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Curriculum Units by Fellows of the National Initiative
2020 Volume IV: Solving Environmental Problems through Engineering

Mask On: Clearing the Air: the Challenges of Indoor Air Pollution on Urban Health and Academic Performance

Curriculum Unit 20.04.11, published September 2020
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Introduction

For breath is life, so if you breathe well you will live long on earth. – Sanskrit Proverb

During a worldwide pandemic, masks are required to be worn to shield us from transmitting sickness or becoming ill, but air pollution is causing alarming health risks on its own account especially in the very place we spend much of our time and relaxation- our own homes. We spend more than 90% of our time indoors be it in our workplace or our homes. Breathing is a critical and essential tool to sustaining life. Each day we breathe in an amalgamation of substances in the air. These substances that are the main contributors released into earth's atmosphere can consist of car emissions, dirt, dust, chemicals, fossil fuels, pollen, smoke and household chemicals from within our homes. Historically urban areas have been affected by air pollution at high rates due to the fact of proximity of chemical plants and highways, but our homes are actually a bigger culprit that restricts quality breathing than others. These pollutants reduce the quality of air in which elevates the risks for various health issues amongst children or students who are one of the most vulnerable populations. The repercussions of an underprivileged environment results in academic performance because attendance, comprehension, and participation can determine the success outcome. Health issues play a major role and correlation in students' success because if students are not at school, they are not learning to the best of their ability. The lack of educational stimulation will lead to the regression and the slowing of knowledge retention.

For the following unit, students will look at the impact of indoor air quality as it pertains to our health. Students will examine urban areas quality of air and household contributing factors. They will also decide which type of pollutant contributes the most to the onset of health issues such as chronic illnesses like lung disease, bronchitis and mainly asthma. The ultimate goal of the unit is to facilitate a learning environment conducive to cause and effect of health issues as it relates to our indoor air quality. Students will become familiar with the respiratory system and the function of lungs. They will also examine damage that is occurs

when foreign subjects enter the lungs from inhaling various substances. The students will track indoor air quality over a period of time each day. As a fifteen-year veteran teacher, it's my goal to make sure that the curriculum unit will encompass strategies for cooperative learning, small differentiated learning stations, higher order thinking by using inquiry-based instruction, hands-on learning, experiential learning, student- led learning and virtual learning opportunities. The students will also utilize visual aids and technology to support their understanding. These methods will bridge the gap between health literacy, ways to avoid and protect respiratory issues, and an overall understanding of air quality in our homes.

Rationale/ Demographics

"Water and air, the two essential fluids on which all life depends, have become global garbage cans."— Jacques-Yves Cousteau

Air pollution takes a toll on each of us because we need to breathe. Every breath we take is critical to sustaining life to all humans and animals, but the vulnerable, including children are at the helm of the impacts of contaminated air more. Children are not in control of where they reside or attend school. In the rural area of Bryan, Texas, the area in which my school is located, has seen tremendous economic growth in the last ten years. In this geographical location, there has been business development including restaurants, grocery stores, hotels, an oil and gas industry, and a high school. Bryan/College Station has seen massive influx of people migrating to the area and raising families due to the university, the small-town big city feel in the atmosphere, being a hub between the larger cities of Houston, Dallas, Austin and San Antonio, and due to the available real-estate for development in the area. Teachers express the magnitude of changes saying the school used to be considered far out and filled with trees and prairie, but has now been inundated with the expansion of the city now consumed with traffic, businesses, constant construction and the development of nearby subdivisions all impacting current neighborhoods and student's health. As a result, today, the air quality has developed to a much more polluted environment bringing more pollution into the homes that students reside in. My students are faced with polluted air within indoors and it's a domino effect that contributes to their well-being.

Sam Rayburn Intermediate School is a Texas public school within the Bryan Independent School District system. The Bryan Independent School District is located in close proximity to Texas A&M University and College Station Independent School District. Sam Rayburn is one of two intermediate campuses in this rural area that educates grades fifth and sixth only. The school is a Title I campus, thus having students predominantly from families that are socioeconomically disadvantaged. The population of the school is made up of approximately 1,195 pupils with about 636 fifth grade students and 559 sixth grade students. The student body consists of 52% Hispanic-Latino, 20% Black-African American, and 25% of White students. Of those students, 66% receive free lunch, 64% are at-risk with 72% being economically disadvantaged. About 7% of the population receives some form of bilingual services and about 14% receives special education services. The families are living below the poverty line with large families of four or more individuals or are living with grandparents. Many parents or grandparents work in the area's large production plants such as Sanderson's Farm which is a poultry plant, Alenco, which is a mass production for windows, VT Industries making countertops, and in the fast food industry. In these areas of employment, they are exposed daily to irritants which heightens the risk of the development of health issues especially chronic respiratory issues.

This unit is created for approximately 100 fifth grade general education students. Prior to the 2020 school year, these students experienced being home for COVID-19 for an extended time during the school year. They also experienced minimal exposure to science in elementary school on a higher level due to science not being assessed by standardized testing. Students only begin structured instruction in their fifth-grade year in preparation for the state's testing. The classes are mixed in a heterogeneous nature; meaning in one class there can be English as Second Language learners, special education learners, gifted learners and regular education learners. The lesson focus has to be differentiated in order to provide equity for all learners. This unit will encompass a variety of learning methods such as whole group, individualized learning, peer assistance, group activities, and small groups. This grade level has a state assessment that is rigorously designed for science, so the unit will not deviate away from those curriculum areas. While the focus is heavily in science, aspects of math will be incorporated bridging the gap between the two tested content areas.

My particular school is a fifth and sixth grade campus that is offering home learning and face to face learning this school year. The students have a choice in staying home for six weeks to protect themselves against COVID-19 or coming into the building for instruction either daily or on an A day/B day schedule. In a class, I typically have 25-30 students, but this new model will reduce classes by 50%. I will still be responsible in teaching students in a virtual method, thus still being responsible for 100 students. This unit will incorporate in-person approaches, virtual approaches along with other learning methods.

This unit is designed to align with the state of Texas' fifth grade science and math Texas Essential Knowledge and Skills. The state standards for this unit will include data collection, constructing appropriate simple graphs, tables, maps and technology, analyzing, evaluating, recording and critique of scientific explanations by using evidence. The students will also apply mathematics to problems arising in everyday life, society and the workplace. This unit will focus on evaluating the impact of air quality from home and school. The students will also be conducting investigations to determine the major contributors to respiratory health.

The Unit

The unit should take a full six weeks marking period to be completed at the beginning of the school year or during the fall semester. Completing the unit early on, gives the students the opportunity to use the skills learned in upcoming lessons and establishes a foundational skillset. The plan is to finish observations, readings, and the hands-on model in six weeks by doing tasks daily. One week will devoted to understanding terms, readings, concepts and investigating. The students will build upon an interchangeable word wall within the class and a personal interactive notebook vocabulary list if we are virtual. The virtual word list will be comprised in the form of a foldable that can be revisited at any time during the unit. This week the students will follow anchor charts and glue a miniature copy into their interactive notebook. The other weeks will be filled with observation, simulation, and completing indoor air tasks. The students will be writing in their interactive notebooks and this will take longer because my students do not write daily at this level. The students will be reflecting on the changes and various of other activities in their notebooks. At the end of the unit, students will have explored lungs, created their own mock lung, have a level of comprehension in regards to their indoor air quality within their homes, and developed an understanding of their health by using real life applications.

Content

Respiratory System

Giovanni Papini once was quoted saying “Breathing is the greatest pleasure in life.” Although, we claim that breathing is a great aspect of living, do we really know the system at which a breath comes from? The main source of breathing is the centerpiece of the respiratory system better known as the lungs. The other two parts of the respiratory system, muscles of respiration and the airway, all function in unison with the lungs to bring oxygen into the body and expel carbon dioxide. Each of the other parts are also comprised of different components of the anatomy, further making this a symphony of systems within the body. The lungs (see Figure 1) are the most essential piece of the symphony being that they allow us to breathe in oxygen. This is accomplished by the spongy pair of organs that are found lateral to the heart. The left lung is smaller and contains two lobes due to its placement next to the heart, while the right lung consists of three lobes and is larger. Both the left and right lung are surrounded by pleural membrane which allows for space and negative pressure to expand and contract relative to the body’s exterior. The inside of each lung contains around 30 million tiny, cup shaped sacs known as alveoli and are surrounded by capillaries.

> It is a common belief that we breathe with our lungs alone, but in point of fact, the work of breathing is done by the whole body. The lungs play a passive role in the respiratory process. Their expansion is produced by an enlargement, mostly downward, of the thoracic cavity and they collapse when that cavity is reduced. Proper breathing involves the muscles of the head, neck, thorax, and abdomen. It can be shown that chronic tension in any part of the body's musculature interferes with the natural respiratory movements. (Alexander Lowen, The Voice of the Body).

The respiratory system encompasses three vital parts. Those parts are the head, trachea and the lungs.

The Respiratory System

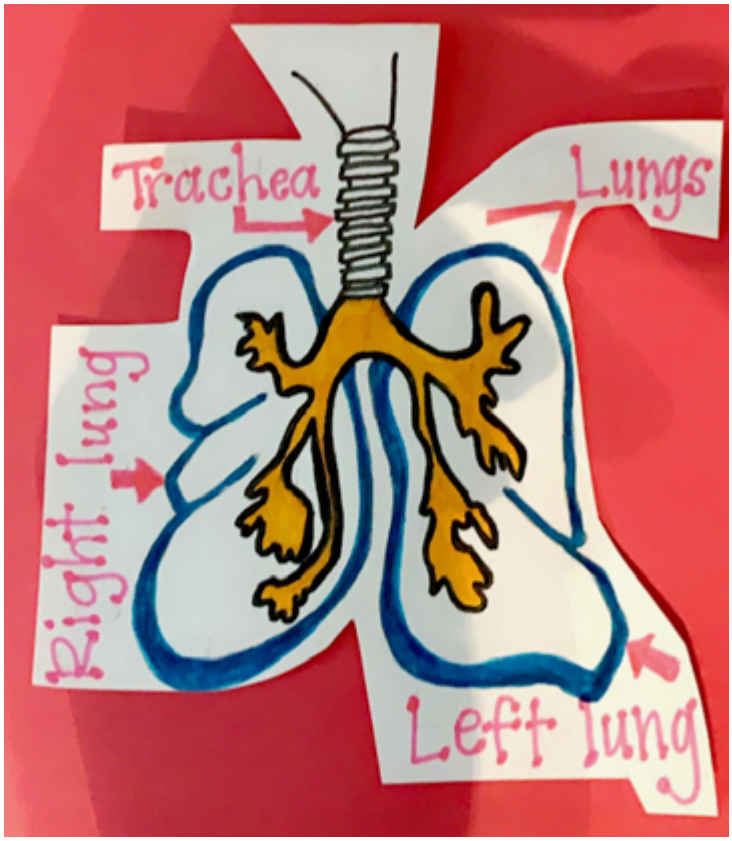

Figure 1: The lungs, the most essential piece within the respiratory system.Source: Virginia Redwine Johnson

Indoor air pollution/air quality

When we think of air pollution it is easy for us to refer to sources outside. The six priority pollutants are carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter of different size fractions, and sulfur dioxide (EPA.gov, 2020). These pollutants can contribute to the quality of air. Sources include combustion from the industry, transportation emissions, agriculture side effects from farmers using machinery driven by fossil fuels, home heating, volcano eruptions, forest fires, metal smelting, aerosols and chlorofluorocarbons. These pollutants can compromise human health in various ways, but they are not the leading source causing poor health. That distinction belongs to indoor pollution from our homes. We spend more than 90% of our time inside of buildings or in cars escaping the elements outside—be that at work or home. We are inside where chemical and biological concentrations are greater than they are outdoors (Jordan Peccia, 2020).

Being indoors for a substantial amount of time, the air we breathe is being inundated with gases and particles. These gases and particles are the byproducts of various sources that we come into contact on a daily basis. The daily contact hinders us having optimal health. We are faced with some common contributors that effect the air quality according to the Environmental Protection Agency (EPA). The table (Table 1) below displays some of the frequently studied contributors and the pollutants.

Common Contributors to Poor Air Quality

Sources	Pollutants
Building material and furnishings	Asbestos, volatile organic chemicals (VOC's)
Incomplete combustion	Carbon monoxide

Tobacco products	First, second, and third hand smoke
Household cleaners and maintenance	Aerosols, ammonia, VOC's

Table 1: Various sources of pollutants Source: Environmental Protection Agency

Poorly ventilated buildings can be filled with pet dander, combustion, overall building material and continuous moisture and humidity that causes mold growth.

> The pollutants found in indoor air are similar to those found outdoors and in some instances actually come from outdoor sources. Yet, the pollutants measured in the highest concentrations indoors are those that arise from within buildings or their substructures (Nero, Jr, 1988).

These pollutants can drastically affect everyday life in hidden ways and result in health issues and even premature deaths. "Exposure to asbestos, carbon monoxide and radon can lead to preventable deaths" (American Lung Association, U.S. Consumer Product Safety Commission and U.S. EPA, 1996, 1997: US. EPA 1993). These common contributors of poor air quality have a correlation amongst lower income neighborhoods. A lot of times these neighborhoods are the victims of time, maintenance, and innovation. Homes are not required to be inspected or equipped with improved amenities once they are built. This lends to families in this area being more susceptible to air pollutants within their own homes causing respiratory issues. These issues stem from outdated building materials, appliances (see Table 2 displaying combustion appliances) , older appliances, and subpar heating and cooling units. Other major contributors to poor air quality within the home could be poor ventilation, flooring material for instance linoleum and carpet pad containing asbestos or emitting volatile organic chemicals (VOC's). Building materials and furnishings are more likely to release VOC's pollutants at high or extremely low levels continuously. This combined with household cleaners, smoking and other hobbies that release pollutants immediately can present a myriad of pollutants that effect breathing. These pollutants impact health causing many children to develop respiratory problems such as asthma.

Chronic illness/asthma

Cough. Gasp. Wheeze. Gasp. Sigh. Wheeze. The chest is going up and down as a person attempts to breathe in and out…in and out. The person is fumbling for air while draping their arm across their chest aligned with their heart as to motion to saying the Pledge of Allegiance. The only difference is this isn't to sing a song---this is to signal distress in breathing.

> "I can't breathe!" "My chest is tightening… oh no, I'm choking!" "It is like a bad dream that I have absolutely no control over." "It feels like someone is sitting on my chest and holding me down." "I'm trying to push air out of my mouth, but the air seems stuck." "It's like I'm in a bad boxing match and all of my oxygen has disappeared, but it's difficult to explain," said the 9-year-old boy.

The struggle or fight for air is the classic sign of asthma or an asthma attack in which 47.5 percent of 18 and younger children with asthma experienced one or more asthma attacks in 2017. The boy's experience with breathing and asthma is extremely common. Asthma has become apparent as a major health problem. There are nearly more than 300 million people in a world of 7 billion people that suffer from asthma. This astonishing

number contributes to around 250,000 deaths from asthma each year (TedEd, 2019).

Asthma is debilitating because it causes the swelling of the airways which restricts air from the nose and mouth to the lungs. It makes one pause and gasp for air trying to gather their composure. This deadly disease can be triggered by allergens or air pollution irritants causing the onset of one having trouble breathing, wheezing, coughing, or having a tightness in their chest. Asthma is common in that data shows that one in every thirteen people suffer from asthma and one in twelve children have asthma. According to the Centers for Disease and Prevention (CDC), there are more than 25 million Americans that have asthma and 8.4 percent of children with the incurable disease. These numbers have grown in the last thirty years causing enlightenment on a major health issue in America. Asthma is sadly more common in children than adults and is the leading chronic disease in children. The CDC states that asthma is more common amongst boys than girls and that there are currently about 6.2 million children 18 and under living with the chronic disease known as asthma.

The data entails that there are on average of ten Americans that die from asthma each day.

Asthma is more prevalent in African-Americans in the United States, and African Americans die from asthma at a higher rate than any other group. With the increased cases, African-Americans are three times more likely to succumb due to asthmatic related causes than the white population.

According to the U.S. Department of Health and Human Services Office of Minority Health, African American children had a death rate ten times that of non-Hispanic white children from asthma in 2015.

In 2013, about 13.8 million missed school days were attributed to asthma (AAFA.org, 2020). Asthma is the top reason for missed school days and it accounts for 9.8 million doctor's visits, 188,968 discharges from the hospital inpatient care and 1.8 million emergency department visits each year (AAFA.org, 2020). African Americans are four times more likely to be hospitalized due to asthma compared to other groups. The minority groups, African Americans and Hispanics, are at the leading helm of asthma rates. There are various differences that minorities are faced with that could account for the increased asthma cases and why minorities have the highest asthma death rate. The data shows disparities found between minorities and white populations such as health, behavior causes and environmental links to asthma. Genetics play a role in one's risk for the development of asthma due to the family's history of the chronic illness. Another reason for the increased cases of asthma amongst African Americans and Hispanics is the absence of medical insurance, the inadequate use of medicine to treat the asthma or the shortfall of the continuation use of long-term asthma control medicines. Lastly, a major component in asthma cases in minorities is based on one's environment around them. According to AAFA and the National Pharmaceutical Council, allergens in the air can trigger asthma attacks leading to chronic asthma. It also states that childhood asthma development and exacerbation is often associated with home allergens. Those allergens can be induced by allergens around the house such as dust mites, pets, cockroaches, mold, and tobacco smoke. These triggers, items their lungs are extra sensitive to can range from viral infections, irritating gases and particles in the air or allergies. Asthma children can react different to causes that may result in an asthma attack. Such triggers could derive from respiratory infections, common colds, cigarette smoke, pollen, mold, animal dander, feathers, dust, food, or even cockroach waste. Other possible triggers that result in narrowed airways causing difficulty to breathe could be from exposure to cold air or a sudden change in temperature, excitement, stress, exercise, or indoor and outdoor pollutants including the ozone and particle pollution (American Lung Association, 2020).

In the Bryan Independent School District, there are a number of students with asthma ranging from Pre-kindergarten to twelfth grade. Bryan students may be more likely to develop asthma due to having more

interaction with the industrial world. The students inhale various organisms in which contributes to their decline in health (see Figure 2). Statistically, the students live below the poverty line and live in areas where environmental pollutants and behavior add to their chronic illness. The data displays a higher number of asthma students amongst minority groups and boys within the district. The students with asthma in the district must have an asthma action plan. This is a daily asthma management plan that includes the educators, the doctor, and the student to manage and avoid interactions that may result in further medical attention due to an asthma attack.

Teaching Strategies and Activities-

Anchor Charts/Visual Aids

Anchor charts are exactly what the name signifies—to help anchor or support the lesson. When I create anchor charts, I have the end in mind. It is a tool to assist in the learning process of the lesson by guiding the focus and to nail the importance of the concept and the skills taught. The rationale behind having anchor charts within a lesson is that they improve on students' comprehension. They are also designed to scaffold learning which is important in a heterogenous atmosphere. When creating anchor charts, I make it a point to use colors and drawings to draw upon connections and to provide visual stimulation to improve retention. It is important to me to make a neat anchor chart with legible penmanship, colors, and fun illustrations. By using colors and the other methods, it helps the anchor charts come alive. There are three anchor charts that I will be making for this unit. I will also shrink a copy of each anchor and copy for students to put into their interactive notebook. This strategy within a strategy eliminates the stress of students trying to duplicate my anchor charts and helps students that cannot keep up with the pace of notetaking. This also helps when we move on to other material and my big anchor chart gets removed or covered up for other charts.

1. Types of Pollution
2. Respiratory System
3. Indoor Air Pollution

A strategy that the curriculum unit will employ is meaningful posters and vocabulary cards through visual aids from whole group lectures and student-centered groups. These will be used by incorporating foldables into the students' interactive notebook. Foldables within the students' interactive notebook are a way to include the science and math TEKS aligned vocabulary into daily practices and routines. These posters, foldables, and vocabulary cards will be accessible to all students on various levels. These methods are collaborative, engaging and provide visual cues to better support understanding of key vocabulary terms. These tasks of vocabulary cards will be revisited throughout the unit for various activities such as warm-ups or cooperative learning activities. Another visual aid that will support understanding is the use of graphs and charts. This will help gauge the information students retain. The teacher will use graphs and models to display information and create a picture model in the students' learning toolbox. Some of the graphs that will be used are vocabulary graphic organizer, t-chart, webs, or Venn diagrams. The students will record information in their notebook after information is modeled. Based on past experience, conferences, and research it is clear that this method of visual support encourages compression in a number of ways.

During my research for the unit, I found the book Breathe In, Breathe Out Learning About Your Lungs by

Pamela Hill Nettleton. This book is an easy read for any leveled learner. In the book, the author shares a basic introduction to the lungs. She describes how the lungs function within the body. There are other items discussed such as the concepts of blood and oxygen, as well as asthma. This book will be read to students in order for students to glean and understand about lungs.

Another strategy that I will include in the unit is more whole group discussion. I plan to use learning talks throughout the year so my students will use content specific vocabulary to explain their science and math thinking. The other way I will employ whole group discussion is by utilizing a word wall. I will model and use vocabulary to begin discussions by referencing the word wall. The goal is that over the school year, students will become comfortable with conversing using academic language and it will become a habit.

The students will watch me create a model of a lung from everyday items. This do it yourself model of lungs will simulate the lungs in our bodies and give students another visual approach while learning. The model will be constructed with tape, straws, three nice sized balloons, a plastic bottle with the bottom portion cut, the bottle lid, and a glass. This model will display by pulling on the diaphragm, how one inhales and exhales daily. This will be just like how lungs operate within the respiratory system. I do, we do, you do is an instructional strategy that helps students become confident and capable learners. This learning approach shows students by watching me model the activity, just what I expect of the students. It provides students with a level of understanding prior to getting started by visualizing step by step.

Inquiry-based learning involves the teacher and the students by allowing questioning to guide learning. This method creates an interest and motivation for learning. It also allows students to have some buy-in in their learning. Inquiry-based learning is conducive for all learners because it is individualized. I will use this method to effectively engage students on the topic of the unit by using high order thinking skills that requires students to think critically, creatively, and reflectively. I will have the students watch a short video and deduct from it by listing a series of questions from the topic at hand. I will utilize students' natural curiosity by using the inquiry skills circular process that begins with asking questions. The next steps have the students research answers, interpret information, present findings and lastly, reflect.

The students will be given a handout or a virtual checklist to complete the home indoor air quality check on each of their homes. I will emphasize the necessity of including the number of yes answers in each question in order to gather a complete reading of the results. The students would then need to add up the total yes answers to give them an idea of the air quality in their homes. The more yes answers that a student may have, may indicate poor indoor air quality in their home. We will have a class discussion on the results and see how many of their homes indicated a poor indoor air quality rating. These findings will be written on the whiteboard or virtually on Jam board in google slides or in a discussion on google classroom. there will be an open discussion about what was learned in regards to their homes and indoor air pollutants. This discussion will be put into flip grid for students to record responses. The students will complete a foldable in their interactive notebook.

The students will have a collaborative approach by working together in a table group or in a zoom breakout session if we are completing this virtually. The students will have a series of questions to ask each other in their group. These questions will lead to discussion and interest considering that most students have some form of connection to respiratory issues. The respiratory issues or experience might be from the student, their siblings, a parent, another family member or a peer. Students will be engaged by questioning, hands-on, and by having to display their findings. The students will use Jam board in google to compile their group's answers. The students will be encouraged to be creative in their groups and make their Jam boards their own. It should

be appeasing to the audience, easily read, and compiles answers to all of the five questions. The students will share and reflect on their group discussion with the whole class. The questions that each member of the group will be asked to complete are below.

Questions

- What are some respiratory issues?
- Do you have any respiratory issues?
- Do you know anyone that has major respiratory issues?
- What are some triggers that cause respiratory issues?
- What are ways we can reduce respiratory issues?

The students will then move into collecting data from simulated indoor air pollution conditions over a period of six week. Each of the five classes will create two models representing the leading pollutants in the area on mock lungs. The mock lungs will consist of balloons, straws, bottle and glass. The students will work in a group to monitor, record, graph, and highlight the effects the model has on the lung representation. If this is done virtually, I will make all of the pollutant models and have students observe and record daily via zoom. The students will still get to work as a group because they will be placed in zoom breakout rooms. This allows for peer assistance The students will get to create flip grids based on their findings and observation. This allows students to incorporate technology and engagement. The flip grids will lend to the student's voice and understanding as well as provide students with a free resource that can be used in or out of the classroom.

Conclusions

All the students must understand the sources of indoor air pollutants and how it impacts the environment and our health. The students will correlate how their home actions of cooking, cleaning, heating, cutting the lawn, and more contribute to their overall health, breathing, and ability to work at school. This unit will set the tone for other skills that will be taught throughout the year by giving students a foundation of problem solving, reflecting, and how to apply solutions to problems arising in everyday life, society, and the workplace.

Appendix on Implementing District Standards

Texas Essential Knowledge and Skills (TEKS)

There will be various TEKS standards that will be key into the development for this unit. The standards will include investigations, observations, collecting and recording information, analyzing and interpreting information, and problem solving. The standards that are crucial to the implementation of thus unit also involve formulating a plan or strategy and the justification of a solution. The science and math TEKS that are included are:

Fifth Grade Science Standards

- Science investigating and reasoning
  The student conducts classroom and outdoor investigations following home and school safety procedures and environmentally appropriate and ethical practices.
    - 5.1.B: The student is expected to: make informed choices in the conservation, disposal, and recycling of materials.

- Science investigating and reasoning
  The student uses scientific practices during laboratory and outdoor investigations.
    - 5.2.A: The student is expected to: describe, plan, and implement simple experimental investigations testing one variable;

- Science investigating and reasoning
  The student uses scientific practices during laboratory and outdoor investigations.
    - 5.2.B: The student is expected to: ask well defined questions; formulate testable hypothesis, and select and use appropriate equipment and technology;

- Science investigating and reasoning
  The student uses scientific practices during laboratory and outdoor investigations.
    - 5.2.C: The student is expected to: collect and record information using detailed observations and accurate measuring.

- Science investigating and reasoning
  The student uses scientific practices during laboratory and outdoor investigations.
    - 5.2.D: The student is expected to: analyze and interpret information to construct reasonable explanations from direct (observable) and indirect (inferred) evidence.

- Science investigation and reasoning
  The student uses scientific practices during laboratory and outdoor investigations.
    - 5.2.F: The student is expected to: communicate valid conclusions in both written and verbal forms.

- Science investigation and reasoning
  The student uses scientific practices during laboratory and outdoor investigations.
    - 5.2.G: The student is expected to: construct appropriate simple graphs, tables, maps, and charts using technology, including computers, to organize, examine, and evaluate information.

Fifth Grade Math Standards

- Mathematical process standards
  The student uses mathematical process to acquire and demonstrate mathematical understanding.
    - 5.1.A: The student is expected to: apply mathematics to problems arising in everyday life, society, and the workplace;

- Mathematical process standards
  The student uses mathematical process to acquire and demonstrate mathematical understanding.
    - 5.1.B: The student is expected to: use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process, and the reasonableness of the solution

- Mathematical process standards
  The student uses mathematical process to acquire and demonstrate mathematical understanding.
    - 5.1.D: The student is expected to: communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.

- Mathematical process standards
  The student uses mathematical process to acquire and demonstrate mathematical understanding.
    - 5.1.G: The student is expected to: display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

- Data Analysis
  The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data.
    - 5.9A: The student is expected to: represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots.

These TEKS are critical to the unit in that it specifically highlights comprehension by having students describe, plan, and implement practices to gather a deeper understanding of the topic. They also establish ways that students can ask well defined questions such as using the inquiry-based approach. This method of questioning will advance learners in their own understanding by allowing them to take ownership in their knowledge and direction of the unit. The TEKS are required to relate problems rising in everyday life, observe, dissect and glean from things occurring all around us such as indoor air pollution. The unit is designed to help students to create and formulate strategies to correct problems in our environment. The students will use their knowledge to share with others and be more aware of their contribution from home.

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