

Technology Concepts and Trends

Unit: Technology

Problem Area: Describe Technology Concepts and Impacts

Lesson: Technology Concepts and Trends

- **Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

- 1 Describe emerging technology concepts.**
- 2 Describe the application of technology concepts by specific businesses and industries.**

- **Resources.** The following resources may be useful in teaching this lesson:

E-unit(s) corresponding to this lesson plan. CAERT, Inc. <http://www.mycaert.com>.

“10 Breakthrough Technologies 2018,” *MIT Technology Review*. Accessed Sep. 7, 2018. <https://www.technologyreview.com/lists/technologies/2018/>.

Heltzel, Paul. “12 Technologies that will Disrupt Business in 2018,” *CIO*. Accessed Sep. 7, 2018. <https://www.cio.com/article/3254744/emerging-technology/technologies-that-will-disrupt-business.html>.

Moffitt, Sean. “The Top 30 Emerging Technologies (2018–2028),” *Medium*. Accessed Sep. 7, 2018. <https://medium.com/@seanmoffitt/the-top-30-emerging-technologies-2018-2028-eca0dfb0f43c>.

Neiger, Chris. “5 Technological Innovations That Could Change The World,” *The Motley Fool*. Accessed Sep. 7, 2018. <https://www.fool.com/investing/2017/08/04/5-technological-innovations-that-could-change-the.aspx>.

Smith, Kelli. “99 Terms You Need to Know When You’re New to Tech,” *The Hard Refresh*. Accessed Sep. 7, 2018. <https://skillcrush.com/2015/03/26/99-tech-terms/>.



■ **Equipment, Tools, Supplies, and Facilities**

- ✓ Overhead or PowerPoint projector
- ✓ Visual(s) from accompanying master(s)
- ✓ Copies of sample test, lab sheet(s), and/or other items designed for duplication
- ✓ Materials listed on duplicated items
- ✓ Computers with printers and Internet access
- ✓ Classroom resource and reference materials

■ **Key Terms.** The following terms are presented in this lesson (shown in bold italics):

- ▶ 3D printer
- ▶ artificial intelligence (AI)
- ▶ augmented reality
- ▶ cloud storage
- ▶ computer-aided design (CAD)
- ▶ data mining
- ▶ drone
- ▶ e-commerce
- ▶ internet
- ▶ laser scanners
- ▶ nondurable manufacturing
- ▶ point of sale (POS) software
- ▶ social media
- ▶ universal internet
- ▶ virtual reality
- ▶ wi-fi
- ▶ world wide web

■ **Interest Approach.** Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Ask students to generate a list of technology advances that they have seen come about during their lifetimes. Some items mentioned might include self-driving cars, drones, virtual reality goggles. Then ask students to generate a list of technology advances they expect to see before their lives are over. If students have trouble coming up with ideas, have them think about fictional technology seen in sci-fi movies (i.e. teleportation, time travel, etc.) Explain to students that they will be exploring emerging technology applications in specific businesses and industries.

CONTENT SUMMARY AND TEACHING STRATEGIES

Objective 1: Describe emerging technology concepts.

Anticipated Problem: What are emerging technology concepts?

I. Emerging Technology

- A. The dictionary defines **technology** as “the application of scientific knowledge for practical purposes, especially in industry”. In its most basic form, technology is the development of tools that make tasks easier.
- B. During the 21st Century many technological advances have occurred that improve personal, industrial and office environments. Some of the commonly recognized advancements include the following:
 1. **Computer-aided design (CAD)** is a computer technology that designs a product and documents the design’s process. CAD is used in engineering, architecture and building trades to streamline and improve design processes. 3-D printers are often partnered with computer-aided design to building the products created with CAD. A **3D printer** is an output device that creates three-dimensional objects. A 3D printer receives digital data from a computer as input and then builds a three-dimensional model using custom materials like plastic, metal, etc.
 2. The **internet** is an electronic communications network connecting computer networks around the globe. As a result of the internet’s creation, many other technological advances have occurred. The **world wide web** is an information system on the internet that allows documents to be connected to other documents through hypertext links. The world wide web provides countless opportunities for users to conduct research and share findings. **Cloud storage** is a computing model in which data is stored on remote servers accessed from the internet, or “cloud.” It is maintained, operated and managed by a cloud storage service provider. Individuals frequently use free accounts associated with Microsoft or Google for personal cloud storage. Businesses pay for cloud storage offered from a variety of companies, usually based on the amount of storage required. **Wi-fi** is a wireless networking technology that allows computers and other devices such as printers and projectors to communicate over a wireless signal. Wi-fi connections are becoming more prevalent for internet access around the world. **Universal internet** will occur when internet coverage is streamlined and permanent so that there is no concern for loss of internet coverage. In the future it is predicted that there will be no need for individual connections to the world wide web. As wi-fi advances continue, universal internet becomes more probable.

3. **Social media** technology includes any web-based technologies used to create interactive dialogue. Common social media apps include Facebook, Instagram, SnapChat, Twitter and Pinterest. Social media was originally created for personal use but has become a driving force in most marketing campaigns, no matter what size the business. Social media is often linked to e-commerce sites, which are another emerging technology resulting from the development of the internet.
4. **E-commerce**, the abbreviation for electronic commerce, is defined as commercial transactions conducted electronically on the Internet. According to the U.S. Census Bureau, e-commerce retail sales were over \$120 billion for the second quarter of 2018. The amount of sales happening through e-commerce continues to increase and was approximately 10% of all sales in 2018.
5. **Data mining** is used to solve problems through data analysis. Computer programs sort through large data sets to identify patterns or establish relationships between various information. Data mining is frequently used in business to predict trends which may be valuable information for decision making.
6. **Artificial intelligence (AI)** is the development of computer systems able to perform tasks that normally require human intelligence. Artificial intelligence technology advancements are being made in the areas of language translation, visual perception, speech recognition, and decision-making. Artificial intelligence is already in use for certain manufacturing tasks performed by robots and with the technology involved with autonomous (self-driving) cars. **Virtual Reality** is an artificial environment that is created and presented so that the user suspends belief and accepts it as a real environment. Using software on a computer, virtual reality is primarily experienced through sight and sound. Virtual reality technology frequently requires users to wear a helmet, goggles or other special equipment fitted with sensors. **Augmented reality** creates a digital overlay on top of the physical world rather than immersing the user in a complete digital experience. Augmented reality technology is currently being developed for video games but has potential as a training device.

Teaching Strategy: Many techniques can be used to help students master this objective. Use VM–A to discuss how five ways technology has changed education during their educational careers. Some possible answers may include learning management systems, online assignments, virtual field trips, etc. Assign LS–A to give students an opportunity to predict future technology trends.

Objective 2: Describe the application of technology concepts by specific businesses and industries.

Anticipated Problem: How are various technology concepts used by specific businesses and industries?

II. Technology in Business and Industry

- A. According to a 2018 Investopedia article titled, “The 5 Industries Driving the U.S. Economy”, the United States Bureau of Labor and Statistics reported the following five industries as the largest:
1. Healthcare
 2. Technology
 3. Construction
 4. Retail Sales
 5. Nondurable manufacturing
- B. Technology is used in many facets of healthcare. Data mining is being used to predict trends in healthcare issues as well as check for indicators of health risks for patients. Artificial intelligence is being developed to help make decisions about treatment and diagnosis as well as helping patients determine appointment scheduling needs. The internet and world wide web allow patient health records to be shared among physicians that may be in various locations. Patients may receive expert advise from professionals in another city. 3D printers are being developed to create artificial limbs and organs. Models of organs may be created to test procedures and methods. In addition, CAD programs help doctors with surgical processes.
- C. Obviously, technology is used in the technology industry. As technology continues to develop and change additional employees are needed. A large portion of the demand for more employees comes from the large amount of cloud computing in all industries, as well as the collection and storage of big data and the need for information security. Technology plays a role in nearly every business sector including health care, manufacturing, transportation, education and energy. Artificial intelligence, autonomous vehicles, and augmented and virtual reality are all having a tremendous impact on the world. One technological development can lead to multiple new opportunities in other industries.
- D. Technology advances help the construction industry in many ways. The availability of wi-fi on construction locations makes it easier to access permits, plans, etc. necessary for project completion without employees carrying hard copies of all those documents. **Laser scanners** capture detailed geometric information about worksites. A **drone** is an unmanned aircraft, also called a flying robot. Drones may have cameras attached to them and can be used to capture pictures and videos of work sites that are difficult for people to access. 3D printed building components are also being produced and used in construction using special concrete composites, plastics and other building materials. In addition, robots and

artificial intelligence are also being used for demolition, excavation and other tasks.

- E. Retail sales companies use technology in many aspects of their business models. **Point of Sale (POS) software** manages sales transactions for businesses. Point of Sale software has become sophisticated enough to include electronic fund transfers for debit and credit cards as well as adjusting electronic inventory records for the business. Many small businesses use a web-based program with wi-fi to process transactions that only requires a mobile device. Nearly every retail business has a website to conduct e-commerce and there are several businesses that only conduct e-commerce. Businesses such as eBay and Amazon are two of the most prominent e-commerce sites. Most industries, but particularly retail sales businesses use social media regularly to promote products and improve customer satisfaction. Many companies use social media as their primary customer service tool. Data mining is used to predict customer purchase trends by demographics including geographic location, income and spending patterns. Retailers are now using data mining to target specific coupons or promotional offers to individual customers based on the data collected. Large retailers provide their own mobile apps or use coupon apps such as Cartwheel to track customer spending and offer specials. Retail establishments are also using artificial intelligence to recommend other products that compliment items found in virtual shopping carts and with automated check-out lanes in stores. Of course, cloud storage is used to store and share customer and inventory records between various divisions of retail sales businesses.
- F. **Nondurable manufacturing** is the industry that manufactures consumer goods that have a lifespan of three years or less. Robots and artificial intelligence continue to play a larger role in nondurable manufacturing facilities. Automated assembly lines are manned by robots. Some businesses now use artificial intelligence models to inspect goods for quality control. CAD is used to help design and create products that will eventually roll off the assembly lines. 3D printed CAD models are used to engineering and testing of new products.
- Technology advancements will continue to shape the way people conduct business around the world. In the long run, consumers and producers benefit from the increased efficiency technology provides.

Teaching Strategy: Many techniques can be used to help students master this objective. Use VM-B to generate student interest regarding the way technology has changed business. Some possible answers may include online shopping, reading online customer reviews, automated answering systems, etc. Assign LS-A to give students an opportunity to predict future technology trends.

Review/Summary. Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. If a textbook is being used, questions at the ends of chapters may also be included in the Review/Summary.

- **Application.** Use the included visual master(s) and lab sheet(s) to apply the information presented in the lesson.
- **Evaluation.** Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is provided.

■ **Answers to Sample Test:**

Part One: Matching

1. f
2. a
3. e
4. d
5. c
6. b

Part Two: Completion

1. 3D printer
2. internet
3. data mining
4. social media
5. cloud storage
6. universal internet

Part Three: Short Answer

Answers will vary.

Technology Concepts and Trends

► Part One: Matching

Instructions: Match the term with the correct definition.

- | | |
|---------------------------------|--------------------|
| a. artificial intelligence (AI) | d. e-commerce |
| b. augmented reality | e. virtual reality |
| c. computer-aided design (CAD) | f. wi-fi |

- _____ 1. A wireless networking technology that allows computers and other devices such as printers and projectors to communicate over a wireless signal.
- _____ 2. The development of computer systems able to perform tasks that normally require human intelligence.
- _____ 3. An artificial environment that is created and presented so that the user suspends belief and accepts it as a real environment.
- _____ 4. The abbreviation for electronic commerce, is defined as commercial transactions conducted electronically on the Internet.
- _____ 5. A computer technology that designs a product and documents the design's process.
- _____ 6. Creates a digital overlay on top of the physical world rather than immersing the user in a complete digital experience.

► Part Two: Completion

Instructions: Provide the word or words to complete the following statements.

1. An output device that creates three-dimensional objects is a(n) _____.
2. An electronic communications network connecting computer networks around the globe is the _____.



3. A method used to solve problems through data analysis is _____.
4. Technology that includes any web-based technologies used to create interactive dialogue is _____.
5. A computing model in which data is stored on remote servers accessed from the internet, or “cloud” is _____.
6. When internet coverage is streamlined and permanent so that there is no concern for loss of internet coverage there will be _____.

► **Part Three: Short Answer**

Instructions: Answer the following.

Describe three technologies and how they have changed business.

TECHNOLOGY & EDUCATION

How has technology changed during your educational career?



TECHNOLOGY AND BUSINESS

How has technology changed the way businesses operate?



Future Technology Predictions

Purpose

The purpose of this activity is to encourage students to make predictions about future technology trends.

Objective(s)

1. Explore current and future technology trends.
2. Make predictions about future technology developments.

Materials

- ◆ lab sheet
- ◆ pen/pencil
- ◆ device with internet access

Procedure

1. Review materials from this lesson regarding technology trends.
2. Conduct research via the internet regarding trends in technology.
3. Based on your research and observations, prepare a list of “Top 5 Technology Trends of the Future”. Record your predictions in the table below (an example is provided).

Technology Trend Prediction & Brief Explanation	Expected Changes as a Result
<i>Perceptual computing is technology being developed to allow interaction with personal computers using natural senses rather than traditional interface methods.</i>	No more passwords, facial recognition will be used instead.



Technology Trend Prediction & Brief Explanation	Expected Changes as a Result

4. Create a infographic (virtual poster) with your predictions. The following sites provide free templates for creating your infographic:
 - ◆ <http://www.Piktochart.com>
 - ◆ <http://www.Canva.com>
5. Share your infographic with your class members and instructor.
6. Turn in your completed lab sheet to your instructor.