

## Written and Performance Exam General Overview

- The intent of this exam is to assess the candidate’s ability to teach the skills found in the Massachusetts Technical Education Framework.
- The written exam is a state-developed exam aligned to the frameworks which can be accessed [here](#). The performance exam is a NOCTI-developed teacher test and has been determined by DESE to align to the state frameworks.
- Many questions and tasks require a synthesis of knowledge based on experience in the field and may not be found in any book.
- Use this exam outline and the Massachusetts Technical Education Framework to focus your preparation for the exams.
- Candidates are encouraged to prepare for their written exam by reviewing textbooks and reference material which have been listed as part of this exam outline. These resources can be found using online search tools, online vendors, and websites.

## Written Exam

- Number of Questions: 100
- Administration Time: 3 hours
- Passing Score: 70.0%
- Administration Method: Remote Proctored Online Testing Session

## Written Exam Content Coverage

### 5% **Fundamentals of Health and Safety**

- Safety Regulations
- Health and Safety Practices
- Safety Health Knowledge and Skills

### 15% **Environmental Systems**

- Hydrosphere
- Atmosphere
- Geosphere
- Biosphere

### 18% **Natural Resource Management**

- Aquatic Ecosystems
- Meteorology
- Soil Science
- Wildlife Biology
- Forestry

### 5% **Mapping and Geospatial Analysis**

- Topographic Maps

### 5% **Environmental Science and Technology Mathematics**

- 5%     *HAZWOPER Certification***
  
- 5%     *Environmental Sampling***
  - Field Samplings
  
- 5%     *Energy Technologies and Sustainability***
  
- 12%    *Environmental Site Management***
  - Hazardous Waste Site Assessment and Remediation
  - Solid Waste Management
  
- 15%    *Applied Water Technologies***
  - Wastewater and Drinking Water Treatment
  
- 6%     *Ecology***
  
- 4%     *Forest Conservation***
  - Botany
  - Forestry

### Written Exam Reference Materials (Reference Current Edition)

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- **Environmental Science, Working with the Earth** by G. Tyler Miller Jr. (Wadworth Publishing Company)
- **The Rivers Curriculum Guide – Earth Science** by William Donato (Dale Seymour Productions)
- **The Rivers Curriculum Guide – Geography** by Bob Ashley (Dale Seymour Productions)
- **Envirothon Manual**
- **Field Manual for Water Quality Monitoring: An Environmental Education Program For Schools** by Mark K. Mitchell and William B. Stapp (Thomson-Shore, Inc.)
- **Safety and Health – Basic Foundation Series 719** (Schoolcraft Publishing)
- **Groundwater** by R. Allen Freeze and John A. Cherry (Prentice-Hall, Inc.)
- **Oceans and Atmosphere – Science Workshop Series** by Seymour Rosen (Globe Fearon)
- **The State of Our Environment** (Commonwealth of Massachusetts Executive Office of Environmental Affairs)
- **Environmental Science** by Karen Arms (Holt, Rinehart and Winston)
- **Operation of Wastewater Treatment Plants, Vol. I** (USEPA Office of Water Programs)
- **Operation of Wastewater Treatment Plants, Vol. II** (USEPA Office of Water Programs)
- **Water Treatment, Grade 1** (American Water Works Association)
- **Keller’s Hazardous Waste Operations and Emergency Response Compliance Manual**

### Materials Needed for the Written Exam

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- A four-function calculator is included in the online testing system. No other calculators are permitted.
- Scrap paper and pencil/pen are permitted.

## Written Exam Sample Items

Each question on the exam consists of one incomplete sentence or question followed by four choices. Some items reference an image or diagram. A few sample items are included below; the correct answer is designated with an asterisk (\*).

Which of the following is most characteristic of a confined aquifer?

- a. It has high porosity.
- b. It has a low permeability layer on top of it. (\*)
- c. It has a high permeability layer on top of it.
- d. It has a low permeability layer beneath it.

Which piece of laboratory equipment would be used to most accurately measure 7 ml of a sample?

- a. 5 ml graduated cylinder
- b. 10 ml graduated pipette (\*)
- c. 50 ml graduated cylinder
- d. 10 ml volumetric pipette

## Performance Exam

- Administration Time: 2 hours and 30 minutes
- NOCTI Criterion-Referenced Cut Score/Passing Score: 70%
- Administration Method: Onsite at a DESE approved Massachusetts Area Testing Center (MATC) location. Candidates must register and schedule their exam session through NOCTI.

## Performance Exam Content Coverage

- 17% Describe Resources and Concepts Related to Aquaculture and Marine Science**  
*The candidate will obtain the LaMotte dissolved oxygen field test kit and determine the dissolved oxygen concentration in the designated aquarium.*
- 34% Laboratory and Field Sampling and Testing**  
*The candidate will conduct a 2-point calibration on a pH meter using 4.00 and 7.00 buffer solutions. Using the provided standard solution of a given concentration [in milligrams per liter (mg/L)], prepare diluted solutions according to OSHA and industry standards with required concentrations.*
- 23% Select and Use the Appropriate Tools to Perform a Given Task**  
*The candidate will use the given materials and laboratory equipment to determine the measurements as required on the data sheet provided.*
- 17% Hydrogeology**  
*The candidate will use the electronic water level meter to measure the depth-to-water in the simulated observation wells at a hazardous-waste site. Assume the well is contaminated. Record the depth-to-water to within +/- 0.02 feet and calculate the groundwater elevation.*

**9% Safety**

*The candidate will be assessed according to the demonstration of appropriate safety guidelines. The tasks must be completed particularly but not limited to industry and OSHA safety regulations.*

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## Performance Exam Requirements

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### Candidate Supplied

Candidates must bring all appropriate Personal Protective Equipment (PPE), attire/uniform, and any other safety items as is routinely expected to be used by an employee in the related industry. If the candidate does not bring what is needed to safely complete all jobs on the exam as required in the workplace, the testing session will need to be rescheduled at the candidate's expense.

### Site Supplied

Additional equipment and supplies needed to complete the jobs on the performance test will be provided by the testing site.

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## Performance Exam Site Requirements

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Testing sites may have individual requirements based on location and any relevant and current guidance from the Center for Disease Control and Prevention (CDC).