

DESK

Lesson

Course: 6th Grade Common Core State Standards

Davis Essentials: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1 – 100 with a common factor as a multiple of a sum of two whole numbers with no common factor.

Skills and Knowledge: Extend understanding of operations to divide fractions, compute with multi-digit numbers, and find common factors and multiples.

Title **GREATEST COMMON FACTOR**

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Objectives
What will students know and be able to do at the end of this lesson?

Find the greatest common factor of two whole numbers less than or equal to 100.

Lesson Description Students will work through concrete, pictorial, and abstract examples to find the GCF of 2 numbers less than or equal to 100.

Lesson Materials and Resources Multi-link cubes (or counters in two colors)

To create custom grid paper, try this link. 4 lines/inch works great for this lesson.
<http://incompetech.com/graphpaper/plain/>

Instructional Activities

Concrete:

1. Introduce the following word problem.

There are two 6th Grade classes at Lincoln Elementary. The first class has 18 students. The second class has 24 students. Both classes get together at the end of the day to play a math game. The teachers want the children to be on teams with their own classmates, but all teams need to have the same number of students in each group. What is the largest number of students that can be in each group without any students being left out?

2. Assign students to work in pairs or small groups. Pass out multi-links or counters to each group.
3. Students will count out 18 of one color links and 24 of a different color.
4. Allow students to manipulate the links to determine the largest groups possible, keeping students from each class grouped only with students from their own class. (Walk around and observe the students working and assess whether they are putting the cubes in equal groups across both classes. If they aren't, remind them that all the teams need to have the same number of students.)

5. Have students write their thinking in a math journal or on a sheet of paper, explaining why they grouped the students the way they did. Are there other ways to group the students? (Allow the students to express their thinking and why they grouped the links the way they did. Avoid correcting students who have not identified the GCF. For example, some students may have grouped the links in groups of 2, but the GCF is 6.)
6. Identify students that have grouped their links in groups smaller than 6 and ask them to share their thinking with the class. When they are finished, ask how they can show their multi-links as two arrays, one for each class. (If students are grouped by 2's the arrays would be a 9×2 (meaning 9 groups with 2 students in each), and a 12×2 (meaning 12 groups with 2 students in each). If grouped by 3's, the arrays would be 6×3 (meaning 6 groups of 3 students) and 8×3 (meaning 8 groups of 3 students). If there aren't any groups of students that create these arrays, the teacher will need to make these so that all the arrays can be shown and compared. Save these arrays for the pictorial part of the lesson.)
7. Emphasize that the number of groups as well as the number in each group are factors of the original number. In an array, the length and width are factors.
8. Other students will recognize they have made larger groups. Allow these students to share their thinking. When they are finished, ask how they can show their multi-links as arrays.
9. Once all 6 arrays are made and presented, compare the arrays to each other and determine which arrays represent the largest number of students in each group (6).

Pictorial:

10. Pass out grid paper to each student.
11. Using the arrays built in step 6, draw and label all the arrays for each number on grid paper.
12. Compare the factors of each number. 18 will have arrays of 1×18 , 2×9 , 3×6 . 24 will have arrays of 1×24 , 2×12 , 3×8 , 4×6 . The students should notice that the largest factor in common is 6.

Abstract:

13. Ask the students to figure out a way to write the total number of groups of six students there are in the two classes. (e.g. $6(3+4)$)

1. Once students understand how to group in arrays, present another story problem and ask the student to represent their answer as an array.

The school choir has 21 girls and 15 boys. The choir teacher wants to arrange the students in equal rows. Only boys or girls will be in each row. What is the

**Formative
Assessment**

*How will I check for
understanding?
How will students*

show what they know?

greatest number of students that can be in each row?

2. Have students find and write down their solution.
3. Have the students write their answers using the abstract representation.
4. Present other scenarios as needed with different numbers until students are comfortable forming arrays.

Extending the Lesson

What are ways to reteach the objectives?

What are ways to enrich the lesson?

Optional