

# HEALTH CAREERS, MATH & SCIENCE ENRICHMENT PROGRAM GUIDE



NORTHEAST  
**AHEC**

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[www.neahec.org](http://www.neahec.org)

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When you are asked to think of a health career, is the first thing that comes to your mind a doctor or a nurse? This is one of the most common misconceptions about the health care field; that there are just a few choices. However, there are literally hundreds of careers in the health care field with a variety of specialties and educational requirements. Not only are there a variety of options in the health care field, but there is projected job growth and security as well. According to the Bureau of Labor Statistics, "nine of the ten fastest growing occupations are in health or computer occupations". The increase in future need is due to a projected twofold growth in the health care and social assistance sectors of our economy by the year 2014. These statistics coupled with aging baby boomers and an increased usage of our health care system makes careers in the health care field a solid career choice.

One of the major goals of the Northeast Kentucky Area Health Education Center (NE AHEC) is to assist eastern Kentucky in growing the health care workforce of tomorrow by increasing an interest in health careers among our youth today. This is accomplished by providing activities which support the Kentucky Department of Education curriculum requirements while adding fun, hands-on programs in math, science and health career exploration for students in the 5th through 12th grades at absolutely NO COST to the school.

For elementary schools, interactive programs increase awareness of various health occupations and general health education. Classroom presentations and summer enrichment camps focus on math and science to provide middle school students a firm background in each. As students enter their high school years, health career presentations along with college information and skills workshops equip the students with the necessary information and knowledge to pursue their desired health profession.

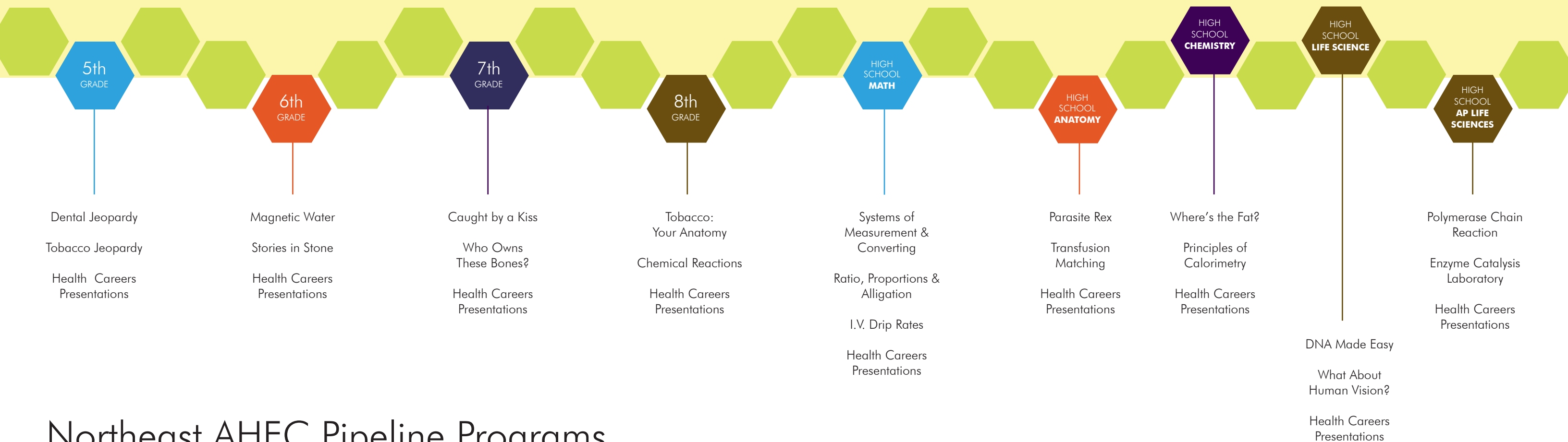


10 Out of 20  
Occupations  
Projected to Grow  
the Fastest are  
Concentrated in  
Health Services

*U.S. Department of Labor*

1 Out of Every Four  
New Jobs Created  
in the U.S. Economy  
Will be in Either  
the Healthcare or  
a Related Social  
Assistance Field

*U.S. Department of Labor*



## Northeast AHEC Pipeline Programs

## 5th GRADE

### TOBACCO JEOPARDY

Approximately 1 hour

This tobacco prevention program gives students the opportunity to identify the harmful effects of tobacco use, including smokeless tobacco, on their body. Students will also learn basic information about tobacco-related data, unhealthy products in tobacco, and the skills to resist media or peer pressure to use tobacco. The Tobacco Awareness Jeopardy game reinforces what students have learned during the discussion and demonstration.

KDE: PL-5-PW-U-1;  
PL-5-PW-S-PPH1  
PL-5-PW-S-PPH2  
PL-5-PW-S-PPH3  
PL-05-1.1.6  
PL-04-1.1.8



### DENTAL JEOPARDY

Approximately 1 hour

The primary objective of the Dental Jeopardy game is to provide students with a fun and interactive tool for learning about dental health. The program is designed to provide participants with information on dental hygiene, tooth development, preventing periodontal disease, dental first aid, and the risks of smokeless tobacco and oral lesions.

KDE: PL-5-PW-U-7  
PL-5-PW-S-DP1  
PL-5-PW-S-DP2  
PL-5-PW-S-DP3  
PL-05-1.1.7



## 7th GRADE

### CAUGHT BY A KISS

Approximately 1 hour

Students act as crime scene technicians to identify which pieces of evidence from multiple crime scenes contain potentially useful DNA information. By detecting amylase activity, students infer the presence/absence of saliva on the evidence. Students learn why the detection of saliva is important at a crime scene, as well as how the amylase enzyme chemically reacts to starch.

KDE: SC-7-STM-U-1;  
SC-7-STM-S-1  
SC-7-STM-S-3  
SC-07-1.1.1

### WHO OWNS THESE BONES

Approximately 1 hour

Students are the detectives in a local missing persons case. They examine a set of 4 plastic bones (a skull, arm bone, pelvis, and leg bone) that were recently unearthed from a field near the school. After identifying the bones, students use skeletal characteristics to determine as much information as possible about the person including: race, gender, and height.

KDE: SC-7-UD-U-1  
SC-7-UD-S-2  
SC-07-3.4.1

## 6th GRADE

### STORIES IN STONE

Approximately 1 hour

Students learn how igneous, sedimentary, and metamorphic rocks form. Working in small groups, students use a boxed set of 10 pre-numbered rock and mineral samples to learn how rocks and minerals differ and then classify the samples. "Mystery rocks" are included to challenge their classification skills.

KDE: SC-6-EU-U-2  
SC-6-EU-U-3  
SC-6-EU-S-1  
SC-6-EU-S-3  
SC-06-2.3.2  
SC-06-2.3.3

### MAGNETIC WATER

Approximately 1 hour

This program illustrates the unique properties of water and teaches concepts that apply to all substances. Through 9 activities, students learn first hand how these fundamental interactions determine the unique chemical and physical properties of substances, such as polarity, hydrogen bonding, surface tension, solubility, states of matter, and crystal structure.

KDE: SC-6-STM-U-3  
SC-6-STM-S-2  
SC-6-STM-S-3  
SC-06-1.1.2

## 8th GRADE

### TOBACCO: YOUR ANATOMY

Approximately 1 hour

The program examines a healthy set of pig lungs and details the anatomical and physiological changes due to prolonged tobacco use. This hands-on demonstration shows the processes of human ventilation through cellular respiration. The program also uses a model mouth and personal experience to demonstrate the effects of using smokeless tobacco.

KDE: PL-8-PW-U-1  
PL-8-PW-S-PPH1  
PL-8-PW-S-PPH2  
PL-8-PW-S-PPH3  
PL-08-1.1.5  
PL-08-1.1.6  
PL-08-1.1.8



### CHEMICAL REACTIONS

Approximately 1 hour

An exciting introduction to chemistry, this program utilizes an ordinary Ziploc® bag as a safe and spectacular laboratory. Students mix chemicals that bubble and change color, then get hot and smell. They will experiment to determine what causes the heat in this chemical reaction and examine the properties of liquids and solids.

KDE: SC-8-STM-U-1 SC-08-1.1.1  
SC-8-STM-U-2 SC-08-1.1.4  
SC-8-STM-S-2 SC-8-STM-U-5  
SC-08-1.1.2 SC-8-STM-S-1  
SC-08-1.1.3 SC-08-1.1.1  
SC-8-STM-U-3 SC-8-STM-U-6  
SC-8-STM-S-5 SC-8-STM-S-3  
SC-08-1.1.2 SC-8-STM-S-4  
SC-8-STM-U-4 SC-08-1.1.4  
SC-8-STM-S-5



HIGH SCHOOL MATH

**MEDICAL MATH: SYSTEMS OF MEASUREMENTS**

Approximately 1 hour

Students are encouraged to improve their ability to identify, solve, and apply mathematical principles involving temperature, weights, and measures used in the health care delivery system. This program is interactive and makes mathematics interesting and hands on by allowing the student to take on the role of a pharmacist and calculate drug dosages.

**MEDICAL MATH: RATIO, PROPORTIONS & ALLIGATION**

Approximately 1 hour

This program focuses on ratio and proportion and their relationship to calculating drug dosage. The alligation portion of the program teaches students the correct way to mix products of different strength.

**MEDICAL MATH: I.V. DRIP RATES**

Approximately 1 hour

Students improve their problem solving skills by calculating IV dosages. Taking the role of the pharmacist, students will use mathematical formulas to calculate and convert drug dosages to the appropriate measurement system.



HIGH SCHOOL LIFE SCIENCE

**WHAT ABOUT HUMAN VISION**

Approximately 1 hour

Students study basic characteristics of human vision, learn about eye structure, and genetics. Following a short lecture, students get to conduct eye tests that cover accommodation, visual acuity, visual mapping, and peripheral vision with a Snellen eye examination chart. The astigmatism test chart, transparent colored vinyl (for studying afterimages) and a Holmgren-type color blindness chart allows for other test to be conducted.

**DNA MADE EASY**

Approximately 1 hour

Students learn about such topics as the double helix, amino acid chains, and replication. Multimedia presentations, illustrations and a jumbo sized DNA demonstration board are used to provide students with a look into the nucleus of a cell and allow them to see the DNA at work.



HIGH SCHOOL ANATOMY

**TRANSFUSION MATCHING**

Approximately 1 hour

This lab exercise introduces students to the procedures used to determine blood-type and the importance of correct blood-typing. Students act as clinical blood technicians in a hospital emergency room. They will have to supply the medical team with the correct blood-type information to save the life of an accident victim.

**PARASITE REX**

Approximately 1 hour

For centuries, parasites have lived in nightmares, horror stories, and in the darkest shadows of science. This lecture takes students on a fantastic voyage into the secret parasite universe we actually live in but haven't recognized. An interesting slide and specimen presentation allows students to view a variety of parasites.



HIGH SCHOOL AP LIFE SCIENCES

**POLYMERASE CHAIN REACTION**

Approximately 1 hour

In this activity students will carry out electrophoresis of DNA samples that simulate the results of PCR DNA fingerprints from the crime scene evidence of two suspects. Through this activity students will gain an understanding of what the polymerase chain reaction does and how it is used to generate human DNA fingerprints.

**ENZYME CATALYSIS LABORATORY**

Approximately 1 hour

Students learn how a particular enzyme catalyst affects the rate of a chemical reaction through an eight station lab set-up.

HIGH SCHOOL CHEMISTRY

**PRINCIPLES OF CALORIMETRY**

Approximately 1 hour

This lab exercise introduces students to endothermic and exothermic reactions and the relationship between heat and temperature.

Students construct a calorimeter and use it to determine the heat of solution of two salts and the heat of neutralization.

**WHERE'S THE FAT**

Approximately 1 hour

Students learn extraction procedures by extracting the fat from their favorite snack food. They analyze the effectiveness of their chemical extraction procedure by comparing their actual results with their predicted results based on the snack food's label information.

**FOR MORE INFORMATION**



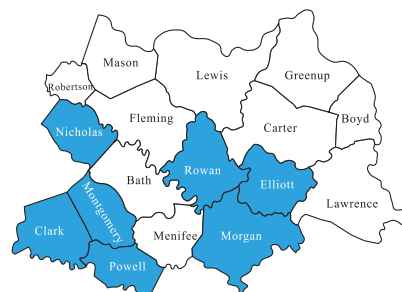
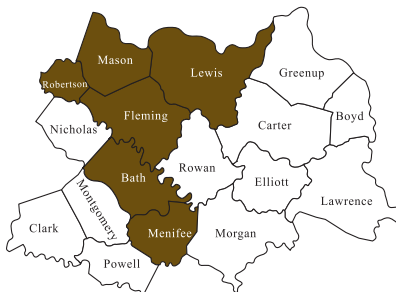
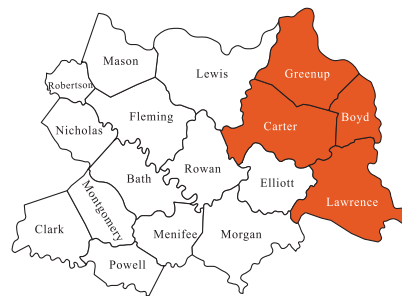
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OUTSIDE THE CLASSROOM

**HEALTH CAREERS EXPLORING PROGRAM**

The Health Careers Exploring Program is for 10th - 12th grade students that have expressed interest in health careers and want to observe the workplace of specific healthcare professionals. Monthly meetings take place at St. Claire Regional Medical Center and focus on specific health career areas each session. Participants have the opportunity to take an inside look into what it takes to be in a health career position and work in a hospital.

**HEALTH OPPORTUNITIES WORKSHOP**

MARCH 2, 2007

The Health Opportunity Workshop is a regional workshop that targets high school juniors and seniors. The conference provides students with an opportunity to meet health care professionals from a variety of backgrounds as well as admissions and financial aid representatives from technical colleges and universities. The HOW conference is also a fun and educational experience with hands on projects for students to test their skills.

**ACT PREP COURSES**

Two 90-minute videotapes present the structure of the ACT examination, test-taking strategies for each section of the test, and fully explain practice problems. A 110 page student workbook contains practice problems presented on the video along with a full-length practice examination with answer explanations for all questions.

**UK HEALTH RESEARCHERS YOUTH ACADEMY**

July 8-20, 2007

This is a 2 week summer program at the University of Kentucky for rising high school junior or senior students. The Health Researchers Youth Academy provides students with exposure to health research careers while learning about research methodology, areas of research, and basic science concepts.

**HEALTH CAREERS CLUB**

The Health Careers Club is for any 6th - 8th grade students. The AHEC Health Careers Team will provide hands-on activities focusing on information about health careers or educational programs. The club will meet during a school's Club Day or whenever time is appropriate for students.

**HEALTH CAREERS SUMMER CAMP**

The Health Careers Summer Camp is a 3 day camp for middle school student's grades 6-8 interested in learning more about health career professions. The camp format incorporates math and science activities to stimulate the student's interest and to facilitate participation in discussions and hands-on activities. Staff, equipment resources and meals are provided by the Northeast AHEC. There is no charge to the school for hosting or students to attend these camps. If your middle school is interested in hosting one of these health career camps please contact the Health Careers Coordinator assigned to your county.

**UK HEALTH CAREERS EXPLORING PROGRAM**

June 10 - July 20, 2007

This is a 6 week summer program at the University of Kentucky for rising high school junior students (11th grade in the fall). The primary focus of the Summer Enrichment Camp is academic preparation through math and science development. Additionally, students will participate in a variety of activities at area medical facilities. Health related seminars, hands-on activities as well as discussions regarding the admissions process for health professions schools are important components of the program.

**UK Professional Education Preparation Programs (PEPP)**

**UofL** Pre-College Summer Workshops for graduating high school seniors from Kentucky interested in medicine or dentistry. This residential summer workshop occurs at the University of Kentucky, University of Louisville, and Pikeville College School of Osteopathic Medicine. Participants receive academic enrichment in college level pre-medical and pre-dental courses, health career exposure in medicine and dentistry, professional and personal development, and exposure to college life.  
**PCSOM**

## Kids Into Health Careers Presentations

There are many job opportunities in the healthcare field and qualifying for them is an achievable and rewarding goal for any student to have. Northeast AHEC can help present a guest speaker on a specific health career field or talk about health careers in general. We also provide information about Kentucky schools that have educational healthcare programs or degrees available. Please contact your area program coordinator to find out more or to schedule a presentation.

Examples of a few of these health fields are listed below:

**Physician Assistants (PAs)** perform physical examinations, diagnose illness, recommend treatment, and order laboratory tests under the supervision of a physician. Physician assistants attend an accredited PA program often after attaining a bachelor's or master degree. The median salary for a physician assistant is \$61,910 a year.

**Pharmacy Technicians** are support personnel in pharmacies. Most attend community colleges or vocation-technical schools where they earn associate's degrees. Pharmacy technicians make between \$9 and \$11 dollars an hour.

**Radiologic Technologists** use radiation for diagnostic imaging. There are programs for radiography, radiation therapy, and diagnostic sonography at the certificate, associate's, and bachelor's degree levels. The median salary for radiologic technologists is almost \$36,000 a year.

**Respiratory Therapists** work with physicians to treat and care for patients with pulmonary disorders, such as asthma or emphysema. They must complete a formal training program that can be a 4-year bachelor's degree or 2-year associate's degree. The median salary for respiratory therapists is almost \$37,680 a year.

**Athletic Trainers** prevent, care for, and rehabilitate athletic injuries as recommended by a physician. A certified athletic trainer must graduate from an accredited program, fulfill an internship, and pass a certification exam. This is a growing field offering a range of salaries.

**Physical Therapists** work with people who have been disabled by illness or accident. Treatment may include exercise, massage, the application of heat, and other techniques. There are both undergraduate and graduate degrees for physical therapists who earn a median salary is \$54,810 a year.

**Occupational Therapy Assistants** teach disabled patients how to get around with limited mobility, perform strengthening or muscle toning exercises with patients, and work with them in other ways to complete treatment regimens. An associate's degree from an accredited training program is required for these jobs which pay \$34,340 a year.

**Dispensing Opticians** make and fit eyeglasses and lenses. Opticians can be trained on the job either informally or in an apprenticeship program. As the population ages and requires more prescription eye wear, there will be more job opportunities for opticians. Salaries range from \$14,400 to \$39,660 a year.

**Surgical Technologists** prepare operating rooms for surgery, assist during operations, and carry out post-operative procedures. Training programs vary from 9 to 24 months. Salaries range from \$20,490 to \$40,310 a year.

**Emergency Medical Technicians** perform basic life support skills, such as restoring breathing, controlling blood loss, and treating shock victims. This job requires some 120 hours of classroom exercises and 10 internship hours. The median salary is a little more than \$22,460 a year.

**Certified Registered Nurse Anesthetists (CRNAs)** care for patients before, during, and after surgical procedures, they blend nursing skills with the practice of anesthesia. Nurse anesthetists administer more than 65 percent of the anesthetics given in this country. After receiving a bachelor's degree in nursing and one year of clinical experience, training programs vary from 24 to 36 months. Starting salary is \$105,000 or more.

**Dental Hygienists** work with dentists, they provide dental care by examining teeth for cavities, removing tooth deposits, applying fluoride and sealants, and placing temporary fillings. Dental hygiene offers programs at the certificate, associate's, or bachelor's degree levels. Average starting salary is \$40,000 a year.

**Public Health Program Specialists** identify those at risk of a specified health problem. They also implement and evaluate interventions to prevent such health problems. Many colleges and universities award a bachelor's degree in public health; most advanced positions require a master's degree. Public health professionals' salaries vary by specialty, experience, geographic location, and level of education. Average salary for all specialties is \$70,700.