KENAN FELLOWS PROGRAM
FOR TEACHER LEADERSHIP

# LET'S LEARN ABOUT VISCOSITY

**Miranda Pierce**

| SUBJECT/COURSE: | GRADE LEVEL: | DURATION: |
|---|---|---|
| Science<br>Math | 5-6 | 60 minutes |

## STANDARDS

- NC.5.MD.2 Represent and interpret data.
- NC. 5.G.1-Graph points in the first quadrant of a coordinate plane and identify and interpret the x and y coordinates to solve problems.
- 5.P.2.3: Summarize properties of original materials, and the new material(s) formed, to demonstrate that a change has occurred.
- 6.P.2.3-Compare the physical properties of pure substances that are independent of the amount of matter present including density, melting point, boiling point, and solubility to properties that are dependent on the amount of matter present to include volume, mass and weight.
- 5.SL.4-Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
- 5.SL.5.6-Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation. (See grade 5 Language standards 1 and 3 here for specific expectations.)

## SUMMARY

This project teaches students about the viscosity of liquids and how that can change over time depending on different factors. Students are given different product data points that a company wants them to evaluate. Each company requires their product to have different things. Some want a product with high viscosity, and some want a lower viscosity. Each company will have three viscosity reading graphs with the points of data and average viscosity included. Students will get these graphs to help them evaluate and create their own data over time graphs.

Once students create their data over time graph/graphs they will then create a presentation for company representatives including the following requirements: graph of the three readings given, an explanation what viscosity is and how it affected their decisions, and a recommendation of which product the company should sell.

## DRIVING QUESTIONS

How does the viscosity of liquids change, and is it different for different types? How does data affect the decisions of companies?

## ENTRY EVENT

Students will complete a lab that shows the viscosity of various everyday products.

## PUBLIC PRODUCT

Students will create a presentation to demonstrate their product data in an X/Y chart as well as show their knowledge of viscosity. They will also make a recommendation of which product they believe meets their company's requirements.

## RESOURCES/MATERIALS NEEDED

- Viscosity Lab
- Research Questionnaire
- Project Plan Sheet
- Company Information
- Graphs
- Company Feedback
- Rubric
- Reflection Notebook
- Student Critique Form

## FORMATIVE AND SUMMATIVE ASSESMENTS

| ASSESSMENT DESCRIPTION | | | |
|---|---|---|---|
| Students will have a rubric completed by the teacher during their presentation. | | | |
| **Select One** | | **Select One** | |
| [X] Individual | ❒ Team | ❒ Formative | [X] Summative |
| **CONTENT AND SKILLS TO BE ASSESSED FROM THE STANDARDS** | – Graphing skills<br>– Knowledge of physical properties of certain materials<br>– Speaking skills | | |

| ASSESSMENT DESCRIPTION | | | |
|---|---|---|---|
| Students will get a reflection page from the other people they are presenting to based on their presentation. The company Head feedback from will be completed for each student presentation and given to them when they are done. | | | |
| **Select One** | | **Select One** | |
| [X] Individual | ❒ Team | [X] Formative | ❒ Summative |
| **CONTENT AND SKILLS TO BE ASSESSED FROM THE STANDARDS** | – Graphing skills<br>– Knowledge of physical properties of certain materials<br>– Speaking skills | | |

## ASSESSMENT DESCRIPTION

Students will reflect on another student's presentation using the student critique page. They will give glows (things they did well) and grows (things they could improve on) of the other persons prestation.

| Select One | | Select One | |
|---|---|---|---|
| ☒ Individual | ❒ Team | ☒ Formative | ❒ Summative |

| CONTENT AND SKILLS TO BE ASSESSED FROM THE STANDARDS | – Graphing skills<br>– Knowledge of physical properties of certain materials<br>– Speaking skills |
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## PROJECT CALENDAR

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| **Day One:** | Entry event to the project to get students excited and spark interest in viscosity. |
| **Day Two:** | **Intro to the project**: Explain to students that they will be the deciding factor in a company's next product. (I used the company for my Kenan fellowship, but you could use a company in your area.) Hand out company information and graphs. (I did not include company's name at the top.) Explain that they will be collecting data provided by their company to decide what product they believe meets the company's requirements. They are going to take the graphs provided and create their own graphs with all their data to show which product meets the requirements of their company.<br><br>They will be presenting their final product to company heads when they are done and need to be able to explain why the product, they are recommending meets the requirements in whichever format they would like. Some of my students just showed their graph and talked through their presentation. Others made a book that they used to show the company heads. You can give them a few ideas, or they can decide on their own.<br><br>Explain that they will be using the rest of the day to do some research through Wakelet. They have questions typed up that will help guide them but can also take notes on the bottom of the research questionnaire. Show them the Wakelet site especially if they have never seen one.<br><br>**Research**: Students will have time to do some research on viscosity and graphs, as well as examine the data from their company. Included in this project is a Wakelet link to sites that are fifth grade appropriate or you can have them free range research. It also includes a questionnaire to help students focus their research. While looking over the data sheets, students can create questions. Those questions can be asked to you as the teacher and answered or asked to a community partner as explained in Day 3. |
| **Day Three:** | **Planning for the Project**: First part of planning is having students ask questions about viscosity and the company graphs that they have come up with through their research. You could have a community partner visit your classroom in person or virtually. You could also answer the questions yourself or email them to a community partner. If students need more time for research, they can complete this in the remaining time you have this day. |
| **Day Four/Five:** | **Working on Presentation**: Students have time to create their graphs and presentations. At the beginning of the work time each student should look over their planning sheet and to-do list. At the end of the work time, students will reflect on what they did that day and what they need to do the next day in their reflection book. |

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|---|---|
| **Day Six:** | **Student Critique**: Students team up with another student who has a different company. Each student goes through their presentation for their company. The student not presenting will be giving glows and grows to the other group in the student critique form.<br><br>**Revising/Finishing Presentation**: After the student critique time, students will have time to revise or finish (if need to) their presentation, using the feedback from the other group. |
| **Day Seven:** | **Presentation Day**: Students give their presentation to "company representatives". You can use community partners, or even administrators in your school. Company representatives will give feedback on the presentation as the teacher fills out the rubric. When students are not presenting, they can be finishing up their reflection notebook. |
| **Day Eight:** | **Feedback/Discussion**: For the first few minutes, students will discuss the driving question with the other students with their same company. They will talk about what they learned about viscosity and what they believe is the answer to the driving question. The class will then come together, and each group of students will tell what they talked about and what their answer to the driving question is. |

## NOTES

Extension: Students can create a student friendly flyer explaining viscosity and how it is affected by heat and cold.

## ABOUT THE AUTHOR

Miranda Pierce is a 2019-2020 Kenan Fellow. She is an elementary teacher in Wake Forest, NC. She has been teaching for eight years, in Special Education and in General Education. For her Kenan fellowship, she interned at Novozymes of North America and worked on a project centered around the viscosity of one of the products the company uses daily. She gathered data on the viscosity of this product to see if its effectiveness changes over time.