STRANDS AND STANDARDS
NON-DESTRUCTIVE TESTING

Course Description
An introduction to the five major Non-Destructive Testing methods, certification requirements, inspector’s responsibilities, visual testing and the use and operation of gauges.

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<th>Intended Grade Level</th>
<th>10-12</th>
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<td>Non-Destructive Testing</td>
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<td>Endorsement 3</td>
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STRAND 1
Students will understand the history of Non-Destructive Testing (NDT).

Standard 1
Describe the origins of the five basic methods of Non-Destructive Testing.
- Penetrant inspection
- Magnetic particle and eddy current inspections
- Ultrasonic inspection
- X-rays
- Liquid penetrant

Performance Skills
- List the year and industry that originated penetrant inspection.
- List the year and industry that originated magnetic particle, and eddy current inspections.
- List the year and country that originated ultrasonic inspection.
- List the year and person that discovered x-rays.
- List the industry that originated liquid penetrant.

STRAND 2
Students will understand an introduction to Non-Destructive Testing Methods.

Standard 1
Perform a simple inspection using the basic five inspection methods.
- Use of ultrasound in thickness gauging
- Use of eddy current in crack detection
- Use of radiography in locating weld defects
- Use of magnetic particle in weld inspection
- Use of penetrant in crack detection

Performance Skills
- Demonstrate the use of ultrasound in thickness gauging.
- Demonstrate the use of eddy current in crack detection.
- Demonstrate the use of radiography in locating weld defects.
- Demonstrate the use of magnetic particle in weld inspection.
- Demonstrate the use of penetrant in crack detection.

STRAND 3
Students will be able to understand uncommon Non-Destructive Testing Methods.

Standard 1
Compare the uses of uncommon methods to the methods in wide use today.
- Thermal inspection in defect detection
• Acoustic inspection
• Changes with regard to computers

Performance Skills
• Explain the use of thermal inspection in defect detection.
• Assess the value of acoustic inspection as related to cost and the use of the more common methods of defect detection.
• Summarize in a short statement the changes taking place in the inspection field with regard to computers.

STRAND 4
Students will be able to understand the functions of Non-Destructive Testing.

Standard 1
List the uses and functions of NDT.
• List the uses and functions of the five primary forms of NDT used in a given industry

Performance Skills
• Rank in order, five primary forms of Non-Destructive Testing used in a given industry.

STRAND 5
Students will be able to understand applications of Non-Destructive Testing.

Standard 1
List and describe applications of NDT methods.
• Ultrasonic
• Radiography
• Penetrant
• Magnetic particle
• Eddy current

Performance Skills
• Name one application of ultrasonic in a specific industry.
• Name one application of radiography in a specific industry.
• Name one application of penetrant in a specific industry.
• Name one application of magnetic particle in a specific industry.
• Name one application of eddy current in a specific industry.
• Show how each of the above applications if not used could lead to a failure of materials.
STRAND 6
Students will be able to understand quality control/quality assurance.

Standard 1
Describe the structure of quality control.

- Chain of command flow
- Flow diagram
- NDT inspection
- Visual inspection

Performance Skills

- Determine the chain of command flow in quality control.
- Construct a flow diagram of a typical quality control system.
- Compare Non-Destructive Testing inspection to visual inspection.

STRAND 7
Students will be able to understand economic factors.

Standard 1
Judge the economic factors involved in selecting a particular NDT.

- Lowest cost
- Compare costs of the five basic methods
- Economic advantages to NDT over not inspecting a product

Performance Skills

- Select an inspection that would be of lowest cost for the company.
- Compare the costs of the five basic methods and rank in order of least to most expensive.
- Understand the economic advantages of Non-Destructive Testing over not inspecting a product.

STRAND 8
Students will be able to understand qualification of personnel.

Standard 1
List the documents that govern NDT inspectors.

- Two major documents governing NDT certification
- Most widely used qualification/certification document in aviation industry
- Three procedures widely used in NDT

Performance Skills

- Compare the differences between the two major documents governing Nondestructive Testing certification.
- Summarize the materials in the two documents in a two-paragraph statement.
• List the most widely used qualification/certification document in the aviation industry.
• Summarize information found in three procedures that are widely used in Nondestructive Testing.

STRAND 9
Students will be able to understand the American Society for Non-Destructive Testing.

Standard 1
Describe the advantages of a national society of inspection.
• Quality control department
• Advantage to a national organization

Performance Skills
• Construct and illustrate a flow chart showing the links in a quality control department.
• List one advantage a technician would have if he/she joined a national organization.

STRAND 10
Students will be able to understand international involvement in Non-Destructive Testing.

Standard 1
Compare NDT in this country with NDT in other countries in the world.
• Two countries lead the world
• Inspection requirements

Performance Skills
• List the two countries that lead the world in Non-Destructive Testing development.
• Compare inspection requirements in our country to one other country in the world.

STRAND 11
Students will be able to understand future growth and expansion.

Standard 1
State the projected growth and expansion of NDT.
• Infrastructure is the fastest growing area

Performance Skills
• Point out and explain why infrastructure is the fastest growing Non-Destructive Testing area in the country.
• Compare three areas, assess the growth potential, and list them in order of most likely to grow to least likely to grow.