Specific curriculum area standards can be found at the Colorado State Board of Education website, located at the above address. Links to the specific standards are found under the current curriculum frameworks with the PDFs specific goals within each educational category located on the page. The benchmark interpretations are those of the Dangerous Decibels® program and do not represent official state board of education interpretation or review.

THE DANGEROUS DECIBELS PROGRAM is designed to reduce the incidence of noise induced hearing loss and tinnitus by changing knowledge, attitudes, and behaviors about sound exposures. Common underlying educational messages:
1. What are the sources of dangerous sounds
2. What are the consequences of dangerous sounds
3. How do I protect myself from dangerous sounds.

RATIONALE:
The Centers for Disease Control Division of Adolescent and School Health (DASH) recognizes noise induced hearing loss as a health risk for young people. http://www.cdc.gov/healthyyouth/noise/

The U.S. national health initiative; Healthy People 2020 has indicated three related health goals for the prevention of noise induced hearing loss in youth; http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=20 (Ear-Nose-Throat (ENT) and Educational and Community-Based Program (ECBP) Objectives

1. ENT-VSL-6: Increase the use of hearing protection devices
   a. ENT-VSL-6.2: Adolescents aged 12 to 19 years who have ever used hearing protection devices (earplugs, earmuffs) when exposed to loud sounds or noise.

2. ENT-VSL-7 Reduce the proportion of adolescents who have elevated hearing thresholds or audiometric notches, in high frequencies (3, 4, or 6 kHz) in both ears, signifying noise-induced hearing loss.

3. ECBP-3: Increase the proportion of elementary, middle, and senior high schools that have health education goals or objects that address the knowledge and skills articulated in the National Health Education Standards (high school, middle, elementary).
   a. ECBP-3.1: Comprehending Concepts related to health promotion and disease prevention (knowledge)
   b. ECBP-3.2: Accessing valid information and health promoting products and services (skills)
   c. ECBP-3.3: Advocating for personal, family, and community health (skills)
   d. ECBP-3.5: Practicing health-enhancing behaviors and reducing health risks (skills)
   e. ECBP-3.6: Using goal-setting and decision-making skills to enhance health (skills)
   f. ECBP-3.7: Using interpersonal communication skills to enhance health (skills)

4. ECBP-4: Increase the proportion of elementary, middle, and senior high schools that provide school health education to promote personal health and wellness in the following areas: hand washing or hand hygiene; oral health; growth and development; sun safety and skin cancer
What is Sound?

DD Educational Objectives: Students will know that:
1. Sound is a result of vibrations
2. Sound vibrations are called sound waves
3. You cannot have sound without vibrations
4. The energy in sound is what can cause damage to our ears

Colorado Educational Benchmarks:
A. Comprehensive Health (First Grade)
   Standard 2. Physical and Personal Wellness in Health
   - Demonstrate ways to prevent harmful effects of the sun as well as hearing and vision loss (DOK 1-2)

B. Comprehensive Health (Sixth Grade)
   Standard 2. Physical and Personal Wellness in Health
   - Summarize personal strategies for reducing sun damage as well as hearing and vision damage (DOK 1-2)
   - Strategies exist to prevent damage to the skin from the sun, hearing loss, and vision loss.

C. Science (Second Grade)
   Standard 1. Physical Science
   - Changes in speed or direction of motion are caused by forces such as pushes and pulls
     - Identify and predict how the direction or speed of an object may change due to an outside force (DOK 1-2)
     - Analyze and interpret observable data about the impact of forces on the motion of objects (DOK 1-2)

D. Science (Fourth Grade)
   Standard 1 Physical Science
   - Energy comes in many forms such as light, heat, sound, magnetic, chemical, and electrical
   - Describe the energy transformation that takes place in electrical circuits where light, heat, sound, and magnetic effects are produced (DOK 1-2).

E. Science (Eighth Grade)
   Standard 1 Physical Science
   - Identify and calculate the direction and magnitude of forces that act on an object, and explain the results in the object’s change of motion.
Predict and evaluate the movement of an object by examining the forces applied to it (DOK 1-2).
Use mathematical expressions to describe the movement of an object (DOK 1-2).

Inquiry Questions:
1. What relationships exist among force, mass, speed, and acceleration?
2. What evidence indicates a force has acted on a system? Is it possible for a force to act on a system without having an effect?
3. There are different forms of energy, and those forms of energy can be changed from one form to another – but total energy is conserved.
4. Gather, analyze, and interpret data to describe the different forms of energy transfer (DOK 1-2).

Relevance & Application:
Recognize that waves such as electromagnetic, sound, seismic, and water have common characteristics and unique properties.
Compare and contrast different types of waves (DOK 1-2)
   o Describe for various waves the amplitude, frequency, wavelength, and speed (DOK 1)
   o Describe the relationship between pitch and frequency in sound (DOK 1)

Inquiry Questions:
1. What are some different ways to describe waves?

Relevance & Application:
Different vibrations create waves with different characteristics. For example, a vibrating low-pitch guitar string feels different to the touch than a high-pitch guitar string.
Living organisms collect and use light and sound waves – such as for hearing and vision- to gather information about their surroundings.
Evaluate models used to explain and predict wave phenomena that cannot be directly measured (DOK 2-3)
Select and use technology tools to gather, view, analyze, and report results for scientific investigations about the characteristics and properties of waves. (DOK 1-2).

Measuring Decibels with Sound Level Meters

DD Educational Objectives:
1. Students will measure sound intensities with a sound level meter.
2. Students learn how effective walking away from dangerous sound levels can be to reduce their exposure to dangerous sound.

Colorado Educational Benchmarks:
A. Comprehensive Health (First Grade)
   Standard 2. Physical and Personal Wellness in Health
• Demonstrate ways to prevent harmful effects of the sun as well as hearing and vision loss (DOK 1-2)

B. Comprehensive Health (Sixth Grade)
Standard 2. Physical and Personal Wellness in Health
• c) Summarize personal strategies for reducing sun damage as well as hearing and vision damage (DOK 1-2)
  o Strategies exist to prevent damage to the skin from the sun, hearing loss, and vision loss.

C. Science (Eighth Grade)
Standard 1 Physical Science
  o Identify and calculate the direction and magnitude of forces that act on an object, and explain the results in the object’s change of motion.
  o Predict and evaluate the movement of an object by examining the forces applied to it (DOK 1-2).
  o Use mathematical expressions to describe the movement of an object (DOK 1-2).

Inquiry Questions:
• What relationships exists among force, mass, speed, and acceleration?
• What evidence indicates a force has acted on a system? Is it possible for a force to act on a system without having an effect?

Relevance & Application:
• There are different forms of energy, and those forms of energy can be changed from one form to another – but total energy is conserved
• Gather, analyze, and interpret data to describe the different forms of energy transfer (DOK 1-2).
• Recognize that waves such as electromagnetic, sound, seismic, and water have common characteristics and unique properties
• Compare and contrast different types of waves (DOK 1-2)
• Describe for various waves the amplitude, frequency, wavelength, and speed (DOK 1)
• Describe the relationship between pitch and frequency in sound (DOK 1)

Inquiry Questions:
  o What are some different ways to describe waves?

Relevance & Application:
• Different vibrations create waves with different characteristics. For example, a vibrating low-pitch guitar string feels different to the touch than a high-pitch guitar string.
• Living organisms collect and use light and sound waves – such as for hearing and vision- to gather information about their surroundings.
• Evaluate models used to explain and predict wave phenomena that cannot be directly measured (DOK 2-3)
• Select and use technology tools to gather, view, analyze, and report results for scientific investigations about the characteristics and properties of waves. (DOK 1-2).

How Do We Hear?

DD Educational Objective:
Students will have a general understanding of how sound waves and vibrations travel through the parts of the ear to enable hearing

Colorado Educational Benchmarks:
A. Science (Second Grade)
   Standard 1. Physical Science
   o Changes in speed or direction of motion are caused by forces such as pushes and pulls
     o Identify and predict how the direction or speed of an object may change due to an outside force (DOK 1-2)
     o Analyze and interpret observable data about the impact of forces on the motion of objects (DOK 1-2)

B. Science (Fourth Grade)
   Standard 1 Physical Science
   o Energy comes in many forms such as light, heat, sound, magnetic, chemical, and electrical
   o Describe the energy transformation that takes place in electrical circuits where light, heat, sound, and magnetic effects are produced (DOK 1-2).

C. Science (Eighth Grade)
   Standard 1 Physical Science
   • Identify and calculate the direction and magnitude of forces that act on an object, and explain the results in the object’s change of motion.
   • Predict and evaluate the movement of an object by examining the forces applied to it (DOK 1-2).
   • Use mathematical expressions to describe the movement of an object (DOK 1-2).

Inquiry Questions:
1. What relationships exists among force, mass, speed, and acceleration?
2. What evidence indicates a force has acted on a system? Is it possible for a force to act on a system without having an effect?

Relevance & Application:
• There are different forms of energy, and those forms of energy can be changed from one form to another – but total energy is conserved.
• Gather, analyze, and interpret data to describe the different forms of energy transfer (DOK 1-2).
• Recognize that waves such as electromagnetic, sound, seismic, and water have common characteristics and unique properties
Compare and contrast different types of waves (DOK 1-2)
Describe for various waves the amplitude, frequency, wavelength, and speed (DOK 1)
Describe the relationship between pitch and frequency in sound (DOK 1)

Inquiry Questions:
• What are some different ways to describe waves?

Relevance & Application:
• Different vibrations create waves with different characteristics. For example, a vibrating low-pitch guitar string feels different to the touch than a high-pitch guitar string
• Living organisms collect and use light and sound waves – such as for hearing and vision to gather information about their surroundings.

Nature of:
• Evaluate models used to explain and predict wave phenomena that cannot be directly measured (DOK 2-3)
• Select and use technology tools to gather, view, analyze, and report results for scientific investigations about the characteristics and properties of waves. (DOK 1-2).

How Do We Damage Our Hearing?

DD Educational Objective:
Students will know how loud sounds create strong vibrations that can permanently damage hair cells in the cochlea.

Colorado Educational Benchmarks:
A. Comprehensive Health (First Grade)
   Standard 2. Physical and Personal Wellness in Health
   • Demonstrate ways to prevent harmful effects of the sun as well as hearing and vision loss (DOK 1-2)

B. Comprehensive Health (Sixth Grade)
   Standard 2. Physical and Personal Wellness in Health
   • Summarize personal strategies for reducing sun damage as well as hearing and vision damage (DOK 1-2)
     o Strategies exist to prevent damage to the skin from the sun, hearing loss, and vision loss.

C. Science (Fourth Grade)
   Standard 1 Physical Science
   o Energy comes in many forms such as light, heat, sound, magnetic, chemical, and electrical
   o Describe the energy transformation that takes place in electrical circuits where light, heat, sound, and magnetic effects are produced (DOK 1-2).
What’s that Sound?

DD Educational Objectives:
1. Students will understand one of the consequences of being exposed to dangerous sound levels.
2. Students will understand what it is like to try to identify sounds with a high frequency hearing loss.

Colorado Educational Benchmarks:
A. Comprehensive Health (First Grade)
   Standard 2. Physical and Personal Wellness in Health
   - Demonstrate ways to prevent harmful effects of the sun as well as hearing and vision loss (DOK 1-2)

B. Comprehensive Health (Sixth Grade)
   Standard 2. Physical and Personal Wellness in Health
   - Summarize personal strategies for reducing sun damage as well as hearing and vision damage (DOK 1-2)
   - Strategies exist to prevent damage to the skin from the sun, hearing loss, and vision loss.

How Loud is Too Loud?

DD Educational Objectives:
1. Students begin to associate different sounds with decibel levels.
2. Students identify which method of hearing protection is the best to practice when exposed to dangerous decibels from different sources.
3. Students identify and discuss the social norms and challenges associated with practicing hearing protection.

Colorado Educational Benchmarks:
A. Comprehensive Health (First Grade)
   Standard 2. Physical and Personal Wellness in Health
   - Demonstrate ways to prevent harmful effects of the sun as well as hearing and vision loss (DOK 1-2)

B. Comprehensive Health (Sixth Grade)
   Standard 2. Physical and Personal Wellness in Health
   - Summarize personal strategies for reducing sun damage as well as hearing and vision damage (DOK 1-2)
   - Strategies exist to prevent damage to the skin from the sun, hearing loss, and vision loss.
How to use Earplugs

**DD Educational Objectives:**
1. Students will observe the proper technique and fitting of preformed earplugs
2. Optional: Students will have the opportunity to practice fitting earplugs in their ears.

Rock Your World: Time to Act!

**DD Educational Objectives:**
1. To bring awareness to peer pressure that a person can encounter when practicing smart hearing.
2. Students practice making personal decisions on individual behavior in social settings and discuss their answers with the class and educator.

**Educational Benchmarks:**

A. Comprehensive Health (First Grade)
   Standard 2. Physical and Personal Wellness in Health
   - Demonstrate ways to prevent harmful effects of the sun as well as hearing and vision loss (DOK 1-2)

B. Comprehensive Health (Sixth Grade)
   Standard 2. Physical and Personal Wellness in Health
   - Summarize personal strategies for reducing sun damage as well as hearing and vision damage (DOK 1-2)
     - Strategies exist to prevent damage to the skin from the sun, hearing loss, and vision loss.