Fraction Mash Activity 5: Family Tree

Analyzing Fractions while Combining and Recombining Mashups

Overview
Students will create a series of combinations of images and generate a family tree with visual representations of the resulting fractions.

Big Idea
The importance of family trees may date back to the history of mathematics itself. Often, people look like a perfect combination of both of their parents and sometimes child will look far more like one parent than the other. Though not a scientific approach (i.e. this is not a lesson in genetics), this Fraction Mash activity approaches the idea of a family tree in a very fun, basic way that lends itself to a potentially complex exploration of combinations and fractions. Students will create three generations of mashups, beginning with four grandparents and ending with their five grandchildren. The mashup of each grandchild will be analyzed to determine what fractional part they are of each parent and grandparent.
NOTE: The concept of the “whole” is important to consider with Fraction Mash. For the purposes of this app, the “whole” is the picture itself – the image that fits within a frame. The parts of one picture combine with parts of another picture to make one whole picture: the mashup.

Learning Objectives
Students will use denominators, numerators, and various grid options to create combinations of images and a representation of a family tree.

From this activity, students will be able to:
- Create combinations of images, then combinations of the combinations and analyze the fractional parts of the final image.
- Explain a basic level of understanding of the math concept of combinations.

Vocabulary
- Fraction
- Denominator
- Numerator
- Grid
- Whole
- Combination

Grades
Elementary and Middle School, 3-7

Standards Addressed
Grade Level: 3, 4, 6, 7
Common Core Standards-Math
CCSS.MATH.CONTENT.3.NF.A.2.A
CCSS.MATH.CONTENT.3.NF.A.3.A
CCSS.MATH.CONTENT.3.NF.A.3.B
CCSS.MATH.CONTENT.3.NF.A.3.D
CCSS.MATH.CONTENT.4.NF.B.3.B
CCSS.MATH.CONTENT.6.NS.C.6
CCSS.MATH.CONTENT.6.RP.A.1
CCSS.MATH.CONTENT.6.RP.A.3.A
CCSS.MATH.CONTENT.7.RP.A.2
CCSS.MATH.CONTENT.7.RP.A.2.C

Mathematical Practices
MP1
MP2
MP4

Classroom Strategies
Single-device implementation
Create an example of a family tree prior to class and share using an interactive white board or projector. Lead a discussion about the math involved and then create a new family tree together as a class with selected popular figures. Use the student sheets and discussion questions if they are helpful.

Multiple-device implementation
This is a great activity for two to four students per iPad. Students will collaborate to create their own family trees, reflect on the math involved, and help each other work through common misconceptions around these topics.

Tips and Tricks: Discussions of why certain mashups work better than others allow students to share their underlying understandings of fractions in general. These connections help reinforce some of the fractional reasoning introduced here.

App Features You Will Use

<table>
<thead>
<tr>
<th>In Create Mode, you will use:</th>
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<tbody>
<tr>
<td>Swipe right to increase or left to decrease the numerators and denominators. This controls how many parts are in your mash-up and how big they are.</td>
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<td>Import or take a new picture.</td>
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### Expected Activity Time

**Family Tree** (20 minutes)

### Materials and Prep
- Family Tree Student Sheets
- iPad with Fraction Mash app
- Wifi access for sharing mashups

### Activity Prompt

**Intro:** Have you ever seen the funny photographs where faces get combined to create a mashup? (Display examples like these: [http://aplus.com/a/celebrity-face-mashups.](http://aplus.com/a/celebrity-face-mashups.))

In this activity, you will create mashups of faces and then combine (or remix) your mashups. Combining and recombining is the Fraction Mash process of creating a family tree.

**Family Tree:** Using four individual faces, pair them into two sets of grandparents. With set 1, create a single mashup using vertical bars and 10ths and represent both grandparents equally (i.e. 5/10 and 5/10). With set 2, create another mashup with vertical bars and 5/10ths. The mashups from set 1 and set 2 represent the parental generation. Finally, mashup the parents in five ways of your choosing and follow steps to analyze the fractional components related to the parents and grandparents.

### What To Do

**Family Tree Challenge** (20 minutes):

Open the app, and select “Make A Mashup.”
- Have students choose four grandparents for the family tree. They could be students in the class, famous people with photos from the Internet,
or people you would like your students to work with for this activity.

- Import from camera roll or take new pictures. Focusing on overlaying features like eyes and mouth helps line up images for cohesive outcomes.
- Have students create mashups with the two sets of grandparents using vertical bars and tenths. Each grandparent will be represented equally, 5/10 and 5/10.
- Once the first two mashups are complete, students now have the parental generation to work with. Have students mash up the two parents in five different ways. That is, have them use different grids, denominators, etc. The parents do not need to be represented equally but remember that no child comes 100 percent from one parent.
- Have students analyze the family tree using the student sheets.
- Repeat if desired with different grandparents, and different grids, denominators, numbers of children, etc.

**Discussion**

Prompt students to describe the mashups they made and what they had to do to achieve certain outcomes. Encourage students to think about how many combinations were possible at the parent and child level of the family tree. Also, what fraction of each grandparent is each child?

Ask students:

- As you mashed up the parents and children, how did fractions play a role?

- When you mashed up the children, did some grids work better than others?

**Extensions and Inquiring Further**

Create more extensive family trees using people from different contexts. For example, students could use their own grandparents, or comic book heroes, etc. The more they care about their relationship to the people they are mashing, the more they will be interested to dig into the math involved.

OR:

Many other Fraction Mash activities invite students to mashup animals, faces and even objects. That same sort of creativity could go into creating a family tree. Perhaps a starting set of grandparents could be a giraffe and a penguin with another set being a car and a flower. Students can follow the same steps to explore these relationships but with even wackier images.

OR:

Expand the parameters of the grids and denominators to your liking, or to the level of your students. Perhaps start by mashing up grandparents with a 100ths grid to set up a much more complex family tree. Ask your students to create a larger family tree, bringing in many more faces and stories for each family.
Fraction Mash Noticing Tool

Name: _______________________________    Date: ____________

Fraction Mash Activity 5: Family Tree

Follow steps to create a representation of a family tree and then explore the fraction relationships involved between children, parents and grandparents.

![Image of Fraction Mash app]

To Do:

1. Choose two sets of grandparents and call them set 1 and set 2. You can take pictures of yourself and classmates or use images from the Internet or camera roll that are imported into the Fraction Mash app.

2. Using Fraction Mash, line up grandparents in set 1 and choose the vertical bar grid. Then swipe the denominator to 10. Make a mashup with 5/10 of each grandparent represented. The more precise your mashup is, the more fun your results will be. Save the mashup to the camera roll and repeat with grandparents in set 2.

3. The two mashups you made are now the parents in your family tree. Bring the two parents into Fraction Mash and line them up side by side.

4. Create five new mashups from these two parents. Each of these mashups will represent their children. For the children, choose any grid and denominator that you want. The parents do not need to be represented equally, but they should be represented at least somewhat as no child comes from any parent 100 percent. Be sure to save each child with the grid.

5. Once you have the five children, answer the reflection questions.
Name: ________________________________  Date: ____________

Fraction Mash Activity 5: Family Tree
Reflection Questions

1. What are the names of your family members?

2. Examine the fractional components of each child and fill in the table below. (Note: Another way to think about these fractions is in terms of ratios. For example, the ratio of Parts of Child 1 from Grandparent 1 to Total Parts is the fraction in the first grid of the table.)

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<td>Child 5________</td>
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2. What is the sum across each row for Child 1–5? Why?

3. When you look at the children, use fractions to describe which grandparents they resemble the most. Do any of the children visually resemble a grandparent more even though the fractional makeup isn’t the greatest? Why?

4. How did the different grids affect the creation of your family tree?

5. How would you attempt to figure out how many combinations of parents and children there could be from the two sets of grandparents?