

LESSON 9

THE TRAIT TO INNOVATE

SLIDE 9A



WORKBOOK

This lesson corresponds to *The 21st Century Student's Guide to Financial Literacy*, student workbook, Chapter 9.

MATERIALS LIST

Computer/smartboard

Webslides (www.c21student.com)

Link to highly recommended videos ★ organized by lesson at www.c21student.com/you-tube-lesson-links/

SUGGESTED VIDEOS AND ADDITIONAL RESOURCES

- Bloomberg Brink features “revolutionaries, dreamers and disrupters” shaping the futures of such industries as transportation, music, film, fashion, and others which students may find of particular interest. (www.bloomberg.com/video/bloomberg-brink)
- Steve Jobs explains the rules for success (www.youtube.com/watch?v=KuNQgIn6TLO) (1:28)
- ★ How Incredibly Successful People THINK (www.youtube.com/watch?v=OLfM9ZPGmVY) (6:34)
- ★ Will Smith Ultimate Motivational Speeches (www.youtube.com/watch?v=Ucv8075erpg) (9:44)

WHAT DOES *THAT* MEAN?

SLIDE 9B-E

Term	Definition
innovation	an improvement on or a significant contribution to an existing product, process or service which creates value.
invention	the creation of a product or introduction of a process for the first time.
collaboration	joint effort of multiple individuals or work groups to accomplish a task or project.
associational thinking	drawing connections between questions, problems, or ideas from unrelated fields.
research and development	R&D; scientific and technological research and experiments made for the purpose of developing a new product, process, or service.

NOW
DEAR, REMEMBER--
HE'S STILL IN R&D!

REPORT CARD
ENGLISH D
MATH D
SCIENCE F
LANGUAGE D
HISTORY C
LUNCH A

SPORTS
PIXELATED

BEET
CHIP
FILLED WITH FAT BUTTER

SUNNY P
PURPLE DRINK

HURSHY'S
CHOCOLATE REMOTE



LESSON OBJECTIVES

SLIDE 9F

By the end of this lesson the student will be able to:

1. Relate innovation to economic growth and prosperity.
2. Analyze the traits of an innovator.
3. Explore whether they have the traits of an innovator.
4. Create a plan to develop associational thinking skills.

GAINING ATTENTION

SLIDE 9G

Go to Slide 9F or write these words on the board:

Innovation Invention

Engage students in a discussion: Are “innovation” and “invention” the same things?

COMMUNICATING OBJECTIVES

By the conclusion of this lesson, you will be able to relate innovation to economic growth and prosperity, analyze the traits of an *innovator*, and explore your personal traits to see if you have what it takes to be an innovator. You will also plan how to develop your *associational thinking skills*, which is a way of thinking that inspires innovation.

PRESENTATION OF CONTENT

SLIDE 9H

Invention is the creation of a product or introduction of a process **for the first time**.

Innovation is when someone **improves on or makes a significant contribution or advancement** to an existing product, technology, process, or service.

New inventions can be, and often are, **applied to existing products to improve or advance them**. That is innovation. Take the light bulb, for example. Years after Edison invented the light bulb, Lewis Latimer a member of Edison’s research team, invented a carbon filament which was used to **improve and advance Edison’s original design**. Edison’s design was further improved by Willis R. Whitney who invented a treatment for the filament so that it wouldn’t darken the inside of the bulb as it glowed. It was even further improved by William Coolidge who invented a tungsten filament which lasted longer than the old filament. Latimer, Whitney, and Coolidge, while inventors of things in their own right, were also innovators because they **improved on or made a significant contribution or advancement to an existing product**. Another classic example of innovation is the iPod. It was not even close to being the first portable music device. Steve Jobs of Apple Inc., improved on old portable music devices in ways that the original inventor could never have imagined! Invention – that is coming up with a new product or process which never previously existed in any form happens, but is more rare than innovation.

It's All About Innovation

SLIDE 9I

Almost none of the products we use, medicines we take, or appliances we rely on to make our lives easier, safer, or more enjoyable are in their original invention form. Over time, they have been revised and reworked by people other than the inventor, to be better in some or many ways, and to meet the changing needs of society. Think how the airplane has changed since Orville and Wilbur Wright's original version. What if aviation engineering had stopped there? Financial literacy includes understanding and appreciating the value of innovation. When a society stops being innovative, the economy suffers, jobs are lost, businesses close, progress stagnates, and people suffer. *It's all about innovation.* **Innovation is the key to economic growth, prosperity, and frankly, to the advancement of civilization.**

Traits of an Innovator

SLIDE 9J

What kind of person is an *innovator*? What made Latimer, Whitney, and Coolidge come up with ideas to improve the light bulb, or Jobs figure out that portable music devices could be so much better? What are the *traits* of an innovator? Here's what the experts say:

An innovator is alert to opportunity.

Better, cheaper, faster! Some people are just always thinking about how to make something better. They obsess over how to take a product or process, alter it a bit (or a lot) to make it more efficient, adapt it to a different use, combine it with another product or process to expand its usefulness, or (in the case of a product) change its design so it's cheaper to manufacture. Experts tell us that innovators are **alert to opportunities** to improve things.

Engage students in a discussion: Do you have a friend or family member who likes to ponder new or different uses for products, or who constantly comments on how a product or system can be made better or more efficient? Are you like this?

An innovator is educated.

Successful innovators are not drop outs or couch potatoes who suddenly came up with an amazing idea. They are **well-educated**, and usually **work within their field of innovation**. For example, biologists typically don't innovate within the visual arts field, or aeronautical engineers don't develop surgical products or improve mining processes. The combination of education and immersion within their field of expertise enables them to recognize opportunity.

Engage students in a discussion: How important is education to innovation? How likely is it that an uneducated person will come up with a cutting edge medical product or procedure if they have no background or education in medicine? What are your higher education plans?

Innovators are persistent.

Innovators often spend several years researching, designing, experimenting, and testing a product or system. They may experience several failures before getting it right. Sometimes they never get it right! Successful innovators see **failure as a part of the process, and persist in spite of set backs**. They utilize failure as a guide to success.

Engage students in a discussion: How do you view failure? Do you see success as a long term process, or do you require immediate success? How persistent are you when faced with a difficult long term task?

Innovators accept uncertainty.

Innovators are comfortable with doubters and with following a path that holds **no guarantee of success**. Innovators have even been ridiculed for their ideas. Sometimes they are the only ones who believe in their idea or product.

Engage students in a discussion: In the last lesson's Ponder and Predict you were asked what the explorers, adventurers, and conquistadors of yore had in common with the innovators of today? Didn't they face uncertainty or ridicule? In your career, would you be willing to trade many years of uncertain pay or job advancement to pursue your idea? How do you react to ridicule of your ideas now?

Innovators are passionate.

Successful innovation can involve many years of work, during which there may be little reward for the effort. **Passion provides the fuel that keeps the innovator's dream alive** and keeps them working, even through set backs. Innovators are a passionate and ambitious group. They love their work.

Engage students in a discussion: Have you ever worked on a project you were passionate about? How does that compare to working on a project you are only mildly (or not at all) interested in? How does this impact your energy? Persistence? Creativity?

Innovators are Associational Thinkers.

According to experts, *associational thinking* is a key trait of innovators. It means **drawing connections between questions, problems, or ideas from unrelated fields**. Pulling ideas – even just bits and pieces of things – from other seemingly unrelated fields, fuels creativity and finds solutions to problems in unlikely places. For example, a cancer drug developer may draw inspiration from the behavior of fish, or an automobile designer may study the physics of a baseball pitch to improve a car's aerodynamics. Associational thinkers connect and combine nonobvious ideas and objects.

Engage students in a discussion: Are you an associational thinker? How has associational thinking affected your creativity? What can you do to improve your associational thinking skills? Advise students that in this lesson, they will complete an activity designed to help them develop associational thinking skills.

An innovator has vision.

Innovators think about the future. They have a knack for predicting societal changes and envisioning what comes next. **They think ahead to ways that needs will change**, such as a social trend or a demographic shift that will create a demand for a new or different product or service.

Engage students in a discussion: Do you ever imagine the future and how society's needs will change? Do you follow anticipated demographic changes? Can you anticipate how a product or service should evolve to meet consumers' new demands?

Innovators are cautious.

Weird and crazy scientists are a Hollywood stereotype. Innovators do not go wildly about their business, casting fate to the wind. In a process called **R&D (Research and Development)**, they patiently and thoroughly plan, review, organize, design, re-review, test, and retest their product. R&D can be a very expensive process, so it is approached with purpose and planning. **Innovators are careful not to waste money or time.**

Engage students in a discussion: Think about the early explorations, expeditions and ventures that lead to the great expansion of commerce in the 15th - 19th centuries. How cautious were explorers as they planned, prepared, and conducted their explorations? How was planning and organizing a voyage or expedition an early form of R&D?

Innovators are collaborators.

Innovators rarely work alone in a lab or office. They are team players. Innovators collaborate with others because they appreciate and need **different viewpoints, knowledge, talents, education, and life experience**. Innovation teams are united with a common purpose and clearly defined goals. Studies show that successful innovations are almost always the product of collaboration.

Engage students in a discussion: Have you ever been a team member of a successful group project? How did your group make the best use of the members' talents? What made it a successful venture?

Innovators know their market.

Innovators have a sense of how their product will play to the public – such as who needs it, who will buy it, how much they are willing to pay for it, and how it will best be marketed. The ability to **envision product use and marketing** is an important innovator trait. Innovators must also understand the competition, and how consumer needs may change over time.

Engage students in a discussion: Why is it important to understand the consumer market your product will release to? What is involved in crafting just the right message to a potential consumer?

THE BIG PICTURE

SLIDE 9K

It's all about innovation. When a society stops being innovative, commerce and the economy slow, jobs are lost, businesses close, and people suffer. Innovators improve on or make significant contributions to an existing product or service which creates value in the product or service. They are well-educated, insightful, and persistent team players who have a passion for, and a strong belief in their mission. A good education and the ability to think associatively are traits of an innovator. Being 21st century financially literate means understanding and appreciating the value of innovation and innovative thinking to growth and prosperity.

LET'S PRACTICE!

Select from the following practice activities:

- ✓ **Let's Practice: Do You Have What It Takes to Innovate?** (Complete in class and compare scores.)
- ✓ **Let's Practice: Your Life in R&D**
- ✓ **Exploring 21st Century Skills and Issues: How to Develop Associational Thinking Skills**

PONDER AND PREDICT

SLIDE 9L

Americans are very innovative. In fact, most of the innovations that drove 20th century commerce originated in the U.S. with companies like IBM, Westinghouse, and General Electric leading the way. As the tech industry grows and commerce expands globally, the U.S. remains a top innovator. However, according to Bloomberg, a popular business and financial analysis site, two countries now outrank the U.S. in innovation. Which ones? Write your predictions here and in the next lesson, find out if you are correct!

ASSIGN

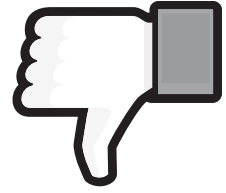
- Blog, debate, discuss: *Of all the traits of an innovator, which do you think is the most important and why?*
- To prepare for the next lesson: read Chapter 10 in the student workbook.
- **Watch business or financial news at least 15 minutes per day:**
Bloomberg West (www.bloomberg.com/video/bloomberg-west)
The Street Business News (www.thestreet.com)
Reuters (www.reuters.com/video/technology)
- Each week compare and contrast tweets from students' selected financial journalists. Compare journalists' opinions about events and stories.

LET'S PRACTICE

Name: _____



Do You Have What It Takes to Innovate?



On a scale of 1-5 (5 being **“Oh Yea, Totally!”** and 1 being **“No Way, Not at All”**) do you have the traits of an innovator? Complete the survey below and compare your scores with your classmates.

1. Do you frequently think about how to make something work better, or how to alter a product to make it more efficient, or adapt it to a different use? How **alert are you to opportunity?**
5 4 3 2 1
2. Do you have a knack for thinking about the future and having a vision for what comes next, such as a social trend or demographic shift that will create a demand for a new product or service? Are you a **visionary?**
5 4 3 2 1
3. Will you pursue a college (and possibly graduate school) education and vigorously pursue learning opportunities in your field of knowledge? Are you likely to **immerse yourself in your field of knowledge?**
5 4 3 2 1
4. Do you use your failures to guide you to success? Are you **persistent** in the face of setbacks?
5 4 3 2 1
5. Are you comfortable with following a path that encounters many doubters, and holds no guarantee of success. Are you **accepting of uncertainty?**
5 4 3 2 1
6. Passion provides the fuel that keeps an innovator’s dream alive and keeps them working, even after setbacks. When involved in a project, are you **passionate** about its success?
5 4 3 2 1
7. When seeking solutions, do you draw connections between questions, problems, or ideas from unrelated fields? Are you an **associational thinker?**
5 4 3 2 1

LET'S PRACTICE

8. When working on a project or trying to solve a problem, do you plan, review, organize, design, re-review, test and retest your idea? How **cautiously** do you plot your path to success?

5 4 3 2 1

9. When working on a project, or trying to solve a problem, do you seek out different viewpoints, knowledge, talents, education, and life experiences? Do you value **collaboration**?

5 4 3 2 1

10. If you were a product developer, how likely would you be to study how your product will play to the public and how to best market it? Can you **envision your product use and marketing message**?

5 4 3 2 1

Score: _____

Between 40-50

Inside of you beats the heart of an innovator. Why not focus on developing your innovator traits? Make a game of critically examining products and processes to determine how they can be improved. Practice your ideas. Sketch them. Build them. Run your ideas by friends and family for their opinions. Maybe you've already got a product or process in mind. You're not too young to innovate. Many of today's uber-successful innovators are not much older than you.

Between 30-39

You exhibit many traits of an innovator. Circle your three lowest scoring traits. Focus on developing those. Remember, successful innovation is collaborative. Know your weaknesses and plan to collaborate with people who have the strengths you lack. Compare your scores with other students. Find a student who scores high on the traits you lack. Consider collaborating on an upcoming project.

Between 20-29

Circle your lowest scores. Make a plan to develop those traits. Read more, seek out other people's opinions, explore college majors, develop a hobby. Break out of that shell you have built around you. Don't let fear of failure or ridicule hold you back from exploring your inner innovator.

Below 19

Concentrate on your strengths. Work at being the best at those. For example, you may not have a stomach for risk and uncertainty – many people don't. But maybe you have great vision or a knack for anticipating the future needs or desires of consumers. Maybe you enjoy immersing yourself in a field of study. Develop a skill so thoroughly that one day you can be a valuable, indispensable member of an innovation team.

LET'S PRACTICE

Your Life in R&D

You are an innovator. Your product is *you* (your life!) As a teen, you are in the R&D (Research & Development) process. How is it going? Answer these questions to determine if your product will be a success.



1. **Collaboration.** With whom do you collaborate for success? Who is on your team? List your R&D team members such as family, friends or teachers, and tell how each contributes to the success of your product.

2. **Alert to opportunity.** Are you alert to ways to improve your product? List three ways you can improve your product to enhance its value and likelihood of success.

3. **Persistence.** Do you persist in developing your product in spite of setbacks? Tell how you overcome setbacks. Provide an example of how your persistence overcome a setback in your life.

LET'S PRACTICE

4. **Vision.** Think about your future. What changes do you anticipate. How can you alter your product to improve its ability to meet the changing needs of society?

5. **Associational thinking.** Do you draw from nonobvious ideas and objects to improve your product? Tell how you are developing and using your associational thinking skills in your product development. Provide examples.

6. **Cautious.** Do you approach your product's R&D with purpose and planning? Do you research, review, and organize rather than cast your fate to the wind, hoping for success? Explain.

7. **Marketing.** What is the future market for your product? What (or who) is your competition?

8. **Message.** What's your plan for making your product stand out among the competition? What is your marketing message and to whom will you target your product message?

EXPLORING 21ST CENTURY SKILLS AND ISSUES

How to Develop Associational Thinking Skills

Associational thinking means **drawing connections between questions, problems, or ideas from unrelated fields**. Pulling ideas – even just bits and pieces of things, from other seemingly unrelated fields fuels creativity. It’s also been referred to as *cross-pollenization of ideas*. Here are some ways to develop your associational thinking skills. Read them, check the ideas that appeal to you, and make a plan to practice associational thinking every day.



Step out of your mental comfort zone – often!

Disillusioned with his required college classes and looking for a change of pace, Steve Jobs broke ranks and took a calligraphy class. Calligraphy is the art of hand-lettering. Jobs knew it had little practical application to his life as a 20 year old, but he loved it. Years later, when he was designing his first computer, it occurred to him that computers ought to be able to create a variety of fonts and document designs. He credited his knowledge of calligraphy for the inspiration which eventually made a huge difference in the functionality of computers and the success of Apple. The point is, the ability to think associatively requires that you expose your brain to new and novel ideas. Go ahead. Delve into a few subjects and activities that are out of your normal routine. Check the activities that appeal to you and make a plan to do them!

- Apply for a local internship or community service project where you will meet new people, and have new experiences; observe how activities are organized. Observe group dynamics and how problems are solved.
- Go to a museum – any museum. They all have cool stuff. Make museums part of your regular routine. If you don’t live near one, most offer virtual exhibit tours through their websites.
- Take an online class in a subject not offered at your school, such as astronomy, archeology, even calligraphy.
- Adopt a Take 5 routine. Once a day select a topic completely at random. Read about it for five minutes.
- Learn to play chess.
- Campaign for a cause.
- Surround yourself with intelligent and ambitious people. That may require making a lifestyle change, joining some clubs, or working harder at school. It may also mean losing so-called friends who drag you down with wasteful habits, bad attitudes, and no respect for education.
- Watch the financial news or videos from Bloomberg West or Bloomberg Brink at least 15 minutes every day.
- Other: _____

EXPLORING 21ST CENTURY SKILLS AND ISSUES

Expand your sources of data

Not only does the ability to think associatively require exposing your brain to new and novel ideas, it requires a large database of information for your brain to work with. For many students, their teacher and textbook are their only sources of intellectual stimulation. Expand your sources of intellectual data beyond your teacher and textbook. Mix up the medium of delivery. Incorporate new data sources and mediums into your daily routine. Here are some ideas:

- Listen to/watch podcasts - there are thousands of amazing podcasts on iTunes, NPR, Open Culture.
- Read blogs. Many of the world's leading experts on all kinds of subjects are regular bloggers. If you are interested in a topic, it's easy to consult an expert. Read their blog!
- Watch a webcast. NASA, United Nations, concert series, and all sorts of top notch universities have awesome webcasts. You can even ride a SpaceX Rocket from launch to 600 kilometers above the earth on the SpaceX website.
- Download audio books. There are thousands of titles, including lots of free ones. Don't *just* listen to music – listen to a book on occasion. It's possible be well-read, without even reading!
- Compare opinions from liberal newsites with opinions from conservative news sites without making a judgment as to who's right or wrong – just to identify the differences.
- Listen to archived interviews of famous people.
- Read or watch foreign news sites like BBC, JapanNews Today, Aljazeera, Foreign Policy, War on the Rocks.
- Watch TED Talks. There are thousands of really interesting short talks by people who are not only expert speakers, but brilliant associational thinkers.

Think *differently*

Associational thinking skills require flexibility of thinking. This enables the brain to examine concepts or problems from different perspectives and shift approaches to solutions. Just like exercising your body, there are lots of ways to exercise your brain to improve its flexibility and agility. These exercises help you learn how to make connections between random ideas by figuring out why and how they connect.

- Visualize an issue or idea as a hologram. Walk around it. Walk under it. Examine it from every perspective.
- Think in metaphors, such as how is a traffic jam like an egg? or How is a virus like a Mayan pyramid?
- Degrees of Separation exercises are a fun way to develop the ability to find connections the discovery of solutions for difficult-to-solve problems. Select 3 things, events, or people at random, then figure out how they connect.
- If an idea could talk to you, what would it say?

EXPLORING 21ST CENTURY SKILLS AND ISSUES

- Sketch an essay; write a screenplay for a math formula; rap a biology chapter.
- Think fresh. Drop any preconceived ideas about a subject, then relearn it.
- Mix up sensory experiences. What if you could hear color? What if you could see odors? What would music feel like if you could touch it?
- Think in “what if’s...?” What if dinosaurs walked the earth again? What if the Allies had lost WWII?
- Diagram your day – backwards.

Keep a Journal

Ideas rarely arrive completely formed, polished, packaged and ready for the world. The creative brain is on its own schedule. Ideas often arrive at inconvenient times, like in the middle of the night when your mind is dreamy and free-floating ideas. They come in bits and pieces – small insights or notions that can be added to, revised, and developed. Writers often keep several files of partially written stories, ideas for stories or characters, or even just opening sentences of a novel, because they may be something they can use later. Innovators and inventors do the same thing. Exactly where these ideas fit is not yet known to them. They are like pieces of a puzzle. Make a habit of preserving your ideas by text, mail, voice message, journal, or sketching. Save them until you have enough to work with.

Tell how you will journal your ideas or designs:

Unplug

Tech is great, but it’s also addictive, and can be a barrier to interaction with people and the environment. The creative brain sometimes needs quiet to sort, develop, and bring ideas to the surface. Unplug once and awhile. Turn your cell phone off for an hour. Don’t even listen to music. Let the dust in your brain settle. Go for a walk. Notice the sounds of life. Create a story in your head using the sounds you hear or the sights you see. Engage in conversations without checking your phone every minute. Mediate in a quiet place. At first, this all may seem weird if you are tech-addicted, but your brain will soon welcome the change.

Tell how you will journal your ideas or designs:

LESSON SOURCES

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