

Overlaid Materials

MAJOR CONCEPTS and TOPICS

For all Major Concepts, material should be overlaid, as appropriate, to include instruction and practice with safety issues, historical aspects, impacts, and management and control of the technology and exploratory occupational information. Sub-topics of these elements include:

1. *Historical aspects*
2. *Impacts*
 - a. *Cultural*
 - b. *Social*
 - c. *Economic*
 - d. *Political*
 - e. *Environmental*
3. *Management/Control*
 - a. *Management processes to plan organize and control*
4. *Safety*
 - a. *Safety devices*
 - b. *Agencies and regulations*
 1. *Local*
 2. *State*
 3. *Federal*
5. *Careers*

Below is an example to illustrate how these Concepts and Topics could be overlaid into the Content Area of Transportation.

CONTENT AREA COMPETENCIES

1. Students will understand that the study of technology involves an organized set of concepts, processes, and systems that are specific to the study of technology.
2. Students will understand that the implementation of technological solutions requires the application of human and material resources, processes, and systems.
3. Students will understand that technological systems require input, processes, output, and feedback.
4. Students will understand that relationships exist among technologies and between technology and other fields of study.
5. Students will understand that there are interrelationships among the individual, society, technology, and the environment.
6. Students will understand that solving problems relating to a variety of technological systems requires the use of technical information.
7. Students will understand that they must develop the ability to question, investigate, experiment, and evaluate; habits of mind necessary to a lifelong learner.
8. Students will understand that solving technological problems involves cooperation, collaboration, and individual contributions.
9. Students will understand that technological problem solving requires the application of the design process.
10. Students will understand that all technological systems require the development of safe

and acceptable applications of techniques, equipment, and materials.

11. Students will understand that safe practices, attitudes, and awareness are essential within all areas and levels of technologies.
12. Students will understand that there is a need for human societies to develop, control, and maintain a variety of technological systems such as medical, agricultural, biological, energy and power, information and communication, transportation, manufacturing and construction.
13. Students will understand that it is important to develop leadership abilities through participation in co-curricular activities such as the Technology Student Association.

Major Concept: Historical

Topics	<ol style="list-style-type: none"> a. Land b. Water c. Air d. Space e. Intermodal
Concept Competencies	<ol style="list-style-type: none"> 1. Students will understand that the study of technology involves an organized set of concepts, processes, and systems that are specific to the study of technology. 2. Students will understand that the implementation of technological solutions requires the application of human and material resources, processes, and systems. 3. Students will understand that technological systems require input, processes, output, and feedback. 4. Students will understand that relationships exist among technologies and between technology and other fields of study. 5. Students will understand that there are interrelationships among the individual, society, technology, and the environment. 6. Students will understand that solving problems relating to a variety of technological systems requires the use of technical information. 8. Students will understand that solving technological problems involves cooperation, collaboration, and individual contributions. 9. Students will understand that technological problem solving requires the application of the design process. 10. Students will understand that all technological systems require the development of safe and acceptable applications of techniques, equipment, and materials. 11. Students will understand that safe practices, attitudes, and awareness are essential within all areas and levels of technologies.
Knowledge/Skills	Define a transportation system.

List the five types of transportation systems.

Name several transportation system inputs.

Recognize several transportation system processes.

State the expected output of a transportation system.

Define intermodal transportation.

State the importance of intermodal transportation in our society.

List and discuss the advantages of intermodal transportation.

Define passenger and cargo intermodal transportation.

Explain the function of feedback within a transportation system.

Make a list of devices used to provide feedback in a transportation system.

Describe the functions of at least one government agency that controls transportation.

Create a flowchart of the production processes in a specific environment of transportation.

Give examples of societal and economic goals of transportation systems.

Plan an intermodal shipping route.

List the major milestones from the history of transportation (land, air, water, and space).

Explain the concepts, processes and systems specific to the study of transportation technology.

Describe human and material resources, processes and systems that must be implemented to solve transportation problems.

Explain the relationship between transportation and other technologies and fields of study.

Explain the interrelationship among transportation technology and the individual, society and the environment.

Research technical information when solving transportation problems.

Work individually to solve transportation problems.

Work cooperatively to solve transportation problems.

Demonstrate safe and acceptable applications of techniques, equipment and materials.

Demonstrate safe attitudes and practices in all levels and areas of transportation technology.

<p>Sample Performance Assessment SPA #1</p>	<p>You are a summer intern at the Boston Museum of Science. The curator knows that you have an interest in the history of transportation and has asked you to plan an exhibit that would: illustrate the progression of human transportation from land to water, air and space; highlight one major player from each mode of transportation; demonstrate how that person worked individually and cooperatively with others; explain other technological fields that influenced the transportation industry; show how transportation has affected the individual, society, and the environment; and, illustrates safety improvements to transportation vehicles through the years. The curator has given you one week to develop a concept, at which time you must present a plan including a written description and sketches of your exhibit. Additionally, you must begin your research and provide details concerning one of the criteria listed above in order to clarify your concept.</p>
<p>Topics in SPA#1</p>	<ul style="list-style-type: none"> a. Land b. Water c. Air d. Space e. Intermodal
<p>Concept Competencies Addressed in SPA#1</p>	<ul style="list-style-type: none"> 1. Students will understand that the study of technology involves an organized set of concepts, processes, and systems that are specific to the study of technology. 2. Students will understand that the implementation of technological solutions requires the application of human and material resources, processes, and systems. 3. Students will understand that technological systems require input, processes, output, and feedback. 4. Students will understand that relationships exist among technologies and between technology and other fields of study. 5. Students will understand that there are interrelationships among the individual, society, technology, and the environment. 6. Students will understand that solving problems relating to a variety of technological systems requires the use of technical information. 8. Students will understand that solving technological problems involves cooperation, collaboration, and individual contributions. 9. Students will understand that technological problem solving requires the application of the design process. 10. Students will understand that all technological systems require the development of safe and acceptable applications of techniques, equipment, and materials.

11. Students will understand that safe practices, attitudes, and awareness are essential within all areas and levels of technologies.

SPA#1 Rubric

Level 4	Level 3	Level 2	Level 1
<p>The student will:</p> <p>Plan an exhibit that clearly illustrates the progression of human transportation from land to water, air and space.</p> <p>Plan an exhibit that highlights the important contributions of one major player from each mode of transportation.</p> <p>Plan an exhibit that provides numerous examples of how that person worked individually and cooperatively with others.</p> <p>Plan an exhibit that explains five or more technological fields that influenced the transportation industry.</p> <p>Plan an exhibit that illustrates numerous examples of how transportation has affected the individual,</p>	<p>The student will:</p> <p>Plan an exhibit that illustrates the progression of human transportation from land to water, air and space.</p> <p>Plan an exhibit that highlights one major player from each mode of transportation.</p> <p>Plan an exhibit that demonstrates how that person worked individually and cooperatively with others.</p> <p>Plan an exhibit that explains three or four technological fields that influenced the transportation industry.</p> <p>Plan an exhibit that shows how transportation has affected the individual, society,</p>	<p>The student will:</p> <p>Plan an exhibit that incompletely illustrates the progression of human transportation from land to water, air and space.</p> <p>Plan an exhibit that highlights one major player from two or three modes of transportation.</p> <p>Plan an exhibit that inaccurately demonstrates how that person worked individually and cooperatively with others.</p> <p>Plan an exhibit that explains one or two technological fields that influenced the transportation industry.</p> <p>Plan an exhibit that shows how transportation has affected two of the following three:</p>	<p>The student will:</p> <p>Plan an exhibit that does not illustrate the progression of human transportation from land to water, air and space.</p> <p>Plan an exhibit that does not highlight any major players from each mode of transportation.</p> <p>Plan an exhibit that does not demonstrates how that person worked individually and cooperatively with others.</p> <p>Plan an exhibit that does not explain any technological fields that influenced the transportation industry.</p> <p>Plan an exhibit that does not show how transportation has affected the individual, society, and the</p>

<p>society, and the environment.</p> <p>Plan an exhibit that illustrates numerous safety improvements to many transportation vehicles through the years from each mode of transportation.</p> <p>Complete the work in one week or less.</p> <p>Present a plan that includes a lengthy written description and multiple sketches of the exhibit.</p> <p>Present complete research and provide numerous details concerning one or more of the criteria listed above in order to clarify the concept.</p>	<p>and the environment.</p> <p>Plan an exhibit that illustrates safety improvements to transportation vehicles through the years from each mode of transportation.</p> <p>Complete the work in one week.</p> <p>Present a plan that includes a written description and sketches of the exhibit.</p> <p>Present research and provide details concerning one of the criteria listed above in order to clarify the concept.</p>	<p>individual, society, and the environment.</p> <p>Plan an exhibit that illustrates safety improvements to transportation vehicles through the years from two or three modes of transportation.</p> <p>Complete the work in 1 to 1½ weeks.</p> <p>Present a plan that is missing a written description or sketches of the exhibit.</p> <p>Present incomplete research and provide few details concerning one of the criteria listed above in order to clarify the concept.</p>	<p>environment.</p> <p>Plan an exhibit that does not illustrate safety improvements to transportation vehicles through the years.</p> <p>Complete the work in 2 weeks or more.</p> <p>Present an incomplete plan that is missing a written description and sketches of the exhibit.</p> <p>Present no research and provide no details concerning one of the criteria listed above in order to clarify the concept.</p>
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Major Concept: Impacts

<p>Topics</p>	<ul style="list-style-type: none"> a. Cultural <ul style="list-style-type: none"> 1. Historical 2. Archeological 3. Architectural 4. Geological b. Social <ul style="list-style-type: none"> 1. Recreational 2. Places of Worship 3. Clubs and organizations c. Economic <ul style="list-style-type: none"> 1. Tax base 2. Employment/jobs d. Political <ul style="list-style-type: none"> 1. Leadership/decision making 2. Law enforcement e. Environmental <ul style="list-style-type: none"> 1. Noise 2. Air
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	<ol style="list-style-type: none"> 3. Land 4. Water 5. Lose of habitat
Concept Competencies	<ol style="list-style-type: none"> 1. Students will understand that the study of technology involves an organized set of concepts, processes, and systems that are specific to the study of technology. 2. Students will understand that the implementation of technological solutions requires the application of human and material resources, processes, and systems. 3. Students will understand that technological systems require input, processes, output, and feedback. 4. Students will understand that relationships exist among technologies and between technology and other fields of study. 5. Students will understand that there are interrelationships among the individual, society, technology, and the environment. 6. Students will understand that solving problems relating to a variety of technological systems requires the use of technical information. 7. Students will understand that they must develop the ability to question, investigate, experiment, and evaluate; habits of mind necessary to a lifelong learner. 8. Students will understand that solving technological problems involves cooperation, collaboration, and individual contributions. 9. Students will understand that technological problem solving requires the application of the design process. 10. Students will understand that all technological systems require the development of safe and acceptable applications of techniques, equipment, and materials. 11. Students will understand that safe practices, attitudes, and awareness are essential within all areas and levels of technologies. 12. Students will understand that there is a need for human societies to develop, control, and maintain a variety of technological systems such as medical, agricultural, biological, energy and power, information and communication, transportation, manufacturing and construction. 13. Students will understand that it is important to develop leadership abilities through participation in co-curricular activities such as the Technology Student Association.
Knowledge/Skills	<p>Identify the types of goals that affect a transportation system.</p> <p>List safety factors in the design and operation of vehicular systems.</p> <p>State the various aspects of the environment that pollution from energy, power, and transportation industries most commonly affect.</p> <p>Name ways in which present day methods of transportation are</p>

	<p>harmful to the environment.</p> <p>Describe how airways are used to keep airways safe.</p> <p>Discuss the steps that have been taken to minimize environmental impacts associated with the transportation of goods and people.</p> <p>Describe the steps that have been taken to minimize the environmental impacts of harvesting and refining energy for use.</p> <p>Give examples of societal and economic goals of transportation systems.</p> <p>Explain one major piece of legislation associated with environmental protection.</p> <p>Summarize advanced and futuristic concepts associated with environmental protection emerging from the energy, power, and transportation industries.</p> <p>Research technical information when solving transportation problems.</p> <p>Work individually to solve transportation problems.</p> <p>Work cooperatively to solve transportation problems.</p> <p>Demonstrate safe and acceptable applications of techniques, equipment and materials.</p> <p>Demonstrate safe attitudes and practices in all levels and areas of transportation technology.</p>
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Sample Performance Assessment SPA#2	<p>The Planning Department from the town of Wolfeboro wishes to eliminate all vehicular traffic from the area around the town docks and turn it into a pedestrian friendly park. The area in question is a parking lot with 30 spaces that is surrounded by a number of restaurants, snack bars, real estate offices and boat docks along the shoreline. The docks do not sell gasoline. There is a small boat launch in the area. At the south end of this area is a small park and bandstand that hosts concerts during the season. The Planning Department has asked your class to research the cultural, social, economic, political and environmental impacts (positive and negative) this change of use will have on the community. You will report your findings to the members of the Planning Department.</p>
Topics in SPA#2	<p>a. Cultural</p> <ol style="list-style-type: none"> 1. Historical 2. Archeological 3. Architectural 4. Geological <p>b. Social</p> <ol style="list-style-type: none"> 1. Recreational

	<ul style="list-style-type: none"> 2. Places of Worship 3. Clubs and organizations c. Economic <ul style="list-style-type: none"> 1. Tax base 2. Employment/jobs d. Political <ul style="list-style-type: none"> 1. Leadership/decision making 2. Law enforcement e. Environmental <ul style="list-style-type: none"> 1. Noise 2. Air 3. Land 4. Water 5. Lose of habitat
<p>Concept Competencies Addressed in SPA#2</p>	<ul style="list-style-type: none"> 1. Students will understand that the study of technology involves an organized set of concepts, processes, and systems that are specific to the study of technology. 2. Students will understand that the implementation of technological solutions requires the application of human and material resources, processes, and systems. 3. Students will understand that technological systems require input, processes, output, and feedback. 4. Students will understand that relationships exist among technologies and between technology and other fields of study. 5. Students will understand that there are interrelationships among the individual, society, technology, and the environment. 6. Students will understand that solving problems relating to a variety of technological systems requires the use of technical information. 7. Students will understand that they must develop the ability to question, investigate, experiment, and evaluate; habits of mind necessary to a lifelong learner. 8. Students will understand that solving technological problems involves cooperation, collaboration, and individual contributions. 9. Students will understand that technological problem solving requires the application of the design process. 10. Students will understand that all technological systems require the development of safe and acceptable applications of techniques, equipment, and materials. 11. Students will understand that safe practices, attitudes, and awareness are essential within all areas and levels of technologies. 12. Students will understand that there is a need for human societies to develop, control, and maintain a variety of

	<p>technological systems such as medical, agricultural, biological, energy and power, information and communication, transportation, manufacturing and construction.</p> <p>13. Students will understand that it is important to develop leadership abilities through participation in co-curricular activities such as the Technology Student Association.</p>
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SPA#2 Rubric

Level 4	Level 3	Level 2	Level 1
<p>The student will:</p> <p>Research the cultural impacts this change of use will have on the community including various survey instruments and library research.</p> <p>Research the social impacts this change of use will have on the community including various survey instruments and library research.</p> <p>Research the economic, impacts this change of use will have on the community including various survey instruments and library research.</p> <p>Research the political impacts this change of use will have on the community.</p> <p>Research the environmental impacts</p>	<p>The student will:</p> <p>Research the cultural impacts this change of use will have on the community.</p> <p>Research the social impacts this change of use will have on the community.</p> <p>Research the economic, impacts this change of use will have on the community.</p> <p>Research the political impacts this change of use will have on the community.</p> <p>Research the environmental</p>	<p>The student will:</p> <p>Incompletely research the cultural impacts this change of use will have on the community.</p> <p>Incompletely research the social impacts this change of use will have on the community.</p> <p>Incompletely research the economic, impacts this change of use will have on the community.</p> <p>Incompletely research the political impacts this change of use will have on the community.</p> <p>Incompletely research the</p>	<p>The student will:</p> <p>Inadequately research the cultural impacts this change of use will have on the community.</p> <p>Inadequately research the social impacts this change of use will have on the community.</p> <p>Inadequately research the economic, impacts this change of use will have on the community.</p> <p>Inadequately research the political impacts this change of use will have on the community.</p> <p>Inadequately research the environmental</p>

<p>this change of use will have on the community including various survey instruments and library research.</p> <p>Present a PowerPoint presentation of their findings complete with summaries of all surveys, to the members of the Planning Department.</p>	<p>impacts this change of use will have on the community.</p> <p>Present an oral report of their findings to the members of the Planning Department.</p>	<p>environmental impacts this change of use will have on the community.</p> <p>Present a written report of their findings to the members of the Planning Department.</p>	<p>impacts this change of use will have on the community.</p> <p>Present an incomplete written report of their findings to the members of the Planning Department.</p>
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Major Concept: Management and Control

<p>Topics</p>	<ol style="list-style-type: none"> a. Planning <ol style="list-style-type: none"> 1. Goal setting 2. Determine a plan of action b. Organizing <ol style="list-style-type: none"> 1. Preparation 2. Scheduling 3. Routing c. Controlling <ol style="list-style-type: none"> 1. Record keeping 2. Systems monitoring 3. Signaling
<p>Concept Competencies</p>	<ol style="list-style-type: none"> 1. Students will understand that the study of technology involves an organized set of concepts, processes, and systems that are specific to the study of technology. 2. Students will understand that the implementation of technological solutions requires the application of human and material resources, processes, and systems. 3. Students will understand that technological systems require input, processes, output, and feedback. 4. Students will understand that relationships exist among technologies and between technology and other fields of study. 5. Students will understand that there are interrelationships among the individual, society, technology, and the environment. 6. Students will understand that solving problems relating to a variety of technological systems requires the use of technical information. 7. Students will understand that they must develop the ability to question, investigate, experiment, and evaluate; habits of mind necessary to a lifelong learner. 8. Students will understand that solving technological problems involves cooperation, collaboration, and individual contributions.

	<p>9. Students will understand that technological problem solving requires the application of the design process.</p> <p>10. Students will understand that all technological systems require the development of safe and acceptable applications of techniques, equipment, and materials.</p> <p>11. Students will understand that safe practices, attitudes, and awareness are essential within all areas and levels of technologies.</p> <p>12. Students will understand that there is a need for human societies to develop, control, and maintain a variety of technological systems such as medical, agricultural, biological, energy and power, information and communication, transportation, manufacturing and construction.</p> <p>13. Students will understand that it is important to develop leadership abilities through participation in co-curricular activities such as the Technology Student Association.</p>
<p>Knowledge/Skills</p>	<p>Identify and define the six separate systems that make up a vehicular system.</p> <p>Identify three different types of land transportation routes.</p> <p>Cite examples of the three types of pathways.</p> <p>List the different modes of land transportation.</p> <p>Identify types of guidance systems.</p> <p>List ways in which land vehicles are controlled.</p> <p>Name the support systems for land transportation</p> <p>Cite ways in which vessels are controlled.</p> <p>Name the support systems of water transportation.</p> <p>Cite the support systems used in air transportation.</p> <p>Identify the ways navigation information is collected</p> <p>State how manned and unmanned spacecraft are controlled.</p> <p>List several support systems for space vehicles.</p> <p>Chart a course on a nautical chart.</p> <p>Explain how the Mission Control Center (MCC) operates.</p> <p>Describe legislation and government agencies that control intermodal transportation.</p> <p>Create a flowchart of the production processes in a specific environment of transportation.</p> <p>Describe how global positioning systems operate.</p> <p>Research and determine the major sea-lanes used in transoceanic transportation.</p>

	<p>Plan a flight using an aeronautical chart.</p> <p>Research technical information when solving transportation problems.</p> <p>Work individually to solve transportation problems.</p> <p>Work cooperatively to solve transportation problems.</p> <p>Demonstrate safe and acceptable applications of techniques, equipment and materials.</p> <p>Demonstrate safe attitudes and practices in all levels and areas of transportation technology.</p>
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Sample Performance Assessment SPA#3	<p>Every year, the city of Nashua celebrates the 4th of July with a parade. The route begins at the end of Main St at the intersection of Amherst, Locke and Concord Streets and ends 2 miles away at a large parking lot at the intersection of Lake and Main Streets. The parade has enough divisions that it will completely block Main street for the entire length of the parade route for 1 hour. As an intern in the Planning Office, it is your responsibility to plan alternative transportation routes around the city for residents and visitors. You must set a goal, determine a plan of action, schedule when routes will be closed and where traffic will be routed. You will need to determine how many personnel and equipment will be needed to make your plan work. You must monitor all routes and keep records of performance so your plan can be compared to plans from past years. You must file a report to the head of the Planning Department.</p>
Topics in SPA#3	<ul style="list-style-type: none"> a. Planning <ul style="list-style-type: none"> 1. Goal setting 2. Determine a plan of action b. Organizing <ul style="list-style-type: none"> 1. Preparation 2. Scheduling 3. Routing c. Controlling <ul style="list-style-type: none"> 1. Record keeping 2. Systems monitoring 3. Signaling
Concept Competencies Addressed in SPA#3	<ul style="list-style-type: none"> 1. Students will understand that the study of technology involves an organized set of concepts, processes, and systems that are specific to the study of technology. 2. Students will understand that the implementation of technological solutions requires the application of human and material resources, processes, and systems. 3. Students will understand that technological systems require

	<p>input, processes, output, and feedback.</p> <ol style="list-style-type: none"> 4. Students will understand that relationships exist among technologies and between technology and other fields of study. 5. Students will understand that there are interrelationships among the individual, society, technology, and the environment. 6. Students will understand that solving problems relating to a variety of technological systems requires the use of technical information. 7. Students will understand that they must develop the ability to question, investigate, experiment, and evaluate; habits of mind necessary to a lifelong learner. 8. Students will understand that solving technological problems involves cooperation, collaboration, and individual contributions. 9. Students will understand that technological problem solving requires the application of the design process. 10. Students will understand that all technological systems require the development of safe and acceptable applications of techniques, equipment, and materials. 11. Students will understand that safe practices, attitudes, and awareness are essential within all areas and levels of technologies. 12. Students will understand that there is a need for human societies to develop, control, and maintain a variety of technological systems such as medical, agricultural, biological, energy and power, information and communication, transportation, manufacturing and construction. 13. Students will understand that it is important to develop leadership abilities through participation in co-curricular activities such as the Technology Student Association.
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SPA#3 Rubric

Level 4	Level 3	Level 2	Level 1
<p>The student will:</p> <p>Expertly write a goal statement for this project that clearly explains the objectives.</p> <p>Compile a detailed step by step plan of action.</p>	<p>The student will:</p> <p>Write a goal statement for this project that clearly explains the objectives.</p> <p>Compile a step by step plan of action.</p>	<p>The student will:</p> <p>Write a goal statement for this project that explains the objectives.</p> <p>Compile a plan of action that may not list all the steps.</p>	<p>The student will:</p> <p>Write a goal statement for this project that is not related to the stated objectives.</p> <p>Compile a plan of action that does not list all the steps.</p>

<p>Compile a complete schedule that clearly shows when routes will be closed.</p> <p>Draw complete maps that clearly show how traffic will be routed around closed roads.</p> <p>Compile a complete list and placement of personnel and equipment /signage that will be needed.</p> <p>Plan a method to monitor traffic in real time, on all routes.</p> <p>Explain a method of keeping complete and accurate traffic records during the Parade.</p> <p>File an expertly written report to the head of the Planning Department.</p>	<p>Compile a schedule that clearly shows when routes will be closed.</p> <p>Draw maps that clearly show how traffic will be routed around closed roads.</p> <p>Compile a list of personnel and equipment /signage that will be needed.</p> <p>Plan a method to monitor traffic on all routes.</p> <p>Explain a method of keeping complete traffic records during the Parade.</p> <p>File a report to the head of the Planning Department.</p>	<p>Compile a schedule that shows when some routes will be closed.</p> <p>Draw maps that show how traffic will be routed around some of the closed roads.</p> <p>Compile an incomplete list of personnel and equipment /signage that will be needed.</p> <p>Plan a method to monitor traffic on some routes.</p> <p>Explain a method of keeping incomplete traffic records during parts of the Parade.</p> <p>File an incomplete report to the head of the Planning Department.</p>	<p>Compile an incomplete schedule that does not show when the routes will be closed.</p> <p>Draw incomplete maps that do not show how traffic will be routed around some of the closed roads.</p> <p>Compile an incomplete list of personnel, neglecting to list equipment /signage that will be needed.</p> <p>Plan a method to inaccurately monitor traffic on some routes.</p> <p>Explain a method of keeping faulty traffic records during parts of the Parade.</p> <p>File an incomplete report to the head of the Planning Department.</p>
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Major Concept: Safety

Topics	<ul style="list-style-type: none"> a. Safety Devices <ul style="list-style-type: none"> 1. Personal <ul style="list-style-type: none"> i. Seat belts ii. Helmets iii. Air bags 2. Rules of the Road (refer to the driver’s manual) b. Agencies and regulations <ul style="list-style-type: none"> 1. Local <ul style="list-style-type: none"> i. Planning Board ii. Zoning Board iii. Historical Commission iv. Conservation Commission v. Agricultural Commission
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	<ol style="list-style-type: none"> 2. State <ol style="list-style-type: none"> i. NH Department of Environmental Services ii. NH Division of Historic Resources iii. NH Department of Safety (State Police/Highway Patrol) 3. Federal <ol style="list-style-type: none"> i. Army Corps of Engineers ii. Federal Aviation Administration, iii. Federal Energy Regulatory Commission iv. Federal Highway Administration v. Federal Motor Carrier Safety Administration vi. Federal Railroad Administration vii. Federal Transit Administration viii. Maritime Administration ix. National Highway Traffic Safety Administration
<p>Concept Competencies</p>	<ol style="list-style-type: none"> 1. Students will understand that the study of technology involves an organized set of concepts, processes, and systems that are specific to the study of technology. 2. Students will understand that the implementation of technological solutions requires the application of human and material resources, processes, and systems. 3. Students will understand that technological systems require input, processes, output, and feedback. 4. Students will understand that relationships exist among technologies and between technology and other fields of study. 5. Students will understand that there are interrelationships among the individual, society, technology, and the environment. 6. Students will understand that solving problems relating to a variety of technological systems requires the use of technical information. 7. Students will understand that they must develop the ability to question, investigate, experiment, and evaluate; habits of mind necessary to a lifelong learner. 8. Students will understand that solving technological problems involves cooperation, collaboration, and individual contributions. 9. Students will understand that technological problem solving requires the application of the design process. 10. Students will understand that all technological systems require the development of safe and acceptable applications of techniques, equipment, and materials. 11. Students will understand that safe practices, attitudes, and awareness are essential within all areas and levels of technologies. 12. Students will understand that there is a need for human societies to develop, control, and maintain a variety of technological systems such as medical, agricultural, biological, energy and power, information and communication, transportation, manufacturing and construction. 13. Students will understand that it is important to develop leadership

	abilities through participation in co-curricular activities such as the Technology Student Association.
Knowledge/Skills	<p>List safety factors in the design and operation of vehicular systems.</p> <p>Describe the functions of at least one government agency that controls transportation.</p> <p>Describe how airways are used to keep airways safe.</p> <p>Explain how the Mission Control Center (MCC) operates.</p> <p>Describe legislation and government agencies that control intermodal transportation.</p> <p>Research technical information when solving transportation problems.</p> <p>Work individually to solve transportation problems.</p> <p>Work cooperatively to solve transportation problems.</p> <p>Demonstrate safe and acceptable applications of techniques, equipment and materials.</p> <p>Demonstrate safe attitudes and practices in all levels and areas of transportation technology.</p>

Sample Performance Assessment SPA#4	<p>You have just entered a cross country transportation competition to promote safety in the transportation industry. You will begin in San Francisco and end your trip in Boston. The winner will be the person who plans their trip using the most transportation modes as possible, lists all the safety devices used and compares those devices from one mode to the next, and lists the various agencies involved in the safety of the transportation modes used.</p>
Topics in SPA#4	<p>a. Safety Devices</p> <ol style="list-style-type: none"> 1. Personal <ol style="list-style-type: none"> i. Seat belts ii. Helmets iii. Air bags 2. Rules of the Road (refer to the driver's manual) <p>c. Agencies and regulations</p> <ol style="list-style-type: none"> 1. Local <ol style="list-style-type: none"> i. Planning Board ii. Zoning Board iii. Historical Commission iv. Conservation Commission v. Agricultural Commission

	<ol style="list-style-type: none"> 2. State <ol style="list-style-type: none"> i. NH Department of Environmental Services ii. NH Division of Historic Resources iii. NH Department of Safety (State Police/Highway Patrol) 3. Federal <ol style="list-style-type: none"> i. Army Corps of Engineers ii. Federal Aviation Administration, iii. Federal Energy Regulatory Commission iv. Federal Highway Administration v. Federal Motor Carrier Safety Administration vi. Federal Railroad Administration vii. Federal Transit Administration viii. Maritime Administration ix. National Highway Traffic Safety Administration
<p>Concept Competencies Addressed in SPA#4</p>	<ol style="list-style-type: none"> 1. Students will understand that the study of technology involves an organized set of concepts, processes, and systems that are specific to the study of technology. 2. Students will understand that the implementation of technological solutions requires the application of human and material resources, processes, and systems. 3. Students will understand that technological systems require input, processes, output, and feedback. 4. Students will understand that relationships exist among technologies and between technology and other fields of study. 5. Students will understand that there are interrelationships among the individual, society, technology, and the environment. 6. Students will understand that solving problems relating to a variety of technological systems requires the use of technical information. 7. Students will understand that they must develop the ability to question, investigate, experiment, and evaluate; habits of mind necessary to a lifelong learner. 8. Students will understand that solving technological problems involves cooperation, collaboration, and individual contributions. 9. Students will understand that technological problem solving requires the application of the design process. 10. Students will understand that all technological systems require the development of safe and acceptable applications of techniques, equipment, and materials. 11. Students will understand that safe practices, attitudes, and awareness are essential within all areas and levels of technologies. 12. Students will understand that there is a need for human societies to develop, control, and maintain a variety of technological systems such as medical, agricultural, biological, energy and power, information and communication, transportation, manufacturing and construction.

	13. Students will understand that it is important to develop leadership abilities through participation in co-curricular activities such as the Technology Student Association.
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SPA#4 Rubric

Level 4	Level 3	Level 2	Level 1
<p>The student will:</p> <p>Plan their trip using all 4 transportation modes and 5 or more types of transportation within each mode.</p> <p>Completely list all the safety devices used by riders and drivers, on each type of transportation in each mode.</p> <p>Compile a colorful chart that compares those devices for both riders and drivers from one transportation type and mode to the next.</p> <p>Lists 3 or more of the various agencies involved in the safety of each transportation mode used.</p>	<p>The student will:</p> <p>Plan their trip using 3 of the 4 transportation modes and 3-4 types of transportation within each mode.</p> <p>Completely list all the safety devices used on each type of transportation in each mode.</p> <p>Compile a colorful chart that compares those devices from one transportation type and mode to the next.</p> <p>Lists 1-2 of the various agencies involved in the safety of each transportation mode used.</p>	<p>The student will:</p> <p>Plan their trip using 3 of the 4 transportation modes and 1-2 types of transportation within each mode.</p> <p>List some of the safety devices used on each type of transportation in each mode.</p> <p>Compile a chart that compares those devices from one transportation type and mode to the next.</p> <p>List 1 of the various agencies involved in the safety of each transportation mode used.</p>	<p>The student will:</p> <p>Plan their trip using 2 of the 4 transportation modes and 1 type of transportation within each mode.</p> <p>List some of a safety device used on each type of transportation in each mode.</p> <p>List on scrap paper those devices from one transportation type and mode comparing them to the next.</p> <p>List 1 of the various agencies involved in the safety of transportation in the United States.</p>

Major Concept: Careers

Topics	<p>a. Careers</p> <ol style="list-style-type: none"> 1. Engineers 2. Technologists 3. Repairers and maintainers 4. Scientists 5. Operators
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	<ol style="list-style-type: none"> 6. Managers 7. Dispatchers 8. Drivers 9. Pilots 10. Fabricators 11. Etc...
Concept Competencies	<ol style="list-style-type: none"> 1. Students will understand that the study of technology involves an organized set of concepts, processes, and systems that are specific to the study of technology. 2. Students will understand that the implementation of technological solutions requires the application of human and material resources, processes, and systems. 3. Students will understand that technological systems require input, processes, output, and feedback. 4. Students will understand that relationships exist among technologies and between technology and other fields of study. 5. Students will understand that there are interrelationships among the individual, society, technology, and the environment. 6. Students will understand that solving problems relating to a variety of technological systems requires the use of technical information. 7. Students will understand that they must develop the ability to question, investigate, experiment, and evaluate; habits of mind necessary to a lifelong learner. 8. Students will understand that solving technological problems involves cooperation, collaboration, and individual contributions. 9. Students will understand that technological problem solving requires the application of the design process. 10. Students will understand that all technological systems require the development of safe and acceptable applications of techniques, equipment, and materials. 11. Students will understand that safe practices, attitudes, and awareness are essential within all areas and levels of technologies. 12. Students will understand that there is a need for human societies to develop, control, and maintain a variety of technological systems such as medical, agricultural, biological, energy and power, information and communication, transportation, manufacturing and construction. 13. Students will understand that it is important to develop leadership abilities through participation in co-curricular activities such as the Technology Student Association.
Knowledge/Skills	<p>Define a transportation system.</p> <p>List the five types of transportation systems.</p> <p>Name several transportation system inputs.</p>

	<p>Recognize several transportation system processes.</p> <p>State the expected output of a transportation system.</p> <p>Identify the types of goals that affect a transportation system.</p> <p>Name the different kinds of land vehicles.</p> <p>Name the support systems for land transportation</p> <p>Identify several water vehicles.</p> <p>Name the support systems of water transportation.</p> <p>Identify aviation services.</p> <p>Cite the support systems used in air transportation.</p> <p>Define spacecraft.</p> <p>List several support systems for space vehicles.</p> <p>Describe how airways are used to keep airways safe.</p> <p>Demonstrate safe and acceptable applications of techniques, equipment and materials.</p> <p>Demonstrate safe attitudes and practices in all levels and areas of transportation technology.</p>
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Sample Performance Assessment SPA#5	<p>While you were a high school student, taking various courses to earn graduation credit, you had a difficult time understanding how the numerous topics you studied related to each other and to other courses. Now that you are a first year engineering student in college, you can understand the value of all those math and science courses you took in high school. Although you have yet to narrow down which field of engineering you will eventually study, you are fascinated with electrical energy, transportation technologies and enjoy researching science problems. You will meet with your adviser next week to select a major, and have decided to research different engineering specialties to see which ones most use the subjects you enjoy.</p>
Topics in SPA#5	<p>a. Careers</p> <ol style="list-style-type: none"> 1. Engineers 2. Technologists 3. Repairers and maintainers 4. Scientists 5. Operators 6. Managers 7. Dispatchers 8. Drivers 9. Pilots

	<p>10. Fabricators</p> <p>11. Etc...</p>
Concept Competencies Addressed in SPA#5	<ol style="list-style-type: none"> 1. Students will understand that the study of technology involves an organized set of concepts, processes, and systems that are specific to the study of technology. 2. Students will understand that the implementation of technological solutions requires the application of human and material resources, processes, and systems. 3. Students will understand that technological systems require input, processes, output, and feedback. 4. Students will understand that relationships exist among technologies and between technology and other fields of study. 5. Students will understand that there are interrelationships among the individual, society, technology, and the environment. 6. Students will understand that solving problems relating to a variety of technological systems requires the use of technical information. 7. Students will understand that they must develop the ability to question, investigate, experiment, and evaluate; habits of mind necessary to a lifelong learner. 8. Students will understand that solving technological problems involves cooperation, collaboration, and individual contributions. 9. Students will understand that technological problem solving requires the application of the design process. 10. Students will understand that all technological systems require the development of safe and acceptable applications of techniques, equipment, and materials. 11. Students will understand that safe practices, attitudes, and awareness are essential within all areas and levels of technologies. 12. Students will understand that there is a need for human societies to develop, control, and maintain a variety of technological systems such as medical, agricultural, biological, energy and power, information and communication, transportation, manufacturing and construction. 13. Students will understand that it is important to develop leadership abilities through participation in co-curricular activities such as the Technology Student Association.

SPA#5 Rubric

Level 4	Level 3	Level 2	Level 1
The student will: List all transportation	The student will: List all	The student will: List 2-3	The student will: Find one transportation

<p>specialties that use electrical energy, transportation technology and researching science problems.</p> <p>Prioritize all those specialties into a list from greater to lesser interest.</p> <p>Prepare to meet with the adviser by refining the transportation specialties list, analyzing the positive and negative aspects of those specialties, interviewing engineers within those specialties and compiling a list of questions for the adviser.</p>	<p>transportation specialties that involve electrical energy, transportation technology and researching science problems.</p> <p>Prioritize those specialties into a list from greater to lesser interest.</p> <p>Prepare to meet with the adviser by refining the transportation specialties list, analyzing the positive and negative aspects of those specialties and compiling a list of questions for the adviser.</p>	<p>transportation specialties that use electrical energy, transportation technology and researching science problems.</p> <p>Compile a list but in no particular order of interest.</p> <p>Prepare to meet with the adviser by refining the transportation specialties list, and analyzing the positive and negative aspects of those specialties or compiling a list of questions for the adviser.</p>	<p>specialty that uses electrical energy, transportation technology and researching science problems.</p> <p>Not compile a list.</p> <p>Not prepare for the meeting.</p>
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Many of the “Knowledge/Skills” for this document came from the transportation sections of the following text:

Litowitz, Len S., Brown, Ryan A., Energy, Power and Transportation Technology, The Goodheart-Willcox Company, Inc., 2007