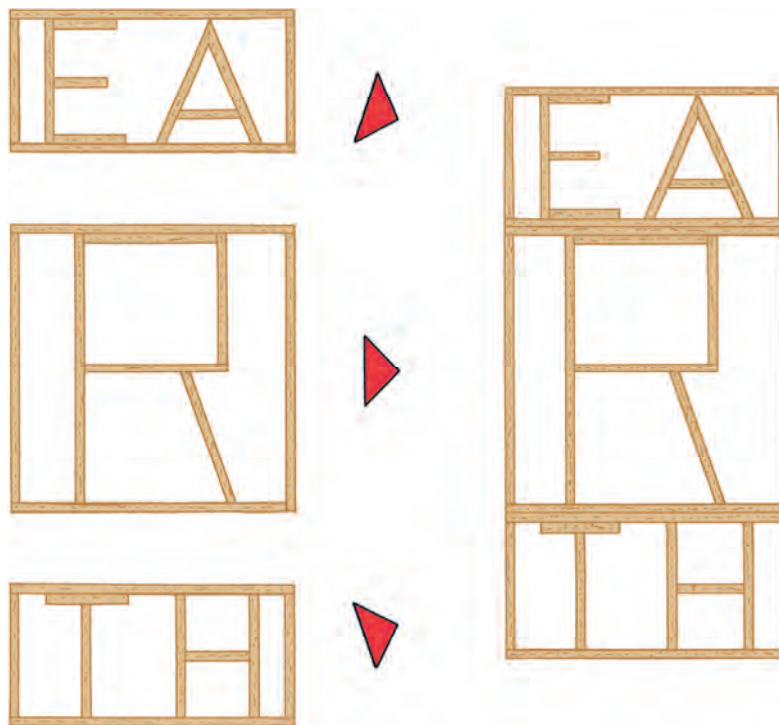




# Odyssey of the Mind™

2013-2014

## Problem No. 4: The Stackable Structure



# The Stackable Structure

## Problem No. 4: Divisions I, II, III & IV

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### A. The Problem

The team's problem is to design and build a structure using only balsa wood and glue that is made up of separate components stacked on top of one another. The more components used to make up the structure, the higher the score. These components will be tested by balancing and supporting weights after they are stacked to form a structure. Before they are stacked, the separate components will be integrated into an artistic representation of Earth. The placement of the weights onto the structure and the artistic representation of Earth will be integrated into the team's performance.

The **creative emphases** of this problem are on how the team integrates the artistic representation of Earth and weight placement into the performance.

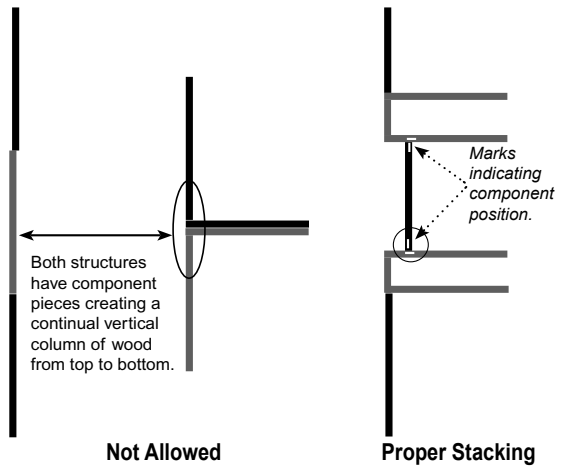
The **Spirit of the Problem** is to design and build a structure of balsa wood and glue that is made up of separate, disconnected components that is tested by having weights placed onto it. Before they are stacked, the components will be incorporated into a replica of Earth. Placing the weights on the structure and the artistic representation of Earth will be integrated into the performance.

### B. Limitations (Italicized words/terms are defined in the Problem Glossary or in the *2013-2014 Odyssey of the Mind Program Guide*.)

1. **General Rules:** Read the *2013-2014 Odyssey of the Mind Program Guide*. This manual is updated each year and includes basic limitations for this problem and the forms required for competition. This problem cannot be solved without referring to the Program Rules section of the guide.
2. **Problem Clarifications:** The *Odyssey of the Mind Program Guide* explains the types of questions about the rules that will be clarified and the ways to submit those questions. General problem clarifications can be accessed at [www.odysseyofthemind.com/clarifications/](http://www.odysseyofthemind.com/clarifications/). Problem clarifications submitted after February 15, 2014, will not be answered. CCI may find it necessary to issue clarifications after that date, so continue to check for them after February 15 and before each competition.
3. The time limit for this problem is 8 minutes. This starts when the Timekeeper says, "Team begin" and includes setup, Style, and the presentation of the problem solution.
4. The cost limit for this problem is \$145 (U.S.). The combined value of the materials used during the demonstration of the team's solution, including Style, must not exceed this amount. The *Odyssey of the Mind Program Guide* explains the cost limit and lists items that are exempt from cost.
5. The team's solution will include:
  - a. a structure of balsa wood and glue that is made up of separate components.
  - b. an artistic representation of *Earth*.
  - c. the integration of the components into an artistic representation of Earth.
  - d. testing the structure by placing weights onto it.
  - e. the integration of weight placement and Earth into the performance.
6. The **components**:
  - a. must each be part of an artistic representation of Earth when time begins. The team will stack them to form the structure during the performance time.
  - b. must each be made up of both vertical and horizontal pieces of balsa wood.
  - c. must be touching when stacked to create the structure. They cannot interlock or connect in any way.

- d. must be *stacked* so that only one component is touching the bottom of the Crusher Board and a different component is touching the tester base.
- e. must each have markings using pencil or ink. These will line up with similar markings on other components and must indicate the position of each component when it is stacked during weight placement (See Figure A).

**Figure A: Stacking Components**



7. The stacked **structure**:

- a. must be designed and built by team members without any outside influence (see B20).
- b. must be made of only balsa wood and glue. It cannot be artificially strengthened, and no other materials can be part of the structure.
- c. may be assembled using other items and/or devices; however, these must be removed before weigh-in at the competition.
- d. must weigh no more than 18 grams.
- e. must be a minimum of 8" (20.32 cm) in height when resting on the Tester base and supporting the Crusher Board (see Figure B). It cannot have any extension pieces used for meeting height limitations only.
- f. must be made up of at least three separate components that are stacked on top of each other. The stacked structure must not have a continuous, solid column of wood that extends completely from the tester base to the crusher board. That is, the stacked components must not have vertical pieces aligned with those in a different component in a way that it appears to be a single column of wood that runs from top to bottom (see Figure A). This includes partial overlapping.
- g. must fit entirely within the perimeter of the Tester base without touching the corner supports of the Tester.
- h. must have an open area running the entire height that will accept a column that is 2" (5.1 cm) in diameter. Therefore, the opening in the structure must be greater than 2". This will be measured at weigh-in. The safety pipe must be in the opening of the structure during weight placement (see Figure C).

8. The **balsa wood** used in the structure:

- a. must come from only *commercially produced* strips of balsa wood. No other type of wood or any variation of balsa wood may be used. Balsa wood may be purchased through [www.odysseyofthemind.com/shop/](http://www.odysseyofthemind.com/shop/) — any balsa purchased from here during the 2013-14 program year will be considered as being within limitations. Teams must show an invoice from CCI that shows the purchase date.
- b. must have a cross section no greater than 1/8" wide x 1/8" deep (0.32 cm x 0.32 cm). Some commercial cuts vary, so the maximum allowed of either dimension is actually .135" (0.33 cm), which is slightly greater than 1/8".
- c. must be in strips at least 36" (0.91m) long when the team receives it.
- d. cannot be hand-picked by anyone other than the team members. Team members may request wood to be from a commonly known grade, but no one else may sort and pick specific pieces. If the wood is handpicked by anyone other than the team members, the judges will assess an Outside Assistance penalty.
- e. must be cut by the team. The only exceptions are the perpendicular end cuts of the original strip. If a cut is made by anyone other than the team members, the judges will assess an Outside Assistance penalty.
- f. may be marked and/or colored. However, it cannot be artificially strengthened in any way.

9. If **glue** is used in the structure:

- a. the team can use more than one type of glue.

- b. it must be used as purchased. That is, nothing may be added to it, nor may it be mixed with anything unless the manufacturer specifies that two ingredients combine to form the glue.
- c. it must be a brand with the word “glue,” “epoxy,” “cement,” or “adhesive” printed by the manufacturer on the tube, container, box, or accompanying material.
- d. the use of an accelerant is not allowed. Non-chemical methods used to modify the drying process, such as the application of hot or cold air, that does not include the addition of a chemical or material is allowed.

10. The **artistic representation of Earth**:

- a. can be made up of any material the team wishes.
- b. must be visible to the judges and audience.
- c. must integrate the components without them being stacked. The components can be integrated any time after the team picks up its structure from Weigh-In.

11. The **team-created performance** can be about anything as long as it incorporates the placing of the weights onto the structure, Earth, and the stacking of the components.

12. The team must use only the weights and Tester supplied by the Tournament Director. These can be used only in the normal process of placing weights; for example, the weights cannot be used for Style, the Tester cannot be decorated, etc.

13. Team members must place weights one at a time onto the structure. The first weight must be the Crusher Board supplied by the Tournament Director. This will count toward the total weight held (See Figure B).

14. **Division I** teams may have an adult (18 years of age or older) assist\* at least one team member in placing weights heavier than 20 pounds. **Division II** teams may have an adult assist\* at least one team member in placing weights heavier than 40 pounds. In **Divisions III and IV**, team members must place all of the weights themselves. For all divisions, the team must decide the order in which it will place the weights.

*\*The adult can only help to place these weights. A team member must select the weight and be actively involved in bearing and aligning the weight as it is placed on the stack. An adult cannot have his or her hands on the weight stack unless a team member is touching it as well.*

15. Team members must wear safety goggles, eyeglasses with plastic lenses, or other protective eyewear (approved by the judges) if they are within the Safety Area with their head below the level of the Crusher Board while the structure is supporting weight. This applies to everyone in the Safety Area (see E10).

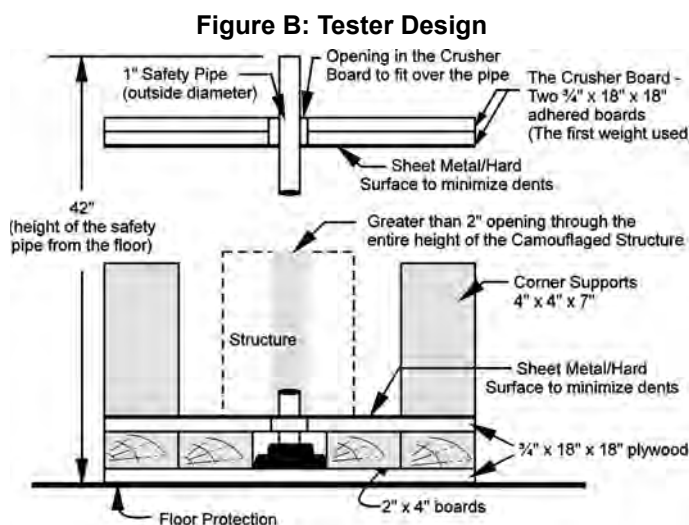
16. A weight must be held on the stack for at least 3 seconds to count in the total weight held. There is no restriction on how rapidly team members place the weights.

17. Team members may remove weights from the weight stack during testing; however, only the weights on the stack when weight placement ends are eligible for score.

18. It is the team's responsibility to add the extension pipe to the safety pipe, if needed.

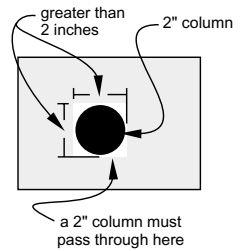
19. The team may test the structure and perform its Style presentation at any time during its 8-minute competition time. If the team plans to perform Style after its structure breaks, it is recommended that the team inform the Staging Area Judge. If the team does not inform the judge, there will be no penalty.

20. **A reminder about outside assistance:** Team members are responsible for building an original structure. No one beyond the team is allowed to provide ideas, tips, and information on how to build and/or improve a structure. This



includes photographing other teams' solutions for reference. Also, team members are not allowed to discuss with others how they solved this problem until after World Finals. Sharing ideas with other participants or in a public forum is considered outside assistance. Anyone doing this puts their team and the team of anyone who receives the information in position for a penalty. Failure to report such an occurrence could bring a significant penalty, or lead to disqualification or suspension (see the *2013-2014 Odyssey of the Mind Program Guide*).

**Figure C: Top View of the Opening**



21. Judgments dealing with measurements, weight, wood, the “open area” (see Figure C) and artificial strengthening will take place at the Weigh-In Site. Judges not associated with weigh-in may bring certain matters to the attention of the Weigh-In Judges. Penalties may be given before and/or after a team has competed.

## C. Site, Setup and Competition

1. If possible, the Tester will be on a solid, level floor. The Tester will be positioned in the center of the Safety Area, a 60" x 60" taped square, which will serve as a guide to keep team members aware of their proximity to the Tester and as a reminder of where they must wear safety glasses. The team is not allowed to move the Tester.
2. At least 45 minutes before its scheduled competition time, the team must report to the Weigh-In Site with its structure components to have them checked for specifications.
3. If the structure does not meet specifications, Weigh-In Judges will try to give the team an opportunity to bring them into specification or submit a different structure before the team's competition time. In most cases, corrections should be completed no less than 20 minutes before competition time. There is no penalty if the structure is brought into specification before completing the weigh-in process. If the components do not have the component markings, the team is allowed to add them during the weigh-in process.
4. Once the structure is weighed, measured, and stacked, a judge will ask a team member to place the components into a bag and keep it at the Weigh-In Site until the team picks it up for competition. The judges at Weigh-In will supply the bag. The team must return to pick up its structure components no earlier than 25 minutes before its scheduled competition time.
5. The judge will attach a Weigh-In Checklist to the bag containing the structure components. The team cannot remove the Weigh-In Checklist until directed to do so by the Staging Area Judge. If the Weigh-In Checklist has been removed, the bag tampered with, or the structure removed, the team may have to repeat the weigh-in process. Depending on the situation, the team could receive a Spirit of the Problem penalty.
6. Team members must report to the competition site with everything they will use in their solution at least 20 minutes before they are scheduled to compete.
7. The team may stack its components onto the tester any time after the Timekeeper says “Team Begin” and the components are shown as being part of the artistic representation of Earth.
8. Once stacked on the Tester, the team may adjust the components to form the structure, including removing them from and replacing them on the Tester. Team members may continue touching the structure while placing the Crusher Board onto it. No one can touch the structure once the team begins to place weights onto the Crusher Board. If team members wish to adjust the structure they must remove all weights except the Crusher Board. Team members may then touch the structure before resuming weight placement.
9. The weight-placement portion of the problem solution will end when:
  - a. the Crusher Board or any part of the structure touches any corner post.
  - b. any part of the structure touches anything other than the surface of the Tester base and the bottom of the Crusher Board in such a way that judges determine that it is helping to support the weight stack.

- c. a weight rests against the safety pipe and the judges determine that the pipe is helping to support the weight stack. If time remains, the team will be given an opportunity to adjust that weight and continue weight placement.
  - d. a weight extends beyond the height of the full length of the safety pipe, including the extension pipe.
  - e. the 8-minute time limit ends. The team must stop all activity when the judge calls "time" or the team gives a signal that it has finished and its structure is broken.
10. The team should inform the Staging Area judge if it expects to continue its Style presentation after the structure breaks. Should the team finish its Style presentation before the structure breaks, and the signal to end is given in the performance, the team will be allowed to continue placing weights until any one of the criteria from C9 occurs.
  11. Teams should bring cleaning utensils to clean up any mess. Should a team take an unreasonable amount of time to clean the site, or leave a mess, the judges will assess an Unsportsmanlike Conduct penalty. Others not on the team's roster may help the team clear the site and remove the team's props. The competition area must be left clean and dry for the next competing team.

## D. Scoring

1. Weight held (In each division, the team with the highest weight-held score will receive 150 points. All other structures will receive a corresponding score based on the percentage of weight held) ..... 1 to 150 points
  2. The components are integrated into the artistic representation ..... 0 or 10 points
  3. Number of components in the structure ..... 0, 5, 15 or 25 points
    - a. minimum 3 components ..... 0 points
    - b. 4 components ..... 5 points
    - c. 5 components ..... 15 points
    - d. 6 or more components ..... 25 points
  4. Creativity of how weight placement and the artistic representation of the Earth are integrated into the performance ..... 1 to 15 points
- Maximum possible: 200 points*

## E. Penalties (Deduct penalty points from the percentaged score, not from total weight held.)

1. "Spirit of the Problem" violation (each offense) ..... -1 to -100 points
2. Unsportsmanlike conduct (each offense) ..... -1 to -100 points
3. Incorrect or missing membership sign ..... -1 to -15 points
4. Outside assistance (each offense) ..... -1 to -100 points
5. Having someone other than team members cut pieces of wood, or glue joints ..... "weight held" score of zero
6. Over cost limit ..... -1 to -100 points
7. Artificially strengthened structure ..... -5 points to "weight-held" score of zero
8. Structure does not meet specifications and is not corrected before completing weigh-in\*:
  - a. **Overweight Structure** (Weight will be determined by the official gram scale for each competition.): Any structure weighing more than 15 grams will receive -5 points for every .1 gram over weight up to 1.50 or more grams over (zero score for weight held). ..... penalty must not exceed the calculated "weight- held" score
  - b. **Oversized Wood:** any piece exceeds 1/8"x1/8" (.135" x .135") at its cross section (not assessed if it is an irregularity of that piece and the rest is within limitations) ..... "weight-held" score of zero
  - c. **Undersized Structure:**

(1) \*Less than 8" but more than 7-7/8" high .....-100 points

(2) 7-7/8" or less ..... "weight-held" score of zero

9. "Open area" does not accept the 2" diameter column through its entire height .....-100 points

10. If any team member is not wearing safety glasses while inside the Safety Area with their head below the Crusher Board, the team must stop weight placement until that team member puts on safety glasses. Time will continue.

11. If an adult selects a weight or places it without help from a team member, that weight does not count toward weight held score. The weight may be removed and placed properly for score. An official will warn the team and the adult. If this continues after two warnings, a 10-point Outside Assistance penalty will be assessed for each future occurrence, and the improperly placed weight will not count unless it is removed and placed properly.

12. Structure is made up of less than 3 components ..... "weight-held" score of zero

*\* These penalties will be substituted with a weight-held score of zero if, in the aggregate, that is less of a penalty.*

**F. Style** (Elaboration of the problem solution; use the Style Form from the *2013-2014 Odyssey of the Mind Program Guide*.)

1. Creativity of the artistic representation and how the components are integrated into it ..... 1 to 10 points

2. *Artistic quality* of a costume ..... 1 to 10 points

3. (Free choice of team) ..... 1 to 10 points

4. (Free choice of team) ..... 1 to 10 points

5. Overall effect of the four Style elements in the performance ..... 1 to 10 points

*Maximum possible: 50 points*

## **G. Tournament Director Will Provide\***

*At the weigh-in site:*

- a gram scale accurate to 1/10th of a gram.
- a micrometer or other precision method of checking wood thickness.
- a 2-inch diameter column-measuring device.
- an accurate ruler or device to measure the structure's size requirements.
- a bag to hold the team's structure.
- tape to attach the Weigh-In Checklist to the bag.

*At each competition site:*

- a three-prong electrical outlet.
- a Tester and a 60" x 60" taped Safety Area.
- a 12-inch extension to the safety pipe.
- three pairs of safety glasses: one to be used by a judge and two that are available to the team.
- a judging team and all materials necessary to judge this problem.
- a minimum of 400 lbs. of weights in assorted sizes, generally from 5 lbs. to 45 lbs., each with a hole 2" in diameter.

When registering for a tournament, teams needing more weight should notify the Tournament Director.

**\*NOTE:** *Contact your Tournament Director for information regarding specific competition sites such as actual dimensions, amount and size of weights, weight of the Crusher Board, registration procedures, floor surface, etc. Do not submit a clarification request for this information.*

## **H. The Team Must Provide**

- Four copies of its Style Form, one Cost Form, one Outside Assistance Form, and all of its team clarifications.

2. Safety glasses or other eye protection. However, the team may use up to two pairs of goggles provided by the tournament director.
3. Any necessary extension cords or adapters.
4. Cleanup materials as needed.

## I. Metric Equivalency Chart

### *Lengths:*

1 inch = 2.54 cm	1 foot = 30.48 cm
1 cm = .39 inches	1 meter = 3.28 feet

### *Weights:*

1 ounce = 28.35 grams	1 gram = .035 ounces
1 pound = .45 kilograms	1 kilogram = 2.2 pounds

## J. Problem Glossary (Italicized terms that are not in this Glossary can be found in the *2013- 2014 Odyssey of the Mind Program Guide*.)

*Earth* – the planet or any part of our planet in its natural form, for example a mountain range, the globe, oceans, etc.

*Stacked* – a component placed on top of one other component and held together only by gravity.

## P R E C A U T I O N S

- Use eye protection, e.g., a face shield, safety glasses, goggles, etc., when looking closely at a structure holding weight. Collapsing structures may project pieces of wood several feet.
- Keep your fingers on the sides of the weights when placing them onto the Crusher Board or onto other weights.
- Remain aware of the structure, the testing device, and the weight stack at all times to avoid injury in case of collapse.
- Do not stand too close to the structure, Tester, and weight stack unless necessary, and avoid bumping them accidentally.
- Use a safety pipe through the center hole of the weights to help prevent them from falling.
- Place a piece of plywood/hardboard or a tumbling mat under weights waiting to be placed onto the weight stack to help prevent damage to the floor.
- Super glues are extremely dangerous to use and some glues have dangerous fumes. Read and follow all precautions and directions on the manufacturer's labels. Non-toxic model airplane wood glues are recommended. If toxic glue is used, proper precautions, such as adequate ventilation and parental supervision, are advised.

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Problem by Dr. C. Samuel Micklus and Samuel W. Micklus.

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