

Curriculum topics:

- Division
- Remainders

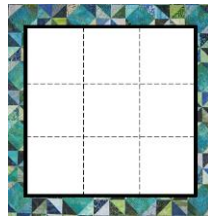
Subject:

Mathematics

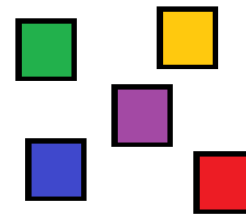
Grade range: 2 – 6

LEFTOVER QUILT PATCHES

The player with the most leftovers wins



game quilt



patches

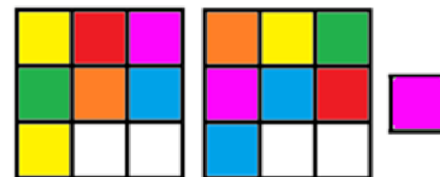
Fill quilts with an equal number of colorful square patches. Any leftover patches are kept, and the winner is the player with the most leftovers at the end of the game!

Who we are:

Resource Area for Teaching (RAFT) helps educators transform the learning experience through affordable “hands-on” activities that engage students and inspire the joy and discovery of learning.

For more ideas and to see RAFT Locations

www.raft.net/visit-raft-locations



$$15 \div 2 = 7 \text{ R } 1$$

In the picture above, the first player started with 15 patches, and then rolled the number 2 on the dice. The number 2 rolled means to use 2 game quilts on this turn. The player tries to place each of the 15 patches evenly distributed among both quilts. Only 14 of the 15 patches can be split evenly onto the 2 game quilts, leaving 7 patches on each quilt. The remaining 15th patch cannot fit on both quilts, so it is a leftover patch that the player keeps!

Materials required

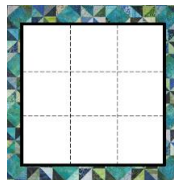
For each team of 2 players:

- Small squares, 2.54 cm (1 inch) on a side, multiple colors, 15
- 6-sided die, 1
- **Leftover Quilt Patches** Recording Sheet, see page 4
- 6 **Leftover Quilt Patches** Game Quilts, cut apart on dotted lines, (see page 5)

Playing the game (for 2 players)

- 1** Place all small squares (“patches”) in one large pile.
- 2** Each player rolls the die; the player with the highest roll goes first.
- 3** Player 1 rolls the die and will use that number of game quilts (if a 1 is rolled during the game, always roll again for a different number).

Two on die =
Two quilts

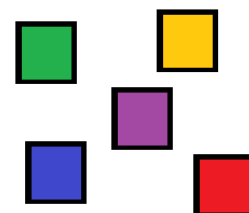


- 4** Player 1 divides the 15 patches equally among the game quilts that are being used. Place the same number of patches onto each of the quilts currently in play and if there are any leftover patches, keep them to the side.
- 5** Player 1 records the result on the *Leftover Quilt Patches* Recording Sheet:
(number of patches) ÷ (number of quilts) = ___ R ___, where **R** stands for the word “remainder”.
See example below: a roll of 2 means 2 game quilts are used, with 15 patches distributed evenly among them; this is recorded as $15 \div 2 = 7 \text{ R } 1$.



$$15 \div 2 = 7 \text{ R } 1$$

- 6** After recording the results, Player 1 puts the used patches (14 in the example) back into the pile and keeps any leftover patches (1 in the example).
- 7** In the next turn, Player 2 can only use the patches in the pile. In the example, only 14 of the original 15 patches can be used. Player 2 follows steps 3 through 6 above, using the new number of patches.
- 8** If the number of quilts is greater than the number of patches available, roll the die again for a different number. If the remainder is zero for three turns in a row, each player receives one patch.
- 9** Players continue as above, alternating turns until either there are less than 3 patches left in the pile, or ten turns have elapsed.
- 10** The player with the most leftover patches wins!



Curriculum Standards:

Division (Common Core Math Standards: Operations & Algebraic Thinking, Grade 2, 6; Grade 3, 2, 3, 6, & 7; Grade 4, 2)

Division by a single-digit (Common Core Math Standards: Grade 4, Number & Operations in Base Ten, 6)

The math behind the activity

This fun activity lets students discover which division problems end up with remainders and which do not. A number is divisible by another number if, after dividing, the remainder is zero. For example, 15 is divisible by 3 because $15 \div 3 = 5$ with 0 remainder. However, 25 is not divisible by 6 because $25 \div 6 = 4$, with a remainder of 1.

Learn more

- Have the winner be the player with the least number of leftover patches.
- Only keep patches for numbers divisible by a certain number (for example: keep patches for only numbers that are divisible by 3).
- Add more patches and/or game quilts. What works, what does not work? Why?

Related activities: See RAFT Idea Sheets:

Divide and Conquer -

[www.raft.net/ideas/Divide and Conquer.pdf](http://www.raft.net/ideas/Divide%20and%20Conquer.pdf)

Fit Together Factors -

[www.raft.net/ideas/Fit Together Factors.pdf](http://www.raft.net/ideas/Fit%20Together%20Factors.pdf)

Meet My Function Machine -

[www.raft.net/ideas/Meet My Function Machine.pdf](http://www.raft.net/ideas/Meet%20My%20Function%20Machine.pdf)

Modeling Simple Equations -

[www.raft.net/ideas/Modeling Simple Equations.pdf](http://www.raft.net/ideas/Modeling%20Simple%20Equations.pdf)

Peek-a-Boo -

www.raft.net/ideas/Peek-a-Boo.pdf

Pick a Stick -

[www.raft.net/ideas/Pick a Stick.pdf](http://www.raft.net/ideas/Pick%20a%20Stick.pdf)



Resources

Visit www.raft.net/raft-idea?isid=670 for “how-to” video demos and more ideas!

See these websites for more information on the following topics:

- **Divisibility Rules for numbers** – <http://mathforum.org/dr.math/faq/faq.divisibility.html>
- **Another hands-on activity about remainders in division problems** – <http://handsonmath.blogspot.com/2011/08/paperclip-division-with-remainders.html>
- **Teacher designed math courses from the New Jersey Center for Teaching & Learning** – <https://njctl.org/courses/math>

Additional standards at:
<http://www.raft.net/raft-idea?isid=670>

Leftover Quilt Patches Recording Sheet



Number of Patches at the start of a turn \div Number of Quilts (from roll on the die) = _____ R _____

15 \div 2 = 7 R 1

14 \div _____ = _____ R _____

Example of the first 2 turns from the illustration on page 1.

Leftover Quilt Patches Recording Sheet



Number of Patches at the start of a turn \div Number of Quilts (from roll on the die) = _____ R _____

15 \div _____ = _____ R _____

_____ \div _____ = _____ R _____

_____ \div _____ = _____ R _____

_____ \div _____ = _____ R _____

_____ \div _____ = _____ R _____

_____ \div _____ = _____ R _____

_____ \div _____ = _____ R _____

_____ \div _____ = _____ R _____

_____ \div _____ = _____ R _____

_____ \div _____ = _____ R _____

Roll again - if a 1 is rolled or if the number of quilts is greater than the number of patches.

Leftover Quilt Patches Game Quilts

