2013 National Science Bowl®
Official Academic Competition Rules
Changes and clarifications in **green/bold**

1. Eligibility Requirements

1-1. Each competing team consists of 4 or 5 student members. (Only 4 will be playing at any time.) To be eligible to compete, a high school student must be enrolled for the current school year in grades 9, 10, 11, or 12 at the team's school, and be born on or after **April 30, 1993.** To be eligible to compete, a middle school student must be enrolled for the current school year in grades 6, 7, or 8 at the team's school, and be born on or after **September 1, 1997** and on or before April 25, 2003. **A student is limited to at most 3 years of middle school competition and at most 4 years of high school competition.** A student may not compete in both the middle school and high school events in the same year.

Teams of home school students, girl scouts, boy scouts, and science clubs are welcome to participate **provided all members of the team live within the Department of Energy's defined geographic area of the regional event.** However, if the school that a student attends is competing in a Regional Science Bowl, then that student may compete only on a team from that school.

1-2. No school or student group may compete in more than one regional competition. No student may compete on more than one team. **No student may compete in or attend more than one regional competition, except that high school students may attend middle school competitions and vice versa.** Each regional coordinator will determine if more than one team from a middle or high school will be allowed to participate in that regional. No more than 3 teams from one middle or high school or student group may compete in a regional event. **If a student attends two schools, such as a neighborhood school and a specialty school, that are both participating in regional Science Bowl competitions, then the student must participate on the neighborhood school's team.**

1-3. The winning team from each qualifying regional competition is eligible to be invited to the National Science Bowl finals held near Washington, DC, on **April 25 - April 29, 2013**. In the case that fewer than 4 players from the first-place team can attend and participate in all National Science Bowl finals activities, the invitation will be extended instead to the next highest place team from which at least 4 players can attend. **To be eligible for the National Science Bowl finals, a student must have competed at the regional competition on the team that attends the National Science Bowl finals.**

If a middle school regional event includes both a car competition and an academic event, the team that will be invited to the National Science Bowl finals in Washington, DC will be the winning academic team. The winning regional car team will not attend the National Science Bowl® finals unless it is also the regional academic winning team.

1-4. **Within 2 weeks after its regional competition or by March 12, 2013 (whichever comes first)**, the winning team's coach is required to inform the National event coordinator of its availability to participate at the National Science Bowl finals. During this time of the school

year, students are participating in a variety of activities and academic events that may conflict with their participation in the National Science Bowl finals (including, but not limited to, state athletic or academic tournaments, proms, International Baccalaureate, Advanced Placement, the USAMO, and SAT exams). In the interest of safety, continuity, and maximizing the educational value of the complete National Science Bowl finals experience, the National Science Bowl requires students and coaches to take part in ALL of its events and activities. Therefore, no waivers will be granted or special arrangements made for students to participate in any conflicting activities or exams. If team members are involved in these pursuits, the students will need to determine which activity or event is in their best interests and make their selection **within 2 weeks after their regional competition or by March 12, 2013 (whichever comes first).** All teams must arrive and depart on the designated dates and participate in all events as scheduled throughout the duration of the National event. If fewer than 4 students from the invited regional team are able to participate in all activities at all scheduled times, another team from their regional will be invited to replace them.

2. Competition Structure

2-1. Regional competitions have the option of choosing their tournament style, e.g. only double or single elimination, only round robin, or a combination of both.

2-2. The National Science Bowl® finals will use a round robin tournament format with several divisions for the preliminary rounds. Teams will be placed in divisions by drawing lots, with the number of teams per division as equal as possible. The number of teams in each division will depend on the number of teams participating in the competition. Each team will play every team in its division. At the end of each round robin match, regardless of the overall score, 2 points are awarded for a win, one point for a tie, and zero points for a loss. The top 2 teams from each of the 8 high school round robin divisions will move on to the seeded double elimination tournament. The middle school double elimination tournament will include 16 teams: the top 2 teams from each of the 6 divisions, plus 4 of the 6 third-place teams. (See Rule 10-1 for further details.)

2-3. For games that occur in the elimination tournaments, if the score is tied at the end of the match, a series of 5 toss-up questions will be used to break the tie. Interrupt, blurt, and consultation penalties are in effect during tie-breakers. (See Rules 4-1, 4-2, and 6-2.)

3. The Questions

3-1. Two types of questions will be used: toss-up and bonus questions. A toss-up question may be answered by any of the 4 members of either team that are actively competing. A team answering a toss-up question correctly will always get a chance to answer a bonus question; the other team is ineligible. No consultation among team members is allowed on toss-up questions, but consultation is allowed on bonus questions. The high school question categories are: Biology, Chemistry, Earth and Space Science, Energy, Mathematics, and Physics. The middle school question categories are: Life Science, Physical Science, Earth and Space Science, Energy, Mathematics, and General Science.

3-2. No team will have more than one opportunity to answer a toss-up question. If neither team answers a toss-up correctly, the moderator will proceed to the next toss-up question.

3-3. Questions are either multiple-choice or short-answer. A participant may answer a multiple-choice question with either the letter answer (W, X, Y or Z) or the verbal answer; however, if the verbal answer is given, it must be exactly as indicated in the question or as read by the moderator. The only acceptable answer to a multiple-choice question will be the best of the 4 choices indicated in the question; in the event that more than one of the 4 choices is equally correct, then any of the correct choices will be acceptable. **The official list of conventions used regarding short-answer questions is contained in the appendix at the end of these Rules.**

3-4. Once read in its entirety, a question will not be re-read.

3-5. For toss-up questions, the first player on either team to activate the lock-out buzzer system (or "buzz in") earns the right to answer the question, except that no player may buzz in until AFTER the moderator has identified the subject area of the question. If a player buzzes in prior to the reading of the subject area, the moderator will inform the player that he/she has buzzed in too soon, and may add time back to the clock, if necessary.

3-6. On any toss-up or bonus question, the first response given, as determined by the officials, is the only one that counts. However, if a participant gives both a letter answer and a scientific answer to a multiple choice question, both parts must be correct. Any prefacing remarks that do not directly answer the question, such as "my answer is" or repeating the question, will be considered delaying the game and counted as an incorrect answer. (Note: a very short "um", "er", or vocal stumble is acceptable, provided the officials do not consider it delaying the game.)

3-7. If the first team's answer to a toss-up question is wrong and the question was completely read, the other team is given the opportunity to answer it. The second team is allowed another 5 seconds to buzz in after the moderator indicates the answer is wrong or that a blurt or consulting has occurred. (See Rules 4-1 and 4-2.)

3-8. The answer to a bonus question must come from the team's captain. Moderators should ignore an answer from anyone but the captain on the bonus question. The team that is not playing the bonus should remain quiet during the bonus; if the non-playing team engages in behavior that is visually or verbally distracting, the opposing team will be awarded 10 points for that bonus question **and given the option of having 40 additional seconds run off the clock (decided by the team captain).** The moderator will then proceed to the next toss-up. **During each round, each non-playing team will be allowed one "accidental" buzz during the bonus questions. All subsequent buzzes will be called distractions, and the opposing team will be awarded the 10 points for that bonus question and given the option of having 40 additional seconds run off the clock.**

3-9. On a bonus question, if the moderator inadvertently responds to someone other than the captain while indicating whether an answer is correct, the next bonus question will be read to the team eligible for the bonus. If this situation occurs on question #25, the officials will obtain a replacement bonus question.

4. Verbal Recognition & Consulting

4-1. **The only player who may answer a toss-up question is the one who has buzzed in first.** Before answering a toss-up question, the team member who has buzzed in must be verbally recognized by the moderator or scientific judge. (Before the match, the official who will be recognizing participants will be identified.) If a student was not recognized, it is termed a blurt and the moderator will award 4 points to the opposing team, but will not indicate whether the answer was correct or not. The toss-up question is then offered to the opposing team, if still eligible. If the question has not been completely read, the question is reread in its entirety, and the opposing team has an opportunity to answer the toss-up question, and, if correct, a chance to answer the bonus question.

4-2. On toss-up questions, no consultation among team members may occur. Prior to buzz: Should consultation among any of the team members occur without a team member buzzing in, or if any team member should give an answer without buzzing in, any answer given does not count, the moderator will not indicate whether the answer given was correct or not, and the team loses the right to answer the toss-up question. The question is then offered to the opposing team, if still eligible. After a buzz: If consulting occurs, the consulting is then classified as a blurt as in Rule 4-1, and 4 penalty points will be awarded to the opposing team.

4-3. If the moderator inadvertently gives the answer to a toss-up question without giving either team a chance to respond, the moderator will proceed to the next toss-up question.

4-4. If the moderator inadvertently gives the answer to a toss-up question before allowing the second team to respond (after an incorrect answer, or an answer given without the team member having been recognized) the next toss-up question will be read to the second team in place of the inadvertently answered question. If this situation occurs on question #25, the officials will obtain a replacement toss-up question.

4-5. On a toss-up question, if the moderator inadvertently recognizes a player other than the one who buzzed in, the player who buzzed in will be allowed to answer as though he/she had been correctly recognized. **If the player who was inadvertently recognized answers the question, it will be considered a blurt, with 4 points awarded to the opposing team.**

5. Timing

5-1. The match is played until either the time expires or all of the toss-up questions (and earned bonuses for correct toss-ups) have been read. Regional competitions will have two 8-minute halves with a 2-minute break. Halves at the National Science Bowl® finals will be 10 minutes. Each half begins with a toss-up question. Note: At the National Science Bowl® finals, some of the High School double elimination rounds will contain visual bonus questions. The rounds containing visual bonus questions will have two 12-minute halves with a 2-minute break.

5-2. After reading a toss-up question, the moderator will allow 5 seconds for the 2 teams to respond before proceeding to the next toss-up question. Timing begins after the moderator has completed reading the toss-up question.

5-3. A participant who has buzzed in on a toss-up question must answer the question promptly after being verbally recognized by the moderator or scientific judge. After recognizing a

participant, the moderator will allow for a natural pause (up to 2 seconds), but if the moderator determines that stalling has occurred, it will be treated as a wrong answer.

5-4. After a team member has answered a toss-up question correctly, the team is given the opportunity to answer a bonus question. The team will have 20 seconds for its captain to begin to give its answer to the bonus question. Note: On visual bonus questions at the National Science Bowl® finals, the team will have 30 seconds for its captain to begin to give its answer to the visual bonus question.

5-5. On a bonus question, the signal "5 SECONDS" will be given by the timekeeper after 15 seconds of the allowed 20 seconds have expired. Additionally, the timekeeper will indicate the end of the 20-second bonus period by saying "TIME." If the team captain has not begun the response before the timekeeper calls "TIME," the answer does not count. If the team captain has begun the response, he/she may complete the answer, but must proceed through it without stalling. Note: On visual bonus questions at the National Science Bowl® finals, the signal "5 SECONDS" will be given by the timekeeper after 25 seconds of the allowed 30 seconds have expired.

5-6. If a toss-up question is begun before time expires in a half, that question will be finished under the usual rules of play, including the bonus if the toss-up is answered correctly. The half is then over. A question will be considered to have been begun if the subject area has been completely read. The second half will begin with the first toss-up question not read in the first half.

Summary of Timing – Regional Events

Type of Question	Time Allowed
Toss-up	Teams have 5 seconds to buzz in after question is read. If no team has buzzed in, say "TIME".
Toss-up: Buzz in after Toss-up has been read	Must answer within natural pause (up to 2 seconds). If no answer, say "TIME".
Bonus	Team gets 20 seconds to discuss. After 15 seconds, Timer will announce "5 seconds". If no answer after 20 seconds, say "TIME".
End of Game	Each half is 8 minutes. At 8 minutes, say "Game". If team is in process of answering a question, just turn off the clock and announce "Game" when process of the question has been completed.

6. Scoring

6-1. Toss-up questions are worth 4 points, and bonus questions are worth 10 points.

6-2. If a toss-up question is interrupted, the player is recognized, and the answer is correct, the team will receive 4 points. If the answer is incorrect, or if a player from the team buzzing in

answers without being verbally recognized, or if consultation occurs on the team buzzing in, 4 points are added to the opposing team's score, the question is reread in its entirety, and the opposing team will be given an opportunity to answer the toss-up question, and, if correct, the chance to answer the bonus question.

6-3. The double interrupt. If a toss-up question is interrupted and a team incurs a penalty as in the previous rule, 4 points are added to the opposing team's score. The question is then reread in its entirety. However, if the opposing team interrupts the re-reading and subsequently incurs a penalty as in the previous rule, 4 points are added to the first team's score, and the moderator will proceed to the next toss-up question.

Summary of Scoring

Type of Question	Points Awarded
Correct Toss-up Incorrect Toss-up	+4 points & eligible for bonus question +0 points
Correct Bonus (or distraction by non-playing team) Incorrect Bonus	+10 points +0 points
Interrupted Toss-up: - Correct Answer - Incorrect Answer	 +4 points & eligible for bonus question +4 points to opposing team
After a team member buzzes in: - Unrecognized Toss-up (Blurt) - Unrecognized Interrupted Toss-up (also a Blurt) - Consultation among players	+4 points to opposing team
Before a team member buzzes in: - Answering a toss-up - Consultation among players	+0 points, but team is disqualified from answering the toss-up

7. Challenges

7-1. Challenges must be made before the moderator begins the next question, or, for the last question of a half, within 3 seconds of the end of that half. **No challenges may be made during the play of a question.** All challenges must come from the 4 members of each team who are actively competing. The fifth team member and/or the coach may not object verbally or by signal. If either the fifth team member or the coach objects verbally or by signaling to the active team members, the challenge will not be allowed. All decisions of the judges are final.

7-2. Challenges may be made either to scientific content (i.e., whether an answer is scientifically

correct or not) or to the administration of the rules (e.g., whether the timing or scoring is correct). Challenges may NOT be made to judgment calls by the officials, including but not limited to whether a question has been interrupted, whether 5 seconds have elapsed before a student buzzes in on a toss-up, whether 20 seconds have elapsed before a captain begins answering a bonus, whether the non-playing team has engaged in distracting behavior during a bonus, whether a half has expired before a new toss-up question begins, whether a stall or consultation has occurred, whether a player has given a first response, whether time should be added back to the clock, or whether a non-playing audience member has shouted an answer, including whether the shouter is associated with one of the 2 teams.

7-3. Challenges to scientific content will be limited to 2 unsuccessful challenges per team per round, including tiebreaker questions. Successful challenges do not count against this limit. After the second unsuccessful challenge for a team during a round, that team will not be allowed any further challenges to scientific content during that round. Challenges to rules may be made at any time; however, whether a scientific challenge has been made and whether it has been successful are judgment calls, and may not be challenged, as per Rule 7-2.

7-4. Should a question or challenge arise during a match, the match and the clock will be stopped until the question is resolved. Once the question has been resolved, the match will continue from that point. Should the moderator decide that some time was lost due to the interruption in play, an appropriate amount of time will be put back on the clock.

7-5. If a team's answer to a toss-up question is judged incorrect, and they wish to challenge the ruling on the basis of scientific content, but the opposing team is still eligible for the toss-up, the first team should hold its challenge until after the opposing team has completed its toss-up opportunity. The first team should then state its challenge before the next bonus or toss-up question is read. **If the challenge is denied, play will proceed as usual from the end of the second team's answer.** If the challenge is upheld, the second team's answer will be disregarded and the time lost since the first team's answer was disallowed will be put back on the clock. The first team will then be awarded 4 points and have the opportunity to answer the bonus question.

8. Miscellaneous Rules

8-1. Substitutions may be made only at the half. If a team has 5 players, the player who did not play in the first half may substitute for any of the 4 starters. Teams may switch captains, but only at the half.

8-2. No one in the audience may communicate with participants during the match; communication will result in ejection from the competition room. The officials may clear the room of coaches, alternates, and observers if communication is suspected. If someone in the audience shouts out an answer, and the team with which the shouter is associated can be determined, that team will forfeit the match. If the shouter cannot be determined by the officials to be associated with either team, the room will be cleared of everyone other than the officials and the eight players currently playing; the officials will add time back to the clock, and the question will be replaced with the next toss-up or bonus (whichever is appropriate). If this occurs on question #25, one additional toss-up and/or bonus question will be obtained to

finish the game. (Note: the room will not be cleared for National Science Bowl® finals games played at the National Building Museum.)

8-3. Prior to each match, the two team coaches will introduce themselves to each other and will sit together in the back row of the competition room.

8-4. No notes may be brought to the competition table. Nothing may be written before the clock starts. Scratch paper will be provided at the beginning of each match and collected at half-time and at the conclusion of the match.

8-5. Calculators are not permitted.

8-6. Coaches, non-playing team members, and spectators will not write down the questions or answers the moderator reads or use any electronic recording or transmitting device, including digital cameras, cell phones, or computers during the match. At the National Science Bowl finals, coaches will be provided with a team score sheet to track the number of questions answered by each individual student on their team. No one else in the competition room is permitted to write or make notes of any kind during the active competition (other than the competing players). If this occurs, the individual(s) will be asked to leave the competition room. **No cell phones may be used at any time in any of the competition rooms by students, coaches, or spectators**.

9. Rules for the End of Round Robin Tournaments at Regional Events

At the regional events at the end of Round Robin: A tie-break procedure in the following order will be used to determine teams that advance to the elimination tournament:

(i) Head-to-head won/loss record

(ii) If 2 teams are still tied, there will be a 5 toss-up question tiebreaker (with interrupt, blurt, and consultation penalties in effect). No bonus questions will be used during this segment of the competition. If still tied, another 5 toss-up question tiebreaker will be used, etc. until the advancing team is determined.

(iii) If more than two teams are tied, each team, in separate rooms, will be given a series of five toss-up questions (no bonus questions will be used during this segment of the competition). The usual five seconds will be allowed for a competitor to buzz in after the question is completely read. There are no interrupt penalties but also no reason to interrupt since all five questions will be read completely. Teams will be scored on the basis of +1 for each correct answer, -1 for each incorrect answer or blurt or consultation, and 0 for each unanswered question. If two or more teams are still tied, procedure (ii) or (iii), as appropriate, will be used until the advancing teams are determined; **once tiebreaker games have begun, head-to-head results will no longer matter.**

10. Rules for the End of Round Robin Tournaments at the National Event

(i) **The middle school double elimination tournament will include 16 teams: the top 2 teams from each of the 8 divisions.** A tie-break procedure in the following order will be used to determine teams that advance to the elimination tournament:

(a) Head-to-head won/loss record

(b) If 2 teams are still tied, there will be a 5 toss-up question tiebreaker (with interrupt, blurt, and consultation penalties in effect). No bonus questions will be used during this segment of the competition. If still tied, another 5 toss-up question tiebreaker will be used, etc. until the advancing team is determined.

(c) If more than two teams are tied, each team, in separate rooms, will be given a series of five toss-up questions (no bonus questions will be used during this segment of the competition). The usual five seconds will be allowed for a competitor to buzz in after the question is completely read. There are no interrupt penalties but also no reason to interrupt since all five questions will be read completely. Teams will be scored on the basis of +1 for each correct answer, -1 for each incorrect answer or blurt or consultation, and 0 for each unanswered question. If two or more teams are still tied, procedure (b) or (c), as appropriate, will be used until the advancing teams are determined; **once tiebreaker games have begun, head-to-head results will no longer matter.**

(ii) The high school double elimination tournament will include 16 teams: the top 2 teams from each of the 8 divisions. In the event of ties for the 2 positions from each round robin division to qualify for the double elimination tournament, the rankings of the teams in the Division Team Challenge will be used to break the tie.

APPENDIX – Short-Answer Question Conventions

The following conventions will be followed regarding the form of an answer to a short answer question, unless the question specifies otherwise:

A.1. Numerical answers – all numerical answers should be given in exact and simplest form.

(i) Answers that are integers should be expressed in their integer form (e.g, 2^3 should be expressed as 8).

(ii) Fractions that are part of answers should be in lowest terms. Fractions with absolute values greater than 1 may be expressed as either improper fractions or mixed fractions.

(iii) Answers that contain irrational numbers should be exact rather than approximate (e.g., the area of a circle of radius 3 should be expressed as 9π).

(iv) Answers containing radicals should express the radical part in simplest rationalized radical form (e.g., $\frac{6}{\sqrt[3]{32}}$ should be expressed as $\frac{3}{2}\sqrt[3]{2}$).

(v) Answers that are complex numbers should be expressed in $a + bi$ form; if either a or b is 0, stating the 0 term is optional. If trigonometric (polar) form is requested, the magnitude should be positive and the angle θ should satisfy $0 \le \theta < 2\pi$ in radians or $0 \le \theta < 360$ in degrees.

(vi) Answers that are polynomials should be expressed in standard polynomial form, with terms in order of decreasing degree.

A.2 Gravitational acceleration – gravitational acceleration on Earth should be assumed to be 9.8 m/sec^2 or 32 ft/sec^2, dependent on whether the question is stated in terms of metric or English units, respectively.

A.3. Balancing chemical equations – the coefficients of a balanced chemical equation should be integers with no common integer factor greater than 1.

A.4. Biological classification – an answer that is the name of a biological taxonomic classification should be the scientific name (e.g., Arthropoda as opposed to arthropods).

A.5 Multiple answers – on questions that give a list of choices and ask for all choices that satisfy a certain property, the choices will be numbered. Either the verbal names or the numbers will be acceptable.

A.6. Units – if a question specifies the measurement unit for an answer, the unit does not need to be stated in the answer. However, if it is stated, it must be correct.