GEORGIA | PEACH STATE PATHWAYS

Career, Technical, & Agricultural Education

HEALTHCARE SCIENCE

COURSE: 25.562 Concepts of Emergency Medicine

UNIT: 30.1 Oxygen Therapy

INTRODUCTION

Annotation:

Students will learn how to correctly administer and store oxygen. They will also identify the equipment associated with oxygen therapy and calculate the duration of flow. Safety aspects of managing oxygen will be emphasized.

Grade(s):

	9th
X	10th
X	11th
X	12th

Time:

Five 50 minute periods

Author:

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Additional Author(s):

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Students with Disabilities:

For students with disabilities, the instructor should refer to the student's IEP to be sure that the accommodations specified are being provided. Instructors should also familiarize themselves with the provisions of Behavior Intervention Plans that may be part of a student's IEP. Frequent consultation with a student's special education instructor will be beneficial in providing appropriate differentiation.

FOCUS STANDARDS

GPS Focus Standards: Please list the standard and elements covered.

HS-CEM 16:

Students will understand the rules of pharmacology: giving and assisting with medications and routes of medications, including proper techniques for use of oxygen therapy.

- **a.** Discuss why oxygen is considered a medication and the impact of local protocols and medical oversight governing the administration of oxygen by the First Responder.
- **b.** Analyze the disadvantages or hazards of oxygen therapy.
- **c.** Identify the components of oxygen delivery systems and compare types of oxygen cylinders including the regulators, flowmeters, and humidifiers.
- **d.** Demonstrate the use of all safety guidelines when working with oxygen cylinders.
- **e.** Calculate the duration of flow for both D and E cylinders individually and discuss the general guidelines for oxygen dosages for patients involved in trauma, childbirth, medical, and environmental emergencies.
- **f.** Identify oxygen delivery devices for breathing patients including nasal cannula, venturi mask, and non-rebreather masks.
- **g.** Demonstrate the preparation and correct operation of an oxygen delivery system to provide oxygen to an adult, an infant, and a child (simulations).
- **h.** Demonstrate the steps in discontinuing oxygen.

GPS Academic Standards:

ELA12LSV1: The student participates in student-to-teacher, student-to-student, and group verbal interactions.

National / Local Standards / Industry / ISTE:

COGNITIVE OBJECTIVES

2-1.11	List the parts of a bag-valve-mask system.(C-1)
2-1.12	Describe the steps in performing the skill of artificially ventilating a patient with a bag-valve-mask for one and two rescuers.(C-1)
2-1.13	Describe the signs of adequate artificial ventilation using the bag-valve-mask.(C-1)
2-1.14	Describe the signs of inadequate artificial ventilation using the bag-valve-mask.(C-1)
2-1.15	Describe the steps in artificially ventilating a patient with a flow restricted, oxygen-powered ventilation device.(C-1)
2-1.19	Define the components of an oxygen delivery system.(C-1)

2-1.20 Identify a nonrebreather face mask and state the oxygen flow requirements needed for its use.(C-1)

2-1.21 Describe the indications for using a nasal cannula versus a nonrebreather face mask. (C-1)

2-1.22 Identify a nasal cannula and state the flow requirements needed for its use.(C-1)

AFFECTIVE OBJECTIVES

2-1.24 Explain the rationale for providing adequate oxygenation through high inspired oxygen concentrations to patients who, in the past, may have received low concentrations.(A-3)

Psychomotor objectives:

2-1.30 Demonstrate the assembly of a bag-valve-mask unit.(P-1,2)

2-1.31 Demonstrate the steps in performing the skill of artificially ventilating a patient with a bag-valve-mask for one and two rescuers.(P-1,2)

2-1.37 Demonstrate the correct operation of oxygen tanks and regulators.(P-1,2)

2-1.38 Demonstrate the use of a non-rebreather face mask and state the oxygen flow requirements needed for its use.(P-1,2)

2-1.39 Demonstrate the use of a nasal cannula and state the flow requirements needed for its use.(P-1,2)

UNDERSTANDINGS & GOALS

Enduring Understandings:

Some patients have breathing emergencies in which supplemental oxygen is needed. It is important that EMS providers understand the safety precautions needed when using oxygen. Oxygen is a drug that requires a prescription. There are guidelines and laws in place when using oxygen.

Essential Questions:

- When and how should supplemental oxygen be given?
- What safety precautions need to be followed in administering oxygen?
- What procedures should be followed in handling different types of oxygen equipment?

Knowledge from this Unit:

- The parts of a bag-valve mask set-up

- The different oxygen delivery devices
- The formula required to calculate the duration of flow for D and E tanks
- Safety guidelines associated with oxygen therapy
- When and how to set up and administer oxygen.

Skills from this Unit:

- Demonstrate the steps for attaching a regulator to an oxygen cylinder.
- Demonstrate the steps of applying a nasal cannula and a non-rebreather mask on a "patient" and how to set the appropriate flow rate on the flow meter.
- Demonstrate how to use the flow-restricted, oxygen-powered ventilation device.
- Perform the mathematics involved when calculating the duration of flow for both D and E cylinders oxygen tanks.

ASSESSMENT(S)

Assessment Method Type: Select one or more of the following. Please consider the type(s) of differentiated instruction you will be using in the classroom.

____ Pre-test
____ Objective assessment - multiple-choice, true- false, etc.
__ Quizzes/Tests
__ Unit test
____ Group project
____ Individual project
X Self-assessment - May include practice quizzes, games, simulations, checklists, etc.
__ Self-check rubrics
__ Self-check during writing/planning process
__ Journal reflections on concepts, personal experiences and impact on one's life
__ Reflect on evaluations of work from teachers, business partners, and competition judges
__ Academic prompts
__ Practice quizzes/tests
____ Subjective assessment/Informal observations
__ Essay tests
__ Observe students working with partners
__ Observe students role playing
X Peer-assessment
__ Peer editing & commentary of products/projects/presentations using rubrics
__ Peer editing and/or critiquing
____ Dialogue and Discussion
__ Student/teacher conferences
__ Partner and small group discussions
__ Whole group discussions
__ Interaction with/feedback from community members/speakers and business partners
X Constructed Responses
_X_ Chart good reading/writing/listening/speaking habits
__ Application of skills to real-life situations/scenarios

_____ Post-test

Assessment(s) Title:

Oxygen Therapy Performance Exam

Assessment(s) Description/Directions:

Students will perform a skills task that will include using an oxygen cylinder and delivering oxygen therapy via the appropriate device. Students will also be required to calculate duration of flow for the cylinder.

Attachments for Assessment(s):.

Oxygen Therapy Performance Exam

LEARNING EXPERIENCES

Instructional planning: Include lessons, activities and other learning experiences in this section with a brief description of the activities to ensure student acquisition of the knowledge and skills addressed in the standards. Complete the sequence of instruction for each lesson/task in the unit.

Sequence of Instruction

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

HS-CEM 16 Students will understand the rules of pharmacology: giving and assisting with medications and routes of medications, including proper techniques for use of oxygen therapy.

2. Review Essential Questions.

- When and how should supplemental oxygen be given?
- What safety precautions need to be followed in administering oxygen?
- What procedures should be followed in handling different types of oxygen equipment?

3. Identify and review the unit vocabulary.

Vocabulary:

- **Hypoxia**-low oxygen levels
- **Flowmeter**-device attached to a oxygen source that controls the amount of supplemental oxygen the patient receives.
- **Pressure regulator**- a device that is connected to an oxygen cylinder to reduce the cylinder pressure to a safe working level for safe deliver of oxygen to the patient

- **Humidifier-**device attached to a supplemental oxygen delivery system to add moisture to the dry oxygen coming from the cylinder
- **Nonrebreather mask**-an oxygen delivery system mask that has an oxygen reservoir bag delivering a high concentration of oxygen and expelling all of the patient's expired air
- **Nasal cannula**-a device for delivering oxygen by way of two small tubes that are inserted into the nares.
- **Venture mask**-respiratory therapy face mask designed to allow inspired air to mix with oxygen, which is supplied through a jet at a fixed concentration
- **Cyanosis-**bluish discoloration of the skin because of too little oxygen
- **Oxygen cylinder**-a pressure vessel used to store gases at high pressure.
- **flow-restricted, oxygen-powered ventilation device**-device that delivers oxygen through a regulator from a pressurized cylinder

4. Assessment Activity.

Lesson 1

1. Introduce oxygen therapy with a class discussion on the indications of the administration of oxygen. Write the responses on the board. (Ex. Respiratory or cardiac arrest, lung diseases, blood loss, trauma)

2. Display equipment needed for oxygen therapy and showcase to the students: Can use the attached multimedia presentation to display the names of the equipment as you showcase the actual items

- Oxygen cylinder (D and E if available)
- Flowmeter
- Pressure regulator
- Nasal cannula
- Nonrebreather mask
- Venture mask
- BVM
- Humidifier

3. Distribute the Oxygen Delivery Device Handout, complete, and review.

Lesson 2

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

2. Review Essential Questions.

3. Identify and review the unit vocabulary.

4. Stress the importance of oxygen therapy and the risks associated with it, especially with oxygen cylinders. (Interesting fact: Breaking the pressure regulator off of a full E tank will create a torpedo with enough power to bury itself in a concrete wall)

5. Divide the student into groups of 3-4 and have them research safety rules and regulations when dealing with oxygen cylinders (the students should use their text as a primary reference, but the internet could also be an option).

6. Compile these rules into one class set and post them as the lab safety rules during this unit.

Lesson 3:

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

2. Review Essential Questions.

3. Identify and review the unit vocabulary.

4. Demonstrate the following and allow student practice time:

- How to attach the pressure regulator to the cylinder
- How to adjust flow
- How to attach the different delivery devices to the pressure regulator, include BVM
- How to operate a flow-restricted, oxygen-powered ventilation device.

Lesson 4:

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

2. Review Essential Questions.

3. Identify and review the unit vocabulary.

4. Define the concept of duration of flow and discuss its importance:

What can happen if an EMT is unaware of duration of flow during transport?

5. Review Math-order of operations PEMDAS (Please Excuse My Dear Aunt Sally) and give student a review worksheet , review available at http://www.purplemath.com/modules/orderops.htm or many math websites with worksheets or http://regentsprep.org/Regents/math/orderop/Lorder.htm

6. Write the formula on the board and explain the components

[(Gauge pressure in PSI – 200PSI) x Cylinder Constant]/flow rate in liters per minute

7. Distribute Duration of Flow Worksheet and instruct students to complete this individually. Monitor and provide assistance when appropriate.

8. Review answers

9. Reconvene student practice with performance rubric from previous lesson.

Lesson 5:

1. Identify the Standards. Standards should be posted in the classroom for each lesson.
2. Review Essential Questions.
3. Identify and review the unit vocabulary.
4. Begin Performance Exam
5. Students should complete the following assignment while awaiting their turn:

Read and outline the section in your text concerning the special considerations in oxygen therapy.

Attachments for Learning Experiences:

- Oxygen Delivery Device Handout
- Oxygen Therapy Performance Rubric
- Duration of Flow Worksheet

Notes & Reflections:

- Availability of equipment may limit lessons. When equipment is not available, utilize pictures for identifications and written steps for the skills.
- A Language Arts centered enrichment may include researching medical trade journals (professional or nonprofessional) and reading and summarizing articles relevant to the unit

CULMINATING PERFORMANCE TASK (Optional)

Culminating Unit Performance Task Title:

Oxygen Therapy Performance Task

Culminating Unit Performance Task Description/Directions/Differentiated

The students will blindly choose a patient scenario. Based upon equipment available and the patient's oxygen requirements, students will prepare the oxygen delivery equipment and administer to the patient correctly.

Attachments for Culminating Performance Task

Patient Scenarios

Oxygen Therapy Performance Exam Rubric

UNIT RESOURCES

Web Resources:

http://www.templejc.edu/dept/ems/pages/powerpoint.html multimedia slides

http://www.purplemath.com/modules/orderops.htm-for Math Order of Operations review

http://regentsprep.org/Regents/math/orderop/Lorder.htm order of operations review

Attachment(s):

- Oxygen multimedia presentation

Materials & Equipment:

- Oxygen multimedia presentation
- Materials & Equipment:
- Oxygen cylinder (D and/or E tank)
- Pressure regulator
- Flowmeter
- Nasal cannula
- Venture mask
- Nonrebreather mask
- Flow restricted, oxygen powered ventilation device

What 21st Century Technology was used in this unit:

X	Slide Show Software		Graphing Software		Audio File(s)
	Interactive Whiteboard	X	Calculator	X	Graphic Organizer
	Student Response System		Desktop Publishing		Image File(s)
	Web Design Software		Blog		Video
	Animation Software		Wiki		Electronic Game or Puzzle Maker
	Email	x	Website		