Classify with Venn Diagrams
ID: 11540

Time Required
45 minutes

Activity Overview
In this activity, students use Venn Diagrams to classify numbers. They will first classify multiples of 3, 5, and 6, deciding where to place the least common multiple. Then, students will use the integer division feature to help them classify factors of three different numbers.

Topic: Numbers and Operations
- *Understand numbers, ways of representing numbers, relationships among numbers, and number systems*
- *Use factors, multiples, prime factorization, and relatively prime numbers to solve problems*

Teacher Preparation and Notes
- *Before beginning the activity, students should clear all lists and turn off functions. To clear the lists, press ⎣2nd⎦ ⎣0⎦ and scroll down until the arrow is in front of **ClrAllLists**. Press ⎣ENTER⎦ twice. To clear any functions, press ⎣Y=⎦, then press ⎣CLEAR⎦ when the cursor is next to Y1 through Y4.*

- *TI-Navigator is not required for this activity, but an extension is given for those teachers that would like to use it.*

- ***To download the student worksheet and navigator files, go to education.ti.com/exchange and enter "11540" in the quick search box.***

Associated Materials
- *MGAct08_Venn_worksheet_TI73.doc*
- *MGAct08_Nav_01.act*
- *MGAct08_Nav_02.act*
- *MGAct08_Nav_03.act*
- *MGAct08_LrnChk.edc*

Suggested Related Activities
To download any activity listed, go to education.ti.com/exchange and enter the number in the quick search box.
- *Where Do I Belong? (TI-73 Explorer and TI-Navigator) — 6675*
- *Factors Galore: Common Factors (TI-73 Explorer) — 4223*
- *Oliver's Method (TI-73 Explorer) — 4474*
- *Finding the GCF (TI-73 Explorer) — 5212*
- *The Factor Game (TI-73 Explorer and TI-Navigator) — 6674*

**Problem 1 – Exploring Multiples**

Begin Problem 1 by having students discuss the meaning of the term *multiple.* Students can use several methods to work Exercises 1–6. Different options are shown below.

<u>Questions 1–6</u>

Students can use the home screen to find multiples of a number. To use simple addition, as shown on the right, press the initial number, ⬚6⬚, and press ENTER. Then press ⊞ ⬚6⬚ ENTER. Continue pressing ENTER until students have obtained enough multiples.

```
6              6
Ans+6         12
Ans+6         18
Ans+6         24
Ans+6         30
```
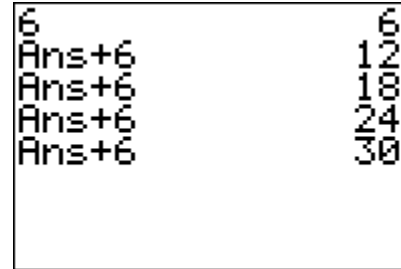
To use the CONST feature, first set the constant. Press 2nd CONST, then ⊞ ⬚6⬚, and 2nd MODE to return to the home screen. Next, clear the home screen and begin the calculation. Press CLEAR, then ⬚0⬚ CONST. Continue to press CONST to receive the next multiples.

```
0+6        n=1    6
6+6        n=2   12
12+6       n=3   18
18+6       n=4   24
24+6       n=5   30
```
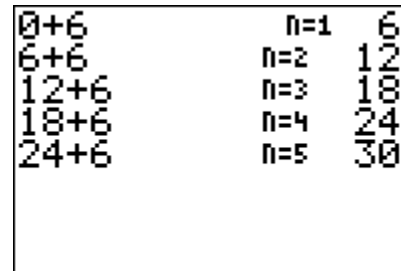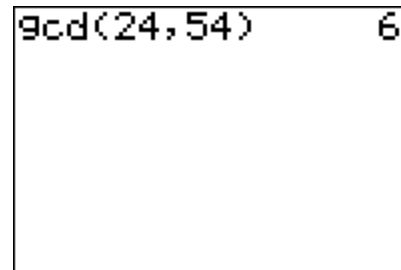
Problem 2 – Greatest Common Divisor

<u>Questions 7–8</u>

Students may initially struggle with the common meaning of *greatest common factor* (GCF) and *greatest common divisor* (GCD). Help them see that the number in question can be divided by the factor..

For Exercise 7, the key presses are MATH ▼ ENTER ⬚2⬚ ⬚4⬚ ⬚,⬚ ⬚5⬚ ⬚4⬚ ⬚)⬚ ENTER.

```
gcd(24,54)       6
```

<u>Question 9</u>

Students can again use multiple methods to find all the factors of the given numbers. Regular division is one method of finding factors. If the division renders a whole number quotient, the divisor is a factor of the dividend.

Students may also want to explore the [INT÷] feature. This will show the actual remainder from the division. Press ⬚8⬚ ⬚8⬚ 2nd ⬚÷⬚ ⬚6⬚ ENTER and ⬚8⬚ ⬚8⬚ 2nd ⬚÷⬚ ⬚8⬚ ENTER for the examples to the right.

```
88 Int/ 6    14r4
88 Int/ 8    11r0
```
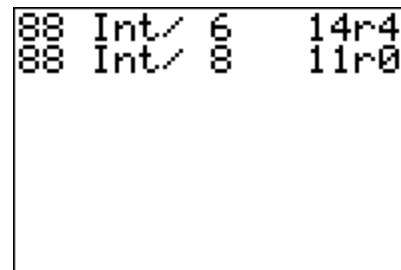
Question 11

If students have not already done so, they should use the **gcd(** command to check that they did in fact find the GCD (or GCF) of the given numbers. Press [MATH] [ENTER] [8] [8] [,] [4] [8] [)] [ENTER]. The other examples follow the same key presses.

```
gcd(88,48)            8
gcd(88,102)           2
gcd(48,102)           6
```
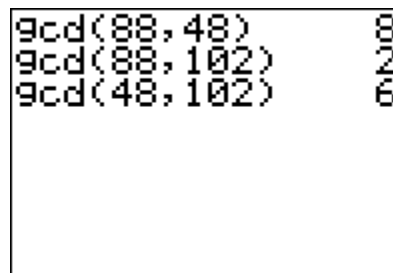
Extension – TI-Navigator™

1. As an introduction to using Venn diagrams, load the **MGAct08_Nav_01.act** activity settings file into Activity Center. This sets up the Activity Center so that the students will have a Venn diagram of three intersecting circles: consonants, vowels, and numbers. Students will have 0 points to submit, so they will be free floating in the Activity Center after you start the activity.
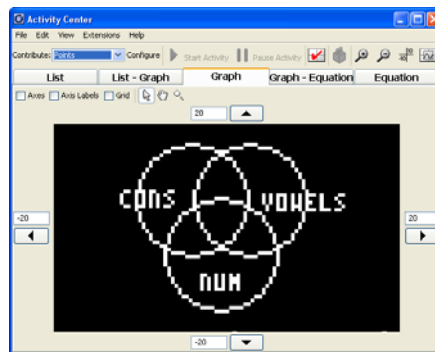
    Give students a word or name and tell them to move their cursor to the appropriate region. For instance, R2D2 would belong in the region where only consonants and numbers overlap. You may want to hide the Activity Center window while students are moving their cursors, pause the activity, and then reveal their locations. Be sure to pause the activity when you want to have a discussion, because moving cursors can be a distraction.

    Repeat with several words or names. Other examples to try are: CPR, MATH, 911, and C3PO.

2. Load the **MGAct08_Nav_02.act** activity settings file. Give students a number and have them move their cursor to the appropriate region. For instance, –4 would belong in integers, but not whole numbers.

    Use examples, including 0, $\frac{4}{2}$, and $\frac{2}{4}$, as appropriate for your students' ability level. If students move to the "Don't Know" circle, pause the activity, discuss the number, and resume the activity.
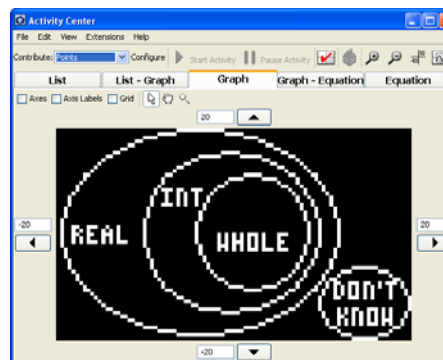
3. Load the **MGAct08_Nav_03.act** activity settings file. Have students locate, one at a time, the appropriate region for the first 10 natural numbers.

4. Use the included LearningCheck™ file, **MGAct08_LrnChk.edc**, to assess student learning.

Solutions to Student Worksheet

Problem 1
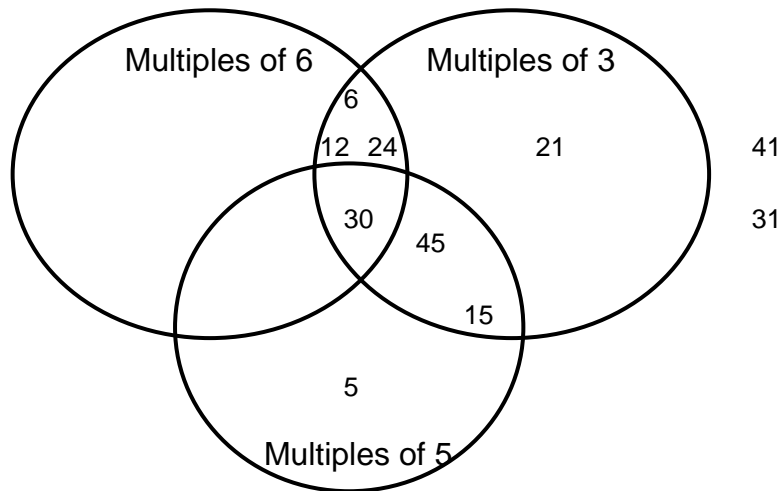
1.

2. 6, 12, 24, 30.

3. They each are obtained by multiplying either 3 or 6 by another number.

4. The LCM of 5 and 6 is placed in the overlap section of those 2 circles. Either including or not including 3. For 3 and 6, it will fall in the overlap of those 2 circles. For 3 and 5, the same.

5. Yes, 41 and 31 are outside the circle. These numbers cannot be obtained by multiplying 3, 6, or 5 by another number.

6. No. Any number that belongs in the 6 circle must also be in the 3 circle because 6 is a multiple of 3.

Problem 2

7. 6

8. 18

9.
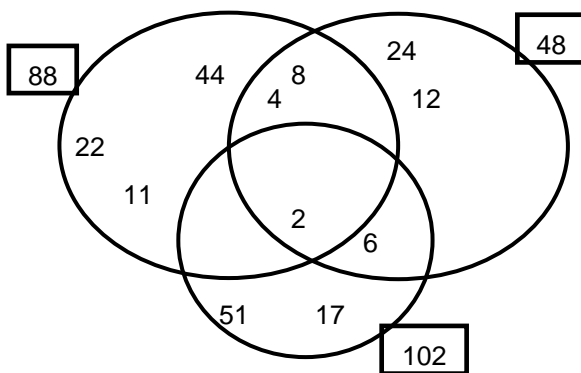
10. A number in the overlap of all 3 circles must be a factor of all 3 numbers.

11. 8 is the GCD of 88 and 48. It is in the overlap of their circles. 2 is the GCD of 88 and 102. It is in the overlap.

12. A GCD will not exist when no common factors exist. Examples include 33 and 14.