

# Rational Number Project

Initial Fraction Ideas Lesson 12: Overview	Materials
Students are introduced to chips as a fraction model. They learn to represent a given fraction using different sets of chips as a unit.	<ul style="list-style-type: none"> <li>∞ Chips or tiles with a different color on each side</li> <li>∞ Paper strips for folding</li> <li>∞ Display chips or overhead chips for teacher</li> <li>∞ Student Page A</li> </ul>

Teaching Actions	Comments
<p><b>Warm Up</b></p> <p>Which fraction is larger? Share your answer and rationale to a partner. Did you both agreed on the larger fraction? Did you think about it in the same way or differently?</p> $\frac{3}{4} \quad \frac{11}{12}$ <p><b>Large Group Introduction</b></p> <ol style="list-style-type: none"> <li>You use chips while students use paper folding to show the same fraction.</li> <li>Model the fraction <math>\frac{2}{3}</math> with the display chips you made [see description at end of lesson].</li> </ol> <p>Say: I have 6 chips (show 6 chips with the white side up). I'm going to partition them into 3 equal groups. Can you partition your paper strip into 3 equal parts?</p> <p>Ask: How are the displays alike and different?</p> <div style="display: flex; align-items: center; gap: 10px; margin-top: 20px;"> <div style="display: flex; gap: 5px;"> <div>○○ ○○ ○○</div> <div style="border: 1px solid black; width: 100px; height: 20px; position: relative;"> <div style="position: absolute; left: 0; width: 33.33%; height: 100%; background-color: #f0f0f0;"></div> <div style="position: absolute; left: 33.33%; width: 33.33%; height: 100%; background-color: #f0f0f0;"></div> <div style="position: absolute; left: 66.66%; width: 33.33%; height: 100%; background-color: #f0f0f0;"></div> </div> </div> <ol style="list-style-type: none"> <li>Turn over 2 of the 3 equal groups of chips to show the tan side of the chips. Ask children to model this action on their paper strips by shading 2 of 3 equal parts.</li> </ol> </div>	<p>This will be a challenging lesson for students. You may want to use two class periods to cover this material.</p> <p>To reinforce important fraction concepts students are introduced to a new model for fractions (chips) by relating this model to a previous one (paper folding). This is a translation from one physical model to another. Seeing similarities between models helps students abstract important concepts.</p> <p>Common error: Students model <math>\frac{2}{3}</math> by making <b>groups of three</b> instead of <b>three equal groups</b>.</p>

## Teaching Actions

Say: I made 2 of 3 equal-sized groups tan.

Ask: What fraction of the chips is tan?

Ask: How are the chips and paper folding models alike? Different?



- Summarize what you did by writing on the board.

I started with a unit of \_\_\_\_ white chips.

I divided the unit into \_\_\_\_ equal groups.

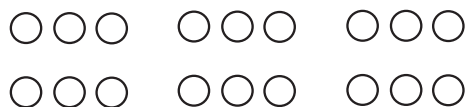
I made \_\_\_\_ groups tan.

\_\_\_\_ of \_\_\_\_ equal-sized groups are tan.

What fraction of the groups is tan? ( $\frac{2}{3}$ )

- Ask students to verbalize what they did with paper in a similar way. Conclude that there are many different models to show fractions.
- Model other fractions using chips. Students should have their own chips. For the sake of consistency, use the white side to show the unit and use the tan side to show “amount shaded.”
- SAY: I have 18 chips. I want to show  $\frac{4}{6}$  using these chips as my unit.

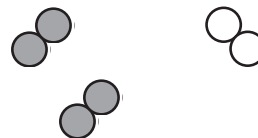
ASK: How many equal-sized groups will I need? (six). Now divide the 18 chips into 6 equal groups.



## Comments

Students often need to exaggerate the grouping of the chips to highlight the separate groups.

Ex:  $\frac{2}{3}$

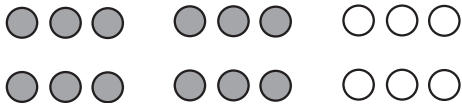


They will spread out the sets and arrange the chips to touch to show a group. At this point don't use the array-model.



Some students say that  $\frac{4}{6}$  is covered. Informal discussion of equivalence is encouraged, but don't rush the idea.

Student verbalization is important. You might ask them to write a description for showing a fraction with chips.

Teaching Actions	Comments										
<p>ASK: To show <math>\frac{4}{6}</math>, how many equal groups must I make tan? (four)</p>  <p>8. Repeat for several more fractions.</p> <table border="1" data-bbox="203 569 803 1010"> <thead> <tr> <th>Fraction</th><th>Unit</th></tr> </thead> <tbody> <tr> <td><math>\frac{2}{3}</math></td><td>15</td></tr> <tr> <td><math>\frac{2}{3}</math></td><td>21</td></tr> <tr> <td><math>\frac{6}{7}</math></td><td>7</td></tr> <tr> <td><math>\frac{3}{4}</math></td><td>20</td></tr> </tbody> </table>	Fraction	Unit	$\frac{2}{3}$	15	$\frac{2}{3}$	21	$\frac{6}{7}$	7	$\frac{3}{4}$	20	
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<p><b>Small Group/Partner Work</b></p> <p>9. Student Page A provides independent practice.</p> <p><b>Wrap Up</b></p> <p>10. Present these two stories to students. Ask them to decide which model, paper folding or chips, would be best to show the fraction the story.</p> <p>Story 1: Devan had 15 m &amp; m's. She shared them equally between herself and 2 friends. What fraction of candy did she get?</p> <p>Story 2: Lianna has a Nestle Crunch bar. She plans to share it between herself and 2 friends. What fraction of the candy bar will each get?</p>	<p>Students will struggle a bit. As you move from group to group you may want to model the fraction using paper folding, going through each step as the students use the chips to copy your steps.</p> <p>Students confuse the number of groups with the number of chips in each group so emphasize that <math>\frac{3}{4}</math> means 3 out of 4 equal-sized groups. It does not mean to put 4 chips into a group.</p>										

**Translations:**

- ∞ Manipulative to manipulative
- ∞ Verbal (written words) to manipulative to pictures

Which fraction is larger? Share your answer and rationale to a partner.

Did you both agreed on the larger fraction?

Did you think about it in the same way or differently?

$$\frac{3}{4} \quad \frac{11}{12}$$

## Modeling Fractions with Chips

1. Show 3-fourths with chips. Use 20 chips in all. Draw a picture of your display.
2. Show 3-fourths with chips. Use 8 chips in all. Draw a picture of your display.
3. Show 2-sixths with chips. Use 12 chips in all. Draw a picture of your display.
4. Show 2-sixths with chips. Use 6 chips in all. Draw a picture of your display.
5. Show 4-fifths with chips. Use 20 chips in all. Draw a picture of your display.
6. On the back of this page, describe steps you would take to show  $\frac{3}{7}$  using 21 chips.