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Resource ID#: 48508

Primary Type: Lesson Plan

Diabetes: More Than Just Sugar

This diabetes MEA provides students with the opportunity to investigate finding affordable health coverage, a problem common to many people living with diabetes. Students must rank doctors based on certain costs and the specific services they provide. The main focus of this MEA is to determine the best doctors to go to for diabetic care and treatment, weighing factors such as insurance, cost, doctor visits, location, patient ratings, number of years in business, diet, exercise, weight management, stress management, network participation, and support groups.

General Information

Subject(s): Science, English Language Arts, Health Education

Grade Level(s): 9, 10, 11, 12

Intended Audience: [Educators](#)

Instructional Time: 2 Hour(s) 30 Minute(s)

Resource supports reading in content area: Yes

Keywords: MEA, model eliciting activity, respiration, cellular, diabetes, sugar, insulin, pancreas, liver, diet, exercise, weight management, stress management, insurance, benefits

Instructional Component Type(s): [Lesson Plan](#), [Problem-Solving Task](#), [Data Set](#), [Model Eliciting Activity \(MEA\)](#), [STEM Lesson](#)

Resource Collection: STEM Lessons - Model Eliciting Activity

Suggested Technology: Computers for Students, Internet Connection, Microsoft Office

Freely Available: Yes

Lesson Content

Lesson Plan Template: Model Eliciting Activity (MEA)

Formative Assessment

The [Diabetic Dog Game](#) virtual manipulative will help the students to recognize some important facts about diabetes before beginning the lesson.

Additionally, the teacher should administer the Readiness Questions after students review the first Reading Passage and Data Set 1 in order to ensure understanding before students begin working.

This healthcare.gov page discusses the importance of health insurance and explains some key terms.

Feedback to Students

Students will receive feedback during the lesson through teacher comments. Students will receive feedback from the teacher as the teacher circulates to each group to ask the reflective questions while students are working (see Guiding/Reflective questions section).

Summative Assessment

Students will design a business brochure to advertise the services of their first choice doctor, citing evidence and explaining the services offered and why they are important to promoting good health for diabetics.

A suggested [Brochure_Rubric](#) has been included.

Summative Assessment Questions:

- What are some societal consequences of not having health care coverage (insurance)?
- How can public health policies and government regulations influence health promotion and disease prevention?
- What is the relationship between health care access and health care status?

Students receive two points if they use evidence to support their answers and use clear and coherent writing. Students receive one point if they provide evidence to

support their answers but do not use clear and coherent writing, or if they do not provide evidence to support their answers but their writing is clear and coherent. Students receive no points if both evidence and coherence objectives are not met.

Learning Objectives

Students will:

- evaluate the cost and benefits for a specific societal problem
- understand the process of cellular respiration
- describe the relationship between cellular respiration and diabetes
- synthesize a procedure for multi-step problems to aid in decision making
- evaluate reports based on data
- generate a procedure for analyzing a problem with changing parameters

Prior Knowledge

Students should have a basic understanding of cell structure, organelles and their functions. Students should also understand cellular respiration.

Students should have a basic understanding of diabetes. See Formative Assessment for an interactive activity, if needed.

SC.8.N.4.1: Explain that science is on the the processes that can be used to inform decision making at the community, state, national, and international levels.

SC.3.N.1.6: Infer based on observations.

SC.6.L.14.1: Describe and identify patterns in the hierarchical organization of organisms from atoms to molecules and cells to tissues to organs to organ systems to organisms.

SC.6.L.14.2: Investigate and explain the components of the scientific theory of cells (cell theory): all organisms are composed of cells (single-celled and multi-cellular). All cells come from pre-existing cells, and cells are the basic unit of life.

SC.6.L.14.3: Recognize and explore how cells of the organisms undergo similar process to maintain homeostasis, including extracting energy from food, getting rid of waste, and reproducing.

SC.6.L.14.4: Compare and contrast the structure and function of major organelles of plant and animal cells, including cell wall, cell membrane, nucleus, cytoplasm, chloroplast, mitochondria and vacuoles.

Instructional Suggestions

Before beginning the MEA, the teacher should have covered the information in the prior knowledge section.

Day 1: There are some articles that could be used before the actual lesson to develop background information on diabetes (see supplemental reading section).

Students should be placed into groups of approximately 3-4 per group for the rest of the MEA lesson. The teacher may then choose to give the first letter (see Reading Passage 1) and questions (see Readiness Questions section), so that students will start to have discussions about the information.

Day 2: Students will be given letter one (see Reading Passage 1), with the data (see Data Set 1), and come up with their method for solving the problem. As each group finishes letter one (see Letter Template 1 if needed), they will be given letter two (see Reading Passage 2) and data set 2 (see Data Set 2) to create their method for the new information (see Letter Template 2 if needed). While students are working, the teacher should ask Guiding/Reflective questions and provide feedback as needed.

Day 3: Students will be given a small amount of time to finalize and review their analysis to the letters. Each group will present their analyses and students will complete the debrief questions and create a brochure (see Summative Assessment).

Supplemental Reading

The article "[Causes of Diabetes](#)" gives an overview of what diabetes is, the two types 1 and 2, and other types and causes of diabetes.

It has a Lexile reading level of 1120L.

This the American Public Health Association page "[Healthy Communities](#)" is about how public health issues are being addressed. Students can use this article to research their responses to the summative assessment questions.

Guiding/reflective Questions

- What are some causes of diabetes?
- What are some side effects of diabetes?
- Name some costs associated with having diabetes?
- What organs are affected by diabetes?
- What are some types of medications taken for diabetes?
- What are the different types of diabetes?
- What effect does not having insurance have on diabetic care?
- What are some direct and indirect cost associated with diabetes?

Reading Passage 1

Dear Esteemed Scholars:

The No-More Sugar Insurance Co. is a new company looking to add five new doctors to our network. We are trying to decide which doctors to add based on a ranking system. We need your Help! In order to come to a decision, we need you to rank the doctors from best to worst. Here are some things your team should know. Our company has researched five doctors and evaluated them on seven criteria: cost per visit, number of visits per year, years in business, patient ratings, office location, other benefits offered, part of a network. We have provided you with a copy of these ratings. Look over this data and develop a procedure for ranking the doctors.

Please write us back and tell us the order in which you ranked the doctors and why. Also provide us with a detailed procedure for how your team ranked the doctors from best to worst. Make sure your team's procedure will work even if we decide to research and collect additional data from other doctors. Thank you for your help.

Sincerely,

The No-More Sugar Insurance Co.,

2013 Sugar Lane

[Reading Passage 1](#)

Readiness Questions

- What is the problem? (need to decide on a doctor to add to the network)
- Who is the client in this scenario? (No-More Sugar Insurance Co.)
- What does the client need? (a ranking of doctors from best to worst, a procedure/method for how your team ranked the doctors)
- What does the development team need to consider in meeting the client needs? (the seven criteria listed in the data set)
- Why does the client want you to explain your procedure? (so even if more doctors are added to the data, the same procedure can be used to select the best one)

Data Set 1

[Data Set 1](#)

Letter Template 1

Letter templates can be used as an accommodation as needed.

[Letter Template 1](#)

Comprehension/readiness questions

See Readiness Questions.

Reading Passage 2

Dear Esteemed Scholars:

Congratulations! We received your letter, and the list of doctors ranked from best to worst. You not only exceeded our expectations, but have prompted us to add two more doctors to our network in different locations. This is necessary because a large number of Americans are uninsured and still need affordable healthcare coverage. We have provided you with some additional data.

Please write us back and tell us the order in which you ranked the doctors and why. Also provide us with a clear and detailed procedure for how you ranked the doctors from best to worst. Also, if your team had to make any changes to your first procedure, please explain what changed and why each change was necessary.

Sincerely,

The No-More Sugar Insurance Co.

2013 Sugar Lane

Pancreas, Ohio 12345

[Reading Passage 2.docx](#)

Data Set 2

[Data Set 2](#)

Letter Template 2

Letter templates can be used as an accommodation as needed.

[Letter Template 2](#)

Reflection question 2

Did your procedure change when you received the second set of data? If so, why? If not, please explain.

Accommodations & Recommendations

Accommodations:

- Letter templates can be used for a writing accommodation.
- Teachers may provide extra time for students who may need it.
- Extension activities for students who thoroughly understand the material.
- Teacher or student read articles aloud for students with limited reading proficiency.
- Teachers may want to organize groups so as to pair low students with high students.
- Teachers may also provide simplified, summarized and clarified directions.
- Teachers may provide advance organizers with key points, main ideas, and vocabulary highlighted.
- Teachers can give students sample problems or tasks.

Extensions:

If a teacher chooses to go further in depth, they can have students examine other factors associated with diabetic care. The teacher could also ask students to investigate (either on-line or in library) how genetics and ethnicity play a role in diabetes.

The teacher may choose to have students graph information into data charts in Excel.

Suggested Technology: Computers for Students, Internet Connection, Microsoft Office

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Is this Resource freely Available? Yes

Access Privileges: Public

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Aligned Standards

Name	Description
HE.912.B.3.4:	Justify when professional health services or providers may be required. Clarifications: Injury, depression, suicide, drug abuse, medical emergency, 911, child abuse, domestic and/or dating violence, and natural or man-made conditions.
HE.912.B.5.1:	Determine the value of applying a thoughtful decision-making process in health-related situations. Clarifications: Defining healthy boundaries and relationships, sexual activity, alcohol consumption, organ-donor decisions, child care, protection against infectious agents, wellness promotion, and first-aid-treatment options.
HE.912.C.1.6:	Evaluate the relationship between access to health care and health status. Clarifications: Early detection and treatment of cancer, HIV, diabetes, bipolar disorder, schizophrenia, childhood disease or illness, and first-responder care.
HE.912.C.2.4:	Evaluate how public health policies and government regulations can influence health promotion and disease prevention. Clarifications: Seat-belt enforcement, underage alcohol sales, reporting communicable diseases, child care, and AED availability.
LAFS.910.RST.3.7:	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LAFS.910.WHST.2.4:	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
SC.912.N.4.2:	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental. Clarifications: Identify examples of technologies, objects, and processes that have been modified to advance society, and explain why and how they were modified. Discuss ethics in scientific research to advance society (e.g. global climate change, historical development of medicine and medical practices). Florida Standards Connections: MAFS.K12.MP.1: Make sense of problems and persevere in solving them, and MAFS.K12.MP.2: Reason abstractly and quantitatively.