



## uBEATS Teacher's Guide:

# Neoplasia

## (Grades 11-12)

This teacher guide is a supplementary text to support the use of the uBEATS Neoplasia module for grades 11-12.

To help students develop the knowledge necessary for an incredible future in health care, we created UNMC Building Excellence in Academics Through STEM (uBEATS), an online health science resource for Nebraska students.

UNMC uBEATS modules are short (15 minutes or less), interactive online health science modules to supplement curriculum taught in grades 6 – 12. These do not replace curriculum, but are a supplement for teachers and students incorporating evidence based information and UNMC expert guided material. Each module is chunked into sections with formative and summative assessments with immediate feedback provided.

Tips on how to utilize uBEATS modules:

- Internet access is required to view uBEATS modules.
- For those who have access to one-to-one technology, modules can be used in or outside of the classroom as a topic introduction, extension, or review.
- For classrooms without individual student devices modules can be used in whole group instruction. Formative assessment questions can use the teacher's preferred call and response method and summative assessment questions can be displayed on the board and answered individually by students or printed and distributed to students after viewing the module.

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## Objectives

- Distinguish between benign and malignant growths.
  - List possible causes of neoplasia.
  - Discuss treatment options for neoplasia.
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## Introduction

Neoplasia is defined as an abnormal growth of cells, or tumors, that can be either benign or malignant. In this module, students will learn about the causes, types, and treatments of different types of tumors.

## Prior Knowledge

Before beginning this module, the student should understand the Next Generation Science Standards (NGSS) featuring [Three-Dimensional Learning](#).

### Core Idea LS1.A. Structure and Function

- **By the end of grade 8.** Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. Animals engage in characteristic behaviors that increase the odds of reproduction. Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features (such as attractively colored flowers) for reproduction. Plant growth can continue throughout the plant's life through production of plant matter in photosynthesis. Genetic factors as well as local conditions affect the size of the adult plant. The growth of an animal is controlled by genetic factors, food intake, and interactions with other organisms, and each species has a typical adult size range. [A Framework for K-12 Education](#).

### Science and Engineering Practices [NGSS](#)

- Developing and using models

### Crosscutting Concepts [NGSS](#)

- Systems and system models

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## Key Terms/Vocabulary

Neoplasia, neoplasm, neoplastic, tumor, benign, malignant, cancer, metastasize, fibroma, connective tissue, lipoma, fat tissue, adenoma, glandular tissue, hemangioma, blood vessels, sarcoma, melanoma, melanin, melanocytes, UV radiation, carcinoma, epithelial cells, lymphoma, lymphatic system, growth regulatory genes, proliferation, tumor suppressor genes, monoclonal, polyclonal, stochastic, mutation, screening, mammogram, endoscopy, dermal, subdermal, biopsy, imaging.

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## Science Standards

This module is related to the content of **UNMC High School Alliance: Introduction to Pathology and Microbiology**

Pathology is the study of disease processes. The field lays the foundation for all of clinical medicine and medical research. All diseases begin at the cellular level and changes in the structure and function of tissues ultimately lead to symptoms that health care providers see on a daily basis. This course will introduce students to medical terminology, normal histology and gross/microscopic pathology, allowing students to correlate the findings they see into basic clinical concepts.

**Nebraska's College and Career Ready Standards for Science 2024** [Nebraska Science Standards](#)

Engineering in Health Sciences SC.HSP.17.1.C

- Evaluate a solution to a complex real-world human health problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

## Extensions of the lesson

- To help students become more familiar with the Key Terms of this module, the teacher can use the vocabulary list for a classroom Word Wall, or integrate the vocabulary into classroom word games during review sessions.
- To help the students see personal relevance, suggest that they have a **private** conversation with family members regarding someone who has had a tumor, attempting to apply this module's vocabulary terms as appropriate.
- As student misconceptions become apparent, the teacher may need to reinforce these important concepts:
  - "Neo" means "new" and "plasia" means growth or formation. Neoplasia is new growth of tissue that is abnormal.
  - A cluster of abnormal cells is a tumor, but such a growth can be either benign or malignant.
  - A benign tumor is not cancerous, but it can still be dangerous if the growth interferes with other organs or life functions. Most benign tumors do not need to be removed if they are in a place where they do not interfere with life functions.
  - A malignant tumor is cancerous because of its rapid growth and its potential to metastasize, which means it can spread to other parts of the body.
  - Tumors are not contagious. However, they can be influenced by a variety of factors that stimulate the cell's DNA to become mutated.
  - Malignant tumors can be removed surgically or treated with chemicals and/or radiation to destroy the cancerous cells.



- Prevention of cancer is preferable to treatment, but some risk factors, such as age, gender, ethnicity, and genetics cannot be controlled. On the other hand, modifiable factors such as lifestyle, diet, exercise, etc., can be managed to reduce cancer risk.
- Early detection is critical when cancers are developing, but some cancers cannot be cured.

## Enrichment

- For information about Healthcare Career Opportunities, see [UNMC Health Career Book](#).
- Students should be watchful in current events for recent articles about cancer.
- For examples of classroom lesson plans, see [Decoding Cancer](#).
- To make connections in your community, contact local hospitals, healthcare clinics, nurses, doctors, medical laboratories.