**Proportional Reasoning Unit Outline: Lesson Descriptions with Expectations**

Concept#1: Introduction

Introduce the unit by sharing with the Fibonacci Sequence. The students will be able to explore and make their own applications, this should excite the students. Ask the students to draw the perfect rectangle. Show the video Donald in Mathemagic Land.

Highlight key content words for the unit.  Ask students based on the words on the chart paper, what they think they will be learning about in this unit? Ask students about their prior knowledge for each of the words shown.

* *Communicate mathematical thinking orally, visually, and in writing, using mathematical vocabulary and a variety of appropriate representations, and observing mathematical conventions*

Concept #2: Fractions/Decimals

Students will learn that they can flip between fractions, decimals, percents and ratios and that they are equivalent.

* *Translate between equivalent forms of a number*

Concept #3: Fractions/Decimals – Investigation

Chocolate Problem

<http://nrich.maths.org/34/index?nomenu=1>

Students will explore the relationship between equivalent forms of a number. They will be shown through demonstrations how to solve problems and then apply their understanding to rich tasks. They will be asked to explain their reasoning and estimate the solutions of other problems by apply their understanding.  You

* *Translate between equivalent forms of a number*
* *Develop and apply reasoning skills to make mathematical conjectures access conjectures and justify conclusions, and plan and construct organized mathematical arguments*
* *Demonstrate that they are reflecting on and monitoring their thinking to help clarify their understanding as they complete an investigation or solve a problem*
* *Solve problems involving operations, using a variety of tools, manipulatives and strategies*
* *Communicate mathematical thinking orally, visually, and in writing, using mathematical vocabulary and a variety of appropriate representations, and observing mathematical conventions*

Concept #4: Introducing Ratios

Include scale

Students will come up with their own definition of a ratio and examples using a Frayer Model. They will be shown how to solve simple ratio problems using several strategies.

* *Identify and describe real-life situations involving two quantities that are directly proportional*
* *Solve problems involving operations, using a variety of tools, manipulatives and strategies*
* *Solve problems involving proportions, using concrete materials, drawings, and variables*
* *Communicate mathematical thinking orally, visually, and in writing, using mathematical vocabulary and a variety of appropriate representations, and observing mathematical conventions*

Concept #5: Ratios - Investigations

Students will practice and test their understanding of ratios. They will be shown through demonstrations how to solve problems and then apply their understanding to rich tasks. They will be asked to explain their reasoning and estimate the solutions of other problems by apply their understanding.

* *Develop and apply reasoning skills to make mathematical conjectures access conjectures and justify conclusions, and plan and construct organized mathematical arguments*
* *Demonstrate that they are reflecting on and monitoring their thinking to help clarify their understanding as they complete an investigation or solve a problem*
* *Identify and describe real-life situations involving two quantities that are directly proportional*
* *Solve problems involving operations, using a variety of tools, manipulatives and strategies*
* *Solve problems involving proportions, using concrete materials, drawings, and variables*
* *Communicate mathematical thinking orally, visually, and in writing, using mathematical vocabulary and a variety of appropriate representations, and observing mathematical conventions*

Concept # 6

Quiz will cover translating between equivalent forms of a number and solving two quantities that are directly proportional. Prior to the quiz students would be provided with a series of review questions to practice.

**Possibly do Volume - to break up the unit**

Concept #7: Unit Rates

Students will learn about a unitizing to help develop unit rates. Students will learn to think about everything in terms of one unit rather than one apple. They will be shown through demonstrations how to solve problems and then apply their understanding to rich tasks. They will be asked to explain their reasoning and estimate the solutions of other problems by apply their understanding.

* *Solve problems involving rates*
* *Solve problems involving proportions, using concrete materials, drawings, and variables*
* *Communicate mathematical thinking orally, visually, and in writing, using mathematical vocabulary and a variety of appropriate representations, and observing mathematical conventions*

Concept #8: Rates - Investigations

Students will practice and test their understanding of rates. They will be shown through demonstrations how to solve problems and then apply their understanding to rich tasks. They will be asked to explain their reasoning and estimate the solutions of other problems by apply their understanding.

* *Develop and apply reasoning skills to make mathematical conjectures access conjectures and justify conclusions, and plan and construct organized mathematical arguments*
* *Demonstrate that they are reflecting on and monitoring their thinking to help clarify their understanding as they complete an investigation or solve a problem*
* *Identify and describe real-life situations involving two quantities that are directly proportional*
* *Solve problems involving operations, using a variety of tools, manipulatives and strategies*
* *Solve problems involving proportions, using concrete materials, drawings, and variables*
* *Communicate mathematical thinking orally, visually, and in writing, using mathematical vocabulary and a variety of appropriate representations, and observing mathematical conventions*

Concept #9: Percent

Students will learn about a percent to help solve problems resulting from real-life contexts. Students will learn to think about percents as ratios. They will be shown through demonstrations how to solve problems and then apply their understanding to rich tasks involving discounts, sales tax and simple interest. They will be asked to explain their reasoning and estimate the solutions of other problems by apply their understanding.

* *Solve problems involving percent that arise from real-life contexts*
* *Solve problems involving proportions, using concrete materials, drawings, and variables*
* *Communicate mathematical thinking orally, visually, and in writing, using mathematical vocabulary and a variety of appropriate representations, and observing mathematical conventions*

Concept #10: Percent - Investigation

Students will practice and test their understanding of percent. They will be shown through demonstrations how to solve problems and then apply their understanding to rich tasks. They will be asked to explain their reasoning and estimate the solutions of other problems by apply their understanding.

* *Develop and apply reasoning skills to make mathematical conjectures access conjectures and justify conclusions, and plan and construct organized mathematical arguments*
* *Demonstrate that they are reflecting on and monitoring their thinking to help clarify their understanding as they complete an investigation or solve a problem*
* *Solve problems involving percent that arise from real-life contexts*
* *Solve problems involving proportions, using concrete materials, drawings, and variables*
* *Communicate mathematical thinking orally, visually, and in writing, using mathematical vocabulary and a variety of appropriate representations, and observing mathematical conventions*

Concept #11: Culminating Activity

Possible Gr 7

<http://www.edugains.ca/resources/LearningMaterials/SummativeUnits/Grade7.pdf>

Concept #12: Review

Students will construct either a mind map or concept map to organize their thoughts on heat. This will help students review for their unit test on heat. Students will also be provided with review questions.

* *Develop and apply reasoning skills to make mathematical conjectures access conjectures and justify conclusions, and plan and construct organized mathematical arguments*
* *Demonstrate that they are reflecting on and monitoring their thinking to help clarify their understanding as they complete an investigation or solve a problem*

Concept #13: Unit Test

Students will be tested on the concepts taught throughout the unit, using a variety of different assessment techniques*.*