

# High School Mathematics Transition Course

Lesson Plan	
<b>Theme 1: Number and Quantity</b> <b>Context 4</b>	<b>Number of Class Periods:</b> 2 (45 minute)
<b>Lesson Title: Modeling - Driving for Gas</b>	
<b>Summary:</b> <ul style="list-style-type: none"> <li>● Students use the Spy, Analyze, Model routine and spreadsheets to determine if it is worth driving further to pay less for gas.</li> </ul>	<b>Standards of Mathematical Practices:</b> MP.1 MP.2 MP.4 MP.6
<b>Goals and Objectives:</b> Students will <ul style="list-style-type: none"> <li>● Learn to create a spreadsheet to model a situation.</li> <li>● Implement the Spy, Analyze and Model routine.</li> <li>● Make sense of problem and persevere in solving them.</li> <li>● Model with Mathematics.</li> <li>● Attend to Precision.</li> </ul> Teachers will <ul style="list-style-type: none"> <li>● Implement the Spy, Analyze, Model routine.</li> <li>● Introduce spreadsheets</li> <li>● Ask advancing questions.</li> </ul>	
<b>Concepts from Previous Mathematical Experiences to be Applied:</b> <ul style="list-style-type: none"> <li>○ Multiplication, proportions, rates, distance</li> </ul>	
<b>Instructional Procedures:</b>  <u>Day 1</u> <ul style="list-style-type: none"> <li>● <b>Part 1 (10 minutes)</b> <ul style="list-style-type: none"> <li>○ Remind Students of the Spies and Analyst Routine for problem solving discussed in Remodeling the Classroom (<a href="#">Modeling Process Handout</a>)</li> <li>○ Explain to students that they are going to do a modeling task. Ask students how many of them like to make their own decisions? Tell them modeling is what people do in real life. It's about decisions—recognizing decisions, making a decision, and revisiting decisions. (Whenever possible, let students “drive” the discussion, helping them especially with the “recognize” <u>part of their own decision-making.</u>)</li> <li>○ Explain that modeling is a process that uses <u>mathematics to represent, analyze, make predictions or otherwise provide insight to real-world phenomenon.</u> Relate this to Covid and how decisions were based on models, and when new information came out those models and decisions had to be revisited.</li> </ul> </li> <li>● <b>Part 2 (25-35 minutes)</b> <ul style="list-style-type: none"> <li>○ Give students the Driving for Gas Modeling Problem handout. Students will need access to technology. <i>Note: In the beginning as students are learning about modeling, problems may need to be scaffold with handouts like this, as the year progresses, take away the scaffold.</i></li> </ul> </li> </ul>	

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- o Read the problem together. Have students vote on whether the drive across town is worth it. Have students defend their choices. Explain to them, that we have to defend our answers mathematically. Students may respond that they have not been given enough information to answer the question, and that is the point. Most real-world problems require you to seek out information. *(2-5 minutes)*
- o Have students read the problem individually and sketch out their ideas under Step 1: Spies. *(3-5 minutes)*
- o Have students then discuss the problem in their groups sharing ideas and researching information. Ask groups these types of questions: *(5-10 minutes)*
  - Describe the problem that your team has been asked to solve. What information do you need in order to solve this problem?
  - What does a solution to your problem “look like”? Is it possible that your solution will have more than one reasonable answer? Why?
  - What is the specific problem your model is going to solve? How can you complete this sentence “Our model will tell you \_\_\_\_\_”
- o Discuss Step 1 as a whole group. Have groups share their thought processes about how to approach the problem.
  - To help clarify the question. Ask students “When wouldn’t it be worth it to drive across town for gas?”
  - Help students refine their problem if needed. *(5-10 minutes)* Examples could include something like---
- o Determine which costs less---
  - Purchasing gas at Gas Station 1, which is on our planned route, or
  - Traveling out of our way to Gas Station 2 (which sells gas at a cheaper rate) to purchase gas there.
  - Encourage them to draw a diagram.
- o Stating assumptions will be new to students. Explain to students what assumptions are. Discuss why assumptions are needed. Give them a few examples and discuss why they would be helpful. such as— *(3-5 minutes)*
  - Gas costs less at the gas station that is out of our way.
  - The fuel economy of the car remains constant.
  - If we choose to go out of our way, we will consider the added cost of the mileage between the gas station we would have gone to and the further station, and back.
  - We will purchase the same amount of gas, no matter which gas station we choose.
  - We will be driving a \_\_\_ car.

### Day 2

Introduce spreadsheets as a tool to model Driving for Gas.

- Walk students through the process of building a spreadsheet to model the Driving for Gas Task.
- [Example Spreadsheet](#)
- [Video explaining the spreadsheet](#)

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Lesson Plan		
<b>Teacher Focus:</b> <ul style="list-style-type: none"><li>o Set up Spies, Analyze and Model Routine</li></ul> Introduce spreadsheets as a tool for modeling		
<b>Differentiation Strategies:</b>		<b>Assessment:</b>
<b>Extension Suggestions:</b>	<b>Materials and Resources:</b> <ul style="list-style-type: none"><li>• Modeling Process Handout-Spies and Analyze version</li><li>• Gas State Modeling Student Handout</li></ul>	<b>Supporting Documents:</b> <ul style="list-style-type: none"><li>• GAIMME report</li></ul>
<b>Ohio Learning Standards:</b> N.Q.1 N.Q.2 N.Q.3	<b>Remediation-Free Standards:</b>	<b>Notes:</b>
<b>Created by:</b>		