INTRODUCTION TO MYCOLOGY

Objective/Rationale

Although most fungi are beneficial to man, some are opportunistic pathogens that cause human disease. The fungi include yeasts and molds that depend upon non-living matter for their nutritional needs (saprophytes). When fungi depend upon other living organisms for food, they cause parasitic infections. The student will identify characteristics of fungi.

TEKS 121.14 5A, 5C

TAKS ELA 1, 4
Science 1, 2

National Science Education Standards A9-12; C9-12; F9-12; G9-12
National Health Care Skills Standards .01, .07, .09
National Curriculum Standards for School Mathematics S1; S3

Key Points

I. Mycology is the study of fungi
   a. Yeast
   b. Mold

II. Yeasts and molds have different structural and reproductive characteristics
   a. Yeasts are unicellular, nucleated rounded fungi while molds are multicellular, filamentous fungi.
   b. Yeasts reproduce by a process called budding while molds produce spores to reproduce.
   c. Yeast are used in the preparation in a variety of foods.
   d. Some yeasts are opportunistic pathogens in that they cause disease in immunocompromised individuals.

III. Fungi serve both beneficial and harmful purposes in our environment.
   a. Molds are used in the production of cheeses and other foods and also serve an antimicrobial purpose.
   b. Molds have a negative impact on our food industry and also cause opportunistic infections in debilitated and immunosuppressed individuals.

IV. Disease states
   a. Allergic reactions to specific fungal antigens
   b. Production and action of fungal exotoxins
   c. Growth of a fungus on or in the body (or a mycosis)
      1. Superficial mycosis
      2. Subcutaneous
      3. Systemic mycosis

Activities

I. Complete the **Fungi Laboratory Investigation**.

Materials/Resources

Prepared slides of pathogenic and nonpathogenic fungi
Microscope
Petri dishes
Dilute 6.2% iodine solution
India ink
Slides
Cover slips
Yeast cake
Inoculating needle
Bunsen burner
Gloves
Laboratory coat or apron
Goggles
Biohazard containers
Surface disinfectant
Paper towels

Assessment

Laboratory Investigation Rubric

Accommodations

For reinforcement, the student will design a poster differentiating characteristics of yeast and mold cell.

For enrichment, the student will research and report on the prevalence of one of the following fungal diseases in the state of Texas, listing factors that affect the incidence of the disease:

a. Aspergillus
b. Cryptococcus
c. Coccidiodes
d. Black mold
e. Histoplasma

Reflections

Fungi Laboratory Investigation

Purpose:
In this laboratory investigation, the student will identify characteristics of fungi.

Background Information:

Materials:
Prepared slides of pathogenic and nonpathogenic fungi (yeast and mold)
Microscope
Petri dishes
Dilute 6.2% iodine solution or India ink
Slides
Cover slips
Yeast cake
Innoculating loop
Eye dropper
Bunson burner
Labcoats
Biohazard container
Surface disinfectant
Paper towels
Gloves
Goggles

Procedure:

1. Wash hands and put on gloves and goggles.
2. Assemble equipment and materials.
3. Prepare work area.
4. Examine and study prepared slides of pathogenic and nonpathogenic fungi noting their structure and the budding. Identify the parts of the yeast cell.
5. Dissolve a portion of yeast cake in warm water in a petri dish and allow to stand overnight at room temperature or warmer.
6. Flame and cool the inoculating loop.
7. Using the loop, place a drop of this mix on a slide and cover with a cover slip. Flame and cool the loop. Examine the yeast cells under the microscope after staining with iodine and India ink.
8. Add a drop of iodine or India ink to the edge of the cover slip to stain the cells.
9. Examine the yeast cells under the microscope.
10. Clean work area with surface disinfectant. Remove goggles and gloves and wash hands.

Data:
Draw the prepared slides of fungi and identify the parts.

Draw and identify the yeast cells as observed under the microscope.

Conclusion:
1. Compare and contrast yeast and mold cells.

2. Explain how fungi can be differentiated from bacterial cells.

3. Research and describe diseases caused by opportunistic fungi.