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**Activities Planning for Third Lab**

This is a draft, with many of the factors listed, but not a guarantee of the scheduling, outline, requirements, or services of either party. This will help plan what becomes of our research and the activities we help facilitate with all involved.

**Third Lab @ VT**

We are the Third Lab at Virginia Tech. We specialize in educational tools, curricula, and activities that promote learning in grounded research and educational goals. We are excited to work with you, your constituents, and the students and their families. We truly know it takes a lot of effort from you all as well to achieve great success. We have many people that work on the small details behind the scenes. If you haven’t met us each in person, you may see our names or interact with us in the future.

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**General Rules we know to follow:**

* Title IX training
* Completed daily by 7p or 8p for homework (of course before is also welcome)

**General Concerns:**

* How do we identify participants, locations, and scheduling?

Should we consider siblings and friends?

Is transportation a factor for participants or just for us researchers?

* Food/drinks/refreshments

**Locations**:

Reynolds Homestead

463 Homestead Ln, Critz, VA 24082  
(276) 694-4135

4 Elementary (K-7)

?

1 Primary (K-3)

?

1 Upper Elementary (4-7)

?

1 High (8-12)

?

**Important Dates:**

August:

First Day of School: Wednesday, August 12, 2015

September

Labor Day: Monday, September 7, 2015

Early Dismissal: Thursday September 17, 2015

First Grading Period Ends (32 days): Friday, September 25, 2015

**Virginia Standards of Learning (SOLs):**

|  |  |  |
| --- | --- | --- |
| Grade | Math  <http://www.doe.virginia.gov/testing/sol/standards_docs/mathematics/index.shtml> | English  <http://www.doe.virginia.gov/testing/sol/standards_docs/english/index.shtml> |
| 2nd | Number Line  Counting | Create oral stories  Reading |
| 3rd | Multiplication & division  Number Sense | Group discussion  More complex vocabulary |
| 4th | Multiples & Factors  Estimation | Identifying primary sources  Make a presentation |
| 5th | Fractions and Decimals | Make and investigate individual hypothesis |
| 6th | Rational numbers  Ratios, and ‘pre-algebra’ | Etymology  Write narrative stories |
| 7th | Proportions & Equations  Multiple Representations | Refine composition skills  ‘Media literacy’ |

**Common Core:**

|  |  |  |
| --- | --- | --- |
| Grade | Math  <http://www.corestandards.org/Math/> | English  <http://www.corestandards.org/ELA-Literacy/> |
| 2nd | Counting beyond 100  Linear counting (ruler) and iteration | Reading to just read  Reading different types of works  Writing  Speaking & Listening  Language and Grammar  Range, Quality, & Complexity |
| 3rd | Multiplication & Division  Unit Fractions  Two dimensional Shapes |
| 4th | Fraction Equivalence  Addition & Subtraction of fractions  Multiplication of fractions by whole numbers (iteration) |
| 5th | Proper & Improper fractions  Decimal notation and operations  Volume (3 dimensions) |
| 6th | Ratio & Rates  Division of fractions |
| 7th | Proportions, Equations, and Scaling  Geometry and Ratios |

**Statistics for Patrick County:**

|  |  |  |  |
| --- | --- | --- | --- |
| Per Pupil Expenses | 2013-2014 | 2014-2015 | 2015-2016 |
| State Funding | $ 5,126 | $ 5,768 | $ 5,752 |
| Sales Tax | $ 880 | $ 901 | $ 966 |
| Federal Funding | $ 876 | $ 870 | $ 835 |
| Local Funding | $ 2,275 | $ 2,187 | $ 2,485 |
| Total | $ 9,157 | $ 9,726 | $ 10,038 |

Total Budget: 29,940,082.58

**General Timeline for Interactive Activities**:

Single Day Event: Make an e-card

Single Day Event: Conductive Play-doh

Two Day Event: Music Sharing

Day one: Discussion and brainstorming

Day two: Interaction with music devices and Discussion

**General Timeline for Sound of Fractions:**

Precurricular days: Observations and Interviews

Day 1: Familiarity with rhythm, wholes, and associated terminology

Day 2: Strengthen terminology, wholes, parts, splitting, and different sizes

Day 3: Fraction Operations

Day 4: Intro to Sound of Fractions

Day 5: Order of Fractions

Day 6: Fraction Identification from different contexts

Postcurricular days: Interviews

**Observations and Interviews:**

The observations will require

The interviews will require parental consent and participant assent is needed. Video recording is best, followed by audio, followed by note taking with an observer, and lastly a discussion with post interview note taking. Identities will be removed from publication, but tracked for internal purposes and progression tracking.

**Day 1: Familiarity with rhythm, wholes, and associated terminology**

Math is about patterns. We are going to engage in a number of activities that focus on noticing and describing patterns. Most of our activities are about the underpinnings of fractions, but some of them are about other kinds of patterns.

GOAL: Gain familiarity with description terminology for rhythms

Engagement

Embodied experience of parts and wholes

Activity 1

DO: Play the hook of a popular rhythm for the class

ASK: Ask the students to describe the rhythm aloud to the teacher and others

Have the Teacher highlight the main words used that are important for fractions

TAKEAWAY: Hear main words of students' descriptions

Activity 2a

DO: Teacher makes their own representation of the popular beat, but doesn't show it to the students

For individual student sessions, we can use the same representation

Activity 2b

DO: Students to make their own short duration rhythm by tapping on the desk

Students repeat their rhythm (2-4 times) to make sure they know it well

Students make their own representation of their rhythm using words, cut paper, color/draw, or manipulatives [Play-doh, blocks]

Exchange representations and listen to how their rhythm is played by others

ASK: (Whole class) Was your rhythm the same when the other person played it as when you created it?

How did it differ?

Write it in a journal

ASK (small group): How could we represent the rhythms differently so that another person could reproduce them?

Write it in a journal

What is not helpful?

[Teacher] reiterates to the students the important words used

Activity 2c

DO: Students individually come up with new rhythm and modified representations that they then exchange and try to get better replication results.

ASK:(whole class) What did you discover about how to get another person to play what you wanted them to play?

TAKEAWAY: Ways to represent a rhythm and some of the words people use

NOTE: When making a representation if a student makes a 'traditional musical' representation, we have them make another

Activity 3

DO: Have pairs of students tap one rhythm together, exactly.

Write what steps you do exactly in your notebook.

ASK: Are each person's actions equal?

What do you do to ensure that they are equal?

DO: Switch rhythms and follow your instructions.

ASK: Did your process work?

What didn't work?

**Day 2: Strengthen terminology, wholes, parts, splitting, and different sizes**

GOAL: Strengthen terminology introduced in the first session

Engagement

Embodied experience of equality [for comparison]

Activity 1

DO: Make a rhythm

Ask the students to describe in words the rhythm aloud to a partner

Have the student tap out their rhythm back

Use additional words to correct the attempt of tapping the rhythm

Reverse rolls

ASK: What important words did you use? (write down in journal new page)

TAKEAWAY:

Activity 2

DO: Split a rhythm evenly so that each person is responsible for an equal part.

ASK: What is "equal"?

How did you do it?

Is it always possible to split something equally? (write down)

TAKEAWAY: Equal splitting

Activity 3: Pizza and cutting

DO: draw your own "pizza" and cut[draw] it into "slices" without looking at one another

ASK: does everyone have the same number?

does everyone have the same size of pizza?

TAKEAWAY: Equal size must happen to compare fractions easier

Activity 4: Pizza and splitting

DO: Provide the scenario that the students:

There are \_\_\_ kids on a band trip. The teacher orders \_\_\_ pizzas. How much pizza does each student get if they share it equally?

ASK: Ask the students how they solved it.

DO: Provide the scenario that the students:

There are \_\_\_ kids on a band trip. The teacher orders \_\_\_ Large pizzas and \_\_\_ Medium pizzas because the pizza place is having a promotion sale. How much pizza does each student get if they share it equally?

ASK: Ask the students how they solved it and what parts are important.

TAKEAWAY: How to split uneven 'wholes'

Activity 5

DO: Play a rhythm with two beats just ONCE

X X

ASK: How many beats are there?

How many spaces/rests/off beats are there?

How many divisions/total parts (beats and spaces/rests/off beats) are there?

DO: Play a rhythm with two beats just ONCE

X . X

ASK: How many beats are there?

How many spaces/rests/off beats are there?

How many divisions are there?

DO: Play a rhythm with two beats just ONCE

X . X .

ASK: Was that one or two?

How do you know what the whole is?

TAKEAWAY: You need to know what a whole of a what you are comparing is

Activity 6

DO: Tables of students that each have different numbers of students (2, 3, 4, 5). Each table of students is presented with a different rhythm via hitting the play button on the table and repeating it by drumming on the desk. [until comfortable]

One table will play out halves, another thirds, another fourths, another fifths to the class.

Halves:

X X . .

X . X .

Thirds

X X X . . . . . .

X . . X . . X . .

Fourths

X X X X . . . . . . . . . . . .

X . . . X . . . X . . . X . . .

Fifths

X X X X X . . . . . . . . . . . . . . . . . . . .

X . . . . X . . . . X . . . . X . . . . X . . . .

Split the beats among each person in the group

ASK: questions based on each table:

Who has more beats at your own table?

Who plays more of the rhythm (if not equal)?

ASK: questions based on the entire class

Who has a longer rhythm?

TAKEAWAY: Size of the whole must be equal in order to compare fractions mathematically

DO: Rotate to other tables and repeat

Notes : the beat rhythms may need play buttons to place once, play, three times, and play repeatedly...

Activity 7

DO: Each make your own rhythm [using any number of beats/rests]

ASK: Who has more beats?

Who has more rests?

DO: Each make your own rhythm using 4 beats.

ASK: How many beats do you each have?

Who has bigger/longer beats and who has shorter?

TAKEAWAY: you need to know the size of the whole to compare fractions

**Day 3: Fraction Operations**

GOAL: Differentiation between numerator and denominator

Engagement

[MATH] - Numerator vs denominator

Activity 1a: Dividing the whole

DO: Have one student be the 'metronome' repeating the down beat.

Every other student plays a beat equally in between the down beats.

Divide the rhythm into equal parts and tap it

Note: this should be a refresher

Who takes what? (sharing)

ASK: Did you start by counting or by splitting?

How did you do it?

Activity 1b: Add a beat

DO: Give the students at each table a particular base rhythm

One student plays the down beat repeatedly, to provide a sense of the whole

Ask students to add a beat to the end in the same division

add a beat to (duration) the rhythm at the end (making it longer)

[this has a bit to do with mixed numbers since the rhythm will be repeated every n+1 times]

ASK: What happens to [the length of] the rhythm?

What happens to [the length of] the beats?

DO: Ask the students to add a beat to (quantity) the rhythm keeping the time the same

ASK: What happens to [the length of] each beat?

What is the difference between the two [previous?

What happens to [the length of] the beats?

What is the difference between the two [previous?

How do you tell this to the another table to get the to understand what you did? [write down]

Activity 1c: Subtraction

DO: Subtract a beat

Remove a beat (duration) from the rhythm at the end (making it shorter)

Don't beat the third beat

ASK: What happens to [the length of] the rhythm?

Don't tap a beat (reducing numerator quantity) from the rhythm keeping the time the same

ASK: What happens to [the length of] each beat?

Activity 1d: Multiply

DO: Multiply the rhythm by playing it 2 or three times (harmony or other people added in succession)

Play the rhythm in double time (twice as fast)

Play the rhythm in half time (half as slow)

ASK: How far into the rhythm does the other person start?

What happens to [the length of] the rhythm?

If one person plays it half time, and the other person plays it double time, which one is greater?

TAKEAWAY: Double time is one quarter of Half time.

**Day 4: Intro to Sound of Fractions**

GOAL: Engagement

Intro to the computer interface and prepare for more complex interactions

Activity 1

DO: play around with the system

Give out silly names

ASK: What do you notice about the SOF? [researchers notate what is noticed]

Activity 2:

DO: Make an instrument have one of each representation

ASK: How are the representations different that what you created on your own at the beginning?

TAKEAWAY: Notice the features of the SOF representations

Activity 3

DO: Tap rhythm on the table

Have another student tap a complementary beat (during the rests)

Make the rhythm in the sound of fractions (not by recording)

Make the other student make a rhythm in the sound of fractions using another instrument (not by recording)

play together

ASK: How do you get them to start at the same time each time?

How much is each person playing?

Activity 4

DO: Make a rhythm that is twice as long [duration] of the previous rhythm (by stretching it or recording it)

The second student makes a complementary rhythm on another instrument

ASK: How do you get them to start at the same time each time?

How much is each person playing?

TAKEAWAY: Percentages are the same, despite the size of the parts

**Day 5: Order of Fractions**

GOAL: Understand the inverse properties of parts/fractions

Activity 1

Which beet comes first?

Beat 2 of 5 or beat 3 of 9?

Beat 1 of 2 or beat 2 of 3?

**Day 6: Fraction Identification from different contexts**

GOAL: Understanding context when considering parts and wholes

Activity 1:

DO: A rhythm repeats itself.

ASK: How do you know what is the first beat?

How do you count the beats during the first set.

- Is there a way to talk about the beats in between the down beat?

- do they have names?

Activity 2:

ASK: There are 16 beats in a rhythm. If there are 4 people, how many beats does each person get?

Activity 3:

DO: Provide another popular rhythm for all students to hear.

ASK: Have the students make the rhythm in Sound of Fractions.

Label the rhythm.

What did you label?

Compare your labels with other students.

Write the labels on the board for everyone to see.

TAKEAWAY: there are many things to label, and it depends on the context. Looking at all the students' answers will help see all the possible contexts.