

# Kansas Science Olympiad Overview

## What is the Kansas Science Olympiad?

Science Olympiad is intended for students that have an interest in science and engineering who may or may not choose a career in one of those fields. The point of Science Olympiad is to learn some science and have some fun in the process. Events cover biology, physics, chemistry, earth science, engineering and inquiry. They range from pencil and papers “tests,” to performing lab experiments, to building a structure or robot. Some of the 23 events include:

- *Designer Genes* where students solve problems using their knowledge of molecular genetics, biotechnology, and population genetics.
- *Remote Sensing* where participants use satellite imagery of Mars and other resources to identify and interpret geologic features, answer questions or solve problems.
- *Bridge Building* – where students build the lightest bridge capable of supporting 15 kilograms
- *Write It Do It* – where one team member writes a description of a structure built from legos (or some other material) while another team member tries to construct it from the written description
- *Chem Lab* – where students work in a laboratory setting to answer a series of questions regarding chemical bonding and oxidation/reduction.



(Rules for two events are attached. This is meant to give you an example of both a building event and an academic event.)

The goals of Science Olympiad include:

- To increase the interest and proficiency of Kansas students in the study of science.
- Promote team work.
- To recognize outstanding student and teacher achievements in science.
- To improve the quality of science education in Kansas.

Students that have participated in Science Olympiad also recognize its benefits:

- I always liked science and make good grades in it but now it seems more fun and amusing.
- I feel that this Olympiad had a lot of value toward making science fun.
- Science has become more fun and I think I’m starting to learn more.
- It has been a way of making me see how fun learning and studying can be.
- I think it was pretty cool and educational to find [out] even more about science.

Coaches have had this to say about Science Olympiad:

- We’re very excited & can’t wait until next year.
- Students enjoyed the challenge of the events during their preparation. Many of the events reinforced classroom learning.

- The tournament opened student's eyes to the wide variety of disciplines within "science."
- I feel it was good for these students who are interested in science to have fun at events such as these. I also think it was valuable for them to see students from other schools who are also interested in science.

From these comments, it is apparent that both students and teachers see the benefit of participation in Science Olympiad.

There are four divisions within Science Olympiad:

- Division A1: Grades K-3
- Division A2: Grades 3-6
- Division B: Grades 6-9
- Division C: Grades 9-12



In Kansas there are regional and state tournaments only for Divisions B and C. Participation in Divisions A1 And A2 is limited to activities at a particular school.

## Getting Started

Preparations for Science Olympiad begin in the fall. Generally a teacher will hold an informational meeting to gauge interest in Science Olympiad. In Kansas, a workshop for both new and returning coaches is held on the third Saturday in October at Wichita State University. The purpose of this workshop is to discuss any logistical changes in how Science Olympiad operates in Kansas and to talk about the changes in particular events and give an overview of the new events. (Each year about 25% of the events are rotated out and new events are brought in. Another 25% of the events will have significant changes. For example in Chem lab, the area of chemistry that is focused on may change.)

Also for a school to participate, the school must register with the Kansas Science Olympiad and pay a membership fee. (This fee includes both state and national membership fees. The national fee is passed on to the national Science Olympiad office.) The Kansas registration must be completed on line at: <http://webs.wichita.edu/scienceolympiad> . Once your membership fee has been received, you will receive a rules manual and you have the right to compete in regional, state and national tournaments. The priority registration deadline is usually in early November with the final deadline in mid December. See the web site for the exact dates.

Here are screen shots of the registration pages

**2009 Kansas Science Olympiad Registration**

**Login Page**

If you participated in Kansas Science Olympiad last year, your userID and password from last year are still valid and we encourage you to reuse them. Use the form fields below if you remember your userID and password.

User ID

Password

Click [here](#) if you are registering your school for the first time.

Click [here](#) if you have forgotten your password

Kansas Registration Login Page

School Information Page

Coach Information Page

Both the school information and the coach information must be completed before your registration is complete. You will receive an e-mail confirmation of your registration.

Also subscribe to the Kansas Science Olympiad ListServ. This will allow you to keep abreast of any event rules clarifications and also give you the ability to seek advice from fellow coaches. A national ListServ is also a good resource that is available. (However the National ListServ can be a bit overwhelming for a new coach.)

## Team Preparation

Although a Science Olympiad Team may consist of more than 15 students, only 15 may actually participate in the competition (except for trial events). Generally two of the 15 students work together on a particular event. For example Melissa and Jacob might do Bridge Building together while later in the day Melissa and Christopher participant in Write It Do It. Occasionally there are events which allow 3 participants or just one. You can always have fewer participants than the number allowed. Likewise you do not need to compete in all 23 events.

There are also limits on the number of 9th and 12th graders that can compete. At most five 9th graders can compete on a Division B team and seven 12th graders on a Division C team.

During the fall, students work on particular events. If more than fifteen students want to participate on the team, a mini tournament can be held at the school to determine which students will be on the team and who will be alternates. Remember that choosing a student that is good in many areas of science is often gives you more flexibility than choosing someone that is excellent in only one area.

The time to compete in a particular event can be as short as 10 minutes to the more typical 50 minutes. (The times needed for a particular event are given in the rules.) Depending upon space considerations, a given event may be run in two or more 50 minute blocks. In looking at the included sample state schedule you will notice that three or four events runs simultaneously. It is possible that a given team member is scheduled to be in two places at the same time. If this is the case you should be prepared to make some adjustments. Fortunately, you should know about these conflicts in advance of the tournament. Walk-in events are just that. Students choose the time they want to compete (with in the times given) and go to the event location to compete. Please note that in a walk-in event students must have **COMPETED** by the time the event ends. If they are in line, they may not be allowed to compete. The rule of thumb here is to not wait until the last minute.

An example of a Science Olympiad schedule is included at the end of this document.

## Invitational Tournaments

Invitational Tournaments are tournaments normally organized and hosted by a school. In most cases only some of the 23 events will be run but it will give your team some experience in a competitive setting. At some invitationals your school can enter more than one team so you can also use them as a bases to form your team for regionals. In addition to a small registration fee for an invitational, each team is usually asked to supervise one event. So if your school has three teams, you will need to supervise three events.

## Regional Tournaments

The regional tournaments in Kansas are held in January and February. Currently regional tournaments are held in: Garden City, Hays, Kansas City, Salina and Wichita. At these regional tournaments, medals are given to the top three finishers in each event. Team trophies are awarded to the top three teams. In Kansas the regional tournaments serve as qualifying events for the state tournament.



In each of the five regional tournaments, the top two teams are automatically invited to the state tournament. Invitations to the other 20 spots are issued based on how well the team did in its regional tournament and the number of teams that participated in that regional tournament. For example if a particular regional tournament has twice as many teams participating as another regional, then the first regional will send twice as many teams to the state tournament as the second regional.

Also receiving invitations to the state tournament are students that won an event at their regional tournament, but their team did not qualify for the state tournament. For example if Lincoln High School won the Astronomy event at the Garden City Regional, but the team did not qualify for the state tournament, the two students from Lincoln high School that participated in the astronomy event will receive an invitation to participate in only the astronomy event at the state tournament. These teams are referred to as regional event winners.

## State Tournament

The state tournament is held on the first Saturday in April at Wichita State University. The first events begin at 9:00 a.m. and last events end at 4:00 p.m. The awards ceremonies begin at 4:45 p.m. and are generally over by 6:00 p.m. At the state tournament, schools within each division (B - Middle School and C - High School) are divided into two groups based on the school's enrollment. Within each of these groups medals are given to the top three finishers in each event and team trophies are awarded to the top three teams.



Regional Event Winners also have the ability to win medals based on how they finish within the group based on their school's enrollment. Any medals won by a Regional Event Winner does not affect the medals won or the points earned by the participating teams.

The top middle school team and the top high school team, regardless of size, receive invitations to the national tournament. (For the past several years, the participation in Science Olympiad of Kansas schools has allowed us to send two teams to the national tournament. Since this is determined on a year to year basis, you should not count on a second team from Kansas being invited.)

## Science Olympiad Calendar

September	<ul style="list-style-type: none"> <li>• Complete the state of Kansas Science Olympiad Registration and pay your membership fee. You will then receive your Rules Manual</li> <li>• Register for the Kansas Science Olympiad Coaches Workshop</li> <li>• Begin to organize your team</li> </ul>
October	<ul style="list-style-type: none"> <li>• Attend the Kansas Science Olympiad's Coaches Workshop that is held on the 3<sup>rd</sup> Saturday in October at Wichita State University</li> <li>• The deadline to register for the Kansas Science Olympiad is in early November. If you haven't registered don't forget to do so.</li> <li>• If you haven't already started to organize your team, you should start now.</li> </ul>
November	<ul style="list-style-type: none"> <li>• Regional Assignments are usually made by November 15<sup>th</sup></li> <li>• Continue working with your team</li> </ul>
December	<ul style="list-style-type: none"> <li>• Continue working with your team</li> </ul>
January	<ul style="list-style-type: none"> <li>• Continue working with your team</li> <li>• Participant in an Invitational Tournament if there is one in your area</li> <li>• Salina Regional Tournament</li> </ul>
February	<ul style="list-style-type: none"> <li>• Compete in your regional tournament</li> </ul>
March	<ul style="list-style-type: none"> <li>• Notification of teams that are invited to the state tournament</li> <li>• State tournament registration due,</li> </ul>
April	<ul style="list-style-type: none"> <li>• State Tournament held on the first Saturday in April at Wichita State</li> <li>• Teams receive notification of invitation to national tournament</li> </ul>
May	<ul style="list-style-type: none"> <li>• National Tournament occurs (normally held on the weekend before Memorial Day weekend)</li> </ul>

## Science Olympiad Websites

Kansas Science Olympiad: [webs.wichita.edu/scienceolympiad](http://webs.wichita.edu/scienceolympiad)

National Science Olympiad: [www.soinc.org/](http://www.soinc.org/)

# BOTTLE ROCKETS

DESCRIPTION: Teams will design, construct, and launch rockets to stay aloft the greatest amount of time. Contestants that do not bring and wear approved Chemical/Splash Protection Goggles will not be allowed to launch their rocket(s). See: <http://www.soinc.org/general/protection/>

A TEAM OF UP TO: 2

APPROXIMATE TIME: 30 min./6 min. for prep and launch

IMPOUND: Yes

## 1. CONSTRUCTION:

- a. Students will bring one or two rockets to the tournament that use a two-liter plastic carbonated beverage bottle with approximately 2.2 cm internal diameter neck (1/2 inch Schedule 40 PVC pipe should just fit inside the neck opening). Contestants should keep and bring a journal recording all phases of their rocket development. The journal will be used for breaking ties.
- b. The structural integrity of the pressure vessel (2-liter bottle) may not be altered. Examples of altering structural integrity include but are not limited to physical, thermal or chemical damage (e.g., cutting, sanding, using hot glues, or super glues). Adhesive may be used to attach fins and other components but must be limited to glue such as silicone adhesive, polyurethane based adhesives and others that do not damage the structural integrity of the pressure vessel.
- c. Teams must verify the bottle used for the rocket's pressure chamber is a carbonated beverage bottle by impounding with each rocket another bottle of the same type with its label intact.
- d. Rockets may not use extenders that increase the 2L volume. Commercial model rockets or model rocket parts may not be used. The rocket(s) must be marked so that the judges can identify to which team they belong.
- e. Metal may be used, but may not be attached to or have direct contact with the pressure vessel at any time. For safety, rockets may not use sharp or pointed metal components or a leading surface consisting of a rigid spike. The total mass of the rocket and recovery device must be a minimum of 150 grams for regional, 175 grams for state and 200 grams for national tournaments. A balloon filled with dry sand is suggested if ballast is needed. The total mass of the empty rocket and recovery device cannot exceed 400 grams.
- f. Rocket components may separate in flight, but must remain linked together. The maximum extended length of the rocket and its components shall not exceed 3 meters.
- g. All propulsive energy imparted to the rocket must originate from the water/air pressure combination provided by the judges. Other forms of potential or kinetic energy may be used for deployment of rocket recovery devices and other components, but may not be used to slow the rockets descent. Remote controls, pyrotechnics or pressurized gases (except for the original air pressure) may not be used.
- h. Rockets may use any type of recovery device (including parachutes) that is safe and doesn't violate the rules.
- i. All rockets will be launched using the launcher provided by the supervisor. Contestants are responsible for ensuring their rocket is capable of launching from the launcher provided. To insure rockets will fit on the launcher, fins and other parts added to the bottle may not extend below the flange on the bottle's neck. The portions of the parts and fins within the bottles radius may not extend closer than 2 cm above the level of the flange on the bottle's neck.

## 2. THE COMPETITION:

- a. All rockets must be impounded before the start of the competition and will be released after the last team has finished competing. Once impounded, no physical alterations may be made to the rocket. Appeals by teams will not be processed after they remove their device from impound unless it has been released by the appeals committee.
- b. Once teams enter the event area to compete, they may not leave the area or receive outside assistance, materials or communication until they have finished competing. Only contestants and judges will be allowed in the event area while teams are competing. Teams violating this rule will be disqualified.
- c. When it's their turn, contestants will pick up their rockets and proceed to the designated staging area to prepare their recovery system. After a safety inspection, the contestants will be allowed six minutes to prepare and launch their rocket(s). The six-minute time will include adjustments to the rockets, adding water, launch of both rockets and timing of the first flight. Contestants will not be allowed to add water and launch their rockets without approved eye protection.
- d. Teams may not shield their rocket from the wind while on the launcher.
- e. All rockets will be launched at a pressure requested by the competitors, not to exceed 60 pounds per square inch. Once the rocket is pressurized, contestant may not touch or approach the rocket.
- f. Timing of the rocket stops when the first part of the rocket hits a stationary object (ground, building, tree, etc.) or when the rocket disappears from the judge's sight. All rocket launch times will be recorded to the nearest hundredth of a second. Preferably three timers should be used and the middle time should be recorded.
- g. Only one launch is allowed per rocket. Any rocket launched before the time expires will be scored.
- h. Each team will be asked to explain an entry in their journal randomly chosen by the judges.

## 3. SCORING:

- a. All rocket launch times will be recorded to the nearest hundredth of a second. A team's score will be the flight time of the rocket that gives them the higher rank. The greater flight time wins.
- b. Rockets whose parts do not remain linked while aloft will be ranked by their flight time in a second tier after those that remain linked.
- c. Rockets that violate any rule that doesn't have a specific penalty will be ranked in a third tier by their flight time.
- d. Teams that attempt to participate but are unable to launch at least one rocket for any reason will receive participation point(s) only (e.g., participants did not have eye protection, rockets failed safety inspection or rocket would not fit on launcher).
- e. When teams that launched two rockets each are tied, the winner will be the team with the longer time aloft of the shorter flight. Teams that launched two rockets will win ties over teams that launched only one rocket. Remaining ties will be broken using the team's journal and their explanation of the entry chosen by the judges.

See: <http://www.soinc.org/events/botrockets/>  
THIS EVENT IS SPONSORED BY PITSCO CO.

## POLYMER DETECTIVES (DIVISION B) DRAFT

**DESCRIPTION:** The purpose of this event is to develop an awareness of polymers and plastics and how they affect daily living in a modern society. Students will be expected to demonstrate knowledge of common plastics, i.e., properties and uses, key terms, chemical formulas and structure, and scientists known for their work on these materials. No notes of any kind will be allowed. Students must bring and use OSHA approved splash goggles with indirect vents and chemical aprons. Open toed shoes are not allowed.

A TEAM OF UP TO: Team of up to 2

APPROXIMATE TIME: 50 minutes

**THE COMPETITION:** This event will consist of three parts:

**Part I:** Students may be given up to 3 unknown samples of fibers including cotton, wool, and no more than one synthetic fiber. Students will be expected to identify these by the reaction of these fibers with burn tests, and/or by examination with a microscope. Burn tests should be done with a match, lighter or candle.

**Part II:** Students will be expected to characterize samples of the following polymers. The characteristics they will be expected to determine by testing or by observation are density and information about the burn results. If the actual burn tests are done, they **MUST** be done as a demonstration under a hood or in an approved ventilation system by the event supervisor. The student may be provided written information about the burn test results for the polymers. Emphasis in scoring this part of the event is placed on careful and organized observation and identifying the polymers.

<u>Types of Plastic</u>	<u>Industry abbreviations</u>	<u>Resin code</u>	<u>Typical packing uses</u>
Polyethylene Terephthalate	PETE	1	Soda, peanut butter & vegetable bottles
High Density Polyethylene	HDPE	2	Milk, juice & detergent bottles, grocery bags
Polyvinyl Chloride (or vinyl)	PVC	3	Shampoo, salad dressing and water bottles
Low-Density Polyethylene	LDPE	4	Trash bags, food & bread wrap, squeeze bottles
Polypropylene	PP	5	Dairy prod. containers, bottle lids, drinking straws
Polystyrene	PS	6	Foam & clear contains for take out food, meat trays, egg cartons, plates, cups and cutlery

Sample Questions: (1) What is the density of this sample of the polymer? (2) Based on the information provided about the burn test, which type of polymer could this be?

**Part III** The other part of the competition will consist of a written test. Students will be expected to be able to do the following for the polymers in the list of part II:

- State common uses of polymers
- Provided with resin code, tell what the material is.
- Know information about recycling and disposing the polymer.
- Know basic information about how the polymers are made.

**SCORING:** Part I: 15 points Part II: 40 points and Part III 45 points. Ties are broken by using highest score from Part II first, then Part I and if needed Part III last. **TIME IS NOT A TIEBREAKER!**

**FREE RESOURCE:** American Plastics Council 1300 Wilson Blvd. Suite 800, Arlington VA 22209. 1-800-2-HELP-90. Website: [www.HandsOnPlastics.com](http://www.HandsOnPlastics.com).

## 2007 Kansas Science Olympiad Schedule – Division B

Event	Impound	9:00 - 9:50	10:00 - 10:50	11:00 - 11:50	12:00- 12:50	1:00- 1:50	2:00 - 2:50	3:00 - 3:50
Anatomy								
Awesome Aquifer								
Balloon Race								
Balloon Launch Glider						Walk-In		
Disease Detectives								
Don't Bug Me								
Ecology								
Food Science								
Heredity								
Meteorology								
Metric Mastery								
Mission Possible								
Oceanography								
Road Scholar								
Rocks and Minerals								
Science Crime Busters								
Science Word								
Solar System, The								
Simple Machines								
Storm the Castle	7:45 - 8:30 am							
Tower Building	7:45 - 8:30 am	Walk-In						
Wheeled Vehicles	8:45- 9:30 am							
Write It, Do It								

The dark blocks indicate the time during which the event is taking place.