarks. *Resource Sheet #1 – Did You Know?*	10 Minutes
C	Explore More Individual Activity	Watch and read the videos or selections on Elon Musk, Stan Ovshinsky, Thomas Edison and Don Chadwick on "Patents and Intellectual Property Rights," a critical part of innovation. *Elon Musk: Overview* http://www.oninnovation.com/innovators/detail.aspx?innovator=Musk *Thomas Edison: Inventor, Leader* http://www.oninnovation.com/innovators/detail.aspx?innovator=Edison *Stan Ovshinsky: Vision and Opposition* http://www.oninnovation.com/videos/detail.aspx?video=1445 *Don Chadwick: Equa Chair Part 3* http://www.oninnovation.com/videos/detail.aspx?video=1172 *Stan Ovshinsky: Legacy and Advice* http://www.oninnovation.com/videos/detail.aspx?video=1474	10 Minutes
D	Critical Thinking	*Complete Activity Sheet #1 – Intellectual Propety Rights*	8 Minutes
E	Problem Solving	Does open source pose a threat to intellectual property rights? Watch Mitchell Baker highlight video at http://www.oninnovation.com/innovators/detail.aspx?innovator=Baker and answer the questions on *Activity Sheet #2 – Innovation and the Open Source Phenomenon*	15 Minutes

Lesson 5 - Innovation, Intellectual Property Rights and More Intellectual Property Rights

Activity Sheet 1

View the suggested videos or readings as well as "Did You Know?" Resource Sheet and answer the following questions:

1. Discuss three difficulties that you see for inventors and innovators in protecting their intellectual rights.

1. .....

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2. .....

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3. .....

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2. List two possible benefits inventors or innovators receive from patents or trademarks.

1. .....

2. .....

3. Thomas Edison executed the first of his 1,093 successful U.S. patent applications on October 13, 1868, at the age of 21. His breakthroughs have had a profound effect on virtually every aspect of our daily life. Which ones continue to evolve and impact the ways we work, live and play?

4. What is the role of the U.S. Patent and Trademark Office? Why do you think the government is involved in this role? Explore more: http://www.uspto.gov

Lesson 5 - Innovation, Intellectual Property Rights and More Innovation and the Open Source Phenomenon

Activity Sheet 2

A popular and current nonpatented invention is called "open source." After viewing what Mitchell Baker has to say on this topic, answer the following questions:

1. Does the concept of open sourcing pose a threat to intellectual property rights, copyright, etc.?

2. List and write briefly about five new things you learned about open source and intellectual property rights. Share with your class.

1. .....

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2. .....

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3. .....

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4. .....

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5. .....

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Thomas Edison's Lab, Greenfield Village, Dearborn Michigan

Lesson 5 - Innovation, Intellectual Property Rights and More Did You Know?

Resource Sheet 1

Intellectual Property	refers to works created by the mind such as processes, tools, equipment, literary and artistic efforts, etc., that may be protected by copyrights, trademarks or patents.
Patents	are issued by the U.S. Patent and Trademark Office. A patent gives the inventor the right to exclude others from making, using, offering for sale or selling the invention in the United States. There are three types of patents: • A plant patent is given to anyone who invents, discovers and asexually reproduces a new and distinct variety of plant. • A utility patent is given to anyone who invents, discovers or improves a process, machine or thing. • A design patent is given to anyone who invents a new design or look for a product.
Trademark	is a brand name. It can be a word, symbol or name that is used to identify and differentiate the products or services of manufacturers or sellers.
Copyright	is a type of protection given for original works of authorship such as literary, dramatic, musical, artistic and other intellectual works.
Entrepreneur	is someone who starts a new business.
Inventing	is the process of using your intellect to create something new that did not previously exist.

For more information, visit the U.S. Patent and Trademark Office at http://www.uspto.gov/