**Circumference and Pi**

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_

**Investigation**

1. Choose 4-6 different sized circular objects to measure.
2. Lay string around the circumference of the circles.
3. Measure the length of each string and record this in the table.
4. Measure the length of each diameter and record this in the table
5. Find a decimal approximation to the hundredths for the ratio of  for each circle.
6. Enter your data in the Circle Investigation Table. Don’t forget to include the units.
7. Find the average of your ratios.

Circle Investigation Table

(include units)

|  |  |  |  |
| --- | --- | --- | --- |
| Object | Diameter | Circumference | Ratio:  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Average of Ratios |  |

**Conclusions**

1. What do you notice about the Ratio of circumference to diameter for all the circles?

The Ratios are all \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Do you think this ratio will always be about the same number? Why or why not? Test our your prediction by measuring one more very small or large circle.

I predict the ratio will/ will not (circle one) be the same because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. The Ratio is an approximation for Pi (π). Define, in your own words, what Pi is.

Pi is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. If I know the diameter of a circle and the approximation for Pi (3.14), how can I figure out the circumference of a circle?

Write this as a formula where *C* represents Circumference, *d* represents Diameter, and π stands for Pi.

Formula 1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. If I know the radius of a circle and the approximation for Pi (3.14), how can I figure out the circumference of a circle? (Recall the relationship between radius and diameter.)

Write this as a formula where *C* represents Circumference, *r* represents Radius, and π stands for Pi.

Formula 2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. If I know the circumference of a circle and the approximation for Pi (3.14), how can I figure out the diameter of a circle?

7. How are circumference and perimeter related?

**Teacher Directions**

**Materials:**

String (approx. 5 feet)- for each group of 4

Rulers (1 per student)

Circular objects around the room to measure (trash can, plates, cups, etc)

Calculators

**Investigation**

Begin by having students show you with their hands-arms what circumference, diameter, and radius are.

Explain the task to the group and have them brainstorm some circular objects they can measure. Have someone from each group come get string, rulers and calculators and set the time for 15 minutes for each group to measure the circumference and diameter of 4-6 circular objects. When time is up, have each group calculate the average ratio.

Gather the average ratios from each group and record the number on the board (note that there will be variations depending upon measurement accuracy).

Use think-pair-share to have students answer question #1.

For question #2, you can either let each group test something new or you can do a class demo with a large circle (like an outdoor trashcan!).

Give students 10 minutes of silence to work on problems 3-7, followed by 5 minutes to discuss answers with their group. Then use numbered heads or random selection to have students share answers.

Make sure each student leaves with the formula written down and the ability to explain where it came from!