Close reading plan

3-D Printing Spurs a Manufacturing Revolution,
Ashlee Vance, September 13, 2010

Created by David Daigneault, 2014 Connecticut Dream
Team Teacher

What makes this text complex?			
Text and Author	3-D Printing Spurs a manufacturing Revolution, Ashlee Vance, September 13, 2010	**Where to Access Text**	http://www.nytimes.com/2010/09/14/technology/14print.html?pagewanted=all&_r=1&

Text Description
A non-fiction complex informative text that explores various manufacturing innovations that have resulted by the development of 3-D printing technology. The author clearly takes a stance on the technology and provides text that offers examples that are relatable to wide and varied audience.

Quantitative			
Lexile and Grade Level	1380, grade 12	**Text Length**	1233

Qualitative	
Meaning/Central Ideas	**Text Structure/Organization**
That current and emerging 3-D printing technologies are revolutionizing manufacturing by making product development and creation, faster, friendlier, and affordable a larger population. 3-D printing is responsible for making business opportunities manageable and affordable to an entirely new population of perspective entrepreneurs.	Text structure has an exceedingly complex organization that uses a variety of complex transitions between ideas that are intricate and discipline specific. The author also provides text features that provide humor, tone, examples, quotes, and illustrations that directly enhance the readers understanding of the content. In addition the author goes further by adding hyperlinks so readers that wish to expand their knowledge can do so.
Prior Knowledge Demands	**Language Features**
The author uses carefully placed humor and text examples that are extremely common and relatable to a large audience therefore, I do not believe that any significant prior knowledge is necessary. However, a basic awareness of the manufacturing and printing process will be helpful.	The author uses fairly complex language that uses subject specific vocabulary in very complex sentences that include subordinate phrases and clauses i.e. company x does this while other's find that is better, and transitional words like even, never before and for example.

Vocabulary	
Tier Two Words (General academic vocabulary) *"Words that are far more likely to appear in written texts than in speech. [They] often represent subtle or precise ways to say relatively simple things—saunter instead of walk, for example." (CCSS ELA Appendix A)*	**Tier Three Words (Domain-specific words)** *"[Tier Three words]…are specific to a domain or field of study (lava, carburetor, legislature, circumference, aorta) and key to understanding a new concept within a text." (CCSS ELA Appendix A)*

Tier Two Words:
- Sophisticated
- Shimmering
- Innovations
- Transformed
- Analysis
- Contraption
- Sea Urchin
- Transitioned
- Revamp
- Enabling
- Technique
- Exotic
- Aesthetic
- Offspring

Tier Three Words:
- Embroidered
- Orthopedic Surgeon
- Manufacturers
- Designers
- 3D
- Developer
- Permutations
- Prototype.
- Architectural models
- Prosthetics
- Advocates
- Mass-produce
- Symmetry

Potential Reader/Task Challenges
This text reads at moderate to high 12th grade level so students that read at lower levels may need scaffolding tools and assistance to help them with some vocabulary, understanding subtle humor and identification of the Author's intended or implied message.

Text-dependent questions		
Question	Standard alignment	Page of this document
TDQ #1 How has the company LGM changed as a result of 3D printing innovations? Please use textual evidence to support your response.	RST.11-12.1	4
TDQ #2. According to the author, what opportunities have the shifts in 3D printing technology provided for the hobbyist and average person? Please use textual evidence to support your response.	RST.11-12.1	7
TDQ #3 According to the author, what advantages has 3D printing technology provided manufacturers and designers? Please give specific examples from the text.	RST.11-12.1	10
TDQ #4 How does the author structure the article to convey the evolution of manufacturing as a result of 3D printing? Please use textual evidence to support your response.	RST.11-12.5	13
TDQ #5, What are the author's argument or position about 3D printing and its effect upon domestic design and manufacturing? Please use textual evidence to support your response.	RST.11-12.2	16
Target Standards		
• RST.11-12.1-Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. • RST.11-12.2-Determine the central ideas or conclusions of a text: summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. • RST.11-12.5-Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.		

Question 1

Question #1	How has the company LGM changed as a result of 3D printing innovations? Please use textual evidence to support your response.
Standard(s) covered:	RST.11-12.1 – Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

Example response that meets standard	**Look-fors**
LGM has used 3D printing to go from building time consuming, expensive models to fast, inexpensive ones. The owner of the LGM states, "We used to take two months to build $100,000 models". Then, the author says, "Now…he is building $2,000 models using an architect's design and homegrown software. He can turn a model around in one night." Therefore LGM has used 3D printing to streamline their model building saving time and money.	• Statements supporting where LGM began ✓ "We used to take two months to build $100,000 models". • Statements that support where LGM is now ✓ "Now…he is building $2,000 models using an architect's design and homegrown software. He can turn a model around in one night." • Reader's conclusion that LGM's model building process has improved in terms of cost and speed as a result of using 3D printing • Organization: I see how they began, I note a change, and I see where they are now, so this is what I think.

If students are struggling to answer the text-dependent question, use this follow-up plan for modeling and practice:

Objective	In this lesson the student will learn to answer a question by gathering evidence and direct quotations from the text.
Prior knowledge to review	To know how to cite specific textual evidence to support analysis of science and technical texts. Know how to attend to the precise details of explanations or descriptions in the text.

Steps to achieve objective	Think aloud for direct instruction
Reread the article to locate and identify portions of the text that contain information that can support an answer to the question.	• The first step I take is to reread the text. • I read carefully to insure that I find the portion of the text that contains the LGM information since the question asks specifically about this company. • I think to myself, "What is the key idea the question asking about LGM"? I conclude that the question is asking about how LGM has changed, so I decide to look for specific information about what LGM was like before they used 3D printing and how they are after using 3D printing. • I reread the LGM portion of the text a couple of times. I see a little more each time I read it. It's like watching a movie for the second time; you see things that you did not see the first time. • I ask myself, "what portions of the text talk about before and after at LGM". • I find and pay close attention to Mr. Ovary's statements about model making. • I identify statements in the text that shows evidence of where LGM started. "We used to take two months to build $100,000 models," said Charles Overy, the founder of LGM. • Now I find text that tells me where LGM is after using 3D printing and I find the text, "Now, he said, he is building $2,000 models using an architect's design and homegrown software for a 3-D printer. He can turn around a model in one night".
Ask yourself, "How does the author use the text to demonstrate the difference between the before and after?"	• When writing an answer I think back to what makes up good structure for my answer, I need a clear beginning, middle, and end with supporting statements from the text. (A basic outline) • I ask myself, what do I need next? I need to list the select the key ideas from the text that demonstrate the beginning (the before), "We used to take two months to build $100,000 models," said Charles Overy, the founder of LGM. • The middle (statement that show transition), "**Well**, that type of work is gone **because** developers aren't putting up that type of money anymore." • Now the end (the after) "Now, he said, he is building $2,000 models using an architect's design and homegrown software for a 3-D printer. He can turn around a model in one night".

Using the difference between the before and after, ask yourself, "What conclusion can I draw from this information?"	• Therefore LGM has used 3D printing to streamline their model building saving time and money. • Finally I polish and refine my sentence structure so that it reads smoothly

Extension and practice

- For students who struggle with being able to answer the question, I might have them practice finding key points in the text i.e.:
  - ✓ Find and highlight every place you can find the name LGM written in the text.
  - ✓ Find and highlight all of the quotes from LGM.
  - ✓ Locate and highlight phrases or words like "we used to", "Now we", next.
- We could then work together using an outline template to organize the key points they have found.
- Now the students can use what they learned to practice writing sentences that incorporate the key points they found in the first activity.
- I would have the students that understand how to identify and analyze key points in the text work with the students that struggle. I find that students are sometimes better at getting their friends to understand a concept or skill better than an adult. This activity also reinforces the advanced learners understanding of a teachable skill
- As an extension for students I would have them draw connections on how 3D printing could be used in similar ways to LGM. How might it be used to save time, money and lives in areas other than manufacturing and design?
- The advanced students could also research other ways that 3D printing is used other than manufacturing.

What next?

For additional practice, with students or for students' independent work, apply this learning objective and set of steps to (name type of text and skill/standard

Objective: In this lesson the student will learn to answer a question by gathering evidence and direct quotations from the text.

1. Reread the article to locate and identify portions of the text that contain information that can support an answer to the question.
2. Ask yourself, "How does the author use the text to demonstrate the difference between the before and after?"
3. Using the difference between the before and after, ask yourself, "What conclusion can I draw from this information?"

Question 2	

Question #2	According to the author, what opportunities have the shifts in 3D printing technology provided for the hobbyist and average person? Please use textual evidence to support your response.
Standard(s) covered:	RST.11-12.1 – Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

Example response that meets standard	Look-fors

The main shift in 3D printing technology that has provided opportunity for the average person is the cost. The author states, "as 3D printing machines have improved and fallen in cost along with the materials used to make products, new businesses have cropped up." This shift in cost has provided opportunity for the average person to make use of this technology. Throughout the article the author provides a variety of examples of how 3D technology is affordable to the average person or hobbyist. She starts with examples that connect the use of 3D printing to the average person. "We are enabling a class of ordinary people to take their ideas and turn those into physical, real products," said J. Paul Grayson, Alibre's chief executive. Then the author continues to strengthen her case by using direct examples of equipment cost. "Depending on the type of job at hand, a typical 3-D printer can cost from $10,000 to more than $100,000. Stratasys and 3D Systems are among the industry leaders. And MakerBot Industries sells a hobbyist kit for under $1,000". By providing examples of low cost devices and connecting their usage to "ordinary people" the author clearly shows that 3D printing has shifted from being an expensive corporate tool to a manufacturing device for the hobbyist.	• A beginning statement that shows that the reader understands the ideas presented by the question.
	 • Statements that demonstrate a shift in 3D printing technology
	   ✓ "As 3D printing machines have improved and fallen in cost along with materials used to make products, new businesses have cropped up."
	 • Statements that provide examples of 3D use or accessibility to average people or hobbyists.
	   ✓ "We are enabling a class of ordinary people to take their ideas and turn those into physical, real products," said J. Paul Grayson, Alibre's chief executive.
	 • Now we are looking for direct statements showing the cost of 3D printers.
	   ✓ "Depending on the type of job at hand, a typical 3-D printer can cost from $10,000 to more than $100,000. Stratasys and 3D Systems are among the industry leaders. And MakerBot Industries sells a hobbyist kit for under $1,000".
	 • Reader's conclusion that restates how the author has built a case of how the shift in affordability in 3D technology has provided opportunities for the hobbyist.

	If students are struggling to answer the text-dependent question, use this follow-up plan for modeling and practice:
Objective	In this lesson the student will learn to answer a question by gathering and analyzing direct quotations and examples from the text.
Prior knowledge to review	To know how to cite specific textual evidence to support analysis of science and technical texts. Know how to attend to the precise details of explanations or descriptions in the text.
Steps to achieve objective	**Think aloud for direct instruction**
Reread the article to locate and identify portions of the text that contain information that can support an answer to the question	• The first step I take is to reread the text. • I identify that the question is looking for information about a shift in 3D technology. • I read carefully to find the portion of the text that discusses the shift in cost of 3D printing technology. • I find the quotation, "as 3D printing machines have improved and fallen in cost along with the materials used to make products, new businesses have cropped up." • I reread the text a couple of times. I see a little more each time I read it. It's like watching a movie for the second time; you see things that you did not see the first time.
Ask yourself, "What examples does the author use to support this quotation?"	• I ask myself, what do I need next? I need to list the select key ideas from the text that help me understand the author's ideas or argument about what the shift in the cost of technology has caused. • I find the quotation, "We are enabling a class of ordinary people to take their ideas and turn those into physical, real products, said J. Paul Grayson, Alibre's chief executive." • I then think to myself, "I need to carefully read and understand both points of view in the argument". "Depending on the type of job at hand, a typical 3-D printer can cost from $10,000 to more than $100,000."
Ask yourself, "What conclusion can I draw from this examples and quotations?"	• For my summary or conclusion I look for all of the points in the text that the author uses to make her case about the shift in 3D technology's cost and how it affects hobby level affordability and use and I restate them in my own words. 'By providing examples of low cost devices and connecting their usage to "ordinary people" the author clearly shows that 3D printing has shifted from being an expensive corporate tool to a manufacturing device for the hobbyist.'

Extension and practice
- For students that struggle with being able to answer the question I might have them practice finding key points in the text i.e.:   ✓ Find and highlight all of the quotes regarding affordability, hobbyists and shifts in 3D printing technology.   ✓ Locate and highlight phrases or words like: use or accessibility to average/ordinary people or hobbyists.   - We could then work together using an outline template to organize the key points they have found.   - Now the students can use what they learned to practice writing sentences that incorporate the key points they found in the first activity.   - I would have the students that get it work with the students that struggle. I find that students are sometimes better at getting their friends to understand a concept or skill better than an adult. This activity also reinforces the advanced learners understanding of a teachable skill   - As an extension for the students who may not be comfortable helping peers or just want more I would have them write about how they would utilize a hobby level 3-D printer in a possible business plan.

What next?
For additional practice, with students or for students' independent work, apply this learning objective and set of steps to (name type of text and skill/standard
Objective: In this lesson the student will learn to answer a question by gathering and analyzing direct quotations and examples from the text. Step 1: Reread the article to locate and identify portions of the text that contain information that can support an answer to the question. Step 2: Ask yourself, "What examples does the author use to support this quotation?" Step 3: Ask yourself, "What conclusion can I draw from this examples and quotations?"

Question 3

Question #3	According to the author, what advantages has 3D printing provided manufacturers and designers? Please give specific examples from the text.
Standard(s) covered:	RST.11-12.1 – Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

Example response that meets standard	Look-fors

Throughout the article the author gives many examples how 3-D printing has provided advantages to manufactures and designers. She begins with a time saving example: "Manufacturers and designers used 3D printing technology for years, experimenting on the spot rather than sending off designs to be built elsewhere, usually Asia, and then waiting for a model to return". She then provides examples of pre-production testing: "Boeing, for example, might use the technique to make and test air-duct shapes before committing to a final design". The author continues by explaining that some companies have gained advantage by changing the way they have used 3D printing: "The technology has radically transformed from its origins as a tool used by manufacturers and designers to build prototypes. These days it is giving rise to a string of never-before-possible businesses that are selling iPhone cases, lamps, doorknobs, jewelry, handbags, perfume bottles, clothing and architectural models". This provides the manufacturers the advantage of saving labor costs, and she notes, "now it is manufacturing with mouse clicks instead of hammers, nails and well, workers". The author is clearly presenting information that shows that the advantages created by 3-D printing could revive domestic industry by replacing labor costs and overseas manufacturing with American creativity, ingenuity, and 3-D printing technology.	• A beginning statement showing the reader understands the question.
	• Statements that demonstrate the advantages of how manufacturers and designers used 3-D printing technology.
	  ✓ "Manufacturing and designers have used 3-D printing technology to experiment on the spot rather than sending designs to be built elsewhere, usually Asia, and then waiting for the model to return.
	  ✓ Boeing, for example might use the technique to make and test air-duct shapes before committing to a final design".
	  ✓ "The technology has radically transformed from its origins as a tool used by manufacturers and designers to build prototypes. These days it is giving rise to a string of never-before-possible businesses that are selling iPhone cases, lamps, doorknobs, jewelry, handbags, perfume bottles, clothing and architectural models".
	  ✓ "It is manufacturing with mouse clicks instead of hammers, nails and well, workers".
	• The conclusion then restates the advantages that 3-D printing has had on manufacturing and designers that have been using the technology.

If students are struggling to answer the text-dependent question, use this follow-up plan for modeling and practice:		

Objective	In this lesson the student will learn to answer a question and make inferences by gathering evidence and direct quotations from the text.
Prior knowledge to review	To know how to cite specific textual evidence to support analysis of science and technical texts. Know how to attend to the precise details of explanations or descriptions in the text.

Steps to achieve objective	Think aloud for direct instruction
Reread the article and locate and Identify portions of the text that contain information that can support and answer to the question	• The first step I take is to reread the text. • I read carefully to insure that I find and highlight portions of the text that identify manufacturers that have been using 3-D printing for years. "Manufacturing and designers have used 3-D printing technology to experiment on the spot rather than sending designs to be built elsewhere, usually Asia, and then waiting for the model to return".
Ask yourself, "How does the author use the text to support these ideas?"	• Now I ask myself what specific information the question asks about this group. The question wants to know what advantages 3-D printing provides to manufacturers. "Boeing, for example might use the technique to make and test air-duct shapes before committing to a final design". • I now look for and highlight statements that show advantages to users of this technology. "It is manufacturing with mouse clicks instead of hammers, nails and well, workers". • I think to myself, why does the question want to know about advantages to manufactures and designers? I consider that there must be a change in the way that they have been using it. Because anything that we do for a period of time we intend to improve on it. "The technology has radically transformed from its origins as a tool used by manufacturers and designers to build prototypes. These days it is giving rise to a string of never-before-possible businesses that are selling iPhone cases, lamps, doorknobs, jewelry, handbags, perfume bottles, clothing and architectural models".
Ask yourself, "What conclusions can I draw from the quotations and examples?"	• Now I consider what conclusions that I can draw by how manufactures have gained an advantage by changing the way they use 3-D printing. "The author is clearly presenting information that shows that the advantages created by 3-D printing could revive domestic industry by replacing labor costs and overseas manufacturing with American creativity, ingenuity, and 3-D printing technology".

Extension and practice
- For students that struggle with being able to answer the question I might have them practice finding key points in the text i.e.:   ✓ Find and highlight every place you can find phrases that show advantages, long term users, changes in use in 3-D printing.   ✓ Users can develop a T chart to record evidence.   - We could then work together using an outline template to organize the key points they have found.   - Now the students can use what they learned to practice writing sentences that incorporate the key points they found in the first activity.   - I would have the students that get it work with the students that struggle. I find that students are sometimes better at getting their friends to understand a concept or skill better than an adult. This activity also reinforces the advanced learners understanding of a teachable skill.   - As an extension for the students who may not be comfortable helping peers or just want more I would have them research and learn about current manufacturing jobs and develop predictions on how 3-D printing will effect these jobs in the future.

What next?
For additional practice, with students or for students' independent work, apply this learning objective and set of steps to (name type of text and skill/standard
Objective: In this lesson the student will learn to answer a question and make inferences by gathering evidence and direct quotations from the text. 1. Reread the article and locate and Identify portions of the text that contain information that can support and answer to the question. 2. Ask yourself, "How does the author use the text to support these ideas?" 3. Ask yourself, "What conclusions can I draw from the quotations and examples?"

Question 4

Question #4	How does the author structure the article to convey the evolution of manufacturing as a result of 3D printing? Please use textual evidence to support your response.
Standard(s) covered:	RST.11-12.5-Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

Example response that meets standard	Look-fors

The author uses a clear comparison between the past and present of manufacturing that demonstrates to a wide audience the changes in manufacturing that have occurred due to 3D printing, and what potential this technology has for the future. The author clearly creates a comparison between manufacturing before 3D printing and manufacturing today to demonstrate clearly to an uneducated reader the advances this new technology has provided to the field of manufacturing. For instance, the author discusses Charles Overy, the head of an architectural firm. The firm "used to take two months to build $100,000 models." Now the same company, equipped with 3D printing capabilities can build "$2000 models…in one night." This clearly demonstrates the evolution of manufacturing from a less efficient, more costly operation to becoming streamlined, less expensive and more efficient. The author also discusses the possibility of the future of manufacturing as a result of 3D printing technology; "It is manufacturing with a mouse click instead of hammers, nails and, well, workers". Through using this comparison structure, the author's organization provides an average reader with an easy to comprehend piece that details the changes that 3D printing has made to the manufacturing world.	• Statements that show the reader understands the author's organization of the text.
	• Statements that demonstrate an evolution of manufacturing as a result of 3D printing
	  ✓ The firm "used to take two months to build $100,000 models." Now the same company, equipped with 3D printing capabilities can build "$2000 models…in one night."
	  ✓ "It is manufacturing with a mouse click instead of hammers, nails and, well, workers".
	• Reader's conclusion that shows they understand where how and why the author uses this type of organization.
	  ✓ "The author's organization provides an average reader with an easy to comprehend piece that details the changes that 3D printing has made to the manufacturing world."

If students are struggling to answer the text-dependent question, use this follow-up plan for modeling and practice:

Objective	The students will analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas by reading the text carefully and identifying past, present and future effects of 3D printing on manufacturing.
Prior knowledge to review	Analyze the structure of the relationships among concepts in a text, including relationships among (e.g., *force, friction, reaction force, energy*).

Steps to achieve objective	Think aloud for direct instruction
Reread the article in order to identify the order of events.	- The first step I take is to reread the text. - I read carefully to insure that I find and highlight portions of the text that identify the information that I need to answer the question of how the author has organized the text. - I found that the author clearly separates the text into past and present to highlight the impact that 3D printing has had on manufacturing and how it may impact the future of manufacturing.
Ask yourself, "What evidence or quotations can help to reveal the structure?"	- I think to myself that I need to identify and highlight portions of the text that compare and contrast the past and present of manufacturing. - I choose the portions that provide the best comparisons of the past and present. "We used to take two months to build $100,000 models," said Charles Overy, the founder of LGM." "Now, he said, he is building $2,000 models using an architect's design and homegrown software for a 3-D printer. He can turn around a model in one night." - I choose portions that represent the future of manufacturing due to 3D printing. "It is manufacturing with a mouse click instead of hammers, nails and, well, workers". - I think about all of the possible reasons for the use of this type of organization, and I think about how it is helpful to explain this complex topic. - I write a list of these ideas.
Ask yourself, "What conclusion can I draw from the organizational pattern I identified?"	- Now I take my list of ideas that I generated and look for a pattern to form. - Now I use this pattern, which is a type of organization, to explain or conclude my answer: "The author's organization provides an average reader with an easy to comprehend piece that details the changes that 3D printing has made to the manufacturing world."

Extension and practice

- For students that struggle with being able to answer the question I might have them practice finding patterns in the text i.e.:
  - ✓ Sentences that use words like before, or used to, to identify past concepts. Sentences that use words like these days, currently, now we, for present. And sentences that use words like soon we will be, replace, next, developing.
  - ✓ Practice finding patterns by locating similar groups of ideas. Find all sentences that talk about the past and highlight in yellow. You would then repeat by finding sentences that represent the current time frame and highlight them in blue. Then you could find sentences that represent the future and highlight in red. This would provide the learner a distinctive visual pattern of the text organization.
- We could then work together using an outline template to organize the key points and patterns they have found.
- I would have the students that get it work with the students that struggle. I find that students are sometimes better at getting their friends to understand a concept or skill better than an adult. This activity also reinforces the advanced learners understanding of a teachable skill.
- As an extension for the students who may not be comfortable helping peers or just want more I would have them go up on the internet and find two other technical articles that use the same organizational technique. They could print them and present their ideas to the class.

What next?

For additional practice, with students or for students' independent work, apply this learning objective and set of steps to (name type of text and skill/standard

Objective: The students will analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas by reading the text carefully and identifying past, present and future effects of 3D printing on manufacturing.

1. Reread the article in order to identify the order of events.
2. Ask yourself, "What evidence or quotations can help to reveal the structure?"
3. Ask yourself, "What conclusion can I draw from the organizational pattern I identified?"

Question 5

Question #5	What are the author's argument or position about 3D printing and its effect upon domestic design and manufacturing? Please use textual evidence to support your response.
Standard(s) covered:	RST.11-12.2-Determine the central ideas or conclusions of a text: summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

Example response that meets standard	**Look-fors**

The author's position on 3-D printing is that 3-D printing technology is causing a paradigm shift in how and where we design, develop, and manufacture products and who will be the product producers of the future. It is clear from the very beginning of this text that the author believes there are big changes in manufacturing that are a direct result of 3-D printing technology. " 3-D printing spurs a manufacturing revolution" is the title of the article and throughout the text she provides numerous examples of industries from the garage shop hobbyist making phone cases or doorknobs and Bespoke innovations making customized "dishwasher safe" body parts to Contour Crafting who has "created a giant 3-D printing device for building houses". "It is manufacturing with a mouse click instead of hammers, nails, and, well, workers". This shift in manufacturing saves time, money and increases the amount of product made domestically. "There is nothing to be gained by going overseas except higher shipping charges". "3-D printing could revamp the economics of manufacturing and revive American industry as creativity and ingenuity replaces labor costs as the main concern around a variety of goods".	• Statements that demonstrate the authors' position on the topic of 3D printing are.
	  ✓ The author's position on 3-D printing is that 3-D printing technology is causing a paradigm shift in how and where we design, develop, and manufacture products and who will be the product producers of the future.
	
	 • Statements that support the authors' arguments about 3D printing.
	  ✓ "3-D printing spurs a manufacturing revolution" is the title of the article.
	  ✓ Throughout the text she provides numerous examples of industries from the garage shop hobbyist making phone cases or doorknobs and Bespoke innovations making customized "dishwasher safe" body parts to Contour Crafting who has "created a giant 3-D printing device for building houses".
	 • Major supporting concepts in the text summarized in the readers own words
	  ✓ Throughout the text she provides numerous examples of industries from the garage shop hobbyist making phone cases or doorknobs and Bespoke innovations making customized "dishwasher safe" body parts to Contour Crafting who has "created a giant 3-D printing device for building houses".
	
	 • This shift in manufacturing saves time, money and increases the amount of product made domestically.

	If students are struggling to answer the text-dependent question, use this follow-up plan for modeling and practice:
Objective	In this lesson the student will learn to determine central ideas of the text by summarizing concepts and information presented in the text, and drawing conclusions from that information.
Prior knowledge to review	Determine central ideas of conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
Steps to achieve objective	**Think aloud for direct instruction**
Reread the article and locate and Identify portions of the text that contain information that can support the author's position.	• The first step I take is to reread the text. • I read carefully to insure that I find and highlight portions of the text that will help me figure out what the author's position in the text is. The first thing I consider for is the title of the text. Sometimes titles can be vague or a little misleading, but often, as with this text, it is right on target. "3-D printing spurs a manufacturing revolution".
Ask yourself, "What examples from the text support the main idea or author's position?"	• I think to myself that there can be more one perspective of the author's position in the text and I remind myself it is all about how I support my answer. • I now look for and highlight statements that support my stance for the author's position. "There is nothing to be gained by going overseas except higher shipping charges" and "3-D printing could revamp the economics of manufacturing and revive American industry as creativity and ingenuity replaces labor costs as the main concern around a variety of goods" • I summarize the supporting statements that I find in my own words "Throughout the text she provides numerous examples of industries from the garage shop hobbyist making phone cases or doorknobs and Bespoke innovations making customized "dishwasher safe" body parts to Contour Crafting who has "created a giant 3-D printing device for building houses".
Ask yourself, "What conclusions can I draw from the examples and position I have identified?"	• Now I use this information to write and support my conclusion. "This shift in manufacturing saves time, money and increases the amount of product made domestically".

Extension and practice
- For students that struggle with being able to answer the question I might have them practice finding key points in the text i.e.:   ✓ Find and highlight portions of the text that will help me figure out what the main idea is.   ✓ List all of the points that support your main idea in a t chart format.   - We could then work together using an outline template to organize the key points they have found.   - Now the students can use what they learned to practice writing sentences that incorporate the key points they found in the first activity.   - I would have the students that get it work with the students that struggle. I find that students are sometimes better at getting their friends to understand a concept or skill better than an adult. This activity also reinforces the advanced learners understanding of a teachable skill.   - As an extension for the students who may not be comfortable helping peers or just want more I would have them research and find two different authors that support the same conclusions and main idea. Then have them explain why they believe the new articles support the same conclusions and main idea.
What next?
For additional practice, with students or for students' independent work, apply this learning objective and set of steps to (name type of text and skill/standard
Objective: In this lesson the student will learn to determine central ideas of the text by summarizing concepts and information presented in the text, and drawing conclusions from that information. 1. Reread the article and locate and Identify portions of the text that contain information that can support the author's position. 2. Ask yourself, "What examples from the text support the main idea or author's position?" 3. Ask yourself, "What conclusions can I draw from the examples and position I have identified?"