Bridge Project

Names 1. _____
2. _____
3. _____

Responsibility Matrix

- The matrix below is the tool your team will use to divide the points for the responsibilities for the tasks shown below.
- Each team members' column must add up to exactly 180 points for the research phase, and 195 points for the design/building phase.
- Make sure the students labeled "1", "2" and "3" above match the similarly labeled columns below.
- The work may be divided between members as the members agree.
- Point allocations may be changed ***with the approval of your instructor***.
- Indicate who will lead in each task with a yellow highlighter.

Task	Due	Value	#1	#2	#3			
Research Phase:								
Submit Responsibility Matrix		12						
Submit research proposal *		18						
Meet with outside expert by*		36						
Assemble test apparatus and pieces		48						
Poster presentation of results *		45						
Report results to class, (pwpt, etc) *		66						
problem sheet and truss calculation		24						
		225						
Design/ Building Phase: Students may regroup for this phase: no more that 2 students per group,								
Points for working in a group of 1		20						
Complete resp. matrix for design/ building phase		15						
Submit preliminary sketch		18						
Build bridge		90						
Bonus for helping test **		??						
Submit 2 page summary report		60						
Feedback points from Research		30						
Total		213						

* See instruction sheet for more details.

** Testing will be in the Tech Lab after school on _____

Responsibility Matrix Details

Summary of review of past research – each group will examine the research results from past years and answer the questions on the handout provided in class.

Outside Expert – Meet with one outside expert (this means anyone besides Mr. Dilsaver) to get specific ideas for your research. Also, you are encouraged to get general bridge building ideas from them. Interview the expert and submit the brief report.

Assemble test apparatus and test pieces. – Your group will be testing some aspect of bridge construction. Perhaps you are gluing together a certain type of joint, and then pulling it apart, and measuring the force needed. You'll need to figure out a way to hold these pieces, and pull them apart.

Report Results to Class. using Powerpoint, overheads, or some other method, report your results to class. Note that at the end of this project, after bridge testing, your classmates will give feedback on which research was useful. Take the following criteria into consideration:

- You must have a sufficient number of trials.
- Clearly present your data. A graphical presentation is suggested.
- Use Error Bars on data points
- Provide a quick, but clear explanation of your techniques. Digital photos.
- Clearly discuss any difficulties and sources of error.

Poster Presentation of Results – When you present your results to our Physics class using powerpoint, you've shared your research results with us, and the poster presentation is to let you share your results with other classes, teachers, etc. Also, the testing of the various bridge designs will give some feedback. The same criteria apply here as in the previous section. Clarity is vital. Use 1 or 2 standard sized pieces of poster paper, and glue and tape up your poster presentation.

Problem sheet and Truss calculation- this is a handout concerning ways to mathematically calculate the force on each member of a truss.

Submit preliminary sketch – this sketch may be a detailed drawing, but does not have to be detailed. You must include with the drawing a list of not less than 5 ways your design takes research into account (this includes ideas you've decided NOT to use base on research results.) The preliminary sketch is not due until _____. If you wish to begin building earlier, you may do provided: you have the preliminary sketch turned in, and you have done ALL: the items on the responsibility matrix down to that point.

Bonus for helping test – Students may earn bonus points by assisting during bridge test. There are only a limited number of jobs available. You must be able to be present on the afternoon of _____, for the duration of bridge testing. This is offered on a first come first served, space available basis.

2 page summary report – The idea here is that scientists, engineers, and many other professionals report their research results to their peers. This summary report will show your bridge design, failure mode, and efficiency results to future classes. See the handout.

A day in the LRC. Bridge research. Name_____

List several (at least 3) non internet resources you consulted, and briefly tell what information was present.

1.

2

3.

List several (at least 3) internet resources you consulted. Briefly tell what you found there.

1.

2.

3.

What are the several best ideas you found:

1.

2.

3.

Outside Expert Report Form

Who did you interview? _____

What makes them an expert?

List the results of your interview. What suggestions for research did you receive?

1.

2.

3.

What general hints or tips for bridge building did they have?

1.

2.

3.

4.

Give the start and stop times for the interview. Start time _____. Stop time _____.
Note, you are **STRONGLY** encouraged to keep these interviews **BRIEF**.

Summary of research results from past years:

List 4 ideas for construction from past years that your group thinks are useful or productive

List 3 ideas from research that your group has judged are not productive, or are ideas you want to avoid.

Where is the internation bridge building and testing competition held in 2008?

List four Ozark HS students who have competed in the international bridge building competition.

Name the bridge in Minnesota which collapsed (an interstate highway bridge) within the past 18 months. Bonus if you can find video online of the collapse.

List of Possible Research Areas

This list is not exhaustive, others areas may be proposed and approved.

Glue Type – this area has plenty of room for 2 different groups to do research. Each group could test a different type of joint.

Strength of various types of joints. For example, lap joints, and butt joints. This also is a large enough topic for more than one group.

Gussets. The use of gussets at corners could be investigated.

Lamination. The use of lamination and its effect on strength can be investigated. This would include measureing the tensile strength of the 3/32" wood we are using. Also, what tools and techniques work best for laminating the supplied material.

Buckling – What is buckling and how can its effects be lessened.

Truss shapes and angles. Varous shapes of trusses can be tested. Students can use plexiglass plates to hold the trusses in position for testing. [This may be a challenging research area to attempt].

++

Criteris for Research Proposal:

- **No two groups may research exactly the same topic. It is first come first served.**
- **A group must perform a sufficient number of trials.**
- **The number of experimental variables must be minimized. If a group tests a lap joint with hot glue, a butt joint with white glue, and a 2" lamination with CA glue, both the joint type and the glue type are being varied, and it's not clear which is responsible for a change in performance.**
- **clearly state how you'll present your results (data) to class. Graphical representation is encouraged – powerpoint.**
- **Data points must be plotted using error bars.**

Summary Sheet Instructions:

The idea here is; scientists, engineers, and many other professionals report their research results back to their peers. This is so others can learn from, and also check, their results. Learning is a collaborative and cooperative (also somewhat competitive) process.

This report might be 1 or 2 pages long, and here are some items you might wish to include. The exact organization doesn't have to be exactly like this. You may include more topics. Few if any of the ones shown should be omitted, however.

- Students are invited to add additional sections concerning other important results they'd like to report
- Try to assemble this as a word processor file and turn in an original color printout. If necessary you may literally tape it together and turn in a clear photocopy.

Bridge Summary Sheet Page 1

Bridge photo before the destructive testing.

Names of the students in the group.

Group photo of the group members, perhaps during the construction or testing phase

Bridge facts

- mass
- length
- height
- failure load
- efficiency ratio
- place/ prizes
- Analysis of failure mode (extremely important) – try to see which part of your bridge failed first. Weak and strong pts.

Summary of the strong and weak points of your design, and what you'd do differently before the next design iteration.

Bridge summary Sheet Page 2

Several digital photos of the construction phases

Include meaningful captions for all photos.

Discussion of construction techniques that worked well (or not).

Best Hints and Tips for future bridge builders

- 1
- 2
- 3
- 4

MISSOURI SOCIETY OF PROFESSIONAL ENGINEERS
OZARK CHAPTER
MODEL BRIDGE CONTEST

LIST OF COMMONLY MADE MISTAKES

1. Please ensure that you are using the current set of rules, dated 11/13/2007, as the rules are updated and modified for each year. Additionally, to aid in the processing of the bridges at the contest, please use only the current entry form, also dated 11/13/2007. One Entry Form and one set of rules were included for each bridge kit ordered.

2. The maximum mass of the structure is 25.0 grams (0.88 oz) and the minimum mass is 5.0 grams (0.18 oz). Not all scales will weigh exactly the same. The digital scales present at the competition will be the final judgment. Please note that the kits contain more than 25.0 grams (0.88 oz) worth of material. If the mass of the structure exceeds 25.0 grams (0.88 oz) or is less than 5.0 grams (0.18 oz), it will be disqualified. Bridge mass has historically been one of the leading causes for disqualification.

3. The dimensions of the structure must fall between the minimum and maximum as stated in the rules. Deviation from these will result in disqualification. Designing to either the minimum or maximum leaves no room for error or construction tolerance. Historically, another of the leading reasons for disqualification has been dimensions not meeting the specifications:

    - Length of the bridge not between 13.0 inches (331 mm) and 14.0 inches (355 mm) (See Rule 2.C).
    - Height of the bridge greater than the 4.0 inch (101 mm) maximum (See Rule 2.C).
    - Width of the bridge not between 2.0 inches (51 mm) and 3.0 inches (76 mm). (See Rule 2.C).

4. The load will be applied to the structure via a wooden loading block that is approximately 1.75 in x 1.75 in x 0.75 in (45 mm X 45 mm X 20 mm) and a 5/16 inch (8 mm) diameter loading rod (see sheets 3 and 4 of the rules). The loading area of the bridge must be such that this loading block can be placed at mid span and the loading area must have an opening for the loading rod. Otherwise, the structure can not be properly tested. The loading block will be placed square with the bridge. If it becomes necessary to rotate the block from square (e.g. turn 45° to the bridge) in order to load it as intended, the bridge will be disqualified.

5. The rules call for the bridge to have a "loading area". The bridge does not, however, have to have a roadway surface from end to end. It must have a location at mid-span of the bridge designed for the 1.75 in x 1.75 in x 0.75 in (45mm x 45mm x 20mm) loading block to rest on for testing as well as a place for a 5/16 in (8 mm) diameter rod to pass through. Many students bring bridges that have a full deck. Although this looks very nice, it greatly increases the bridge weight and reduces the structural efficiency significantly. All that is required is a place to test the bridge with the testing block in the center.

6. Please be certain that all joints are adequately secured. During transportation and the extra handling required to test the bridges, inadequately secured joints have been known to fail prior to testing.

7. Only the materials provided may be used with the exception that any commonly available adhesive may be used.

8. The bridge may not be stained, painted, or coated in any fashion with any foreign substance. All materials must be identifiable as the official basswood.

MISSOURI SOCIETY OF PROFESSIONAL ENGINEERS
OZARK CHAPTER
MODEL BRIDGE CONTEST RULES

1. MATERIALS

A. The bridge must be constructed only from official basswood provided to the contestant.

B. Contestants may use any commonly available adhesive.

C. The official basswood may be notched, cut, sanded, or laminated in any manner but must still be identifiable as the original official basswood.

D. The bridge may not be stained, painted, or coated in any fashion with any foreign substance.

E. No other materials may be used.

2. CONSTRUCTION

A. The maximum bridge mass is 25.0 grams (0.88 oz).

B. The minimum bridge mass is 5.0 grams (0.18 oz).

C. The bridge dimensions (see Figures 1 & 2) must be within the following limits:

		Minimum	Maximum
1.	Bridge length	13.0 inches (331 mm)	14.0 inches (355 mm)
2.	Bridge width	2.0 inches (51 mm)	3.0 inches (76 mm)
3.	Bridge height	N/A	4.0 inches (101 mm)

D. No outriggers will be allowed. Outriggers are any non-structural member added to a bridge mainly to satisfy dimensional constraints.

E. The bridge must be constructed to accommodate the loading block. Clearance must be provided to place the block and for the loading rod to hang vertically through the bridge below the loading point. This "loading area" need not be continuous across the bridge as its purpose is to act as a location to place the loading block when testing the bridge. If the "loading area" has a solid surface, it must have sufficient openings to allow the test apparatus to be installed properly (i.e. the loading block must be able to be placed on the "loading area" at mid span and the "loading area" must contain an opening large enough for the 5/16 inch (8 mm) diameter loading rod to pass through.) The edges of the loading block will be parallel to the longitudinal axis of the bridge at the time of load application.

F. No portion of the bridge shall extend below the support surfaces.

G. The bridge must be symmetrical with respect to its vertical geometric center line.

3. LOADING

A. The load will be applied as near to the mid-span of the bridge as practical.

B. The load will be applied downward from below by means of a wooden loading block resting on the loading area. The loading block will be approximately 1.75 in x 1.75 in x 0.75 in (45 mm x 45 mm x 20 mm) and will be placed square to the centerline of the roadway at mid-span of the centerline of the bridge. The load will be applied to the loading block by a 5/16 inch (8 mm) diameter loading rod which will extend downward from the loading block through the bottom of the bridge. There must be a 5/16 inch (8 mm) hole through the center of the bridge for this loading rod.

MISSOURI SOCIETY OF PROFESSIONAL ENGINEERS
OZARK CHAPTER
MODEL BRIDGE CONTEST RULES

4. **TESTING**

A. The bridge will be centered on the support surfaces.

B. A bucket will be attached to the rod and the load will be applied by the judges adding lead shot to the bucket until failure occurs.

C. Bridge failure is defined as the inability of the bridge to carry additional load, including joint failure, and will be decided by the judges. If a bridge deflects under load to the extent that it hits the lower support of the test frame then the bridge will be considered to have failed. This is a deflection of approximately 1.75 inches (45 mm). Also, if the deflection of the bridge causes it to slip off of the testing supports, it shall be considered a bridge failure.

D. The bridge structural efficiency (E) will determine the winners:

$$E = \frac{\text{Maximum Load Supported (grams)}}{\text{Mass of Bridge (grams)}}$$

The bridges with the highest structural efficiencies will be the winners.

5. **QUALIFICATION**

A. All construction requirements and dimensions will be checked prior to testing by the judges. Bridges that fail to meet these specifications will be disqualified. All decisions of the judges are final. Disqualified bridges may be tested if time permits; however, the results will not be entered into the calculation of efficiency average for the school or class.

B. If, during testing, a condition becomes apparent (e.g., use of ineligible materials, inability to support or place the loading block, etc.) which is a violation of the rules or prevents testing as described above, that bridge will be disqualified.

C. Only one bridge per contestant will be tested.

D. Contestants will not be allowed to test their own bridge.

6. **SAFETY**

We ask all students and observers to stand clear while their bridge is being tested.

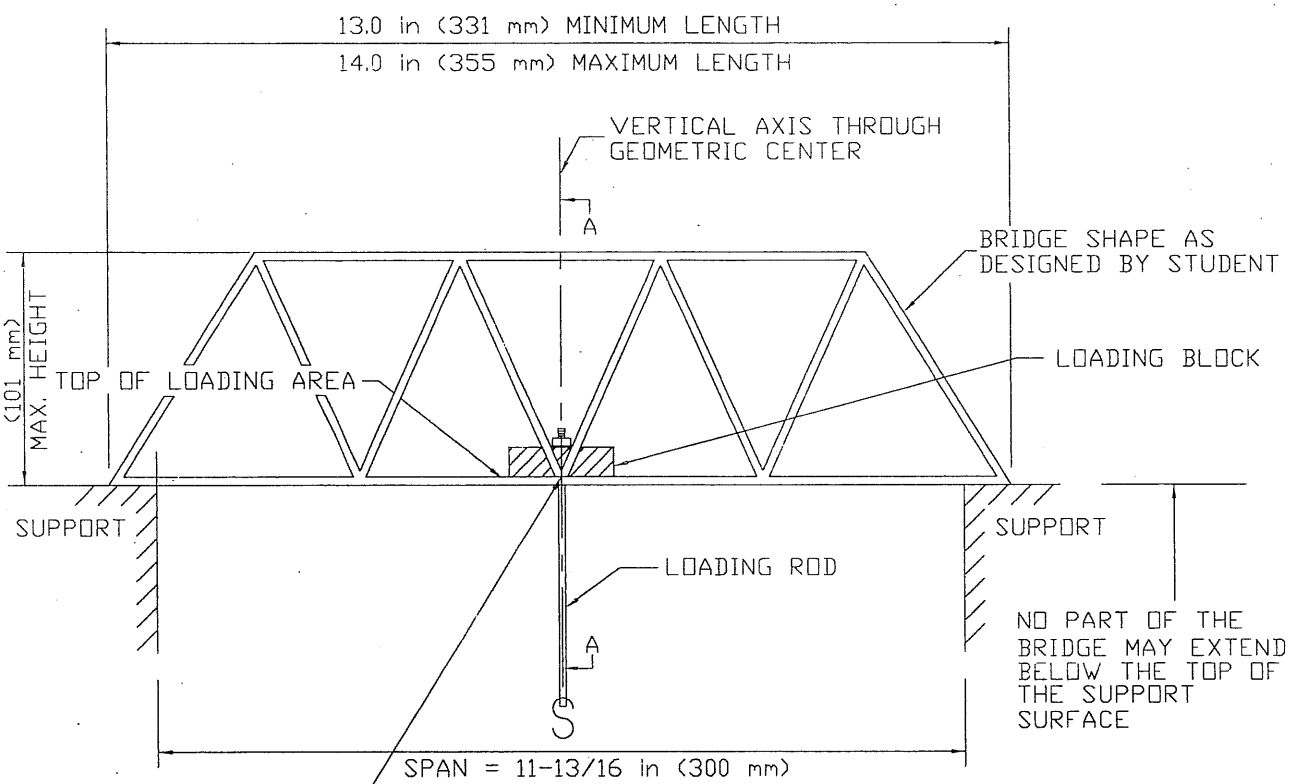
7. **ENTRY FEE**

A $5.00 entry fee will be charged for each bridge kit ordered to cover the cost of materials and prizes. Each kit will contain 18 - 3/32" x 3/32" x 2'-0" long sticks of basswood.

8. **PHOTO RELEASE**

By entering a bridge into the contest, you are granting full permission to any model bridge contest organizer, competition staff, promoter, volunteer, sponsor or agent authorized by said persons and entities, to use photographs, video tapes, or any other records of model bridge contest competitions, including your name, likeness, or voice for any legitimate purpose without compensation or remuneration to yourself, your heirs, executors, administrators, or assigns.

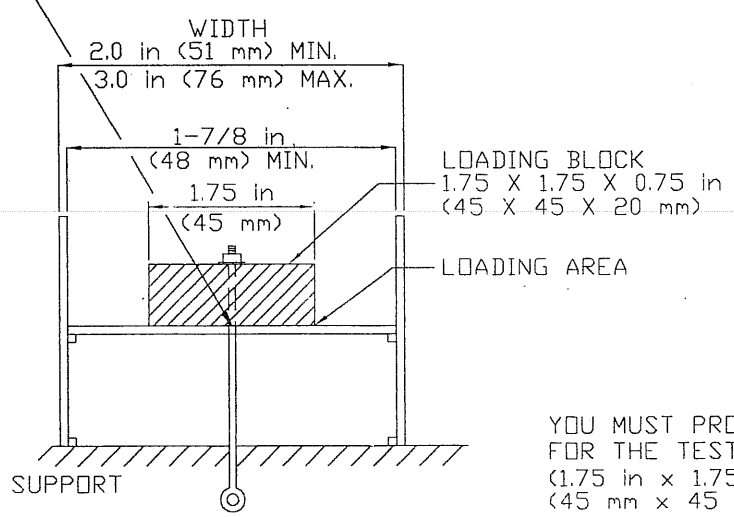
THROUGH TRUSS TYPE BRIDGE



ELEVATION

NO SCALE

LOADING AREA MUST HAVE OPENING FOR 5/16 in (8 mm) DIAMETER LOADING ROD

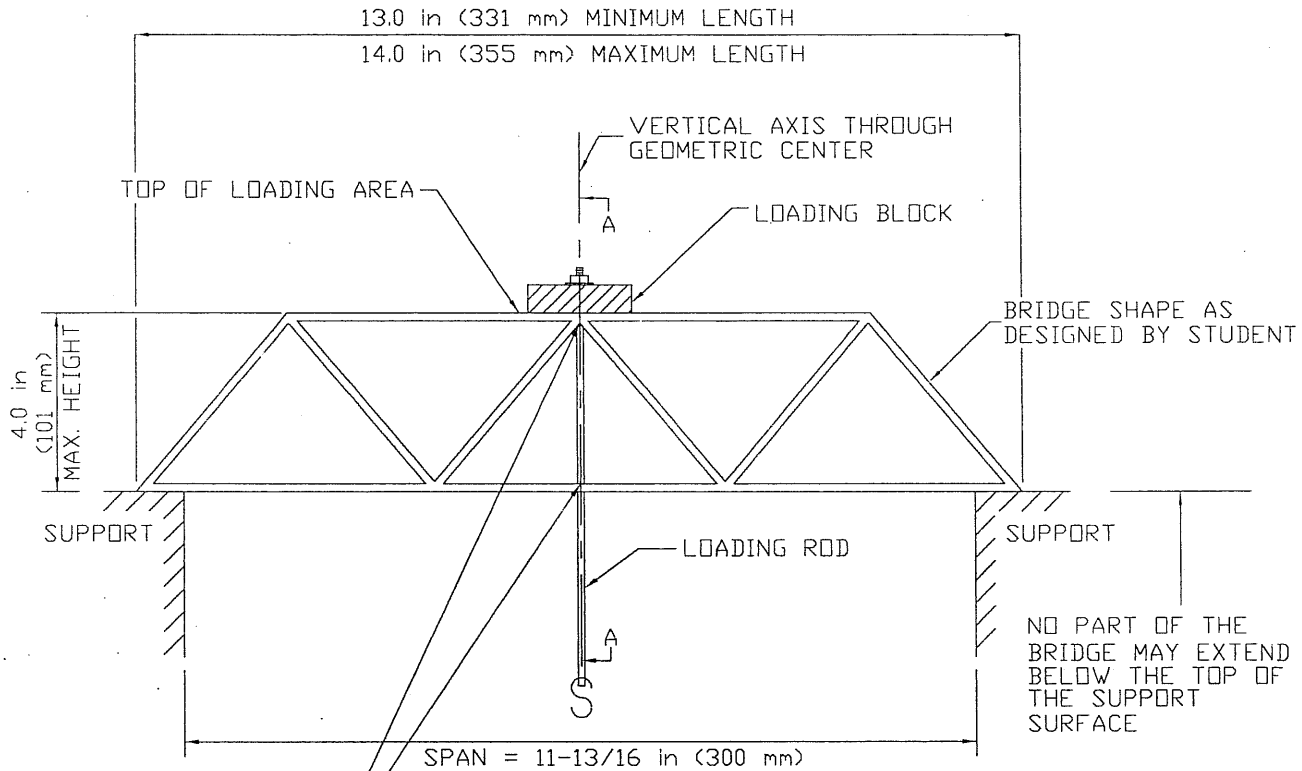


YOU MUST PROVIDE CLEARANCE FOR THE TEST BLOCK
(1.75 in x 1.75 in x 0.75 in)
(45 mm x 45 mm x 20 mm)

SECTION AA

NO SCALE

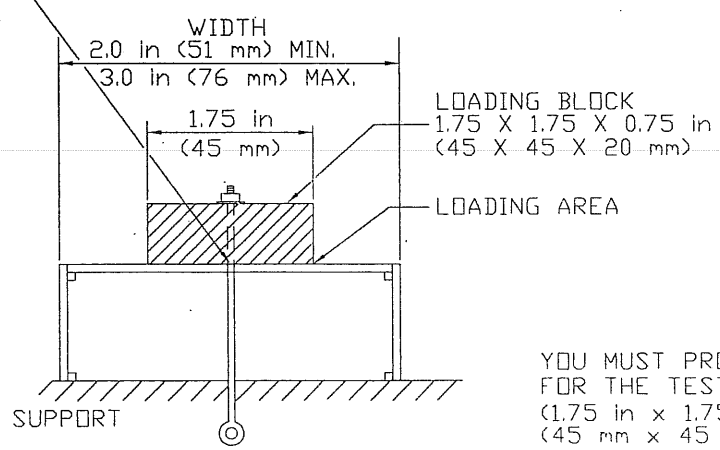
BEAM OR BOX TRUSS TYPE BRIDGE



ELEVATION

NO SCALE

LOADING AREA MUST HAVE OPENING FOR 5/16 in (8 mm) DIAMETER LOADING ROD



YOU MUST PROVIDE CLEARANCE FOR THE TEST BLOCK
(1.75 in x 1.75 in x 0.75 in)
(45 mm x 45 mm x 20 mm)

SECTION AA

NO SCALE

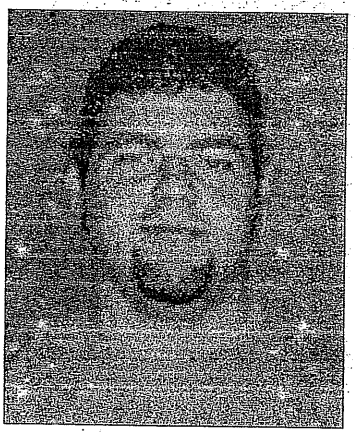
Harrison triumphs in regional bridge contest

David Harrison, a senior at Ozark High School, finished first at the Missouri Society of Professional Engineers' Regional Bridge Contest April 4 at Southwest Missouri State University.

The contest was held in conjunction with the Ozarks Regional Science and Engineering Fair. Harrison competed in a field of 219 students from approximately 16 area high schools.

Harrison's winning bridge had a mass of 17.25 grams and supported a load of 75.2 pounds, for an efficiency ratio of 1977.4. The efficiency ratio tells how many times its own weight the bridge can support before breaking. The contest is won by the student who can build the most efficient bridge. The goal of the contest is to promote interest in science and engineering and to provide an example of how mathematics can be used in real world applications.

A total of 15 Ozark students competed in the contest



HARRISON

including seniors Kyle Ganz, who finished in fourth place, Matt Garrison finishing in seventh, Matt McPheeters in eighth and Dylan Gideon in tenth.

As contest winner, Harrison is qualified to advance and compete in the International Bridge Building Contest held at the Illinois Institute of Technology on April 26. Information about the contest can be accessed online at http://www.iit.edu/~hsbridge/database/search.cgi/:/public/index.

Christian County HEADLINER NEWS

2003 MSPE MODEL BRIDGE CONTEST RESULTS
SUMMARY

Disqualified Bridges are not included in this summary.
To receive the classroom efficiency award, the "class" must consist of 5 or more.

SUMMARY BY TEACHER

	Average Bridge Weight	Average Failure Load	Average Efficiency
Blake	11.41	10.9	418.71
Brewer	14.06	21.6	696.84
Brown	12.36	7.3	235.58
Dilsaver	19.45	52.7	1225.49
Engel	12.98	9.3	337.12
Enos	16.16	18.7	476.64
Gilmore	12.88	4.6	153.24
Hoodenpyle	15.32	10.5	313.18
Keith	21.80	7.5	186.26
Lewis	16.46	26.0	724.04
Mikulin	24.30	66.0	1231.98
Murphy	24.73	27.0	495.23
Peirce	21.72	17.4	354.88
Probert	20.14	11.0	254.36
Sly	24.69	54.0	992.06
Snodgrass	16.95	39.0	1043.66
Stafford	16.09	25.8	688.57
Swain	22.51	12.1	238.27
Tempelmeyer	16.51	39.8	1072.19
Thompson	18.90	8.0	201.16

SUMMARY BY SCHOOL

	Average Bridge Weight	Average Failure Load	Average Efficiency
Ash Grove	21.80	7.5	186.26
Bolivar	18.90	8.0	201.16
Catholic	16.16	18.7	476.64
Central	15.32	10.5	313.18
Gainsville	21.72	17.4	354.88
Greenwood	14.06	21.6	696.84
Hillcrest	18.79	22.6	448.44
Homeschool	16.95	39.0	1043.66
Kickapoo	16.38	35.3	948.26
Mansfield	20.14	11.0	254.36
Niangua	22.51	12.1	238.27
Ozark	19.77	53.6	1225.93
Parkview	12.69	9.3	334.46
Reeds Spring	16.46	26.0	724.04
R-12 Schools	15.35	25.5	706.32

2003 MSPE MODEL BRIDGE CONTEST
RESULTS BY RANK

STUDENT NAME		TEACHER	SCHOOL	BRIDGE (grams)	FAILURE (lbs.)	EFFICIENCY	RANK	NOTES
David	Harrison	Dilsaver	Ozark High School	17.25	75.2	1977.40	1	
Sam	Kim	Tempelmeyer	Kickapoo High School	16.50	70.2	1929.83	2	
Lauren	Gillogly	Tempelmeyer	Kickapoo High School	14.12	56.8	1824.65	3	
Kyle	Ganz	Dilsaver	Ozark High School	17.97	72.0	1817.40	4	
Anne	Kim	Stafford	Kickapoo High School	16.02	64.0	1812.10	5	
Drew	DeJarnette	Tempelmeyer	Kickapoo High School	15.9	62.6	1785.84	6	
Matt	Garrison	Dilsaver	Ozark High School	16.78	65.0	1757.06	7	
Matt	McPheeters	Dilsaver	Ozark High School	15.91	61.2	1744.81	8	
Matthew	Blevins	Tempelmeyer	Kickapoo High School	17.74	67.2	1718.23	9	
Dylan	Gideon	Dilsaver	Ozark High School	18.59	69.6	1698.23	10	With Eric Turner
Michelle	Anderson	Tempelmeyer	Kickapoo High School	15.23	55.8	1661.88	11	
Tyler	Parman	Tempelmeyer	Kickapoo High School	20.72	73.4	1606.84	12	
Patrick	Waggoner	Tempelmeyer	Kickapoo High School	14.86	52.2	1593.37	13	
Aadhar	Garg	Tempelmeyer	Kickapoo High School	19.48	65.2	1518.18	14	
Denver	White	Tempelmeyer	Kickapoo High School	16.99	56.8	1516.42	15	
Drew	Allmeyer	Dilsaver	Ozark High School	23.03	75.0	1477.18	16	
Wes	Buchholz	Tempelmeyer	Kickapoo High School	23.69	73.4	1405.39	17	
Angela	Schulte	Tempelmeyer	Kickapoo High School	14.70	44.6	1376.21	18	
Sarah	Bloom	Tempelmeyer	Kickapoo High School	16.46	48.6	1339.28	19	
Kevin	Off	Stafford	Kickapoo High School	23.82	68.8	1310.12	20	
Eric	Siepker	Dilsaver	Ozark High School	23.92	68.4	1297.06	21	
Jesica	Dial	Tempelmeyer	Kickapoo High School	21.09	60.2	1294.75	22	
Nate	Repuyan	Tempelmeyer	Kickapoo High School	12.12	33.8	1264.97	23	
Rhy	Norton	Dilsaver	Ozark High School	24.60	67.2	1239.08	24	
Katelyn	Gerecht	Tempelmeyer	Kickapoo High School	24.65	67.0	1232.89	25	
Josh	Pyle	Mikulin	Ozark High School	24.3	66.0	1231.98	26	
Sarah	Thompson	Tempelmeyer	Kickapoo High School	15.18	41.0	1225.12	27	
Samantha	Egbert	Tempelmeyer	Kickapoo High School	20.00	53.6	1215.63	28	
Alex	Morris	Tempelmeyer	Kickapoo High School	16.18	41.6	1166.22	29	
Tyler	Pickett	Tempelmeyer	Kickapoo High School	14.71	37.8	1165.59	30	
David	Reno	Stafford	Kickapoo High School	23.51	60.0	1157.62	31	
Timothy	Ewy	Tempelmeyer	Kickapoo High School	17.65	44.4	1141.05	32	
Tyler	Pyle	Lewis	Reeds Spring High School	17.74	43.2	1104.58	33	
Kimberly	Reynolds	Tempelmeyer	Kickapoo High School	14.46	35.2	1104.18	34	
Brian	White	Stafford	Kickapoo High School	16.15	38.8	1089.75	35	
Eric	Turner	Dilsaver	Ozark High School	24.99	59.6	1081.80	36	With Dylan Gideon
Wilson	Fok	Tempelmeyer	Kickapoo High School	22.69	53.8	1075.51	37	
Andrea	Mayus	Enos	Catholic High School	22.89	53.4	1058.18	38	
Aspen	Perretta	Tempelmeyer	Kickapoo High School	15.35	35.6	1051.98	39	
Matthew	Hamilton	Tempelmeyer	Kickapoo High School	17.64	40.8	1049.13	40	
Grace	Khor	Tempelmeyer	Kickapoo High School	16.11	37.2	1047.40	41	
Lucas	Snodgrass	Snodgrass	Homeschool	16.95	39.0	1043.66	42	
Aimee	Quick	Tempelmeyer	Kickapoo High School	20.75	46.8	1023.04	43	
Shawn	Hicks	Tempelmeyer	Kickapoo High School	13.07	29.4	1020.32	44	
Stephanie	Climer	Tempelmeyer	Kickapoo High School	16.10	36.0	1014.24	45	
Brandon	Cotter	Sly	Hillcrest High School	24.69	54.0	992.06	46	
Jess	Gilpin	Tempelmeyer	Kickapoo High School	16.85	36.0	969.10	47	
Megan	Rooney	Stafford	Kickapoo High School	14.15	30.0	961.68	48	
Bethany	Bartholomaus	Tempelmeyer	Kickapoo High School	10.85	21.8	911.37	49	
Ryan	Fordyce	Stafford	Kickapoo High School	11.45	22.0	871.53	50	
Eric	Weaver	Tempelmeyer	Kickapoo High School	18.52	33.6	822.93	51	
Wes	Gathright	Lewis	Reeds Spring High School	10.42	18.8	818.38	52	
Justin	Buchholz	Dilsaver	Ozark High School	19.91	34.6	788.26	53	
Mitchell	Tucker	Stafford	Kickapoo High School	16.41	28.2	779.48	54	
Shannon	Ellis	Tempelmeyer	Kickapoo High School	13.16	22.4	772.07	55	
Ryan	Oldham	Tempelmeyer	Kickapoo High School	13.70	23.0	761.51	56	
Danielle	Shinault	Enos	Catholic High School	16.86	28.2	758.68	57	
Josh	Arend	Tempelmeyer	Kickapoo High School	18.05	29.6	743.84	58	
Nick	Little	Dilsaver	Ozark High School	20.69	33.4	732.24	59	

Ozark High School Bridge Competition

Entry Form

Monday, Feb 10, 2003

STUDENT COMPLETE (PLEASE PRINT CLEARLY)

NAME _____

SCHOOL _____ TEACHER _____

GRADE _____

REMAINING TO SEE YOUR BRIDGE TESTED? YES _____ NO _____

Student estimate of the failure load of their bridge: _____.

JUDGES USE ONLY - PLEASE DO NOT WRITE BELOW THIS LINE

CHECK IN TIME _____ BRIDGE NO. _____

Dimensions	Judge's Initials
Length: 330 to 350 mm	_____
Width: 50 to 75 mm	_____
Height: ≤ 100 mm	_____
No Outriggers	_____
Height to loading surface ≤ 30 mm	_____
Symmetrical	_____
No Portion below test support	_____

TEST RESULTS

(a) Bridge Weight _____

(b) Failure Load _____

(b/a) Efficiency _____