

# Instructions for Math 181 Projects

## *With Options for Unit 1: Meaning of Numbers*

Recall that you are expected to complete two projects in this class by selecting 2 projects from the 3 units in the table below. At least one of your projects must be completed in a small group consisting of 2-4 members. Refer to the table below for deadlines associated with each unit.

Possible Units for Projects (Choose 2)	Select a Project by...	Submit your Project by...
1. Meaning of Numbers	September 16	October 21
2. Operations with Whole Numbers and Integers	September 30	November 18
3. Operations with Rational Numbers	November 6	December 4

### Project Guidelines:

1. You have a choice of what you'd like to produce for your project. You may produce a written report, news article, information brochure, poster, powerpoint presentation, website, radio interview, skit, short story, puppet show, letter, persuasive essay, poem, song, scrapbook, or some other appropriate product or performance.
2. All projects should utilize and cite at least four resources. Resources may include books, journals, credible websites, and/or individuals that you consult. At the end of your project, include a listing of all of your resources. Below you will find examples of how to cite different types of resources.
3. You'll present (individually or as a group) your project to the class on the day the project is due.
4. Each project will be evaluated with the same project rubrics (attached). The rubric scores correspond to letter grades in the following way:

Rubric scores of...	correspond to a grade of...
3.5 – 4.0	A
3.0 – 3.4	B
2.0 – 2.9	C
1.0 – 1.9	D
0 – 0.9	F

### Examples of How to Cite Resources:

- Book: Beckmann, S. (2008). *Mathematics for elementary teachers*. Boston, MA: Pearson.
- Journal Article: Putnam, R. T., & Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher*, 29(1), 4-15.
- Website: National Renewable Energy Laboratory. (2008). *Biofuels*. Retrieved May 6, 2008, from: [http://www.nrel.gov/learning/re\\_biofuels.html](http://www.nrel.gov/learning/re_biofuels.html)
- Individual you Consulted: R. Pugliese, personal communication, March 23, 1990.

## Unit 1 Project Options

*Reminder: Note the deadlines for choosing a project option and for submitting your project.*

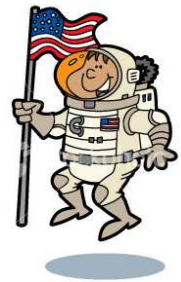
### Option 1: Math Consultant for a Tour Group

You are going on a trip with a tour group to a region that historically used a numeration system different from ours. Your task is to learn about this other numeration system and compare and contrast it to our base-ten numeration system. You have been asked to share this information with your tour group when you arrive in the associated region. You get to select the region/numeration system that you want to use for this project, although you need to select a numeration system that we have not discussed in class. Keep in mind that as part of this project, you must fully address the similarities and differences between additive and positional numeration systems as well as the essential characteristics of each type of numeration system.



### Option 2: An Astronaut Reporting Back to Earth

You are an astronaut and your job is to report back to Earth about the super-fantastic civilization on another planet that you just visited. You are to describe to us earthlings the planet and the civilization as well as their *positional* base-\_\_\_\_ numeration system (something other than base-10). Your description should include at minimum an explanation of how the civilization chose their particular base, an explanation of how to write numbers up to 10,000,000 in their system, and a justification of how you know their numeration system is positional.



### Option 3: Justify to Fellow Teachers the Need for Different Types of Numbers

You are a math coach at an elementary school with grades K-6 and at an upcoming in-service workshop, you want to help your fellow teachers realize why we need different types of numbers. Through your presentation, you hope to encourage the teachers to incorporate these different types of numbers into their classrooms (as grade level appropriate). Your presentation must address why we need counting, whole, integer, and rational numbers. You can receive bonus points by also addressing why we need irrational numbers.



### Option 4: Empathize with a Young Child

You are a kindergarten teacher and you want to help the parents of your students understand why it can be so challenging for young children to learn our base ten numeration system. You plan to share these difficulties with parents at an upcoming Parents' Night. As part of your presentation, you need to incorporate the challenges of learning a *positional* numeration system along with describing the essential features of a positional numeration system.



### Option 5: Where Do Fractions Come From?

You are a member of a history club and you want to help your fellow history members understand that mathematics has a history too. Thus, you decide to share with them a history of fractions. Your history should include information about who first used fractions and how, how the fractions we have today came into use, and the various features of fractions including the numerator, denominator, part, whole, etc.



### Option 6: Your Choice

If you wish, you may develop another math project in this unit in collaboration with me. See me ASAP if you want to work with me to develop your own project.



**PROJECT RUBRIC FOR PROJECTS COMPLETED IN A SMALL GROUP**

<b>Rating</b>	<b>Clarity</b> Weight: 10%	<b>Explanation/ Illustration</b> Weight: 25%	<b>Support</b> Weight: 20%	<b>Understanding</b> Weight: 25%	<b>Presentation</b> Weight: 10%	<b>Working With Others</b> Weight: 10%
<b>Advanced 4 points</b>	The performance or product is highly effective. The ideas are presented in an engaging, polished, clear, and thorough manner, mindful of the audience, context, and purpose. There is unusual craftsmanship in the final product or performance.	Includes a thorough, elegant, or inventive explanation or illustration of the given topic. The explanation is deep and broad and goes beyond the information given.	Draws upon at least four resources and illustrates or explains the given topic in multiple ways.	Shows a sophisticated understanding of the associated mathematical concepts. The understanding goes beyond the grasp of the subject typically found in this class.	The presentation is well-presented, highly engaging, and organized. Craftsmanship is evident in the supporting materials (e.g., visuals, models, overheads, videos).	The student 1. Met as needed with the group, 2. Contributed a fair share of the work, 3. Made sure to include all group members, and 4. Listened to the suggestions of others.
<b>Proficient 3 points</b>	The performance or product is effective. The ideas are presented in a clear and thorough manner, showing awareness of the audience, context, and purpose.	Includes a thorough explanation or illustration of the given topic.	Draws upon at least four resources and illustrates or explains the given topic in two ways.	Shows a solid understanding of the associated mathematical concepts. There are no misunderstandings of key ideas or overly simplistic approaches.	The presentation is engaging and organized. Effective use is made of supporting materials.	The student met three of the four desired cooperative behaviors.
<b>Improving 2 points</b>	The performance or product is somewhat effective. There are some problems with clarity, thoroughness, delivery, and polish. It is unclear whether audience, context, and purpose have been considered.	Includes an incomplete explanation or illustration of the given topic. The reader has to read between the lines or generalizations are made without explanation.	Draws upon 2-3 resources and illustrates or explains the given topic in one way.	Shows a somewhat naïve or limited understanding of the associated mathematical concepts. Response reveals some misunderstandings of key ideas.	The presentation is somewhat engaging and organized. Not all supporting materials are used effectively.	The student met two of the four desired cooperative behaviors.
<b>Unacceptable 1 point</b>	The performance or product is ineffective. The performance is unpolished, providing little evidence of prior planning, practice, and consideration of purpose and audience, or the presentation is so unclear and confusing as to make it difficult to determine key points.	No explanation is provided about the given topic.	Draws upon 0-1 resource and fails to illustrate or explain the given topic.	Shows little apparent understanding of the associated mathematical concepts. Response reveals major misunderstandings of key ideas.	The presentation is unorganized. No supporting materials are used. No prior planning is evident.	The student met one or none of the four desired cooperative behaviors.

**PROJECT RUBRIC FOR PROJECTS COMPLETED INDIVIDUALLY**

<b>Rating</b>	<b>Clarity</b> Weight: 15%	<b>Explanation/ Illustration</b> Weight: 25%	<b>Support</b> Weight: 20%	<b>Understanding</b> Weight: 25%	<b>Presentation</b> Weight: 15%
<b>Advanced 4 points</b>	The performance or product is highly effective. The ideas are presented in an engaging, polished, clear, and thorough manner, mindful of the audience, context, and purpose. There is unusual craftsmanship in the final product or performance.	Includes a thorough, elegant, or inventive explanation/illustration of the given topic. The explanation is deep and broad and goes beyond the information given.	Draws upon at least four resources and illustrates/explains the given topic in multiple ways.	Shows a sophisticated understanding of the associated mathematical concepts. The understanding goes beyond the grasp of the subject typically found in this class.	The presentation is well-presented, highly engaging, and organized. Craftsmanship is evident in the supporting materials (e.g., visuals, models, overheads, videos).
<b>Proficient 3 points</b>	The performance or product is effective. The ideas are presented in a clear and thorough manner, showing awareness of the audience, context, and purpose.	Includes a thorough explanation/illustration of the given topic.	Draws upon at least four resources and illustrates/explains the given topic in two ways.	Shows a solid understanding of the associated mathematical concepts. There are no misunderstandings of key ideas or overly simplistic approaches.	The presentation is engaging and organized. Effective use is made of supporting materials.
<b>Improving 2 points</b>	The performance or product is somewhat effective. There are some problems with clarity, thoroughness, delivery, and polish. It is unclear whether audience, context, and purpose have been considered.	Includes an incomplete explanation/illustration of the given topic. The reader has to read between the lines or generalizations are made without explanation.	Draws upon 2-3 resources and illustrates/explains the given topic in one way.	Shows a somewhat naïve or limited understanding of the associated mathematical concepts. Response reveals some misunderstandings of key ideas.	The presentation is somewhat engaging and organized. Not all supporting materials are used effectively.
<b>Unacceptable 1 point</b>	The performance or product is ineffective. The performance is unpolished, providing little evidence of prior planning, practice, and consideration of purpose and audience, or the presentation is so unclear and confusing as to make it difficult to determine key points.	No explanation is provided about the given topic.	Draws upon 0-1 resource and fails to illustrate/explain the given topic.	Shows little apparent understanding of the associated mathematical concepts. Response reveals major misunderstandings of key ideas.	The presentation is unorganized. No supporting materials are used. No prior planning is evident.