

Mathematics: The Language of STEM

Proportions and Sugar Packets

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CONTENT AND TASK DECISIONS

Grade Level(s): 7th grade

Description of the Task: Students will watch a three acts video by Dan Meyer on sugar packets and proportions. The students will guess the number of packets that are in a bottle of soda. After they have given their answers then they get more information to be able to solve the problem. Then they watch the Act 3 video to see the solution. After a whole class discussion on the problem, the class then will be broken up into groups of 4 and will be ordering several products before looking at the labels from least to greatest on the amount of sugar content. Then they will be finding out how many packets of sugar are in each of the products and seeing how well they guessed.

Indiana Mathematics Content Standards:

7.C.6: Use proportional relationships to solve ratio and percent problems with multiple operations;

7.C.5 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units

7.C.8 Solve real-world problems with rational numbers by using one or two operations.

Indiana Mathematics Process Standards: PS.1 Make sense of problem and persevere in solving it.

PS.4: Model with mathematics by applying what they know to solve problems in everyday life

PS.5 Use appropriate tools strategically to solve the problems.

Mathematics Content Goals: Students will be able to solve real life problems with food and nutrition using proportions or other mathematical processes.

Language Objectives: Students will understand the meaning of nutrition, grams and proportion.

Materials: Dan Meyer video (Click [Here](#)), paper, pencil and several different grocery products that contain sugar.

Proportions and sugar packets

Before:

- **Activate prior knowledge:** Students will have had lessons on proportions in pre-algebra prior to this lesson. (assuming that the students are in Honors Algebra) Questions for students: What are some types of problems or activities that require you to use proportions? How do you solve a proportion? What is the meaning of nutrition? What is a gram?
- **Be sure the problem is understood:** Let the students know that they will be watching a 3-Acts video and answering the question. Classroom discussion will be happening between each of the three acts. During the 2nd half of the period, the student are divided into groups of 4 and solving a problem that are similar to the 3-Acts video.

- **Establish clear expectations:** Everyone needs to have pencil and paper out to record their thinking and problems solving. All students need to be good listeners and when put into groups need to follow group protocol rules.

During:

- **Let go-**

Have the students brainstorm various professions or activities that would involve ratios and proportions. Then show the video (Act 1) of Dan Meyers 3 act sugar packet.

<http://threeacts.mrmeyer.com/sugarpackets/>

Talk about the video briefly and have the students guess how many sugar packets they think are inside a 20-ounce bottle of soda. After finished discussing their guesses, talk about what information would be necessary to solve the problem. After several minutes of discussion the class will hopefully come up with conclusion that they need to know how much sugar is in a packet and how much sugar is in the 20 ounce bottle.

Next, show the students Act Two of the video, which shows a picture of the labels of the bottle and the sugar packet. They then should use paper and pencil to solve the problem of how many sugar packets are in each bottle. Walk around the room to answer questions and to see the different ways the students are solving the problem. After several minutes have different students share their results and how they come up with their solution. Then show Act Three of the video to reveal the correct answer.

After the whole classroom activity, let the students know that you went shopping and as a group of 4 they need to order the products from least amount of sugar to greatest amount of sugar before they are given the products. After they have made their predictions; they will be given the products and will see if they were correct in their predictions. The groups then should work on solving how many packets of sugar are contained in each product. Even though the students are in groups, each student should have his own work on his piece of paper. After they have finished working in their groups, have several groups share their findings on the board or with the document camera.

- **Listen actively-** Teacher should walk around the room and look at their guesses after Act One of Dan Meyers video. Teacher listens to any questions that the students might have during this activity. Teacher will listen to all student responses on what information is needed to solve the problem of how many sugar packets are in the 20-ounce bottle of soda. Teacher will listen to and answer questions that students may have after the reveal of Act Two of the video. Teacher will listen to students share their results of how many packets of sugar are contained in a 20 ounce bottle of soda. During the group activity the teacher will be circulating the room and listening to conversations in the group. The teacher will provide support as necessary.

- **Provide appropriate support** - These questions will be asked to the whole class only if the students are stuck on figuring out what is necessary information needed to solve how many sugar packets are in the 20 ounce bottle of soda
- What specific information do we need to come up with the solution?
- Do we need to know how many ounces of fluid are in the bottle to solve this problem?
- Where would we find this information?

-As the teacher is walking around the room, these questions could be asked to individual students who are struggling on the problem.

- So, how many grams of sugar are in one packet?
- How many grams of sugar are in the bottle?
- Could you use a proportion to solve this problem?
- What information do we know?

-During the group work , the teacher will be floating around the room asking questions to groups to provide support. Some possible questions that might be asked....

- Is everyone in your group understanding what to do?
- What are we looking for on the labels?
- Are you surprised by your results?

- **Provide worthwhile extensions.**

If any groups get finished before other groups, then have them look up some snacks or drinks and their sugar content and then list some more appropriate drinks or snacks that have less sugar content.

After: In this portion of the lesson, students should work as a community of learners, discussing, justifying, and challenging various solutions to the problem all have just worked on. Here is where much of the learning will occur. It is critical to plan sufficient time for a discussion and make sure the During portion does not go on for too long. Describe how you will accomplish each of the following:

- **Promote a mathematical community of learners** - Several students will present their solution to the question in Act One after they have observed Act 2 and have had time to work on it. Also, each group will share their predictions on ordering the products according to their sugar content and then share if their guesses were correct after looking at the labels and doing the math.
- **Listen actively without evaluation-** The teacher will listen attentively to their solutions and allow each group to answer without evaluating their work.
- **Make connections** - The teacher asks questions to connect nutrition and eating habits to

everyday life. Do you think you will start looking at label more often and looking at sugar content? Can you think of anything else we should look for when deciding what food to eat? What different math skills did you use to solve these type of problems?

- **Summarize main ideas-** Nutrition and mathematics (proportional relationship) are used in everyday life. The teacher can talk about how he/she uses proportions in everyday life.

ASSESSMENT

Observe: Describe how you will observe students to gather evidence about what they are learning, and describe the specific evidence of mathematical understanding that you will look for in your observations. I will be walking around the room during the video time and during the group time and assessing their learning by listening to their conversations and seeing what they are writing on their paper.

Ask: List the specific questions you will ask students to assess their learning.

- What does nutrition mean?
- How would you describe a gram?
- What is a proportion?
- What have you learned today?