Unit 1: Meet Technology

Lesson 1: Technology to the Rescue

Why do you need it?

Sketch a picture of something that you need or want, that is not a living thing, and that you could not live without.

Explain why you need the object in the picture.

Might others need the same object?

How would someone use the object in the same way you do to complete an everyday task?

How would someone use the object differently than you do to complete an everyday task?

How could this object be improved? Be prepared to share with the class and make a valid argument for the improved product as being the most wanted.
Purpose of the lesson: This lesson demonstrates how technology’s purpose is primarily to meet human needs and wants. As societies’ needs change, so does technology, through creative innovation.

BIG IDEA for the lesson: Technology addresses our current wants and needs. Through innovation, humans have changed natural resources into products.

BIG IDEA In Your Words: Write the big idea for the lesson in the blank below using your own words.
### Lesson 1: Technology to the Rescue

#### Words to Know

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
<th>Example(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Need</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Want</td>
<td></td>
<td></td>
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<tr>
<td>Impact</td>
<td></td>
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<tr>
<td>Society</td>
<td></td>
<td></td>
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<tr>
<td>Product</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
List the differences between science and technology on the chart below.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Science</th>
</tr>
</thead>
</table>

Does technology have to be a product or tangible object? ______

Why or Why not?
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Different but Still a Family – Technology System

Directions: Fill in each empty square.

Technology Systems
Types of Technology

- Developing and using devices and systems to plant, grow, and harvest crops.
- Developing and using devices and systems to convert, transmit, or process energy.
- Developing and using devices and systems to gather, process, share information, and share ideas.
- Developing and using devices and systems to put structures on the sites where they will be used.
- Using systems and processes to move people and cargo from an origin point to a destination.
- Developing and using devices and systems to promote health and cure illnesses.
- Developing and using devices and systems to convert materials into products in a factory.

Technology is organized into Systems.

Systems rarely work by themselves; they depend on each other.
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### Product Example

**Technology – Sorting Technologies Out**

**Directions:** You are to find pictures of things that best represent technology. Sort the pictures into the 7 technology systems (At least 1 picture for each technology system). You may use computer software or cut and paste pictures from magazines. If using google docs or Word select an 11” x 17” piece of paper. Label each picture with the **Systems Name**. Under each picture explain how it is used and why it is important for society to have this technology and what impact it may have. Below is an example. Be creative it does not have to look exactly like this.

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Ag and Biotechnologies</td>
<td>Picture</td>
<td>How . . .</td>
<td>Why . . .</td>
<td>Impact . . .</td>
</tr>
</tbody>
</table>
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Lesson 1: Technology to the Rescue

Sorting Technologies Out Activity Rubric

<table>
<thead>
<tr>
<th></th>
<th>Below Target</th>
<th>Moving to Target</th>
<th>At Target</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Identifies Technology in proper category.</strong></td>
<td>Cannot tell one technology from the other</td>
<td>Technologies are identified correctly most of the time</td>
<td>Correctly identifies all technologies</td>
</tr>
<tr>
<td><strong>Explains How it is used.</strong></td>
<td>Unclear or incorrect explanations</td>
<td>Explanations are correct most of the time</td>
<td>Use of technology correctly explained</td>
</tr>
<tr>
<td><strong>Explains why it is important to society (what advantage does it give us)</strong></td>
<td>Does not know how it is important to society</td>
<td>Explains why it is important to society most of the time</td>
<td>Explains why the technology is important to society.</td>
</tr>
<tr>
<td><strong>Explains what impacts it may have on society.</strong></td>
<td>Does not list or understand what the technology may have.</td>
<td>Has some idea of how the technology impacts society.</td>
<td>Understands how technology impacts society.</td>
</tr>
</tbody>
</table>
Lesson 1: Technology to the Rescue

Introducing Technology Notes
Technology solves problems that could not have been solved without it.

Directions: Fill in the Blanks

Technology is:
- Not just ________________.
- Developed out of a ________________.
- ________________
- ________________ changing.
- Often done in ________.
- Often an ________________ on pre-existing designs.

Impacts can be intended or ________________.

Engineers take project ideas developed by ________________ and ________________ and produce solutions to be used

Directions: Respond to the Following

Name a product that would not exist without the use of a new technology and the impact it may have had. ______________________________________________________________________ ______________________________________________________________________

Think of a technology that could not have been developed without science mathematics, and history. How have science, mathematics, and history contributed to the development or improvement of this technology? ______________________________________________________________________ ______________________________________________________________________ ______________________________________________________________________

Why do we need to think about the impacts technology might have? ________________

Directions: Fill in the Blanks

Science contributes to the development of ________________.

Mathematics makes sure technology is developed with __________ and ________________.

History lets us know what technologies have or have not worked as well as the ___________ they have had
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Lesson 2: System Design: What Every Technology Needs

Big Idea

**BIG IDEA for the lesson:** Technology is most useful when each facet of its creative design is carefully considered, such as its inputs, process, outputs, and feedback.

**BIG IDEA In Your Words** Write the big idea for the lesson in the blank below using your own words.
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### Lesson 2: System Design: What Every Technology Needs

### Words to Know

<table>
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<tr>
<td>System</td>
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<tr>
<td>Input</td>
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<td>Process</td>
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<td>Output</td>
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<td>Feedback</td>
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Lesson 2: System Design: What Every Technology Needs

Assembly Line Activity

Activity Design Brief: Each person on your team will be given a job on an assembly line. There should be no talking among the workers except for the quality control people; they are allowed to talk to the workers. Complete the task given on your assembly line.

Reflection Questions:

1. What mistakes were made during the manufacturing process?

2. How did the mistake affect the desired outcome of the final product?

3. Were the mistakes noticed before the product was finished?

4. What role did the quality control person have on the assembly line?

5. Do you think there would have been more or less mistakes without the quality control person?
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Lesson 2: System Design: What Every Technology Needs

The Loop System
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Lesson 2: System Design: What Every Technology Needs

Resources of Technology

<table>
<thead>
<tr>
<th>Resource</th>
<th>Examples</th>
</tr>
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<tbody>
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</table>
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Lesson 2: System Design: What Every Technology Needs

Rocket Design Brief

A design brief is a written explanation, given to a designer, outlining the aims, objectives and milestones of a design project.

Design Problem: With the elimination of the space shuttle program in the early 2000s the National Space and Aeronautics Administration (NASA) has depended upon Russia to launch most of its flights into space using Russian space shuttles. With tensions rising in that region the U.S. government has decided it would be a good idea to reinvest in American space technology and design our own space vehicles.

Design Brief: As a recent engineering graduate you have been hired by NASA to design the next rocket NASA will use to deliver payloads into space. With the rising cost of fossil fuels and awareness of our environment NASA has asked you to design and create a working prototype of a water propelled rocket that will meet the following specifications and constraints.

Specifications and Constraints:

- The rocket must use water and compressed air as its fuel source.
- The rocket must use a soda bottle as its propulsion chamber (no other bottle type is acceptable as it will not handle the pressures required)
- Only a 2 liter, 1 liter, 20 ounce, or 16 oz. soda bottle may be used as a propulsion unit.
- The rocket should stay in the air as long as possible. Think about how this can be achieved.
- Nothing sharp that may cut someone may be used on the rocket.
- All parts of the rocket must remain attached to each other throughout the flight and landing.

Resources: NASA has created a list of potential resources you could use in your design.

<table>
<thead>
<tr>
<th>Cardboard</th>
<th>Soda bottles</th>
<th>String</th>
<th>Compact Discs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balsa wood</td>
<td>Water bottles</td>
<td>Plastic Bottles</td>
<td>Paper/Plastic Cups</td>
</tr>
<tr>
<td>Thick paper</td>
<td>Soup Cans</td>
<td>Cardboard Tubes</td>
<td>Tape</td>
</tr>
<tr>
<td>Plastic grocery bags</td>
<td>Fishing line</td>
<td>Modelling clay</td>
<td>Your Choice</td>
</tr>
</tbody>
</table>

***You are responsible for bringing in the resources required for this project. You can count on Mr. Page to have tape, glue, and cardboard.***
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Lesson 2: System Design: What Every Technology Needs

Rocket Systems

Draw and label the systems of a rocket. See links on Mr. Pages’ website.
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Lesson 2: System Design: What Every Technology Needs

Rocket Research Report

List what you learned about rockets or water rockets below.

1. What are the key parts or components of a water rocket?

2. What is important to know or do in order for the rocket to fly straight?

3. What can you do to keep the rocket in the air as long as possible?
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Rocket Design Rough Sketches

Directions: In the boxes below sketch some rough ideas of how you might build your rocket. Label the parts and materials used, for example, fins (cardboard).
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Lesson 2: System Design: What Every Technology Needs

Rocket Design Final Sketch

Directions: Pick the best ideas from the sketches above and create a final sketch in the box below. Remember to label all of the parts and materials in the sketch. Example fins made of cardboard.
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Lesson 2: System Design: What Every Technology Needs

Rocket Feedback Report

Testing the Prototype

How did your prototype work? Write any problems that happened, where did the system fail, and how you will make the needed changes to improve the launch of your rocket.

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

How did the changes you made affect the rocket flight?

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

_______________________________________________________________________

_______________________________________________________________________

_______________________________________________________________________
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Rocket Activity Rubric

<table>
<thead>
<tr>
<th></th>
<th>Below Target</th>
<th>Moving to Target</th>
<th>At Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning/Sketches</td>
<td>Sketches are missing or incomplete.</td>
<td>Sketches are present and contain most of the details required.</td>
<td>Sketches are present and contain all details required.</td>
</tr>
<tr>
<td>Resources</td>
<td>Little to no resources brought in.</td>
<td>At least two resources have been brought in to help the team complete the project.</td>
<td>A great deal of resources have been brought in to help the team complete the project.</td>
</tr>
<tr>
<td>Research</td>
<td>Research questions have been answered but with little research to back them up.</td>
<td>Research questions have been answered and are based on research.</td>
<td>Research questions have been answered and a high degree of research has been used to formulate the answers.</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>A rocket has been built</td>
<td>A functional rocket has been built and some student research into how a rocket works is incorporated into the design.</td>
<td>A quality rocket has been built and a great deal of student research into how a rocket works is incorporated into the design.</td>
</tr>
<tr>
<td>Function</td>
<td>Rocket is incapable of flight or has an extremely poor flight.</td>
<td>The rocket is capable of flight with some problems.</td>
<td>The rocket flight is highly successful.</td>
</tr>
</tbody>
</table>
QUIZ