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Frog Olympics

Leaping amphibians! Find the mean, median, and mode—with the help of a frog or a toad—to select a winning Olympian.



COMAP

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Farewell & Thanks

This double issue marks the last mailing you will be receiving of *The Elementary Mathematician*. We have been proud to serve the elementary school teacher for the past eleven years with applications of mathematics that were relevant, interesting, and dynamic. When we first started publishing in 1986, applications of elementary school mathematics were in scarce supply and the National Science Foundation granted COMAP two years of funds to develop a newsletter to showcase applications materials for the K-6 student. Eleven years and 46 issues later, *The Elementary Mathematician* can boast of a reform movement in mathematics at the grade school level that has achieved credibility with parents, teachers and students alike. There is no shortage of contextual materials for student usage. As the saying goes, nothing succeeds like successors, and now there are many publications that meet the needs of the involved elementary mathematics teacher. Through the efforts of a concerned math community, we successfully worked ourselves out of a job.

Thanks to Contributing Editor Erica Voolich for all her work in getting manuscripts to me; kudos to Kathi Snook for all her Editorial Development efforts on our behalf, and heartfelt gratitude to the COMAP staff for the hours of design/art/planning/production/mailing work put into our newsletter. Special thanks go to all the teachers who wrote, edited, criticized, and prodded to make the newsletter a true classroom asset and not just another magazine.

Good luck in your teaching—we are glad to have been part of the revolution, and look forward to the challenges that lie ahead.



Laurie W. Aragón

The Frog Olympics

Welcome to the Frog Olympics,

adapted from a class project generously supplied to us by Grace Mingione, a teacher from Clifton Park, New York. During this project, you will be using your measuring and data collection and analysis skills to choose the best frog athletes to enter in the final competition.

The first thing to do is to form a Team with three or four classmates. Your team will work for several days, from now until the final "Awards" Ceremony. Now decide on a good team name like the "Fearless Frogs" or the "Leaping Legs." (We know you can think of even better ones.)



Good luck with all your leaps and jumps!

Total Time:

approximately
two weeks

Phase 1

**Making your
Frogs and Storage Box**

1-1.5 days

**Phase 2 Collecting
Trial Data**

1-1.5 days

**Phase 3 Finding and
Graphing the Mean,
Median, and Mode**

2-3 days

**Phase 4 Interpreting
the Data**

1 day

**Phase 5 Olympics
Registration, Games,
and Celebration**

3 days

Our Team Name: _____

Our Team Members: _____

Making Froggie Containers

Each team will need a safe place to keep their leaping Olympiads. Follow the directions shown to make a storage box that will hold the three frogs you will be making soon. Be sure to put your team name on your box so you will be able to find it easily.

Directions for Froggie Storage Boxes

Materials needed

- 2 squares of paper: one 8-inch square for the lid and one 7.75-inch square for the bottom
- a ruler
- pencil
- scissors
- glue stick

The directions for the lid and bottom are the same.

Follow all of the directions for one square, then complete the other square.

Step 1

Draw the diagonals on a square using the ruler and a pencil. (Figure 1.)

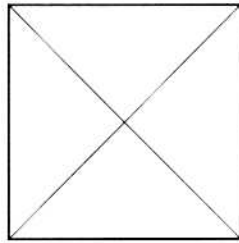


Figure 1.

Step 2

Fold one corner in to meet the intersection of the two diagonals. Crease well. (Figure 2.)

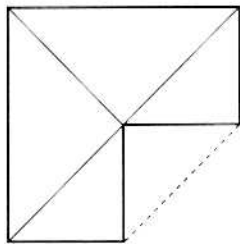


Figure 2.

Step 3

Open the square out flat again. (Figure 3.)

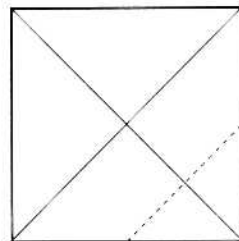


Figure 3.

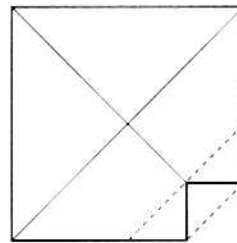


Figure 4.

Step 4

Fold the same corner in to meet the intersection formed by the first fold and the one diagonal guide line. (Figure 4.)

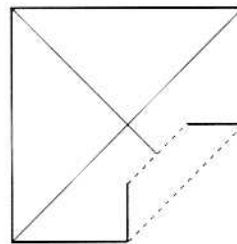


Figure 5.

Step 5

Keeping the paper folded from Step 4, fold over again at the first crease from Step 2. (Figure 5.)

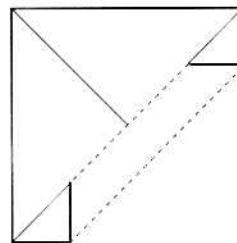


Figure 6.

Step 6

Fold over again one more time. Crease well. (Figure 6.)

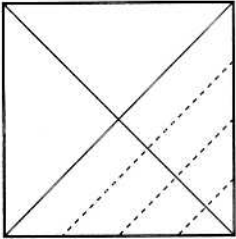


Figure 7.

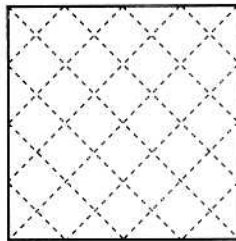


Figure 8.

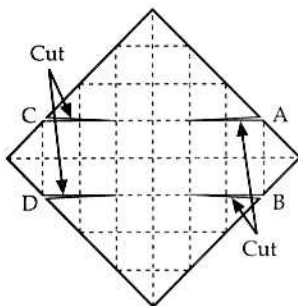


Figure 9.

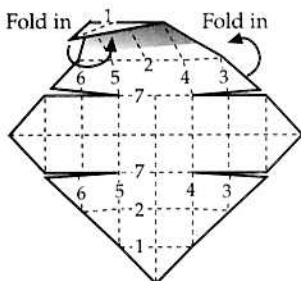


Figure 10.

crease 4 halfway so that the square is sticking up in the air. From the left, fold the small triangle in along crease 6, then fold crease 5 halfway so that the square is sticking up in the air. Now bring the squares that are sticking up in the air towards the center, folding in on crease 7, so that the box side remains upright. Follow the same folding directions with the other *uncut* corner. Your box will look like Figure 11.

Step 7

Open the square out flat again. All of the folds have been made from only one corner of the original square. (Figure 7.)

Step 8

Now you must repeat this activity with each of the other three corners of the square, creasing well each time. When this is done, open your square out flat again. (Figure 8.)

Step 9

You must make four cuts on your square before you can put this part of your box together. Place your square so one corner is toward you, forming a diamond. See Figure 9. At point A, cut along the crease for the length of two squares. Do the same at points B, C, and D, making a total of four cuts.

Step 10

Now you will create the sides of your box. See Figure 10. Begin with an *uncut* corner. Fold inward along crease 1, and then continue to fold inward along crease 2. From the right, fold the small triangle in along crease 3, then fold

Step 11

Now look at the *cut* corners of the original square. See Figures 11 and 12. Starting from the far right, take the triangle and fold it in on crease 1. Holding onto that crease, fold it towards the center so that crease 2 wraps over the side of the box, making the folded triangle hug tightly to the inside of the box. Add a touch of glue to secure it. Repeat this process with the other side. (You may want to have a team member help with the finishing step.)

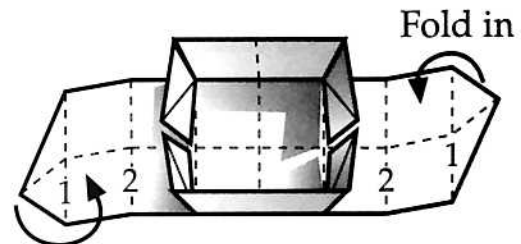


Figure 11.

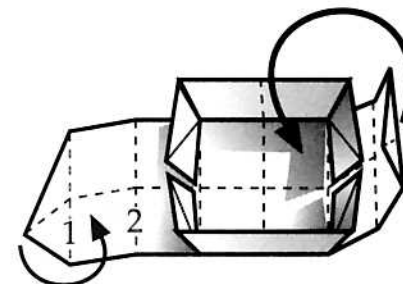
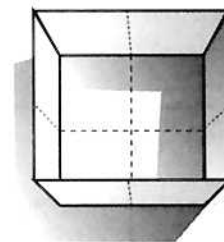
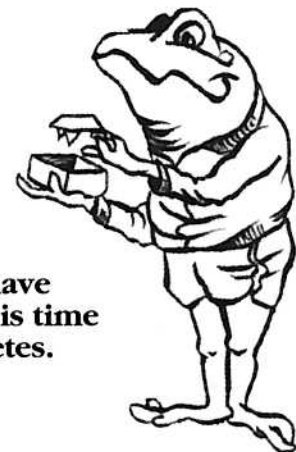


Figure 12.



Great! Now that you have your froggie home, it is time to make the frog athletes.



Creating Your Amphibian Athletes

Each team will make three frogs. You may want to color and decorate them. Just be gentle because your frogs have to be in good shape to do a lot of jumping!

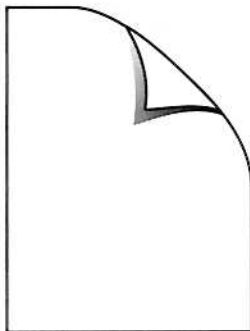
Materials needed

- 3 rectangular pieces of paper (5½ inches x 8½ inches) You may want to experiment using paper of different thicknesses to decide which kind of paper makes the best jumpers!

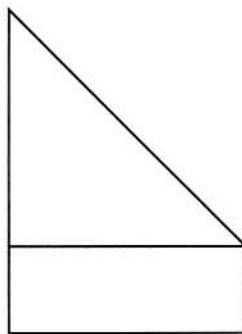
Directions for Folding the Frogs

1. Use one rectangular piece of paper for each frog.
2. Follow the visual directions to fold the paper and form a frog.
3. When each frog is complete, choose a name for the frog and write it on the underside along with the name of your team.
4. Place all three frogs in your storage box.

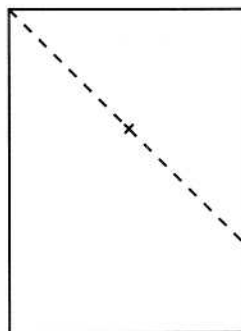
1.



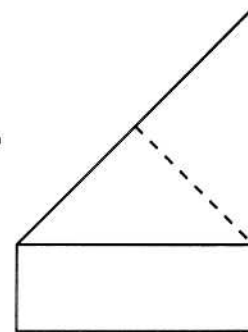
2.



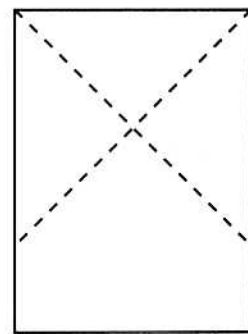
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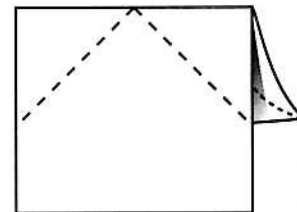
4.

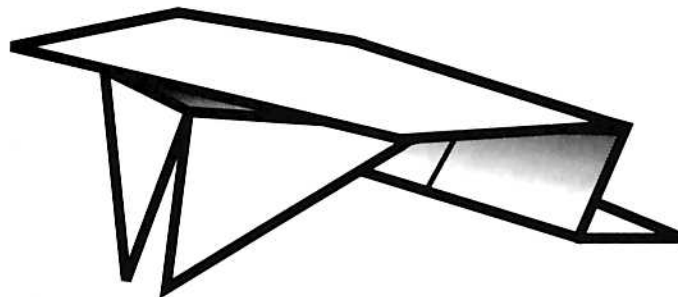
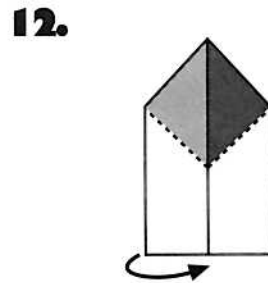
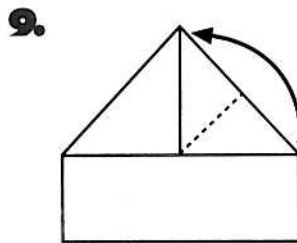
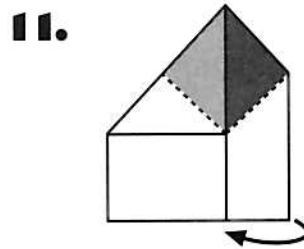
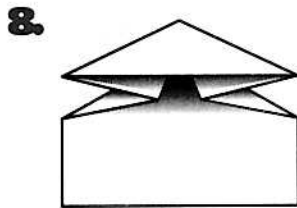
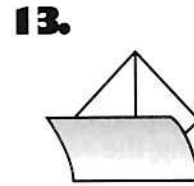
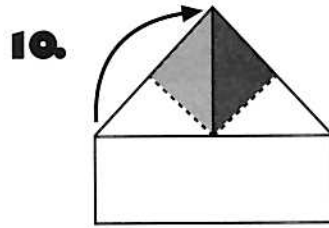
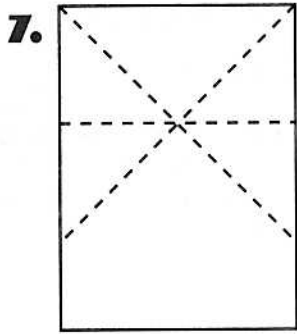


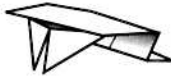
5.



6.





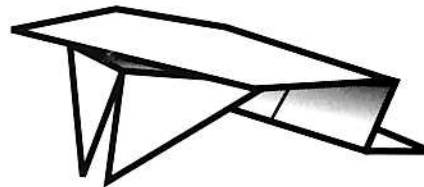


Data Recording Chart #2

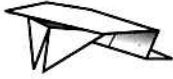
Statistics for Frog: _____

Jump	Distance (cm)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
Total	

Intervals (cm)	Tally	Frequency
0 – 9		
10 – 19		
20 – 29		
30 – 39		
40 – 49		
50 – 59		
60 – 69		
70 – 79		
80 – 89		
90 – 99		



ADAP

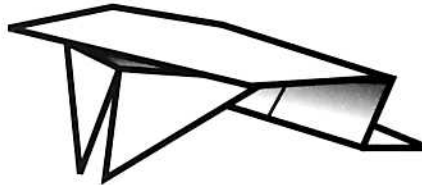


Data Recording Chart #3

Statistics for Frog: _____

Jump	Distance (cm)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
Total	

Intervals (cm)	Tally	Frequency
0 – 9		
10 – 19		
20 – 29		
30 – 39		
40 – 49		
50 – 59		
60 – 69		
70 – 79		
80 – 89		
90 – 99		



Figuring It All Out: Finding the Mean, Median, Toad (whoops) Mode

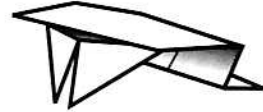
You now have all the data you will use to select your team's frog Olympic entrant! But first you must find the measures of central tendency by calculating the mean and median and indicating the mode based on the data for each frog. You will do your calculations on the next three pages. You will also be making a visual representation of the data on graph paper.

Be sure to put your team name at the top of each page and to record each frog's name and number with its calculations.





Calculating the Mode



The **mode** is the number that appears most often in a list of data. Look at the data and find the centimeter measurement that occurs most often for each frog. Record it here along with the number of times it occurs.

<p>FROG 1</p> <p>Name : _____</p>	<p>FROG 2</p> <p>Name : _____</p>	<p>FROG 3</p> <p>Name : _____</p>
<p>Mode _____</p> <p>occurs _____ times</p>	<p>Mode _____</p> <p>occurs _____ times</p>	<p>Mode _____</p> <p>occurs _____ times</p>

On a piece of graph paper, construct a frequency histogram to show a visual representation of this data. Staple the finished histogram to this page.
Place this in your team pocket folder.

Interpreting Your Froggie Data

Your team can enter only one of your amphibian leapers in the actual Olympics. You and your team must interpret the data you have gathered and recorded during the trials to select the best of your team's three frog athletes to compete. To do this, fill in the information below, and add it to your team pocket folder.

Frog Data Summary and Comparisons

	FROG 1	FROG 2	FROG 3
Mean			
Median			
Mode			

Based on the above information, answer the following questions:

1. Which frog has the highest mean? _____
2. Which frog has the best median? _____
3. Which frog had the highest interval for its mode? _____
4. Which frog will you enter in the Olympics? _____
5. What data most influenced your frog selection? Explain why.

Frog Olympic Registration

Materials needed

- Team pocket folder with all completed data and calculations
- Frog Olympics Entry Form
- Frog and storage box

You and the other competing teams will need to have your teacher or older students (with their teacher's permission, of course) act as Olympic Officials during registration and the Olympic Games.

To officially register to compete on the day before the Olympics:

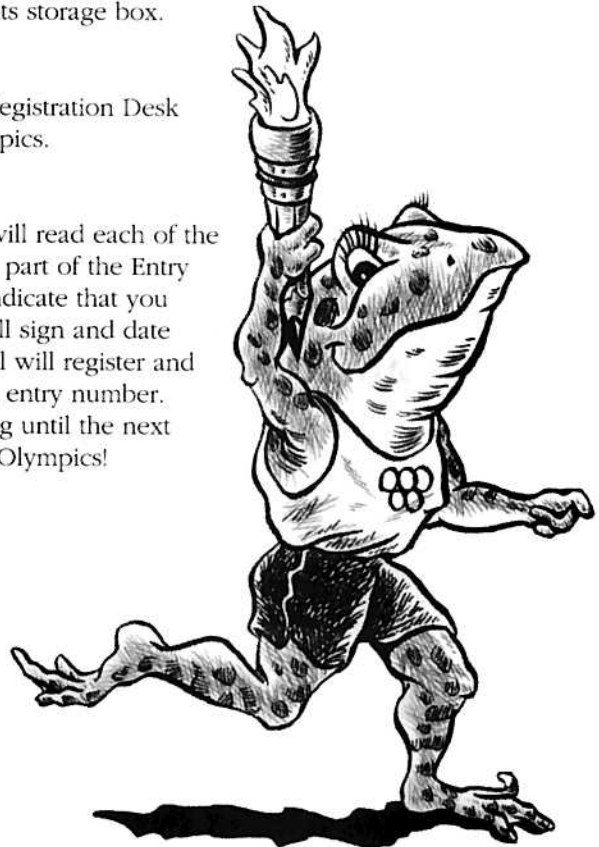
1•Organize your team folder with all of your completed data and calculations.

2•Fill in the top portion only of the Frog Olympics Entry Form with your team name, your name, and your frog's name. Put this form on the outside of your team folder.

3•Put your team frog entry into its storage box.

4•Bring all of the above to the Registration Desk to be checked in for the Olympics.

5•At the Registration Desk you will read each of the four statements on the bottom part of the Entry Form and check them off to indicate that you agree with them. Then you will sign and date the entry form, and the Official will register and stamp your frog and give it an entry number. The Official will keep your frog until the next day—the day of the real Frog Olympics!



**Frog Olympics
Entry Form****Team Name** _____**Student Name** _____**Frog Name** _____ I agree to stay with my team and move with my team to the next event. I agree to stay in the assigned order on my team. This is based on my frog's entry number. I agree not to touch any frog other than my own. I agree not to interfere with the Frog Olympic Officials, nor argue with their decisions. I understand that if I fail to cooperate with all of the above, my frog will be disqualified.

Signature _____

Date _____

