Kentucky Association for Academic Competition

Future Problem Solving

FPS Evaluation Manual
For Coach and Evaluator Certification
All Divisions

2021-2022 FPS Scoring Reminders and Points of Emphasis

The FPS Scoring Process has been completely redesigned based on changes that will occur with FPSPI. The changes are too numerous to list on one page, but changes can be accessed in a scoring guide that will not be the entire Evaluation Manual.

The final draft of the scoring guide brief will be available before FPS competitions are to be scored.

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FUTURE PROBLEM SOLVING (FPS)
2021-2022 EVALUATION MANUAL and GUIDELINES

Future Problem Solving (FPS) is a team events of the Governor's Cup Competition sponsored by the Kentucky Association for Academic Competition (KAAC). The rules in this manual are modified from the Future Problem Solving Program International (FPSPI) materials to meet the competitive standards adopted by the KAAC Board. In addition to Governor's Cup, KAAC component events include Junior FPS Division and Individual FPS which are not a part of Governor's Cup. All events are judged by the same standards with differences for each noted in the chart on page 4. As coaches give directions to teach students **how to think and not what to think,** the evaluator scores student work based on the requirements set forth in the *FPS Evaluation Manual.*

The following rules govern the coach and evaluator requirements for each Governor's Cup team. A team of 4 students must complete and have a booklet scored by a certified FPS evaluator. A coach of a team in a competition is never permitted to score booklet/s in that competition. Two certification rules impact participation in the FPS component of Governor's Cup Competition:

1. **The school FPS coach must be certified** before the FPS team can participate in District FPS competition. To obtain a KAAC FPS certification, attendance at a KAAC FPS clinic and the return of a completed FPS Certification Booklet within the specified timeframe is required. If a school does not have an FPS certified coach **the team cannot participate in the Governor's Cup District competition.** The coach does not have to be present during the competition. The team must be accompanied by an adult representative.

2. Each FPS team competing in District, Regional or State FPS competition **must provide a certified evaluator.** To obtain a KAAC FPS certification, attendance at a KAAC FPS clinic and the return of a completed FPS Certification Booklet within the specified timeframe is required. **NO COACH OR IMMEDIATE RELATIVE OF AN FPS TEAM MEMBER MAY EVALUATE IN HIS/HER OWN DISTRICT COMPETITION.** A coach in one District may fulfill the FPS evaluator requirement in another District. For questions, call KAAC for additional information. Coaches or immediate relatives may evaluate in Regional competitions. At this level of competition no one is assigned to score a booklet from the school the evaluator represents. Schools within the same division within a District may not share the same evaluator. If a school fails to supply a certified evaluator, **the FPS team cannot participate in the FPS component of Governor's Cup Competition. The FPS booklet must be scored by a certified evaluator to be eligible for Governor's Cup-points recognition and advancement.**

3. In the event that a regional competition is consists of three (3) or fewer teams, the booklet/s must be scored by an evaluator who is NOT the coach or immediate family member of the FPS team.

The following individuals can earn FPS evaluator certification as your school's required evaluator:
- Community volunteers: government, business & industry, service organizations
- Teachers, counselors, principals, and other school personnel
- Parents and relatives who have a child on the FPS team may evaluate at Regional and State levels only
- FPS coaches from another FPS competition level; FPS coaches from another District may score at any level
- The Quick Recall coach
- College students who are at least one year past high school graduation may coach or evaluate at any level
- High school students may evaluate in the elementary grade level only

GUIDELINES FOR EVALUATION
2021-2022 Future Problem Solving Program (FPS)

PURPOSE OF EVALUATION

The primary purpose of evaluation is to provide coaches and students with feedback that allows them to develop and improve their problem solving skills. Team FPS is performance-based and evaluation is an authentic assessment of the team's booklet. Because there is no single "right" answer, FPS employs a variety of strategies to review student work. Specific criteria evaluate performance in each step of the process. Skill improvement remains the most important aspect of evaluation; however, since FPS also involves competition, and competitive scoring must be impartial, a secondary purpose of evaluation is to provide a fair, consistent and reliable method for comparing teams in the Future Problem Solving competition.

PREPARATION

Knowledge is Necessary! Before evaluating booklets for any topic, evaluators should know the topic and develop solid background knowledge of the competitive topic. Students can really lose respect for evaluators — no matter how valid the feedback is — if basic understanding of the material is not obvious. Reading the topic descriptor or several articles from the provided suggested readings (See Appendices Beginning on Page 54), is necessary to gain topic knowledge necessary for evaluation. While you read and contemplate the ideas presented in the Future Scene and in the scoring briefs for evaluators to bring a high level of consistency in FPS evaluation, you must **not discuss booklets with other evaluators.** Questions regarding scoring should be directed to the **FPS and Composition Coordinator**. While doing this, it is essential that evaluators maintain a positive attitude throughout the evaluation process.

SCORE SHEET COMPONENTS

Before you begin to score, make sure you are aware of the score sheet components. On the first page you must complete the box in the upper right corner of the first page. The evaluator certification number is also required. This number is available on the KAAC FPS Certification Number website. Review the score sheet for specific descriptors for each step of the FPS evaluation process to determine the numerical scores for each step. Verify the final rank on each score sheet before submitting the booklets to the competition host.

FEEDBACK

The better evaluators offer constructive feedback and make students want to improve their problem solving skills. Regardless of the quality of the student effort, effective feedback praises students for what they did well and encourages them to use their improved skills to tackle the next problem. Negative feedback may discourage a team and keep them from improving, defeating the purpose of the program. You can reference these types of feedback as you score. Examples of brief phrases or statements are included on the next page.

Praise: Evaluator acknowledgements of a team's effort, creativity, and major strengths
- Reinforces positive aspects of a team's performance
- Establishes a good working relationship between the evaluator and problem solvers
- Rewards the team/individual for facing a problem and developing a solution idea
- Reminds the team/individual, even if the score is not high, they did some things correctly and encourages them to improve

Clarification: Evaluator comments asking students to clarify ideas
- Points out statements that may be confusing or unclear and offers suggestions for improvement
- Encourages students to improve the clarity and elaboration of their work
- Promotes the development of effective communication skills

Criticism (Ideas for Improvement): Evaluator suggestions for areas needing improvement
- Helps students build their skills with specific, constructive comments
- Gives students examples of ways to use their ideas, research, or the problem solving process more effectively
- Encourages students to learn from their work to become better problem solvers

Amplification: Evaluator comments that help students expand their ideas, push their thinking even further, and improve the quality of their problem solving
- Points out gaps in information or logic
- Helps improve their planning for an FPS booklet
- Identifies other ideas that might be considered
- Prompts students to consider the possible consequences of their ideas
- Lists positive, constructive ideas for improvement

ATTITUDE

It is essential that evaluators maintain a positive attitude throughout the evaluation process through feedback. Providing constructive feedback can help students to improve their problem solving skills. Below are examples of feedback that can be used during the evaluation process.

AVOID Negative Criticism	USE Praise, Clarification, Improvement Ideas, Amplification
Poorly written	I was not sure what you meant. Could you show how this fits into the Future Scene? Add details to let us know more about how this will work.
Trivial issue	This issue is related to the FS but focusing on … or … would have more impact on the situation.
Wrong info	Be sure to reference information in the FS accurately.
Incomplete UP	Try assigning a team member to remember each part of the UP.
Impossible	How would this work?
Disorganized Action Plan	Could you try giving us a step-by-step plan? Tell us what needs to happen first, then next, etc.

THE FEEDBACK SANDWICH

The sandwich is too much for individual Challenges and Solutions, but it is great for the comments after each step.
- Make a positive comment in the beginning
- Suggest something that could be improved
- Then tell one way to improve it
- End with another positive comment

Sample: Terrific "today" thinking. Now work on making these ideas more futuristic. For example, try to think of new technology that could be used in your solutions. You've got a real spark here.

Then tell one way to improve it WAYS TO SAY...		
...way to go!	**...you're nearly there**	**...oops!**
• You must be proud of this. • Pat yourselves on the back. • First class all the way. • The mountaintop is in sight. • You really met the challenge. • Thanks for sharing your creativity with me. • The world will thank you for caring. • Hats off to you! • I applaud your effort. • You've gone that extra mile. • Thumbs up! • Give yourselves a standing ovation. • Creative and futuristic – hurray! • You show great flair.	• You've nailed the first step really well. • Good basic skills. Now let your imagination fly. • Good ideas. Aim for even more details. • Wonderful creativity. Show how you are thinking in the timeframe of the Future Scene. • You have very strong problem solving skills. Challenge yourself to show even more futurism (or creativity). • Your creative strengths are shining through. Add some research to increase your excellence.	• Check that your ideas are clearly written. Remember that you don't get a chance to talk to me. • Great start. Work on choosing an important UP and make sure your solutions solve all of it. • Great teamwork. Work with your coach to improve your criteria. • Good effort on this problem. FPS is challenging in the beginning, but it's great when you get comfortable with it. • I can see you've done lots of research. Now link all your ideas to the Future Scene.

An evaluator's comments enable students to focus their learning process and allows the coach to adapt the problem solving instruction to meet the needs of the students. Use the chart above to help give feedback or some dropdowns have been provided on the electronic scoresheet that you may also select.

It is important for evaluators not to confuse their personal expectations and skill level with that of the students represented in an evaluation sample. Evaluators should be able to discern the sophistication of the task and should consider the age/division of the team in constructing positive feedback. Once an exceptional booklet is noted, it may be easy to expect the same quality from all booklets. Evaluators should remember the completion of an FPS booklet is, by itself, a major accomplishment - **possibly more demanding than anything else the students have attempted as part of their educational experience.** Students' work may delight and/or frustrate the evaluator, but the effort will eventually reward the evaluation task. **Providing consistent, positive and constructive feedback is the goal to which all evaluators must aspire.**

COMPARISON of FPS EVENTS
EL - MIDDLE GRADE - HIGH SCHOOL REQUIREMENTS
JUNIOR DIVISION AND INDIVIDUAL FPS REQUIREMENTS

There are differences in FPS competition and scoring for the different events and divisions. The majority of the differences, however, is mechanical, rather than changes in the FPS process.

	Elementary Governor's Cup	Individual FPS All Divisions	Middle Grade / High School Governor's Cup	Junior FPS Division
Step 1	8 Challenges	8 Challenges	16 Challenges	
Step 2	1 Underlying Problem			
Step 3	8 Solutions	8 Solutions	16 Solutions	
Step 4	5 Criteria	5 Criteria	5 Criteria	
Step 5	5 Solutions	5 Solutions	8 Solutions	
Step 6	1 Action Plan			
Total Time to Compete	120 Minutes	120 Minutes	120 Minutes	
Differences in Scoring Booklets --EL is based on the Chart above				
Scoring Step 1	*Fluency (1-16) Flexibility (1-16) Clarity (1-16) Insight (1-16) Originality (0-5)* *Fundamental Concepts: Research Applied (1-5) Creative Strength (1-5) Futuristic Thinking (1-5)*			
Scoring Step 2	*Condition Phrase (0, 2, 4, 6) Stem (0 , 1, 2) KVP (0, 2 4 6) Purpose (0, 2, 4 6) FSP (0, 2, 4, 6)* *Significance (2-20) Scope (2-20) Clarity (2-20)*			
Scoring Step 3	*Fluency (1-16) Flexibility (1-16) Elaboration (1-16) Clarity (1-16) Originality (0-5)* *Fundamental Concepts: Research Applied (1-5) Creative Strength (1-5) Futuristic Thinking (1-5)*			
Scoring Step 4 & 5	*Correctly Written (0-10) EL R (0-25) Grid Used Correctly (0-10)*	*Correctly Written (0-10) R (0-25) Grid Used Correctly (0-10)*		
Scoring Step 6	*Impact on Future Scene (1 or 2-20) Relationship to Underlying Problem (1 or 2-20) Clarity (1 or 2-10)* *Humaneness(2-10) Criteria in the Development of the AP (2-10) Completeness (2-20)* *Fundamental Concepts: Research Applied (1-5) Creative Strength (1-5) Futuristic Thinking (1-5)*			

Component events (JR Team & Individual Divisions) registrations include required evaluator information.

THE SCORING PROCESS FOR COMPETITIVE EVENTS

The FPS process contains both objective and subjective processes. Students are given a Future Scene that is a hypothetical description of a particular problem within the declared topic. Their task is to solve the central problem or charge in the Future Scene by using the FPS process; therefore, students are asked to think subjectively and to think beyond traditional solutions.   FPS booklets are not multiple-choice, true-false, or fill-in-the-blank tests. They are not graded as having right or wrong answers; rather, they are evaluated using the objective standards of the FPS program. Evaluators are asked to score FPS booklets using the standards in the FPS Manual, as well as any Evaluator's Notes that accompany the Future Scenes.

We are humans, using human judgment, which makes us subjective beings. What is the result?   One evaluator may not look at a booklet the same way another evaluator will. But that's okay. The most important thing to remember is that as an evaluator, **YOU ARE CONSISTENT IN YOUR EVALUATIONS.** In other words, all of the booklets that you evaluate are scored using your consistent framework of judgment.

Evaluators are given a copy of the Future Scene and supplemental evaluator notes to help with the evaluation of the booklet written by the students. For the purpose of certification, the Invasive Species Future Scene (on the next page) will be used in this *FPS Evaluation Manual*. For the purpose of presenting the material for certification, the Middle Grade and High School chart will be the focus for this session. *The **FPS Booklet for Certification** will use different materials to complete the KAAC FPS Certification process.*

THE FUTURE SCENE

Student work must relate to the Future Scene. A Future Scene is a hypothetical, what-if, scenario based on current information projected at least 20-30 years into the future. Topics are announced months before any competition is scheduled to occur so that students can research the topic. The Future Scene operates as the "reality" within which participant work must take place. Early in the competitive season, Future Scenes are open-ended and allow students to develop and enhance their skills. Future Scenes become more difficult as the FPS season progresses**.** In cases where research can be found that contradicts the Future Scene, the team is still required to problem solve within the boundaries of the given situation. *The Future Scene used in this coach and evaluation and training manual is below.*

The District Topic, Regional Topic, State Finals and the International Conference are competitive with emphasis placed on the application of the process. For competitive competitions, students do not see the Future Scene in advance. Rather they receive the Future Scene in a proctored setting limiting access to resources and time. In these situations, evaluators reward students for responding directly to the Future Scene, recognizing teams that **use their creativity to respond spontaneously to a situation.** This furthers the educational goal of preparing students to respond to real-world Challenges. **COACHES WHO HAVE TEAMS AT MULTIPLE LEVELS SHOULD COACH TEAMS SEPARATELY.**

RESEARCH

It goes without saying that you cannot be an evaluator of FPS for a team without having knowledge about the topic you are to score. Before you score a topic, please take a few minutes to look at a few topics online. Most topics can be researched by checking out a glossary for the competition topic. In order for you to be able to judge a team's submitted booklet and the research included in the booklet, you must have an informed backgroud of the topic to be fair to all the teams you are serving as an evaluator for a competition. This may also provide you with the team's creative thinking skills as well as any futuristic thinking that teams may suggest as relevant challenges and solutions to issues that arise in the competitive Future Scene.

National Park Service News; US Office of the Interior

EAMT'S Investigate Sightings of Alien Species

The Exotic Animal Management Team is a new division under the Department of the Interior established to investigate the invasion of a significant ecological threat to US forest lands: the Asian Longhorned Beetle (*Anoplophora glabripennis*), a small 1 inch long black and white spotted beetle with 1-inch-long antennae that double the body size and give the beetle its name because of their resemblance to Texas longhorn cattle. The Asian Longhorned Beetle (ALB) is native to Asia and is believed to have been transported to the US in wooden packing material used in cargo shipments from China. The beetles favor maple trees, but a complete list of host trees in the US has not been determined. There are few natural predators for the beetles in North America and thus, the insects have been able to dominate their new habitats. Currently there is no known biological and/or chemical defense against these invaders that have been spotted in every major forest east of the Rockies. The Department of the Interior and National Park Service had hoped that the menace could be contained before it traveled across the Rockies and could infest western forests. Unfortunately, that was not the case. Sightings of several beetles among big-leaf maples were reported at a 4th of July party in a Bakersfield suburb in Southern California. These sightings have been verified and additional sampling has indicated growing numbers of the beetle throughout California.

Californian Riparian Forest Endangered by Asian Beetle

Related Articles:

- *EAMTs: The New Biosecurity Task Force*
- *President Orders FEMA to Prepare for Southern California Ecological Crisis*
- *How We Defeated Invasive Kudzu—A Look Back to 2028*

Riparian woodlands in California occur in ribbon-like bands along stream beds with high humidity that produces a natural greenhouse effect. The forest acreage comprised of both evergreens and deciduous trees constitutes less than 1% of the total acreage of forest land in California, yet it boasts one of the most diverse ecological communities of flora and fauna in the United States. The dense undergrowth serves as home for a broad spectrum of ferns and willows as well as the California blackberry and canyon gooseberries. The riparian forest is considered an ecotone that shares characteristics with habitats on either side, as well as having distinct characteristics and species indigenous to the ecotone itself. The riparian ecotone of Southern California has a higher biodiversity than any other area within the contiguous US. With the confirmed sighting of the ALB in the riparian forest of Southern California, entomologists fear that the damage that these invaders can inflict on the forests may be so devastating that the forest may not be able to recover on its own. In verified infestations, the affected trees must be cut down and the wood destroyed by burning. Adult beetles are usually present from July to October, although they can be found later in warmer weather. The ALB has wings and can fly, but size and weight limits the flight to short distances, so adults tend to stay on the tree from which they emerge or fly short distances to a new host to feed and reproduce. Each female lays 35-90 eggs during her lifetime and those eggs hatch in 10 – 15 days. Damage to the tree is caused by beetle larvae that burrow deep into the central portion of the tree trunk forming tunnels that girdle tree trunks and branches. Once inside the tree, the larvae feed on the tree's vascular system. Continued feeding by the beetles causes dieback of the tree crown and eventual death of the tree. The mature beetles will then burrow out of the tree leaving holes the diameter of ballpoint pens.

Presidential Call to Action

Currently the annual damage to Eastern US forests averages 25,000 trees and $729,000 in economic damages. The numbers of trees being destroyed due to the beetle infestation is expected to rise with this westward expansion. The Secretary of the Interior, Dr. Adolph Green, has been directed by President O'Hanson to take whatever measures he may deem sufficiently effective to curb this menace and its economic and ecological damage to America's biological heritage. Dr. Green has decided to contact the Kentucky Future Problem Solvers to use their problem solving skills to assist him in his quest. He has put forth the following request:

> *"The little devil doesn't really look that dangerous, but the ecological and economic damage to the forests of Southern California could be massive."* — President Carol O'Hanson

Kentucky Future Problem Solvers, America needs your help to avert another crisis in 2041. We are being invaded, and our biological heritage is being threatened. We are aware of the abilities of your teams, and we have decided that our best option is to request your assistance. Please use your skills to analyze the problem of the Asian Longhorned Beetle. Develop a Plan of Action that I may present to President O'Hanson for implementation as soon as possible.

Evaluating the Six Step Process

STEP 1—IDENTIFY CHALLENGES
Must be directly tied to competitive Future Scene

OBJECTIVE: Identify 16 challenges (8 for elementary) within the boundaries of the **Future Scene and *written in statement form.***

|	
Fluency	1-16
Flexibility...	1-16
Clarity..	1-16
Insight...	1-16
Originality (Limited to 4 in total)	1-4
Fundamental Concepts: Research Applied	1-5
Fundamental Concepts: Creative Strength	1-5
Fundamental Concepts: Futuristic Thinking	1-5
NO WORK ATTEMPTED..	**0**

Content: A challenge is an issue, concern, or problem that *may* need attention or consideration (points of importance). A Challenge is a logical cause or effect of the situations in the Future Scene that may have a significant chance of occurring. Flexibility in thinking is demonstrated by exploring challenges from different perspectives or categories.

Structure: Well-written challenges follow these guidelines:
1. Challenges are written in statement form. (Questions are inappropriate for this step.)
2. A challenge does NOT have to be directed to the Future Scene charge but must relate to the Future Scene.
3. Challenges are stated in terms of *possibility*, using non-absolute terms such as may, might, could, etc. Using definitive statements, or stating a challenge as absolute by using terms such as **will**, deny an important element of the FPS process. It is impossible to know what will or will not occur in the future. We can only make educated guesses as to possible occurrences, based on investigation of the resources. Challenges consistently using definitive wording ("will" instead of may, might, or could) **can only receive credit for a maximum of four (4) challenges.** Using "will" instead of "may" or another form of probability more than 4 times will result in all subsequent challenges to be scored as Not Relevant.
4. Extremes, such as "widespread death", "economic ruin" or the "end of the world as we know it", should be avoided due to one of these occurring in a real world situation does not have a strong likelihood.
5. A clearly written challenge has logical cause-effect reasoning and tells **what** the challenge is, **why** it is a challenge, and **how** it logically relates to the Future Scene.
6. If and ONLY if no work has been attempted on this section, a score of zero (0) will be awarded.

Cause-effect reasoning as an element of clarity in challenges

Cause and effect is the relationship between two things when one event makes something else happen. By its very nature, a challenge embodies cause-effect reasoning – looking at causes whose effects can be seen in the Future Scene, or looking at the Future Scene details as causes and determining what effects may occur. There may be multiple causes for a single effect, and multiple effects from a single cause.
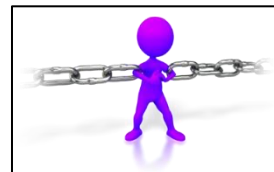
There are many signal words/phrases that indicate cause-effect relationships. The evaluator will probably see all of these in written challenges at one time or another!

Accordingly	Because	Due to	For this reason	Since	Therefore
As a result of	Consequently	If…then	Nevertheless	So that	Thus

Understanding the causes and effects of situations is essential in learning the basic ways the world works. Part of the clarity score is evaluating whether the cause-effect reasoning used in the challenges is logical.

A "reciprocal" cause-effect relationship is a chain. A cause leads to an effect, which then goes on to cause another effect, and so on. Most challenges with high clarity have at least two links within the chain. **Challenges with too many links may become confusing, leading to lower Clarity score.** A cause-effect relationship that takes a "big leap" is probably missing parts of the chain, and is also lower in Clarity. (Example: *Because people are under stress, they may all kill each other*. This is considered an extreme concept and will not score as relevant.)

FLUENCY (1-16 MG/HS) (1-8 EL) measures the quantity of **Relevant (R)** challenge ideas. The numerical score is based upon the number of **Relevant** challenges awarded. If a challenge is **NOT Relevant (NR)**, then you **_MUST_** identify the reason: it is either ambiguous, lacks a connection to the Future Scene, is a Duplicate **(D)** to a challenge, is written as a Solution **(S)**, or is Blank **(B)**. For any challenge scored as Not Relevant, **_GIVE FEEDBACK_** *to explain* the rationale for the assigned score.

Relevant (R) – Challenge has a significant possibility of existing or occurring if the Future Scene were to occur. Challenges must answer three (3) questions: **What, Why** and **How**.

- The cause/effect relationship is a **_logical cause_** of the Future Scene OR a logical **_result_** of the actions within the Future Scene. The cause/effect relationship should be clearly evident.
- An acceptable challenge may be a concern stated in the Future Scene provided that the team gives enough details to the evaluator to show a cause or effect relationship to the Future Scene.
- Challenges that merely **restate** a problem stated in the Future Scene are not awarded a **Relevant**.
- A **Relevant** may be awarded for challenges written at different levels of expertise in the same booklet, as shown in the examples. The focus is on the *ideas*, not the sophistication of the *writing*. As long as the challenge identifies **what** the concern is, **why** it is a concern and **how** it logically relates to the Future Scene, it must be awarded as a **Relevant** in Fluency, even though you, as the evaluator, may have other ideas of its value.
- ONLY **Relevant** responses will earn credit toward Fluency score on the score sheet**.**

- **NOTE: When scoring examples of Relevant challenges, if Challenges are repeatedly written in definitive statement format using "will" and not probablity, the number of acceptable challenges to be awarded will be a maximum of 4.**

The following are examples of some Relevant challenge from the FPS topic Invasive Species but written at different levels of sophistication. Additional scoring elements will be presented after discussed in Step 1.

1. Asian Longhorned Beetles have also been spotted and are moving westward to cross the Rocky Mountains into California. The beetles reproduce and move through forests very quickly. This movement could continue to work westward and then southward to the rainforests of South America. If the rainforests are destroyed, it could lead to the decrease in oxygen production because the Amazon Rainforest provide 40% of the world's oxygen.
2. The devastation to the trees east of the Rocky Mountains from the invasion by the ALB may result in loss of food and shelter for the natural flora and fauna that may be destroyed throughout the path of these future invasions.
3. According to the future scene, the longhorn beetles are starting to invade the US. This may create an ethical dilemma between citizens on what way to solve this problem. Some people may think it is unethical to just exterminate the animal while others may think it is unethical to wait for a better solution. This may cause actions to be ineffective in solving the longhorned beetle issue.
4. Being tasked with the burden of eradicating the ALB before the spread into vulnerable forests may cause stress and anxiety for the EAMT. As a result, the work by this newly formed department may be ineffective as the Department of Interior is trying to thwart destruction of the forests.
5. According to the Future Scene, trees infected by Asian Longhorn Beetles have to be cut down and burned. This may be a problem because as the population of beetles increases, the more trees have to be cut and burned down. This could lead to the pollution of the atmosphere and begin to increase the greenhouse effect in the area.

The Relevant Examples Above will be reviewed again for: *Flexibility, Clarity, and Insight as well as Fundamental Concepts.*

FLUENCY SCORES WHEN THE CHALLENEGES ARE:

Not Relevant (NR) – Challenge does not meet one of the requirements to answer three (3) questions: **What, Why** and **How**. For any challenge scored as Not Relevant, **_GIVE FEEDBACK_** *to explain* the rationale for the assigned score. If a challenge is **NOT Relevant (NR)**, the evaluator **_MUST_** identify the reason:

- does not provide research that is applicable to the competitive FS, Example
- does not identify a challenge or concern, Examples
- it is either confusing or ambiguous, or intent is not clear, Examples
- lacks a connection to the Future Scene, Examples
- is written as a Solution **(S)**, Examples
- is a Duplicate **(D)** to a challenge scored as Relevant,
- is Blank **(B)**.

6. The invasive species may cause destruction similar to what the Kudzu plant did in the last century. This might cause the habitat to be lost.
7. According to the Future Scene mature beetles burrow out of the tree leaving holes the diameter of ballpoint pens. This may be a problem because if someone wants to cut the tree for firewood, they may unknowingly take home a piece of wood with a small animal inside due to the hole created and may burn the animal, causing a small but important part of the ecosystem to slowly die out.
8. According to the Future Scene there is no known chemical defense against these invaders. This might lead to companies creating pesticides that the beetle may become immune to for this cycle and any pesticide developed I the future.
9. According to the future Scene. The little devil doesn't really look that dangerous. This may be a problem because if people don't recognize the ALB, they might leave it alone which may cause the population to grow without any real harm.
10. The affected trees from the ALB may be cut down and burned. The trees may cause bad air pollution for the habitat and the humans living in the area.
11. According to the future scene there is no biological defense against the beetle. This may be a problem because since there is no known biological defense these beetles can run wild. This may lead to the loss of control of the beetle and the loss of riparian forest.

Any duplicate challenge requires that one is Scored as Relevant and the other is the Duplicate. For the Relevant Challenge, Flexibility is assigned and then assessment for Clarity and Insight must be considered according to the scoring guidelines.

NOTE: When scoring examples of Not Relevant challenges, no points are awarded. Only one (1) of the duplicated challenges will receive credit for Fluency.

Awarding the Fluency Score
❑ Mark each challenge statement as **R** — Relevant; **NR** — Not Relevant; **S** — Solution, **D** — Duplicate or **B** — Blank; in the appropriate column of the score sheet.
❑ Fluency score is recorded on the score sheet based on number of challenges scored as Relevant (maximum is 16).
❑ Verify the recorded number of Relevant Challenges.

FLEXIBILITY (1-16 MG/HS) (1-8 EL) measures the *variety* of viewpoints taken in the **Relevant** challenge ideas. The numerical score is based upon the number of categories used in the challenges scored as **Relevant**. *ONLY RELEVANT challenges may be considered when scoring **Flexibility***. A more varied approach to the Future Scene allows a more complete picture of the whole situation. Evaluators take each of the following areas into consideration when scoring booklets for Flexibility:
❑ Evaluators categorize the **Relevant** challenge responses, using the categories listed on the score sheet and in the chart below.
❑ Some challenges can be categorized in more than one way. Evaluators are encouraged to assign a category that has not yet been awarded.
❑ Challenges may receive multiple categories if appropriate. The evaluator is limited to 3 different categories for each challenge.

On the electronic score sheet, it you have assigned more than one category per challenge in Step 1, the maximum number of categories to receive credit will be 16 no matter if you selected all 20 categories. The score sheet will tabulate the final total and can be verified on the Summary Page of the score sheet.

Category List for Flexibility

1. Arts and Aesthetics	11. Government/Politics
2. Basic Needs	12. Law/Justice
3. Business/Commerce	13. Miscellaneous
4. Communication	14. Physical Health
5. Culture	15. Psychological Health
6. Defense	16. Recreation
7. Economics	17. Science
8. Education	18. Social Relationship
9. Environment	19. Technology
10.Ethics/Religion/Morality	20.Transportation

Scoring Challenges 1-5 for Flexibility (Categories). Look back to examples 1-5. Now you must identify the Categories that apply to each of the Challenges. Insert category numbers on the space provided.

1. Category/Categories: _____
2. Category/Categories: _____
3. Category/Categories: _____
4. Category/Categories: _____
5. Category/Categories: _____

Awarding the Flexibility Score AFTER each Challenge is Scored

❏ Mark category/categories for each Relevant Challenge (up to 3 if applicable for each challenge). A category number may be counted ONLY once in the Total.
❏ Record the number of DIFFERENT categories. The maximum score is 16 even if all 20 categories were assigned to a challenge.
❏ Verify and record the Flexibility score in the Step 1 score box.

Now to score for Clarity and Insight. The next 5 challenges will be assessed for Relevant Challenges, Flexibility, and if eligible Clarity and Insight. Fundamental Concepts will be discussed on all Challenges.

CLARITY (1-16 MG/HS) (1-8 EL) Clarity measures the *overall quality* of the writing and the cause-effect reasoning in the challenges. A clearly written Challenge demonstrates effective communication of the cause/effect reasoning presented. A Challenge that is not developed beyond the requirements needed to be considered Relevant is not eligible for additional consideration for Clarity. Only Relevant challenges can be marked with a Clarity score of one (1) point each.

a. Ideas that are fully developed; contain definite consequences rather than vague or extreme statements such as "cause other problems" or "everyone will die."
b. Clarity means it was scored as Relevant with a clear cause-effect relationship indicated.

12. In the future scene, the longhorned beetles favor maple trees. This may be a problem because the longhorn beetles may begin to inhabit much of the maple population. If this occurs, the animals that depend on the tree for basic needs may begin to decline in population. This may lead to fewer people to come to that area as tourists to witness the natural beauty of the area. This might cause businesses surrounding the tourist hotspots to suffer.
13. Because the longhorn beetle has no natural predators in the future scene, this may cause their destruction of native trees to rapidly increase. This may lead to native tree species becoming endangered. This may lead to many animals to be without a habitat or food source. This may lead to competition interference. This is when animals fight for resources, such as food and biomass, which is the available living space for animals.
14. According to the future scene, the longhorn beetles are starting to invade the US. This may create an ethical dilemma between citizens on what way to solve this problem. Some people may think it is unethical to just exterminate the beetle while others may think it is unethical to wait for a better solution. This may cause actions to be ineffective in solving the longhorned beetle issue.
15. In the future scene the longhorn beetle has been spotted in every major forest from the east coast to the Rocky Mountains. This may be a problem because environmentalists and others associated with the major forests of the United States may feel that their government didn't take immediate action. Now their forests are at risk of being destroyed. As a result, they may feel that the social contract has been broken. A social contract is when citizens elect or empower a government official but in return, they expect them to protect their forest life and the biodiversity. In this case if the social contract is broken, citizens may even question past and future decisions some governmental agencies have made that allowed this type of situation, the importation of the beetle in Chinese cargo, to occur.
16. The longhorn beetles are usually present from July to October although they can be found when the weather is warmer. This leads me to infer that the beetle seems to favor warmer climates. Since global warming has made the northern part of the world hotter by several degrees since the year 2007, this means the beetles may move further north. Research reminds us of a time in which this had happened. A type of mosquito indigenous to Southern America was found as far north as Ohio during a heat wave of 2005

Awarding the Clarity Score

❏ Consider the Clarity of each Challenge and award score of one (1) point if clearly written challenge. (maximum score of 16)
❏ Record the Clarity score on the score sheet based on the number of clearly written challenges.
❏ Verify and Record the Clarity score in the Step 1 score box.

INSIGHT (1-16 MG/HS) (1-8 EL) Insight measures understanding of the Challenge consequences with strong and logical cause and effect reasoning. Only Relevant challenges with Clarity point are considered for Insight. An Insightful Challenge demonstrates meaningful, in-depth understanding of potential implications emerging from the Future Scene. the cause-effect reasoning in the challenges. A clearly written Challenge demonstrates effective communication of the cause/effect reasoning presented.

1. Ideas that offer thoughtful analysis.
2. Ideas that are elevated with robust understanding.
3. Ideas that present strong and logical cause and effect reasoning.
   - Insight means it was scored as Relevant and a cause-effect relationship (Clarity), as well as additional Insight into the events of the FS in at least one of the ways numbered above.

Awarding the Insight Score
❑ If a Challenge received a point for Relevant and Clarity, then it may be considered for Insight. Score one (1) point if the clearly written Challenge also meets the requirements for Insight. (Maximum score of 16).
❑ Record the Insight score for each eligible Challenge on the score sheet based on the number of Relevant Challenges receiving a score for Clarity and fulfils the requirements for Insight.
❑ Verify and Record the Insight score in the Step 1 score box.

ORIGINALITY (1 point for each—limited to 4) – Originality rewards Relevant Challenges that are especially insightful, highly creative, and/or unique. A response found infrequently at that age/grade level and considered to be of high quality is scored Original.

1. Only Relevant Challenges are considered for Originality.
2. Challenges do not need to receive points for Clarity and Insight to be considered for Originality.
3. An infrequent Challenge idea that demonstrates breakthrough thinking or is highly creative, futuristic, and/or unique. Original ideas are those that go beyond the obvious.
   - **NOTE:** Wildly futuristic ideas that are scored as Relevant, are not always Original.

Extra example for Original: *If the riparian ecotone is threatened, the changes in the ecosystem may over time cause some of the animals native to this region to move to other areas that are closer to livestock, pets, or humans. If this happens, it may increase opportunities for viruses or bacteria to jump species. Called zoonotic diseases, these pathogens may meet with little resistance from other species and may continue to mutate as they move throughout society, consequently stressing the health care system.* **Relevant: Environment; Clarity and Insight**; **Original; Futuristic**

Awarding the Originality Score
❑ Mark Original in the column for each Relevant challenge judged original. (maximum number of Originals in Step 1 is 4)
❑ Verify and Record the total number of Originals in the Step 1 score box.

FUNDAMENTAL CONCEPTS - Fundamental Concepts for FPS include Research, Creativity and Futurism. Research Applied, Creative Strength, and Futuristic Thinking are scored in the same manner in Steps 1, 3, and 6. Each step is scored independently of the others, based on the work submitted within the step under consideration. All work provided in a step, whether scored Relevant or not, should be considered for determining the scores for Fundamental Concepts. Scores will fall into three ranges that include Developing (1-2 points), Very Good (3-4 points), and Exemplary (5 points). Booklets with **minimal** evidence of the Fundamental Concepts will score 1 or 2 points. If **some** evidence is present, then scores of 3 or 4 can be awarded. Booklets written to **integrate** the Fundamental Concepts will score 5 points.

NOTE: A tally column is available on the scoresheet to assist with scoring these elements as you read each entry.

- ❑ **RESEARCH APPLIED (Range of 1-5 points)** Uses appropriate research and demonstrates knowledge of future issues and trends as related to the Future Scene. Indications of Research Applied include vocabulary terms, concepts, facts, and incidents from the research. Booklets with minimal or no evidence of research, terms, concepts issues or trends will be scored as developing.
- ❑ **CREATIVE STRENGTH (Range of 1-5 points)** Skillfully uses productive, creative, and innovative thinking. Responses showing Creative Strength are those requiring intellectual energy to make mental leaps beyond obvious or commonplace responses.
- ❑ **FUTURISTIC THINKING (Range of 1-5 points)** Utilizes knowledge of future issues and time frame as related to the Future Scene. Futuristic Thinking is demonstrated by addressing and extrapolating relevant trends and technologies from their research to the Future Scene as they identify futuristic, workable ideas, and how they could impact future society.

Awarding the Fundamental Concept Scores
- ❑ Fundamental Concept scores are assessed for each Challenge even if the Challenge was not considered as Relevant.
- ❑ Consider level of development in the booklet of Fundament Concept for each element: Research Applied, Creative Strength and Futuristic Thinking. Use the range for implementation of the concept as evidenced by minimal use, some use or integration into this step. Scores are assigned in the range of 1 or 2, 3 or 4, or 5 depending on each concept's use; descriptors as assigned to each range of scores in the three boxes.
- ❑ Assess the three (3) independently and the corresponding scores within the range to be assigned. On the score sheet select the most appropriate score (1-5) within the range listed.
- ❑ Record the Fundament Concept scores in the Step 1 score boxes provided.

NOTE: If no student work is submitted for a step, a score of 0 will be given for Research Applied, Creative Strength, and Futuristic Thinking within that step.

Fluency and Step 1 Review: Evaluation Issues for Challenges REVIEW

Challenges written without answering *what, why,* or *how* do not meet the requirements to be scored as Relevant.

REVIEW for Step 1 Scores
- **Fluency:** Totals for Relevant and Not Relevant, Duplicate and Solutions (limited to 16 in total)
- **Flexibility:** Unique number of categories used for Relevant Challenges (limited to 16 in total)
- **Clarity:** Number of Relevant Challenges scored as clearly written. (limited to number of Relevants)
- **Insight:** A Relevant challenge that received a Clarity score and identifies meaningful knowledge or understanding of the topic.(limited to number of Clarity)
- **Originality:** Bonus point/s for unique Challenge/s that score Relevant
- **Research Applied:** Shows knowledge of issues and trends for all challenges
- **Creative Strength:** Uses productive, clever and innovative thinking for all challenges
- **Futuristic Thinking:** Uses knowledge of future trends and predictions as related to the FS for all challenges.

Example of a Challenge without answering WHAT
- *The Riparian Forest is located along a stream of water and may have a problem from the invasive species.* (This is a statement about the Future Scene without identifying "What the Challenge is".) This would be scored as **Not Relevant.**

Example of Challenge without answering WHY
- *People may not understand the importance of the trees to the survival of the species.* (Although education is an important issue, this Challenge as it is written does not answer the question, "Why is this a Challenge.")

Example of a Challenge without answering HOW
- *The group faces challenges to protect the species from bioinvasion.* (This is an example of research on the topic with terminology, but is not written to this competitive Future Scene. It does not answer the question, "How is this tied to *this* Future Scene?")

Notes about requirements for Step 1 Challenges
- Challenges must be Relevant to the current competitive Future Scene.
- A well-written Challenge statements will answer 3 required questions, what, why and how.
- Challenges will be written as a statement using a form of probability such as may, might or could.
- Challenges must be clearly written and have a strong connection to the FS

STEP 2 – SELECT an UNDERLYING PROBLEM (UP)
Must be directly tied to Step 1 Challenges(s)

OBJECTIVE: To identify and state an important part of the Future Scene to address	
Condition Phrase	0 2 4 6
Stem	0 2 4
Key Verb Phrase (KVP)	0 2 4 6
Purpose	0 2 4 6
Future Scene Parameters (FSP)	0 2 4 6
Significance	2 4 6 8 10 12 14 16 18 20
Scope	2 4 6 8 10 12 14 16 18 20
Clarity	2 4 6 8 10 12 14 16 18 20
NO WORK ATTEMPTED **0**	

CONTENT: The Underlying Problem (UP) is step that is the foundation for all subsequent steps in the problem solving process, thus it is often considered the most important step in the development of the booklet. A UP must contain a substantive connection to the topic and competitive Future Scene/charge. An Underlying Problem identifies an action to be taken and a goal to accomplish based on one Challenge, one category of concern, or a compilation of several related Challenges the students identified in Step 1. Plans to solve and carry out the UP are identified as solutions in Step 3. An excellent Underlying Problem addresses a **significant,** important issue that has a **scope** that is manageable. The UP is a smaller segment than the entire Future Scene. It identifies the action to be taken through the Key Verb Phrase (KVP), and identifies a positive outcome through the Purpose (P) of accomplishing the KVP. The Underlying Problem is never a *restatement* of the entire Future Scene, nor is it a repeat of the Future Scene charge; it should be narrow enough to focus attention on a defined area of concern and open enough to generate many different solution ideas.

Understanding the Underlying Problem

	Standards	Exceeding Standards
Condition Phrase (CP)	● Based on facts from the FS or research related to the FS	● Facts logically linked to KVP & Purpose ● Clear & Concise
Stem	● How might we (HMW) ● In what ways might we (IWWMW)	● Same as standard
Key Verb Phrase (KVP)	● Derived from challenges ● Clearly related to FS ● Singular	● Significant issue chosen that will positively impact the FS if solved ● Specific/sophisticated verbs
Purpose (P)	● Specifies logical, desired outcome of KVP ● Singular	● Continues to move with KVP in singular, desired direction ● Identifies important stakeholders
Parameters	● Includes topic, time, place	● Same as standard
Significance & Scope	● Identifies issue related to FS ● Issue narrowed without being trivial ● Follows the charge	● Identifies major, important issue related to FS ● Identifies small enough segment of the FS to be manageable but sizeable enough to be impactful
Clarity	● Action clearly defined ● Importance clearly communicated	● Continues to develop ability to be clear & concise

Structure: A well-structured UP is one that includes five **required** elements:
1. Condition Phrase (**CP**)
2. Stem (**S**)
3. Key Verb Phrase (**KVP**)
4. Purpose (**P**)
5. Future Scene Parameters (**FSP**)

Underlying Problem (UP)

> *Because America's biological heritage is being threatened as the ALB moves through the forests,* **(Condition Phrase)** *how might we* **(Stem)** *expand control measures of the Asian Longhorned Beetle* **(Key Verb Phrase**) *in order to minimize ALB's range of destruction in 2041 and beyond?* **(Purpose) FSP Include: Topic**: *invasion of the ALB,* **Time**: *2041 and* **Place:** *woodlands*

UP with elements of the UP identified. This UP is MIDDLE GRADES and HIGH SCHOOL level quality.

CONDITION PHRASE (0, 2, 4, or 2 points) — The Condition Phrase (**CP**) is a lead-in phrase or sentence, fact or logical extension, or research related to the Future Scene, that describes the situation in the Future Scene and is the basis for or cause of the Challenge the team chooses as the focus of its UP. See example inside the box. A Condition Phrase which is not a fact or does not use accurate information from the Future Scene or research such as, *"Since the world is focused on the invasive species in the US, "*will score lower in structure of this element of the UP. This example is not supported by the information provided in the Future Scene. The CP should not be an entire challenge rewritten from Step 1. The CP guides students to make a connection to the Future Scene when selecting the issue for the Key Verb Phrase and the Step 1 Challenge(s) used as the most significant issue of its UP. The **CP** may explicitly or implicitly refer to one challenge or group of challenges, but is not itself a challenge.

Awarding the Condition Phrase Score
- **6 points**: The CP relates to the KVP and uses accurate information from the Future Scene, and/or from research related to the Future Scene, or is phrased to be a logical extension related to the Future Scene.
- **4 points**: CP contains accurate information, sets up direction for the KVP and Purpose
- **2 points**: The CP does not use accurate information from the Future Scene, is NOT a logical extension, or is not related to the KVP.
- **0 points**: The CP is missing.

STEM (0, 2 or 4 points) The UP includes an acceptable Stem ("*How might we*" or "*In what ways might we*") to format the Underlying Problem question. If another Stem is used, it will receive fewer points than the maximum.

Stem
*How might we (***HMW***)*
*In what ways might we (***IWWMW***)*

Awarding the Stem Score
- **4 points**: The Stem is present as listed as one of the examples **HMW** or **IWWMW**.
- **2 points**: The Stem is inappropriate (e.g., *How can we* …? Or *How is the* …?)
- **0 points**: The Stem is missing.

KEY VERB PHRASE (0, 2, 4 or 6 points) — The Key Verb Phrase (**KVP**) is a phrase indicating the students' primary action that addresses the issue in the Future Scene. The **KVP** is <u>ONE</u> single action verb or verb phrase with <u>ONE</u> object or <u>ONE</u> modifier in a phrase that mandates what must occur in Step 3. All Solution ideas in Step 3 must address the action goal of the KVP. When a team writes a **KVP** with multiple verbs, or multiple modifiers or objects to the verb, it will be more difficult to generate relevant solutions in Step 3 and therefore is inappropriate to use. This is the KVP example from the UP listed in the box above: "*expand control measures of the Asian Longhorned Beetle,…*"

Awarding the Key Verb Phrase Score
- **6 points**: The KVP is present and contains a single action verb or verb phrase
- **4 points**: The KVP is present but has two objects or two modifiers
- **2 points**: The KVP is present but has two or more verbs or verb phrases
- **0 points**: The KVP is missing

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Note: A UP with a missing KVP is a **Critical Error** in the FPS process and will negatively affect scores in Steps 2, 3, 4, and 6. In Step 2 on the Structure line of the scoresheet, assign zero (0) points for the KVP if it is missing. This and other critical errors will be explained in more detail later in this manual.

PURPOSE (0, 1, 2, 4, or 6 points) The Purpose (**P**) specifies an optimal direction, goal to pursue, or outcome of the

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Purpose
… in order to minimize ALB's range of destruction in 2041 and

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Key Verb Phrase. (e.g., "*in order to minimize ALB's range of destruction in 2041 and beyond?*") The Purpose is **singular** and should give further information about a desired result that should flow from accomplishing the action goal, and it is not a repetition of the Condition Phrase or the Key Verb Phrase. The Purpose usually begins with "so that," or "in order to". A Purpose may also be identified by "such that", "so" or "to" when it identifies only one action to be taken. When a team writes a Purpose with multiple verbs

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or infinitive phrases or multiple modifiers or objects to that verb, it will be more difficult to generate relevant solutions in Step 3 and therefore is inappropriate to use. If the team does not include a written Purpose in the UP, this is a **Critical Error** and will be discussed later in the manual.

Awarding the Purpose Score
- **6 points**: The Purpose is present and has a single focus with a logical relationship to the KVP
- **4 points**: The Purpose is present but has multiple objects or modifiers
- **2 points**: The Purpose is present but has more than one verb or infinitive phrase, or present but no clear relationship to the KVP or
- **0 points**: The Purpose is missing

Note: A UP with a missing Purpose is a **Critical Error** in the FPS process and will negatively affect scores in Steps 2, 3, 4, and 6. In Step 2 on the Structure line of the scoresheet, assign zero (0) points for the Purpose if it is missing. This and other critical errors will be explained in more detail later in this manual.

FUTURE SCENE PARAMETERS (0, 2, 4, or 6 points) The **Future Scene Parameters (FSP)** place the UP within the confines of the Future Scene. These parameters include **topic** (major focus of Future Scene), **place** (geographic

location), and **time** (date from Future Scene, reasonable related dates, or logical time phrases). The topic parameter can be either the listed topic subject (i.e., invasive species) or the more focused topic presented in the Future Scene such as a reference to the Asian Longhorned Beetle.   Without specific Future Scene Parameters included in the UP, the team shifts the overall focus of the UP to a more generic setting which causes work in subsequent steps to be outside the Future Scene Parameters.

Future Scene Parameters
Because America's biological heritage is being threatened as the invasion of the ALB moves through the **woodlands***, how might we expand control measures of the* **Asian Longhorned Beetle***, in order to minimize ALB's range of destruction in* **2041** *and beyond?*

FSP (Acceptable Parameters for Future Scene on page 4)
Topic – *invasive species or ALB*
Place –*woodlands; Southern California forest*
Time – *2041,* **OR** *time in which the AHB is noted*

The location parameter may not always be a specific geographic location (i.e., the Internet). Phrasing that indicates a time beyond that mentioned in the Future Scene is also an acceptable means of identifying time parameters in place of a specific year (i.e., the era following the arrival of the AHB). However, the phrase **"now and beyond"** is not indicative of the time parameter and would not receive credit.

Note: When scoring the remaining steps of the booklets, the evaluator is to score the booklet based on the competitive Future Scene Parameters regardless of the parameters identified in the UP.

Awarding the Future Scene Parameters Score
- **6 points**: All three parameters of **Topic**, **Place**, and **Time** are present
- **4 points**: Two of the parameters are present
- **2 points**: One of the parameters is present
- **0 points**: None of the parameters are present

SIGNIFICANCE and **SCOPE** measure the **quality** of the Underlying Problem (UP). The students should select a UP that identifies a manageable area of concern which has significant importance to the Future Scene and its charge. Word

choice is vital when considering the written UP, which will impact the scores. If a UP with either a multiple KVP or Purpose exists in a booklet, evaluators **refer to the rubric guidelines** when scoring Significance, Scope and Clarity in Step 2 based on the structure and/or its quality. A UP written with a KVP and Purpose that address the topic, charge, or Future Scene in a very general way will be viewed as a critical mistake and should score very low in Significance and Scope.

SIGNIFICANCE (1 for Critical Errors, and 2—20 points even numbers) looks at the ***importance*** of an Underlying Problem and must be connected to the Future Scene and/or charge.   It should reflect a concern from Step 1; one that identifies an area of concern in which solution ideas can be derived from one Challenge or cluster of Challenges generated in Step 1 from the Future Scene. The UP should establish an objective for Step 3. Full credit is awarded to an UP that identifies a significant area of concern. If the Significance score is lower, then the Impact on the Future Scene score in Step 6 will also be low.

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Awarding the Significance Score
- ❑ Use the descriptors to evaluate the importance of the Underlying Problem.
- ❑ Determine the numerical score.
- ❑ Verify and Record the Significance score in the Step 2 score box as listed below.
- **18 or 20 points**: UP identifies an **important** issue related to Future Scene charge with a meaningful connection to the topic. Excellent KVP that ties directly to a well-defined, clearly-written purpose. UP addresses FS charge.
- **14 or 16 points**: UP identifies an **appropriate** issue related to the Future Scene charge.   Effective KVP; goal/purpose is evident; UP is feasible and addresses FS charge
- **8, 10 or 12 points**: Contains multiple modifiers or objects of verb/s phrases in KVP and/or P; Identifies minor issue from the FS; identifies **limited** connection to FS and/or charge.
- **4 or 6 points**: Contains multiple verb/s phrases in KVP and/or P; UP addresses trivial issue; **little** evidence to connect to FS and/or charge.
- **2 points:** Purpose not connected to KVP; **Weak** connection to the Future Scene or Charge; is not derived from the Challenges generated in Step 1.
- **1 point for Critical Errors**: Restates, is Circular (Purpose repeats KVP &/or CP), uses an Absolute Verb in KVP and/or Purpose, is Without a Purpose or KVP, or is Unrelated to, Broadens or Ignores the Future Scene.

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SCOPE (1 for Critical Errors, and 2—20 points) measures the extent to which the Underlying Problem is manageable. The issue/concern identified in the UP should be a smaller part of the entire Future Scene; identifies a small enough segment of the FS to be manageable but sizeable enough to be impactful. Identifies a major/important issue within the FS to solve, UP addresses FS charge.

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Awarding the Scope Score
- ❑ Use the descriptors to evaluate the Scope of the Underlying Problem.
- ❑ Determine the numerical score.
- ❑ Verify and Record the Scope score in the Step 2 score box as listed below.
- **18 or 20 points**: Identifies as small enough segment of the FS to be manageable but sizeable enough to be impactful; a major/important/major issue within the Future Scene to solve; & UP that addresses the FS Charge.
- **14 or 16 points**: Some consideration given to focus and manageability; impact may be limited identifies an appropriate issue within Future Scene & UP shows connection to the Future Scene Charge.
- **8, 10 or 12 points**: Contains multiple modifiers or objects of verb/s phrases in KVP and/or P. UP is so narrow that it is unlikely to be attainable or effective.
- **4 or 6 points**: Contains multiples verb/s phrases in KVP and/or P; UP is too expansive and unlikely to impact FS.
- **2 points**: Weak relationship to Future Scene, topic and charge UP ignores relevant parameters; expands parameters beyond the Future Scene.
- **1 point for Critical Errors**: Restates, is Circular (Purpose repeats KVP &/or CP), uses an Absolute Verb in KVP and/or Purpose, is Without a Purpose or KVP, or is Unrelated to, Broadens or Ignores the Future Scene.

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CLARITY (1 for Critical Error 2—20 points) examines effective communication of the goal of the UP. An excellent UP will have a powerful impact on the Future Scene and will clearly define the action to be taken. For a clearly written UP, a higher Clarity score will be assigned if it effectively communicates its importance and what the team wants to accomplish. Clarity score will be lower when the Underlying Problem is confusing or ambiguous. This example may be difficult to predict the UPs impact on the Future Scene.

Awarding the Clarity Score

❑ Examines effective communication of the goal (intent) of the UP

> Condition Phrase identifies a significant issue from the Future Scene
> The KVP presents what solutions should strive to accomplish in a way that is easy to understand
> The Purpose should effectively indicate the reason for accomplishing the KVP
> The CP, KVP, and Purpose should logically lead one into another

❑ Verify and Record Scope score in the Step 2 score box as listed below.

- **18 or 20 points**: **UP Excellent: powerful impact on FS.** UP clearly defines action and effectively communicates its importance. UP clearly defines action and effectively communicates its importance
- **14 or 16 points**: **UP Relevant: clear connection to UP**. Effort made to clearly define action and explain its importance
- **8, 10 or 12 points**: **UP Applicable, phrasing awkward,** Contains multiple modifiers or objects of verb/s phrases in KVP and/or P. Action to be taken (KVP) is vague; intent of UP unclear.
- **4 or 6 points**: Contains multiple verb/s phrases in KVP and/or P; UP confusing or ambiguous; difficult to predict UP's impact on FS.
- **2 points**: Purpose not connected to KVP making the UP unclear
- **1 point for Critical Errors**: Restates, is Circular (Purpose repeats KVP &/or CP), uses an Absolute Verb in KVP and/or Purpose, is Without a Purpose or KVP, or is Unrelated to, Broadens or Ignores the Future Scene.

NOTE: A UP that contains multiple KVPs and/or multiple Purposes - The Significance or Scope score will be reduced. Please refer to the rubric when awarding these scores.

NOTE: If there is a multiple KVP or Purpose, only the first one is considered when scoring Clarity in the ranges on the score sheet even though all concerns or goals must be addressed in each Solution.

NOTE: CRITICAL ERRORS: The Underlying Problem addresses a significant issue from the Future Scene and narrows the Future Scene. There are some errors that are deemed critical which affect the successful completion of the FPS process and must be identified by evaluators because of their negative impact upon the booklet scores in Steps 2, 3, 4, and 6. The following list presents the five **Critical Errors** in the FPS process and examples can be viewed in the Underlying Problem chart beginning on page 19.

CRITICAL ERRORS
Steps 2, 3, 4, 6 will be impacted if the UP is a Critical Error

- **RESTATEMENT**: A **Restatement** in the UP is a summary of the entire Future Scene, a revision of the intent of the charge that ***does not narrow the topic***, or a generalization of the Topic. Words from the Future Scene charge can be used in the UP, but if the charge is very general the resulting Key Verb Phrase is most likely a restatement. Without narrowing the Future Scene students not only misunderstand the FPS process, but also do not understand the mandated scores in the subsequent Steps of the booklet.
- **CIRCULAR**: A **Circular UP** occurs when the **Purpose** is repeated in either the **CP** and/or **KVP**. This repetition may be contextually the same (verbatim) or a paraphrase carrying the same meaning. Underlying Problems such as these circumvent the cause/effect relationship necessary for the FPS process.
- **ABSOLUTE VERB**: **Absolute verbs** in the **KVP** and/or **Purpose** are restrictive mandates that lack flexibility and limit the creation of varied solutions. *Solutions will either solve the UP or not at all.* The use of an absolute verb such as ***stop, prevent, eliminate***, etc., in the Underlying Problem will narrow the focus of the UP and cause difficulty for the students to develop solutions in Step 3.
- **NO KVP or NO PURPOSE**: A UP without a **KVP** or **Purpose** occurs when the students fail to include one or both of these elements in the written **UP**. This error causes the team to lack a stated action or goal to pursue or direction to take as they approach the major challenge or area of concern identified from the specific competitive Future Scene.
- **UNRELATED TO, BROADENS OR IGNORES THE FUTURE SCENE**: A UP that ignores the facts of the Future Scene, perhaps concentrating on some aspect of research of the topic and moves outside the parameters of the Future Scene.

Is it an Absolute Verb or Not?
NOTE: As an evaluator, sometimes it is difficult to determine if the mandating verb is absolute. The KVP "***protect against the loss of the trees located in the Riparian Forest***" or as the Purpose "***so that the Riparian Forest will be protected against the loss of the trees***" is written in the Underlying Problem, the first objective is to identify if there is flexibility or degrees to which the mandating verb can be accomplished. In this case, there is flexibility, but it may be more limiting in scope than another verb choice. Some examples of solutions the team identify to protect the Riparian Forest might include emergency warning technology, organization of security devices, training of individuals responsible for protection of the trees, additional funding for the EAMT organization, and many, many more. In this case "protect" or "will be protected" would **NOT** be considered "absolute." If the KVP or Purpose was stated "stop the loss of Riparian tree loss," the flexibility for this verb is not the same. "**Stop**" is absolute. This verb MUST be viewed as either the solutions will **or** will not stop the loss of trees.

Extra Example UP#1: According to the Future Scene, Asian Longhorned Beetles have dominated their new habitats. How might we reduce the threat of Asian Longhorned Beetles in the United States so that its ecosystems will be successful in the year 2041 and beyond? **CP   , Stem   , KVP   , P   , FPS   , SIG   , SCOPE**

Extra Example UP#2: Since the invasive species has not been contained, how might the FPS team provide more protection of the biodiversity in the world, in order to have continued sustainability of the habitat? **CP   , Stem   , KVP   , P   , FPS   , SIG   , SCOPE**

Extra Example UP#3: Since the Southern California forest has many endemic habitats that are in potential danger in 2041 by an invasive species, the ALB, how might we improve collaborative restoration efforts of the native forest so that the survival of these native species like the maple tree is sustainable? **CP   , Stem   , KVP   , P   , FPS   , SIG   , SCOPE**

Extra Example UP#4: Because the Asian Longhorned Beetles are an invasive species to maple trees, how might we improve methods of protecting the riparian forest habitats of Southern California so that the species is less likely to become extinct? **CP   , Stem   , KVP   , P   , FPS   , SIG   , SCOPE**

Extra Example UP #5 How might we reduce bioinvasion, so that the natural habitats in the forest will be protected? **CP   , Stem   , KVP   , P   , FPS   , SIG   , SCOPE**

Extra Example UP #6 Since the natural communities of the riparian are biologically unique, in what ways might we reduce the negative effects of the invasive species so that the forest keeps it unique ecosystem? **CP   , Stem   , KVP   , P   , FPS   , SIG   , SCOPE**

Step 2 – Evaluation Issues for Underlying Problems

KVP with multiple verbs or verb phrases OR multiple objects/modifiers of the verb	**Examples of multiple objects of the Key Verb Phrase**
	• …*expand control measures of the ALB **and** affected trees* (multiple objects used: *control measures of the ALB* and *affected trees*) **Award 12 points**
Scores of 8, 10 or 12 (objects/modifiers)	• …*improve sustainable, biodiverse environment* (multiple modifiers: sustainable, biodiverse) **Award 8 points because this is more general as stated**
	• …*improve survival of forest or natural habitat of riparian forest* (multiple objects:) **Award 10 points**
Scores or 4 or 6 (verbs)	**Examples of multiple verbs/verb phrases in the Key Verb Phrase**
	• …*increase the protection of riparian forest **and** improve* living conditions for natural species (multiple verbs used: increase and improve) **Award 6 points**
	• … *protect environment **and** help retain the number of trees in the forest* … (multiple verbs used: protect & help retain) **Award 4 point**
	Notes on multiple verbs/verb phrases and multiple objects:
	• A KVP should contain a single verb or verb phrase with a single object or modifier.
	• Words like *and* & *or* in the Key Verb Phrase cause multiple verbs, multiple objects or multiple objects/modifiers.
Score first verb or phrase listed to assign score	• Points will be reduced for the KVP in each of these cases.
	• The scores will be reduced and must be assigned within the range identified within the guidelines, and evaluators will use only the first verb/verb phrase or object when determining the score to assign.
	• Evaluators refer only to the first verb/verb phrase or object/modifier for scoring KVP.
NOT Critical Errors	• To be scored as Relevant in Step 3, solution ideas must address everything mentioned in the KVP.
	• multiple and should be avoided to prevent any confusion. EX. …*increase recovery of lost trees affected by the invasive species while arranging for tax incentives*…. This would be regarded as multiple. These two items are not related and are 2 distinct items. **Award 4** points for lack of connection to the KVP
Purpose with multiple verbs, verb phrases, OR multiple objects/modifiers.	**Examples of multiples in the Purpose**
	The following examples are written with commonly used lead-in phrases to help identify the beginning of the Purpose. Lead-ins following the KVP include, but are NOT limited to the phrases "**so**", "**so that,**" "**to,**" "**in order to,**" or "**such that.**"
	• … *so that we minimize the destruction of woodland value and air quality to the area does not occur in 2041?* **Award 12 points** for multiple objects (woodland value and air quality in the Purpose)
Scores of 8, 10 or 12 (objects/modifiers)	• …*in order to assist the Exotic Animal Management Teams and other environmental groups for the eradication of ALB?* (multiple objects to show assistance to the two specific groups identified in the Purpose –*EAMT* and *environmental* groups **(Award 10 points)**
	• … *such that the environmental and economic value is not decreased after 2041?* **Award 8 points** for multiple modifiers describing the type of values in Purpose
Scores or 4 or 6 (verbs)	• …*so the safety of the riparian forest or the inhabitants is achieved?* (Multiple objects used: *riparian forest* and *inhabitants*) **Award 8 points**
Score first verb or phrase listed to assign score	• …*so the US government sets containment of ALB as a priority and the citizens encourage an incentive program for control of this invasive species?* (Multiple verbs used: *sets* containment …and *encourage* incentive program…) **Award 6 points**
	Notes on multiple verbs/verb phrases and multiple objects or not connected to the UP:
	• Refer to the rubric for the range of scores to be assigned.
	• Evaluators will refer only to the first verb/verb phrase or object/modifier when scoring Purpose.
NOT Critical Error	• Solution ideas must support both verbs or objects/modifiers to receive Relevant scores in Step 3.
	• **Caution:** the use of "*while*" may also cause a phrase to be considered as multiple in either the KVP or Purpose when it indicates 2 actions are occurring and should be avoided to prevent any confusion.

| KVP is weakly connected to the FS or Charge

Or

KVP narrows to one aspect that has a minimal impact on the overall Future Scene

NOT Critical Errors | **Example extensive**
• …*in what ways might we expand control measures of the ALB with governments from North America* … (extending the scope of the UP to the include the entire North American continent will still impact the forests in the US, but this would be regarded as "weak" and not the primary focus of FS or charge)
• … **Award 2 Points**
• *… how might we reduce the number of bad species, so that science curriculum teachers can have information to study on the invasive species in 2041 and beyond?* **Award 2 Points**

Example Narrow
• …*how might we expand control measures through the financial support of local businesses…* (not supported in FS) **Award 2 points**
• A KVP that is weakly tied to the Future Scene and the charge. May ignore the specific FSPs of the competitive FS. This usually causes a different line of action to be considered which is ultimately an insignificant issue in the Future Scene. A KVP that limits the charge so that a single issue is addressed that has little impact or is insignificant to the overall Future Scene.
• The Purpose and KVP are not connected.
• A score of 2 is given for Significance, Scope and Clarity
• The Future Scene parameters of topic, place, and time from the competitive FS are used when scoring Step 3 even if incorrect parameters are included in the UP. |

Critical Errors
Mandatory Scores in Steps 2, 3, 6 and
Steps 4 may also be affected

In competitive situations such as the District, Region or State Final a booklet with one of the Critical Errors in the Underlying Problem has a very difficult time advancing to top rounds of evaluation.

❑ Score of 1 for Significance, Scope and Clarity in Step 2.
❑ 25% Rule in effect for the number of possible 16 written solutions for MG/HS or possible 8 written solutions for EL scored as Relevant. (Maximum of 4 for MG/HS and maximum of 2 for EL levels)
❑ The competitive Future Scene Parameters of topic, place, and time must be considered when scoring Step 3 no matter the parameters identified in the UP.

 ADDITIONAL EXPLANATIONS WILL BE GIVEN LATER FOR THE FOLLOWING POINTS OF EMPHASIS
❑ Score of 1 in Step 6 for Impact on Future Scene, Relationship to UP, and Clarity
❑ For a written UP without a KVP or Purpose, NO credit can be awarded in Step 4 for these structural elements in the criteria.

| **CRITICAL ERROR –**

Restatement of KVP and Purpose of the Competitive Future Scene | **Examples**
• … *How might we overcome the challenges resulting from the invasion of the ALB…?* **(Restatement of topic**—Other phrasing for the KVP instead of **"overcome"** may include "**develop remedies for**" or "**lessen.**" or "**solve**") *so that a crisis can be averted in 2041* **(Repeat of the charge)**
• *In what ways might we focus on the issues for the Riparian woodland …* **(Restatement of Future Scene)** *in order to assist President O'Hanson.* **(The KVP and the Purpose combined make this a restatement of the Future Scene.)**
Notes
• A Restatement is a KVP and Purpose that addresses the entire Future Scene in a very general way and is a critical error in the creative problem solving process. The KVP should be a narrowing of the entire Future Scene to one area of concern without trivializing the KVP.
• Words from the Future Scene charge can be used in the UP, but if the charge is very broad the resulting Key Verb Phrase could be a restatement. |

CRITICAL ERROR–	**Examples that could be used in either the KVP or Purpose**
  KVP Absolute Verb **Purpose Absolute Verb**	• …*stop the loss native maple trees* • …*eliminate the ALB from the affected areas* • …*ensure the Riparian woodland is protected against the invasive species* **Notes** • A UP that includes an Absolute Verb as the KVP or Purpose ignores the cause and effect relationship necessary for effective problem solving that identifies an action to be taken to and a goal to be accomplished. • Absolute verbs such as stop, prevent, eliminate, etc. limit the importance and manageability of the UP, thus reducing the points awarded.
CRITICAL ERROR – – **Circular UP (Purpose is repeated in the Condition Phrase and/or the KVP)** 	**Example** • *The Asian Lonhorned Beetles have dominated their new habitats. How might we reduce the threat of Asian Longhorned Beetles in the United States so that its ecosystems will not continue to be dominated by the ALB?* **(Purpose and Condition Phrase are the same Award 1 point)** • *The ALB is continuing to move westward toward the Southern California woodlands. How might we improve the survival of the natural species living in the Riparian forests to help advance the sustainability of numbers of species in the habitat?* **(Purpose and Key Verb Phrase are the same Award 1 point)** **Notes** • A UP identified as Circular ignores the cause and effect relationship necessary for effective problem solving. • **Opposite direction from the Purpose that is not a critical error.** *Since there is a growth in the number of ALB arriving in forests across the US, how might we provide protection against this menace so that the number of this invasive species will reduce in 2041 and beyond?*
CRITICAL ERROR–– **UP unrelated to or ignores the competitive Future Scene** **Or** **broadens or goes beyond the facts stated in the Future Scene** 	**Example of Unrelated to or Ignores the Future Scene** • *Because there are issues for the people, how might we educate the public so that everyone will be more successful?* • *Because biodiversity is vital to our survival, how might we protect habitats from invasive species in order to retain valuable biodiversity? (could be written for any FS on invasive species; ignores the scene.)* **Notes of Unrelated to or Ignores the Future Scene** • An unrelated UP ignores the facts of the Future Scene and/or charge, perhaps concentrating on some aspect of research of the topic. A score of 1 is given for Significance, Scope and Clarity for this Critical Error. **Example of Broaden UP** ● *Since the area is having a problem with invasive species, in what ways might we increase the global concerns so that people so that help can be received from the United Nations?* ● *Because we lack knowledge about what to do with invasive species, how might we use this wealth to increase scientific research for the world in order to improve their situation?* **Notes of Broadened UP** • A UP that broadens the charge of the Future Scene is one that takes a tangent to the Future Scene and applies it to their UP. This is usually a completely different line of action sometimes related to research. Even though the team began the Condition Phrase with a phrase the is connected to the Future Scene, the action to be taken is unrelated to or ignores the Future Scene of the Charge.

CRITICAL ERROR –	**Example NO KVP**
NO KVP or NO PURPOSE	• *According to the Future Scene, Asian Lonhorned Beetles have dominated their new habitats. The treat to the forests in the US needs to be reduced, so that its ecosystems will be successful in the year 2041 and beyond?* **As this example is written, there are 2 Purposes and No KVP and No Stem.**
	Notes
	• A score of 0 is given for KVP.
	• A UP written without a KVP ignores the cause and effect relationship necessary for effective problem solving.
	• Solutions must be assessed against the KVP. Without an action to be taken, it will be extremely difficult to award points for solutions.
	Example No Purpose
	• *Since the Southern California forest has many endemic habitats that are in potential danger in 2041 by an invasive species, the ALB, how might we improve collaborative restoration efforts of the native forest?* **(Purpose is missing)**
	Notes
	• A score of 0 is given for Purpose.
	• A UP written without a Purpose ignores the cause and effect relationship necessary for effective problem solving.
	• Solutions must be assessed against the KVP, FSPs and the Future Scene charge.
	• No solutions may be awarded Elaboration credit in Step 3.
	• It will be extremely difficult for any UP written without a Purpose to score Relevant solution/s.

Note: A UP that encompasses one of the critical errors is inconsistent with the FPS process. The team will have difficulty scoring high marks in the remainder of the booklet. Examples of critical errors will be included in the Underlying Problems chart beginning on page 19.

NOTE: A UP that contains multiple KVPs and/or multiple Purposes - The Significance, Scope and Clarity scores will be reduced. If multiple verbs have been identified, then the scores will be either a 4 or 6. For multiple objects or modifiers, the scores can be assigned within the range of even numbers between 8 and 12 points. When assigning scores with multiples in the KVP or Purpose, the first verb or verb phrase will be assessed when determining the score that falls within the range. When scoring Solution ideas, all elements must be addressed to receive credit.

NOTE: Even though a booklet may be scored without any Relevant solutions, all solutions are evaluated for Fundamental Concepts and must be assigned at least one (1) point for each element for a minimum score of 3 points.

NO KVP or NO Purpose—Critical Error

NOTES: Additional Scoring Information when either of these structural elements, KVP or Purpose, is omitted from the UP: Without including the KVP the team has not identified an action to be taken to solve the possible issues, challenges, or concerns from the Future Scene. This is a Critical Error. Without an action to be accomplished, it will be virtually impossible to generate relevant solutions in Step 3, produce criteria that are applicable in steps 4 & 5, and fully describe an Action Plan in Step 6. Some of the same issues will become evident with NO Purpose. No purpose means no direction/no goal for the action identified in the KVP. This makes generating relevant solutions nearly impossible to create in Step 3. If a solution can be scored as Relevant, it will not be eligible for additional points for Elaboration or Clarity. In Step 4, a UP written without a Purpose means that students will not be able to generate a specific criterion that targets the Purpose. The Action Plan scores in Step 6 will also be negatively affected due to the Critical Error.

The only area of scores not impacted by these errors is the assignment of the Fundamental Concepts. All solutions in Step 3 and the Action Plan in Step 6 should be scored and assigned scores that fall within the range of scores on the rubric.

Since the Southern California forest has many endemic habitats that are in potential danger in 2041 by an invasive species, the ALB, how might we improve collaborative restoration efforts of the native forest?

If the team had written a Purpose such as this one: "in order to decrease a loss of biodiversity?", the team would have the structural elements of the UP that caused the critical error. Scores in Steps 3, 4 and 6 would not be restricted and have the potential to move a booklet from being ranked last to first in the set to be scored by an evaluator. **(For any UP, the evaluator must assess the team's submission based on the UP as written, the Future Scene, Future Scene charge and Future Scene Parameters)**

✓ **Assessing Step 3 with a UP without a written KVP or Purpose:** Solution ideas in Step 3 are scored for Relevance very strictly against the KVP, the Future Scene Parameters and the charge. The restrictions in Step 3 are severe. The limitation on the number of solutions an evaluator may allow for credit toward the Relevance score is up to **25%** *of* the 16 total possible solution ideas in HS & MG divisions and 8 possible solutions ideas in the EL division with a maximum of 4 for HS and MG and 2 for EL Divisions**.** *NO points are given for Elaboration for any UP originally written without a KVP or Purpose. If the CP and the KVP do not have a logical connection, it will be difficult to award credit for solutions in Step 3.*
✓ **Special notes when considering the Future Scene Parameters:** Evaluators will be charged to score all solutions against the Future Scene Parameters (topic, time and place) as written in the Future Scene if they are not the same as written in the UP.
✓ **Assessing Step 4 score with No KVP or No Purpose:** In Step 4, NO criterion may receive credit for being **SPECIFIC to the KVP or PURPOSE**.
✓ **Assessing Step 6 score:** The Impact on Future Scene, Relationship to UP, and Clarity scores will be one (1).

Step 2: – Evaluation Issues for Underlying Problems REVIEW

UP is derived from challenge/s or one area of concern derived from the competitive Future Scene	See examples above for Significance and Scope concerns.
REVIEW for Step 2 Scores • **Structure:** The key to a well-written UP begins with 5 required elements being present and earns points (CP, Stem, KVP, P and FSP) This is the structural score. • **Significance:** The importance of the UP is considered for points. • **Scope:** Points are awarded based on the manageability of the UP • **Clarity:** Examines effective communication of the intent of the UP	**Notes about requirements for Step 2 Underlying Problem** • This is often called "the most important step" of the FPS process because every subsequent step of the booklet is completed based on the UP selected which sets the action to be taken and the purpose to be achieved. • Each UP has scores based on its structure and the quality of the action (KVP) to be taken along with the goal (Purpose) to be achieved. • The parameters of the Future Scene are important to narrow the significance from the general topic to the specific information presented by the team for consideration.

# STEP 3 – PRODUCE SOLUTION IDEAS
Must tie back to the UP

OBJECTIVE: Identify 16 solutions (8 for elementary) addressing the UP within the boundaries of the **Future Scene and *written in statement form.*** Scores for solutions will either be recorded as Relevant, Not Relevant, Duplicate or Blank.

Fluency 1-16

Elaboration 1-16

Flexibility 1-16

Clarity 1-16

Originality (Limited to 4 in total) 1-4

Fundamental Concept: Research Applied 1-5

Fundamental Concept: Creative Strength 1-5

Fundamental Concept: Futuristic Thinking 1-5

NO WORK ATTEMPTED... 0

Content: A solution idea, if relevant, addresses the Key Verb Phrase and clearly supports the Purpose through the information communicated for assessment. Conveying this information can be either explicitly or implicitly. It MUST not contradict the Future Scene parameters of topic, place, and time or Future Scene charge. Flexibility in thinking is demonstrated by suggesting ideas from different perspectives or categories.

Structure: Well-written solutions follow these guidelines:
1. Solutions are written in statement form. Questions are inappropriate for this step.
2. Solutions must be directed to the UP and have an impact on the Future Scene charge.
3. Solutions are stated in *definitive* terms of not possibility, using absolute terms such as will. Using non-absolute statements with terms such as may, might or could, instead of will deny an important element of the FPS process. Solutions are stated to take on the action in the UP and will indicate what will happen to solve the problem. Solution consistently using probability statements (may, might, or could instead of will) **can only receive credit for a maximum of four (4) solutions.** Continued misuse of the correct format will negatively affect the Clarity Score.
4. A Relevant solution will give information about ***what*** the solution is and indicates ***how*** it solves or impacts the UP. An Elaborated Relevant Solution will Include either ***who*** will carry out the solution and/or ***why*** the action is to be completed.
5. If and ONLY if no work has been attempted in this section, a score of zero (0) will be awarded.
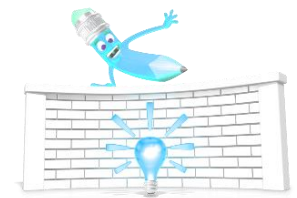
FLUENCY (0-16)— Fluency measures the quantity of solution ideas that are **relevant** to the UP. Each solution must be designated as one of the following: Relevant, Not Relevant, Duplicate, or Blank.

> **REVELANT**: The solution idea addresses, or has a relationship to, the Key Verb Phrase and it is clear or easily inferred that it supports the Purpose. In addition, it does not contradict the Future Scene Parameters, Topic Place and Time, or the Future Scene Charge. If implemented, the solution idea will achieve the goal of the UP.

FLUENCY
Relevant
Not **R**elevant
Duplicate
Blank

- A solution idea does not have to completely solve the Underlying Problem, but it must show a relationship to the UP.
- The Condition, Key Verb Phrase, and/or Purpose do not have to be repeated for a solution to be **Relevant**.
- The connection to the KVP does not have to be explicitly stated, as long as the required action is clearly impacted by the solution idea. If multiple verbs, verb phrases or objects/modifiers are stated in the KVP, the evaluator MUST consider ***ALL*** aspects of the KVP when scoring for Relevant solution ideas in Step 3.
- The connection to the Purpose does not have to be explicitly stated, as long as the Purpose is clearly impacted by the solution idea. If more than one Purpose is stated, the evaluator MUST consider ***ALL*** aspects of the Purpose when scoring for Relevant solution ideas in Step 3.
- A **Relevant** solution does not have to work perfectly, be humane, be cost effective, be tried and true, or be new. These aspects are judged in Step 6 - Action Plan.

- Imaginative inventions are fun, but inventions don't necessarily happen just because someone says it will. Sometimes inventions are "*magical thinking*" or in opposition to the laws of nature. Some level of explanation about how the invention will work may be needed to award a **Relevant**.
- Solutions are stated as absolute statement using the term "will". Terms such as may, might, could, deny an important element of the FPS process when writing solutions. Solutions consistently using probability ("may, might, or could" instead of will) **can only receive credit for a maximum of four (4) solutions.**
- A **Relevant** solution idea does not have to be elaborated. The focus of fluency is on the *ideas*, not the sophistication or elaboration of the *writing*.

> Because America's biological heritage is being threatened as the invasion of the ALB moves through the woodlands, how might we expand control measures of the Asian Longhorned Beetle, in order to minimize ALB's range of destruction in 2041 and beyond?

These are examples of Relevant (R) solution ideas and earn credit toward Fluency score.

1. The Southern California forests will have quarantines established to regulate and prevent the movement of infested materials from one location in the United States to another. By implementing this control measure, the invasive species will have boundaries set to lessen the destruction of the forests.
2. Conservationists will create the sensor stick. The sensor stick will scan the inside of the tree for effluvia, which is waste products made by animals like the beetle. The scientists will then spray the tree which has been infested with a special pesticide which will be formulated by scientists to kill the beetle and help restore the tree.
3. In order to expand control measures of the Asian longhorn beetle, scientists will create the "herding system." Similar to the dog whistle, the herding system will repel the beetle. Scientists will carefully control the direction of the frequencies. They will force the beetle into a special transparent biodome that will not allow the beetle to escape. They will be allowed to live out their lives in the controlled environment under the dome in order to minimize its range of destruction.
4. Bioengineers will create a simulation model to expand the control measures of the ALB. To generate the simulation, the bioengineers will team up with environmentalist to create "fingerprints" of the species in the Riparian Woodlands and surrounding areas. The fingerprints will contain such information as the species' DNA, habitat, consumers or predators, its niche and so on. This information will be completely unique to the species, just as a fingerprint is completely unique. This fingerprint will be inserted into the simulation model which will then be able to test different methods to find the best possible way to control the beetle. The information on the fingerprint will allow them to see how the actual species will react to they can control it and therefore minimize the destruction it can do.
5. In order to expand control measures of the Asian longhorned beetle, local business owners, farmers, landowners and others will create a hotline. If you spot an Asian longhorned beetle, then you call 1-800-S-BEETLE. Report to the operator what you saw, what it looked like, and where you saw it at. Take a picture of the beetle to send if necessary. The lines will be open 24 hours a day, 7 days a week. If your information is a match what it looks like, then the park rangers will be alerted so if they spot them, they can take immediate action to contain the species. This will help minimize the Asian longhorned beetle's range of destruction because the park rangers will be alerted and will contain this species before it can spread any farther.

NOT RELEVANT (NR) – no points awarded
Solution ideas that need additional information to be considered Relevant. At least one of the following describes the Solution:
- Does not solve the UP as written with one or more of the following:
  - ➢ Key Verb Phrase not addressed
  - ➢ Purpose not supported
  - ➢ Solution idea inconsistent with the Future Scene
  - ➢ Solution idea does not operate within the Future Scene Parameters
  - ➢ Solution idea is unclear or ambiguous

DUPLICATE – 0 points awarded
- Any Solution idea in which the **action** is too similar to another Relevant Solution.
  - **NOTE**: Duplicate Solution ideas are not the same as a repeated category.

BLANK – 0 points awarded
- No student response provided

DUPLICATE: A solution idea too contextually similar to one or more solutions previously scored as Relevant is considered a Duplicate. **Each solution identified as a Duplicate could have been scored as an R toward Fluency**. However, duplicated written solution ideas will receive credit for **ONLY <u>ONE</u> (1)** idea that is better written or gives the team the most credit for Elaboration and/or Flexibility. The remaining solution(s) **receive(s) a "Duplicate" in the appropriate column on the score sheet and feedback with the number of the solution that received credit being duplicated.** Evaluators should not confuse duplicated categories with duplicated ideas.

In the above examples the evaluator awards credit for Relevant to solution that receives the most points and the other duplicated solution/s will be identified as the duplicate. Look at number 1 and 9. Challenge 9 was read after 1. The later challenge would be awarded the Relevant and #1 would be the duplicate because it provides more detailed information.

6. Stopping the destruction of the woodlands is critical to have success against the ALB. Microbiologist will design a new environmental spay to protect the trees.
7. FEMA is ordered to prepare for the ecological crisis to defeat the invasive species. Since this organization is going to help with the crisis and people place their faith and trust in this being done, money will be set aside for this task. The first thing to be done will be to have the department to remove affected trees at no cost to the property owners. Following the removal of the trees, tracking of the non-affected trees will be done to be assured the containment of the invasion is completed.
8. In order to expand control measures of the ALB Environmentalists will create super soil that has been chemically altered. When the ALB passes through, a chemical reaction will occur. This soil will be placed on the outside of all the major forest areas. Once the chemical reaction has occurred an odor will fill the air. This odor will not be smelled by humans, only by the ALB. This odor will smell awful to the beetle, but we will smell no change in the air. This will help minimize the ALB's range of destruction because the odor will not be pleasant to the beetle and leave the area.
9. In order to provide security of the woodlands against the ALB in 2041, the US Department of Interior will require that all forms of transportation into or out of the forest areas will be inspected for the ALB. Since this will be taking place, all the ALB will basically be eradicated by preventing them from coming into the forest or if they do make it in, they will be stopped from leaving the area.
10. In order to expand control measures of the Asian longhorned beetle, environmentalists will create a social networking system. The social networking system is called a Think Tank. The Think Tank is divided into three different sections: research database, information gathering and final testing of ideas. This will minimize the beetle's destruction range because it puts out new ways to eliminate the concerns on the beetle**.**
11. The eradication of the ALB can be accomplished by having all wooden materials be chemically treated or kiln dried to help stop new introductions from occurring.

Awarding the Fluency Score
- ❑ Mark each solution idea as **R** – RELEVANT, **NR** – NOT RELEVANT, **D** – DUPLICATE, or **B** – BLANK in the appropriate column of the score sheet.
- ❑ Record the number of RELEVANT solutions.
- ❑ Verify the Fluency score in the Step 3 score box.

NOTE: ***Do not confuse duplicate solution ideas with duplicate categories.*** *It is acceptable for students to list several solution ideas in the same category.* For example, if the UP raises funds, then all solutions will raise funds and thus have the opportunity to be scored as Relevant. With that said, just changing the person or the organization to raise funds, or to have similar funding raising endeavors will result in duplicated ideas.

NOTE for Step 3: In circumstances where the UP is a **Restatement; is Circular;** or uses an **Absolute Verb in the KVP** and/or **Purpose; is Unrelated to, Broadens or Ignores the Future Scene**; or was written by the team **Without a Purpose** or **KVP,** the team may receive credit for a **maximum of 25% of the total (16 High School or Middle Grades or 8 Elementary)** possible solutions **(Maximum of 4 for HS and MG and 2 for EL Divisions).** Please remember that scores must be assigned as whole numbers.

NOTE: Repeating the CP, KVP or P verbatim does not make a solution Relevant to the UP or Elaborated. Elaborated solutions must explain three of the four **what, how, who** and **why** questions. When and where may also be included but will not serve as a replacement for one of the four questions that can support awarding Elaboration.

FLEXIBILITY (1-8) measures the diversity of thought in variety of viewpoints taken in the **Relevant** solution ideas. ***ONLY*** Relevant solutions may be considered and scored for Flexibility. Students should demonstrate Flexibility in their thinking and generate solutions for the Underlying Problem from different perspectives or categories. Evaluators take each of the following areas into consideration in scoring solutions for Flexibility:

- ❑ Do not assign categories to solutions that do not receive credit for being **Relevant** to the UP.
- ❑ Evaluators categorize the **Relevant solution idea** responses, using the categories listed on the score sheet.
- ❑ Some solution ideas can be categorized in more than one way. Evaluators are encouraged to assign a category that has not yet been awarded.
- ❑ Challenges may receive multiple categories if appropriate.

Category List for Flexibility

On the electronic score sheet, it you have assigned more than one category per solution in Step 3, the maximum number of categories to receive credit will be 16 no matter if you selected all 20 categories. The score sheet will tabulate the final total and can be verified on the Summary Page of the score sheet.

1. Arts and Aesthetics	11. Government/Politics
2. Basic Needs	12. Law/Justice
3. Business/Commerce	13. Miscellaneous
4. Communication	14. Physical Health
5. Culture	15. Psychological Health
6. Defense	16. Recreation
7. Economics	17. Science
8. Education	18. Social Relationship
9. Environment	19. Technology
10.Ethics/Religion/Morality	20.Transportation

Awarding the Flexibility Score

- ❑ Mark the category/categories for each RELEVANT Solution ONLY.
- ❑ Count and record the number of DIFFERENT categories. Each category number may be counted toward Flexibility ONLY once.
- ❑ Verify the Flexibility score in the Step 3 score box.

ELABORATION (0-16) measures the number of **RELEVANT SOLUTION IDEAS** that contain at least three significant areas of detail: ***who, what, why*** and ***how***. Solution ideas elaborated by simply adding on the Key Verb Phrase and/or Purpose are not considered for Elaboration credit more than once in a booklet.

ELABORATION
What
How
Why
Who

- Evaluators should provide feedback that contains specific suggestions on ways to elaborate solution ideas.
- No credit will be awarded if a solution is a duplicate.
- **Students do not have to write a lengthy paragraph in order to earn elaboration points, nor should they earn elaboration points for just writing a lengthy paragraph.**
  - ○
    1. **Who** – an appropriate person/entity with the power, interest, or expertise to implement the Solution
       NOTE:
       - The name should convey attributes listed above, or additional information is needed and the who will not be counted toward Elaboration. Teachers cannot pass laws.
       - The same relevant "who" can **receive credit only twice**. Repeating the same "who" in additional Solution ideas will not receive credit toward Elaboration, but a solution using the same "who" may still be elaborated if the other 3 elements are evident: ***what, why*** and ***how***.

2. **How** – the manner in which the Solution will be carried out: how does the solution work?
3. **Why** – presents a suitable reason for enacting the Solution in terms of one of the following:
   ▪ Why the solution fulfills the KVP
   ▪ Why the solution supports the Purpose
   ▪ Why the solution is effective in solving the UP as a whole
   NOTE: A restatement, or simply tacking on, of the entire or part of UP Condition Phrase, KVP or Purpose is not acceptable to receive credit for elaboration.

The next 5 solutions are Relevant, and must be assessed for Flexibility and then scored for Elaboration and Clarity, if Eligible. These are the last 5 solutions in the 16 written in the booklet. You may also see Duplicates to another previously scored Relevant Solution. As you score these solutions, also make notes about Fundament Concepts.

12. In order to expand control measures of the Asian longhorned beetle, bioengineers will genetically alter the trees in which the beetles lay their eggs. They will be altered so that the eggs become infertile and unable to hatch. Once the eggs are unable to hatch, the tree will absorb the larva and eggs for nutrients. This helps replenish the trees' life. Once the generation of beetles is gone, there will be no more because of the eggs hatched. This will minimize the beetles' destruction range because it eliminates all eggs and larvae.

13. Begin an intense educational program about the symptoms for ALB infestation. The Department of Animal and Health Inspectors will provide public service announcement blasts on websites, news networks and other media formats. Bringing up public awareness of the insects and how they bore pencil-sized holes and leave frass behind to destroy the trees will allow for earlier intervention into the attacks on the trees. With this information, people in the affect areas of invasion will be able to accomplish eradication earlier than what was evidence in the past with species such as the Kudzu.

14. In order to expand control measures of the Asian longhorned beetle, government officials will create an artificial enemy. This artificial enemy will look just like the real Asian longhorn beetle. It will be able to fly but only short distances like the beetle. It will pose as a female. But unlike the real Asian longhorn beetle, it will not lay eggs or damage any type of trees. It will only roam through the air and the ground until it smells the beetle's larvae. Then environmentalists will be warned. The enemy will send the environmentalists exact longitude and latitude coordinates. This enemy will follow the beetle until environmentalists arrive. One they have rounded up the beetles, they will ship them back to Asia in a container. This will minimize the Asian longhorned beetles' range of destruction because the Asian longhorn beetle will be back in Asia.

15. In order to expand control measures of the Asian longhorned beetle, environmentalists will create the Mating Siren. This will be a simulated version of the beetle's mating call. The call will lure the beetle into certain areas. The areas the beetles are lured to will be equipped with traps that will trap the beetle in impenetrable cages that will capture it in order to minimize its range of destruction.

16. In order to expand control measures of the ALLB, Park Rangers will organize Eco-Tour. An Eco-tour is a way of fun recreation while helping get rid of the ALB., Park rangers start by training volunteers to spot the beetles and what to do once they are spotted. While on the Eco-Tour the members of the group will record data on how the environment has changed since longhorned beetles have invaded. If they spot a beetle, they will catch it for research purposes. This minimizes the range of destruction the beetle has because it declines the population.

Bioengineers will create a simulation model to expand the control measures of the ALB. To generate the simulation, the bioengineers will team up with environmentalist to create "fingerprints" of the species in the Riparian Woodlands and surrounding areas. The fingerprints will contain such information as the species' DNA, habitat, consumers or predators, its niche and so on. This information will be completely unique to the species, just as a fingerprint is completely unique. This fingerprint will be inserted into the simulation model which will then be able to test different methods to find the best possible way to control the beetle. The information on the fingerprint will allow them to see how the actual species will react to they can control it and therefore minimize the destruction it can do.

> Who: Bioengineers
> What: simulation model
> How: collection of information on DNA, Habitat, consumers, or predators, niche; to see how the species react
>   so it can be controlled
> Why: supporting information given to solve UP

OPTIONAL— Not counted toward Elaboration—Where and When are not mandatory, but can provide important information. The Riparian Woodlands help to identify the specific place in the Future Scene.
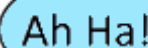
Awarding the Elaboration Score
- ❑ Mark each Elaborated solution that qualifies in the column as elaborated.
- ❑ If no credit is awarded for Elaboration, the space is left blank.
- ❑ No Elaboration credit can be awarded if the **_team_** did NOT write a Purpose in the booklet.
- ❑ Solutions written with without a KVP or Purpose are also NOT eligible for consideration for Elaboration points.
- ❑ Verify the number of solution ideas marked as elaborated in the appropriate column.

CLARITY – 1 point – Clarity measures the effective communication of the action proposed for Solutions receiving credit for Elaboration. Only Relevant Solutions with Elaboration points are considered for Clarity.
- ▪ A Clearly written Solution presents the action and its elaborated details concisely in a manner that is easy to understand.
    - ▪ **NOTE:** A Relevant Solution whose reasoning is questionable but contains the three elements of Elaboration, should receive a 1 for Elaboration only. (No additional points for Clarity.)

ORIGINALITY (1 point for each) rewards **Relevant** solution ideas that are especially insightful, highly creative, and/or unique. Original ideas may often include futuristic elements. An original solution is a response that is found infrequently among responses at that age/grade level and considered of high quality (insightful, indicative of breakthrough thinking). Wildly futuristic ideas are not always original. A relevant solution idea must have substance to receive Originality points.   An invention can't happen just because someone says it will

Awarding the Originality Score
- ❑ Place a 1 in the Original column for each Relevant Solution idea judged original.
- ❑ Verify total number of Originals in the Step 3 score box. (maximum of 4 permitted)

NOTE: Only Relevant solutions may be considered and scored for Flexibility, Elaboration, and Originality

NOTE: Only Elaborated solutions may be considered and scored for Clarity.

FUNDAMENTAL CONCEPTS - Fundamental Concepts for FPS include Research, Creativity and Futurism. Research Applied, Creative Strength, and Futuristic Thinking are scored in the same manner in Steps 1, 3, and 6. Each step is scored independently of the others, based on the work submitted within the step under consideration. All work provided in a step, whether scored Relevant or not, should be considered for determining the scores for Fundamental Concepts. Scores will fall into three ranges that include Developing (1-2 points), Very Good (3-4 points), and Exemplary (5 points). Booklets with **minimal** evidence of the Fundamental Concepts will score 1 or 2 points. If

some evidence is present, then scores of 3 or 4 can be awarded. Booklets written to **integrate** the Fundamental Concepts will score 5 points.

❑ **RESEARCH APPLIED (Range of 1-5 points)** Uses appropriate research and demonstrates knowledge of future issues and trends as related to the Future Scene. Indications of Research Applied include vocabulary terms, concepts, facts, and incidents from the research. Booklets with minimal or no evidence of research, terms, concepts issues or trends will be scored as developing.

❑ **CREATIVE STRENGTH (Range of 1-5 points)** Skillfully uses productive, creative, and innovative thinking. Responses showing Creative Strength are those requiring intellectual energy to make mental leaps beyond obvious or commonplace responses.

❑ **FUTURISTIC THINKING (Range of 1-5 points)** Utilizes knowledge of future issues and time frame as related to the Future Scene. Futuristic Thinking is demonstrated by addressing and extrapolating relevant trends and technologies from their research to the Future Scene as they identify futuristic, workable ideas, and how they could impact future society.

NOTE: Even though a booklet may be scored without any Relevant solutions, all solutions are evaluated for Fundamental Concepts and must be assigned at least one (1) point for each element for a minimum score of 3 points.

Step 3: – Evaluation Issues for Relevant Solution Ideas REVIEW

Solutions written without answering *what the solution is and how it solves the UP will not be scored as Relevant.*	Notes about requirements for Step 3 Solutions
REVIEW for Step 3 Scores • **Fluency:** Totals for Solutions that are Relevant, Duplicate, or Blank • **Flexibility:** Unique number of categories used for Relevant Solutions • **Elaboration:** Totals for Solutions that answer 3 of the 4 questions: What, How, Who and How • **Clarity:** Number of Elaborated solutions that are identified as clearly written • **Originality:** Bonus point/s for unique Solutions/s that score Relevant	• Solutions must be Relevant to the specific UP written. • Solutions must be explained in enough detail to show the strong connection to how the solution will solve the UP. • A well-written, elaborated Solution will answer 3 of 4 required questions to receive full credit, who, what, why and how. • Elaborated solutions must be considered for Clarity. • Solutions will be written as a statement using a form of absolute terms such as will. Probability terms (may, might or could) are not appropriate in this step.

STEP 4 – GENERATE and SELECT CRITERIA
Must tie back to the UP for Ranking of Solutions

Objective: To determine 5 criteria that measure how well the solution ideas accomplish what the UP mandates.
Correctly Written 0 2 4 6 8 10
Applicable.. 0 2 4 5 6 7 8 9 10 11 12 13 14 15 16 17 19 20 22 24 25
NO WORK ATTEMPTED 0

Content: Criteria are the standards by which solution ideas are judged. The solution idea that best meets all of the criteria is considered the "top ranking solution" and becomes the basis for the Action Plan; therefore, criteria should address aspects of the solution ideas that will be very important in determining which one will best accomplish the goals of the Underlying Problem. Generating well-written and applicable criteria will help to explain the relationship between Steps 4, 5 and 6.   The team will be held accountable for writing and applying criteria that are important in choosing the top-ranking solution idea for a specific Underlying Problem and Future Scene.

Structure: A Correctly Written criterion is one that meets **all four** required guidelines. All must be present, or the criterion will be incorrectly written.
1. Focuses on a single dimension/standard (focuses on only one concern)
2. Demonstrates a measure of degree using a superlative (does not use "best" as a superlative)
3. Indicates the desired outcome or direction
4. Recognized as a question

CORRECTLY WRITTEN or **YES** (0-10) – "Correctly written" is a matter of structure. At this point, the evaluator is not deciding the value of the criteria but assessing only the structure. Correctly written is a question of **structure of all 4 required elements being present.** A question mark does not validate the required structural element as a criterion written as a recognizable question. Nor does is it provide a desired direction.

1. **Each criterion must deal with a single standard. The words *and*, *or*, and *also* in a criterion indicate multiple standards and should be avoided. When using the phrase "in the year 2041 and beyond" the use of "and" in this** example is acceptable and will not be scored as a multiple.
   o Adding any phrase with the words "so that" or "so" or "in order to" or "to" along with a superlative can often result in a multiple standard if it denotes two (2) actions will occur, that when read creates a "dual" criterion. This may also result with "while" or "such that." **In either case, when 2 actions are occurring simultaneously, award 0 for Correctly Written**.
2. Each criterion must include a superlative with a qualifier either written before or after the superlative to indicate for whom or what (longest, easiest, fewest, most, greatest, etc.), allowing the solution ideas to be ranked in Step 5
   o Comparative words do not rate as "Correctly Written." (These include better, longer, easier, fewer, more, greater, etc.)
   o The superlative **best** is not acceptable and also does not rate as "Correctly Written."
3. Each criterion must be stated so that the desired outcome is indicated. For example, "Which solution will be the *most helpful* for the people," not "Which solution will be the *least helpful* for the people." (each criterion will have a positive outcome i.e. least costly instead of most expensive)
4. Each criterion must be **recognizable as a question**. As the evaluator, you must be able to see the question clearly to rank solutions from Step 3. Adding a question mark to a superlative does not meet this requirement. EX. *Longest? The four (4) requirement elements are not present as written*.

CORRECTLY WRITTEN scored as YES
- Which solution will be the easiest to accomplish (Identifies what is to be done.)
- WSW be most beneficial to the *people concerned about protection of the riparian woodland?* (This criterion identifies the stakeholders or the action to be done that is specific to UP and Future Scene)
- *Will it be the most effective in the protection of the affected trees.* (Although this is not written with "WSW" and does not end with a question mark, it is obvious that is it a relevant question related to the UP and Future Scene)
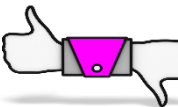
NOT CORRECTLY WRITTEN
- *Greatest?* (Does not meet the 4 structural requirements to be Correctly Written)
- *WSW be the most difficult to get approval?* (Does not indicate a desired direction)
- *Safest for the guards to carry out?* (It is obvious this is a statement and not a question simply by adding a question mark.

NOTE: It is required that criteria be written in question format. Beginning with the words "Which solution will (WSW)" and ending with a question mark helps to identify the question. The phrase "safest for the guards to carry out" does not meet the requirement for Correctly Written. It should include WSW and a question mark for assurance that the criterion is written in question format. Including just a superlative (most, easiest, greatest) as a criterion without an intended qualifier to indicate its function or target group will be scored as **incorrectly written when the superlative cannot be measured.** "Cheapest" is a superlative that **CANNOT** stand alone because it does not represent an ideal of being the least expensive to purchase, manufacture or that the quality of the product can be judged. This example does not provide a desired direction, nor does it guarantee a single dimension because it does not provide the quality to be ranked.

Awarding the Correctly Written Score

❑ If a criterion meets **ALL** four structural requirements, award 2 points for Correctly Written. Indicate with a Yes in Correctly Written column of the score sheet.
❑ If **ALL** four requirements are not met, NO points are given.
❑ Only one (if written correctly) of the criteria identified as a duplicate may be scored as Correctly Written.
❑ Verify the number of Correctly Written criteria for Step 4 on the score sheet.
• **2 points**: Each criterion has a single dimension, uses a superlative, is in a desired direction and recognizable as a question.
• **0 points:** Criterion does not meet all four requirements or is a duplicate.

APPLICABILITY (0-10) assesses the specificity of the criteria content. Criteria that are generic and can be applied to a wide variety of topics and situations are scored as generic. Criteria that are specific to relevant research, elements of the Underlying Problem, and Future Scene for this topic are considered for specificity. Criteria will be identified in one of the three distinct areas.

1. **Not Applicable**– No relationship to the CP, UP, KVP, Purpose, Population (Stakeholders) or Future Scene is evident, is a Duplicated criterion (Give credit to the better of the duplicates) or is left Blank. *Which solution will be the most critical to protecting the animals around the world?* (What connection does this have to the Future Scene about Invasive Species?)

2. **Generic** – These criteria are applicable in measuring concerns to almost any problem. They include generic measures of cost, public acceptance, resources, time for implementation, etc. *WSW be easiest for the community to implement?* (This criterion could be used for any Future Scene, UP or competitive topic. Please note that simply adding one of the Future Scene Parameters does not allow for credit to be awarded for Specific.)

3. **Specific** – This criterion is specific to the **CP, KVP, P, Population** (Stakeholders within the competitive Future Scene), or shows significance to a related issue of the Future Scene with association to the of the UP. *Which solution will generate the most important collection of data about the ALB's destruction patterns in previously affected forests?* This is an example of a criterion that could be Specific to Process in the UP as referenced below. Because the criteria are more specific, they show greater insight into the UP and are more effective in delineating the solution idea to be used for the Action Plan in Step 6. See examples at the bottom of the page. A criterion may be scored as Specific to the CP, KVP, P and Population ONLY once. Process may be used more than once in the five (5) questions listed in Step 4 when judging for a Specific criterion.

4. **Blank—**No response written or left blank.

• **All criteria are read and scored for Applicability, *even if* they were NOT Correctly Written.**
• For criteria with multiple standards (thus not correctly written), use only the first standard to determine applicability.
• Each criterion is scored from 0, 2 or 5 points (see examples in the box below using the same superlative)

• *Easiest?* NCW (Adding a Question Mark does not make this a question, nor can you discern the direction—easiest to manufacture or easiest to destroy?), Meaning is difficult to discern, 0 points for Applicability
• *WSW be easiest to implement?* CW, 2 points for Generic Applicability (Rankable and Applicable to any Future Scene)
• *Which solution is easiest to implement by EAMT staffers?* CW, 5 points for Specific-Applicable (Process, Population of people important to this Specific Future Scene)

Because America's biological heritage is being threatened as the invasion of the ALB moves through the woodlands, how might we expand control measures of the Asian Longhorned Beetle, in order to minimize ALB's range of destruction in 2041 and beyond?

Step 4 Examples: Scoring for Applicability of Criteria with the UP above

5 points – Specific to the Underlying Problem
A criterion with a core idea that is generic, but with significant details to connect it to the Underlying Problem. These details may include the Condition, Key Verb Phrase, or Purpose, or Population (specific stakeholder from the Future Scene) and to the Process. Future Scene parameters alone (topic, place, time) are not enough to score as Specific. A criterion may be scored as specific to the **CP, KVP, P** and **Population _ONLY_** once. Criteria may be written for specificity and be scored relevant to the **Process** multiple times.

Specific Criteria Examples to UP listed above

1. Which solution will expand the control measures of the Asian Long-horned Beetle to the greatest extent? **_(CW: provides appropriate direction, contains appropriate superlative, reads like a question, single dimension; Specific to the KVP)_**
2. Which solution will offer the greatest protection against the threat to the biological heritage of America's forests? **_(CW: provides appropriate direction, contains appropriate superlative, reads like a question, single dimension; Specific to CP)_**
3. Which solution will promote the sustainability of the various tree species that are targets of the ALB? **_(NCW: does not contain a superlative; Specific to Process/Future Scene)_**
4. Which solution will provide the best capability to minimize the beetles' range of destruction? (**_NCW: contains "best" as the superlative; Specific to Purpose_**)
5. Which solution gives the least level of assistance to scientists in the development of technology for the challenges facing the Riparian Woodlands? **_(NCW: written in the wrong direction; Specific to Stakeholder Population)_**

ADDITIONAL EXAMPLES: APPLICABILITY OF CRITERIA

0 points – (NA) Not Applicable
A criterion that has no relevance to evaluating solutions for this Underlying Problem

- _Which solution will most convince people to vacation in the American woodlands?_ (No relationship to Future Scene charge)
- _WSW provides the least support by international governments?_ (Not relevant to this Future Scene)

2 point – Generic to any Future Scene
A criterion that could be applied to nearly any Underlying Problem or Future Scene. Generic criteria with Future Scene parameters added (topic, place, time) are still rated Generic.

- _Which solution will be the safest to do in 2041?_ (time parameter added—but still Generic)
- _WSW last the longest in supporting the affected group?_ (affected group is not the specific target group)
- _WSW be most protective against invasive species?_ (topic parameter added— Generic)

2 points for Generic Criterion – 0 points for the other Criteria identified as Duplicate (D)
A criterion that duplicates one of the other criteria being used will receive 0 points. The criterion may not use the exact wording but will essentially be evaluating solutions based on the same concept. (For demonstration purposes, these examples are duplicates of Generic criterion.)

- _Which solution will offer the most assistance?_
- _WSW most assist the area in need at the site of the Riparian Forest?_ (Including a Topic, Time, and/or Place parameter -- still Generic)

5 points for Specific Criterion– 0 points for the other Criteria identified as Duplicate (D)
A Duplicated criterion is one that duplicates a criterion being used and scored as Specific. The criterion may not use the exact wording, but will essentially be evaluating solutions based on the same concept. (For demonstration purposes, these examples are duplicates of the Applicable examples.) In the 3 examples below, example #3 would receive 5 Points for Applicable and examples 1 and 2 would be scored with 0 for Applicable. Examples 1 and 2 would also be scored with 0 for Correctly Written.

1. Which solution will most support the homes of the species of the riparian woodlands? (Duplicate to #2 and #3)
2. WSW receive the most support for the habitats? (Duplicate to #1 and #3)
3. Which solution will generate the most assistance in creating sustainable habitats for natural species in the woodlands. (Specific to the Population with more detail given to connect to the UP)

In the 3 examples above ONLY criterion #3 will be awarded any points. Duplicates are NOT Applicable nor are they scored as Correctly Written.	

Awarding the Applicable Score
- ❑ Read and identify the appropriate element for each criterion even if it was not Written Correctly. Identify with a **Yes** or **NO** or **Blank** on the score sheet.
- ❑ Use the terms of Not Applicable, or Duplicate, Generic, or Specific for Applicability. When scoring specificity use **CP** — Condition Phrase, **KVP** — Key Verb Phrase, **P** — Purpose, **POP** — Population, or **PRO** — Process. (*ONLY the Process column may be identified more than ONCE.*)
- ❑ Identify the number for Applicability for each criterion in one of the three columns for Applicable. (Only one Applicable score can be awarded in each row.)
- ❑ For criteria with multiple standards/dimensions, use only the first standard to determine Applicability.
- ❑ Tacking on the CP, KVP or Purpose in each criterion will be correctly written and specific if it does not allow for 2 actions to be occurring at the same time. However, if the same phrase is repeated in 2 or more criteria, this duplication of a phrase will NOT be scored for specificity after any subsequent entry. It will be scored as Generic.
- ❑ Without including a KVP or Purpose in the UP, specificity for KVP or Purpose cannot be awarded.
- ❑ Verify corresponding point values – 0 points for Not Applicable or Duplicate, or 2 points for Generic, or 5 points for Specific.
- ❑ Only ONE of the criteria identified as a duplicate will be scored for Applicability.
- ❑ Verify the total for the Generic and Specific columns.
- ❑ Verify the sum of the points for Applicability.

Step 4 – Evaluation Issues for Criteria--Structure and Applicable Criteria

Criteria are more complex than it might seem at first and a variety of mistakes may occur. Examples generated from the following UP cover some of the most common issues or errors.

Because America's biological heritage is being threatened as the invasion of the ALB moves through the woodlands, how might we expand control measures of the Asian Longhorned Beetle, in order to minimize ALB's range of destruction in 2041 and beyond?

Structure issues (incorrectly written) No superlative or Superlative is best or Wrong Direction Recognizable question	**Example**
	- *Which solution will be **better** for the people? **OR** Which solution will be **best** to improve the situation to care for the species attacked by the invasive species?*
	- *Which one will receive the **least support** of the EAMT?*
	- ***Fastest? * OR safest?** OR Cheapest ******
	- ***Which solution will be the easiest to implement and have the most acceptance. Two superlatives***
	Scoring
	- Correctly Written – 0 (Requirements: single dimension, superlative with a qualifier, desired direction, recognizable as a question (Incorrectly written if any one or more is missing)
	Writing a superlative without a qualifier will **always** be scored as incorrectly written and not applicable. *Fastest does not provide a qualifier nor does it identify a desired direction. It cannot be measured so it cannot be ranked. It is not written as a recognizable question. **Safest also does not fulfill the requirements and does not give a desired direction. *** Cheapest is a superlative and if the qualifier is not included that you cannot determine if it is written in a positive direction. (Cheapest quality is negative while cheapest to implement would be positive.)
Duplicated Criteria written that are too similar in content	**Example**
	- *Which solution increasing the sustainability of the riparian forest trees is easiest to implement?*
	- *WSW cause the least difficulty for implementation?*
	Scoring
	- Correctly Written – 2 Contently the same (only one receive credit)
	- Applicability Score — 5 for the one scored as Correctly Written to the Specific Population. The Duplicated criterion receives 0 Credit.

Not related to the Underlying Problem	**Example** *Which solution will be the easiest to convince people to buy products made in South America?* **Scoring** • Correctly written – 2 points • Applicable – 0 points -- This criterion is not applicable to this UP.
Not connected to Future Scene	**Example** • *Since the world is focusing on economic gains in their own countries, which solution will be the most acceptable to them?* **Scoring** • The Future Scene does not state the world is focusing on economic gains for their own countries, this is an incorrect assumption. • Correctly Written – 2 Applicable – 0 (Without the lead-in, the remaining criterion is not-applicable because the meaning is difficult to discern.) *See next box.*
Meaning difficult to discern	**Example** • *Which solution will be the most valuable?* (For what or whom?) • *Which solution is easiest for them?* (Who? To do what) **Scoring** At first these appear to be typical generic criteria; however, the intent to be considered when ranking the ideas is not obvious. Is it *most valuable* to make money, or is it most valuable to the management team? The same with easiest…to do what? • Correctly Written – 0 Missing Qualifier • Applicable – 0 because applicability cannot be determined (NOT Applicable)
Multiple subjects OR objects **Multiple Superlatives**	**Example** • *Which solution will the Exotic Animal Management Team officials **and** the park's visitors find most acceptable? (Because this criterion contains multiple directions, only the first part is scored for applicability to the UP)* • *Which solution will have the greatest positive impact on the California Riparian Forest **and** be successful? (Because this criterion contains multiple directions, only the first part is scored for applicability to the UP.)* • *WSW be most beneficial **and** provide the help needed?* • *Which solution will provide the most help to the species in their natural habitat and be the easiest to implement? (The first superlative "most help" to the species. . . is the part that will be scored for applicability.)* **Scoring Summary for Mulitples** • Correctly Written – 0 (more than one qualifier, subject, or superlative) All of the above criteria would be scored NOT correctly written because they do not indicate a single direction. • Applicable—Score only the first of the multiple for Applicability • If Specific, separate the multiple in each criterion and evaluate the first one for applicability to the UP-- Examples 1 and 2 • If Generic, separate the multiple in each criterion and evaluate the first one for applicability to the UP—Example 3 • If Specific, separate the multiple superlatives in each criterion and evaluate the first one for applicability to the UP—Example 4

***ALL* Criteria must be evaluated for Applicability separately except for any duplicated criterion which will be scored a zero (0) for Correctly Written AND (0) for Applicability.**

NOTE: Tacking on the CP, KVP, or Purpose in each criterion may be scored as correctly written once if it does not create a multiple with 2 actions to be accomplished. If a team writes each criterion with **the same Purpose, KVP, CP, etc. tacked on at the end,** then each subsequent criterion after the first one receiving a score for Specificity will be scored as Generic.

NOTE: If a criterion contains more than one dimension, use the first one to determine the Applicable score. **Which solution will result in the largest increase in improvement of the habitat and sustainable living conditions**? **0 points for Correctly Written** (multiple dimensions) **2 points for Applicability** (scored against first dimension of the criterion). If a team writes each criterion with **the same Purpose, KVP, CP**, **etc. tacked on at the end,** then each subsequent criterion after the first one receiving a score for Specificity will be scored as Generic.

Because America's biological heritage is being threatened in the forests, how might we expand control measures of the Asian Long-horned Beetle in order to minimize ALB's range of destruction in 2041 and beyond?

1.	*Which solution will offer the greatest protection against the threat to the biological heritage of America's forests?*
2.	*Which solution will expand the control measures of the Asian Long-horned Beetle to the greatest extent?*
3.	*Which solution will provide the capability to minimize the beetle's range of destruction?*
4.	*Which solution gives the least level of assistance to EAMT in the development of technology for the challenges facing the Riparian Woodlands?*
5.	*Which solution will promote the sustainability of the various tree species that are targets of the ALB?*

The maximum scores that can be assigned for Correctly Written criteria is 10 and the maximum total score for Applicability is 25 (each Criterion row for Applicability cannot score higher than 5 points.) In the chart below, all criteria have an Applicable score of 5 points for being Specific to one element of the Underlying Problem and one to the Process. The booklet may be written with criteria beginning with CP, followed by the KVP, P, POP, or PRO. The stair-stepped examples are used to indicate how the Applicable scores for Criteria listed above were applied. Teams do NOT have to follow this format as they write Criteria to be applicable.

#	Correctly Written (0 or 1) Duplicate = 0		Not Applicable or a Duplicate	or	Applicability is Generic	or	Applicability is **Specific** to: Condition Phrase, Key Verb Phrase, Purpose, Population (Stakeholder), Process					Feedback
							CP	KVP	P	POP	PRO	
1	0	2	0		2		5	5	5	5	5	
2	0	2	0		2		5	5	5	5	5	
3	0	2	0		2		5	5	5	5	5	No superlative
4	0	2	0		2		5	5	5	5	5	Wrong Direction
5	0	2	0		2		5	5	5	5	5	No superlative
CW Total	4					*Only **Process** accepted more than once*					**Applicability Total**	25

Step 4: − Evaluation Issues for Criteria

A step to connect the UP, Solutions and the remaining steps in the booklet. **REVIEW for Step 4 Scores**	Notes about requirements for Step 4 Criteria
• **Content:** Standards for judging the solution. • **Structure:** 4 required guidelines to be correctly written: Single Dimension, Degree of Measure with Qualifier, Desired Direction, Recognized as a Question • **Not Applicable:** No Relationship to UP or important elements of the Future Scene • **Generic:** A criterion relevant to any UP/FS (FS) • **Specific:** A criterion relevant to this competitive UP/FS	• Each criterion must be connected to an element of the UP/FS to be scored Specific. • Generic criterion would work with any UP/Future Scene. • Must have qualifier with appropriate superlative • May **NOT** use "best" as superlative. • The Population or Stakeholders must be specific to the competitive Future Scene. • Each criterion must be recognizable as a question. Remember a superlative + question mark does **NOT** equal a question!

STEP 5 – APPLY CRITERIA to SOLUTION IDEAS (GRID)
Must tie back to Solutions and Criteria

Objective: To develop an evaluation matrix (grid) that uses the criteria from Step 4 to rank 8 solution ideas to determine the best solution.
    Correctly Used 0 2 4 6 8 10
    NO WORK ATTEMPTED **0**

Content: Students select 8 of their most intriguing solution ideas to enter into the evaluation matrix (grid). The grid is used to rank the solution ideas, considering one criterion, written in Step 4, at a time. With correctly added rows of ranks, the idea with the highest overall ranking is the best solution that will be used for the Action Plan. Students must understand the importance of the Criteria selected and Step 4 and the assignment of applicable ranks on the Grid in Step 5 will produce values for the best solution to be used in Step 6.

Structure: An accurate grid follows these guidelines.

1. Considering one criterion at a time, each of the solution ideas are ranked against all others using that criterion. The ranking is repeated for each of the criteria.
2. In each column, solution ideas are ranked from 1 (low) to 8 (high) or to the highest number that equals the number of solutions ideas in the grid. Elementary students use a rank from 1 to 5.
3. If fewer than 8 solutions, (5 for Elementary level) are generated in Step 3, enter all the ideas on the grid. The highest points then equal the number of ideas. If you have 3 solutions ideas, then the ranks would be 1, 2, and 3.
4. Each number is used once in each column. (Exception: If two ideas rank equally in satisfying a criterion, half points that are mid-way between the two ranks may be used. For example, two ideas that are equal and would have been ranked 5 and 6 may each be ranked 5.5.)
5. The rankings for a single criterion may be weighted if it is especially important. In this case, each rank must show the weight; if double weighting is used the ranks would range from 2 to 16 (2 to 10 for elementary).
6. The ranks are added across the rows and the totals are entered into the final column of the grid.
7. **The solution idea with the highest points must be used as the basis for the Step 6 Action Plan, if not, score as manipulated grid with a score of zero (0).**
8. If there is a tie for the highest points, students must choose to use only one. Breaking ties may be done in several ways. The method used for making the choice must be explained by the team in Step 6.
9. **If two or more unrelated solutions are used to develop the Action Plan, the score for the grid will be an automatic zero (0).**
10. **If no work is attempted on this section a score of zero (0) must be awarded.**

CORRECTLY USED (0—10) measures the accuracy in completion of the evaluation matrix (grid).

- 10 points are awarded for a perfect grid.
    - Add the totals of the final column.
    - One error = 8 points, two errors = 6 points, three errors = 4 points, four errors = 2 point and 5 or more errors = 0 points
- 2 points are deducted for these mistakes:
    - Each instance of using a number more than once in a column (except for half points for adjacent ranked solutions)
    - Each instance of incorrect addition across a row
- 0 points only is awarded for obvious grid manipulation, such as each row containing the same numbers which ignores the problem solving process.
- 0 points only is awarded if the solution idea that scored the highest is not used as the main focus of the Step 6 Action Plan. This includes cases in which the highest ranking idea and another idea of lower rank are combined in the Action Plan with equal weight. (Other related ideas may be used as support as long as they are not the primary focus.. If a team combines two or more **unrelated solutions** to develop their Action Plan, the grid should receive an automatic zero (0) points for Correctly Used.

Note Chart on Page 4 for any differences in Governor's Cup and Component Events.

Awarding the Grid Score for Correctly Used

❑ Verify Correctly Used section of the score sheet.

❑

❑ **10 points:** *the Grid is perfect; not manipulated; the top solution used*

❑ **8 points:** *the Grid contains one error (Addition error or using the same number twice in the same column, etc.)*

❑ **6 points:** *the Grid contains two errors (Addition mistake/s or the same number/s used twice in the same column, etc.)*

❑ **4 points:** *the Grid contains three errors (Any combination of addition mistake/s or the same number/s used twice in the same column, etc.)*

❑ **2 points:** *the Grid contains four errors (Any combination of addition mistake/s or the same number/s used twice in the same column, etc.)*

❑ **0 points:** *the Grid contains five or more errors (any combination of addition mistakes, the same number/s used twice in the same column, an incomplete grid, etc.), is manipulated (all columns have the exact numbers in each row), combined unrelated solutions in the Action Plan, or the top solution was not used.*

Grid Solution Ideas	Solutions	Step 4 Criteria					Total
		1	**2**	**3**	**4**	**5**	
11	Kiln	1	8	2	7	3	**21**
6	Environmental Spray	3	5	1	8	5	**22**
4	Simulation Model	8	7	8	2	6	**31**
3	Herding System	6	2	3	6	7	**24**
14	Artificial Enemy	7	1	5	4	8	**25**
2	Sensor Stick	5	4	6	3	2	**22**
8	Super Soil	4	3	4	5	1	**17**
5	Hotline	2	6	7	2	4	**21**

Grid example used with UP on page 10 and Criteria from page 25

This Grid Contains 2 errors. Duplicated number 2 in column 4 and row 6 is added incorrectly.

Step 5: – Evaluation Issues for Applying Criteria to Solution Ideas Using a Grid

Ranking solutions from Step 3 using the Criteria in Step 4.

REVIEW for Step 5 Scores

- **Content:** 8 solutions are selected by the team to rank.
- **Structure:** One criterion is used to rank solutions against each other. Ranks are 1—8. Each number is used only once in each column of the Grid. Rows are added for totals. The highest scoring solution is used in Step 6 to detail the Action Plan.

Notes about requirements for Step 5 Criteria

- 10 points are awarded for a perfect Grid
- Each mistake (addition, duplicated number in a column, etc. results in a deduction of 2 points)
- Manipulated Grid scores 0 (numbers are the same in each row, the highest ranking solution is NOT used as the Step 6 Action Plan, OR two or more solutions are combined for a major focus in the Step 6 Action Plan)
- Points in a column may be split between two solutions with adjacent points ($1 + 2 = 1.5$).
- A solution can be weighted with a multiplier added without penalty.

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STEP 6 – DEVELOP an ACTION PLAN
Ties back to UP and Highest Ranking Solution

Objective: To develop an Action Plan based on the highest scoring solution idea in Step 3 and to explain and demonstrate its relevance and importance to the UP and the Future Scene.

Impact on Future Scene..	1 2 4 6 8 10 12 14 16 18 20
Relationship to UP	1 2 4 6 8 10
Clarity	1 2 4 6 8 10
Humaneness	2 4 6 8 10
Criteria in the Development of the Action Plan..................................	2 4 6 8 10
Completeness	2 4 6 8 10 12 14 16 18 20
NO WORK ATTEMPTED...0	

Content: An Action Plan is a *proposal* for solving the Underlying Problem which takes place in the future. The Action Plan should **explain in detail what, how, who** and **why,** of the solution idea. Developing an AP involves moving from creative ideas into action; a new idea is incomplete until it is a workable idea. The AP demonstrates how it addresses the problem area in Step 2 **and** how it affects the Future Scene.

Structure: Action Plans vary widely in their structure, but include some or all of these elements:

1. The Action Plan MUST focus primarily on the best solution as identified by using the evaluation matrix (Grid) in Step 5.
2. The Action Plan may first introduce the basic idea, similar to what was written about it in Step 3 – Solution Ideas.
3. Many additional facets may be added to the idea at this point, with the goal of showing a complete plan and strategies for implementation of the best solution. These new facets should not be restated solutions from Step 3.
4. The Action Plan must address specific criteria either implicitly or explicitly in a convincing manner.
5. The Action Plan *may* describe timelines and tasks, details on how the solution will operate, potential obstacles and how to overcome them, how the plan will address the Underlying Problem, how/why it will have a positive impact on the FS, etc.
6. If a team combines two or more unrelated solution ideas in their AP, the evaluator should score only the first solution for Impact on Future Scene, Relationship to UP, and Clarity **and** adjust the Grid score in Step 5 to an automatic zero (0).
7. Assign a score of 1 on Impact on Future Scene, Relationship to UP, and Clarity if the UP was identified as a critical error.

IMPACT ON FUTURE SCENE (1 for Critical Error and 2 -20 Even Numbers)– Measures the positive effect of the AP on the Future Scene (FS) situation. It is determined by comparing the Action Plan to goals stated in the KVP and the Purpose in the UP and evaluating the extent of the relationship. Lower scores are given to an AP that is off target or not specific. **If team does not use the highest ranked solution from Step 5, they will receive a 1 for Impact on Future Scene.**

Awarding the Impact on Future Scene Score

❑ Use the descriptors to evaluate the relationship of the Action Plan on the Future Scene.
❑ Verify the Impact on Future Scene score in the Step 6.
- **18 or 20 points**: if the AP is developed from a solution in Step 3 that is the highest ranking and has an excellent relationship to the UP. Highest ranking solution: action plan has an excellent relationship to UP, AP has strong positive impact on FS (See the scoresheet for scores to be awarded for the range of Relevant solutions)
- **12 or 14 or 16 points**: Highest ranking solution; AP does a good job addressing UP, AP has moderate positive impact on FS
- **6 or 8 or 10 points**: Highest ranking idea; AP has some relation to UP; another solution might be better; AP has minimal positive impact on FS
- **2 or 4 points**: AP does not address UP; has negative or no impact on FS
- **1 point**: If the AP does not address the UP, is not the highest ranking solution, OR is either Circular, a Restatement, uses an Absolute KVP or Purpose, is Unrelated to, Broadens or Ignores the Future Scene, OR had no KVP or Purpose.

RELATIONSHIP TO UP (1 for Critical Error and 2 -10 Even Numbers) – assesses the extent to which the AP solves the UP. Measures the potential ability of the Action Plan to successfully solve the Key Verb Phrase and fulfill the Purpose. A low score is given to an AP that does very little or nothing to achieve the goals stated in the UP.

> **Awarding the Relationship to UP Score**
> ❑ Use the descriptors to evaluate the extent to which the Action Plan successfully solves the UP.
> ❑ Verify the Relationship to UP score in the Step 6.
> • **10 points**: AP effectively responds to KVP and Purpose of UP; detailed explanation.
> • **6 or 8 points**: AP adequately considers KVP and Purpose of UP; provides elaboration.
> • **4 points**: AP addresses some aspects of UP; elaboration is weak.
> • **2 Points:** AP does little to solve UP; AP is unrelated to UP
> • **1 point**: If the AP does not address the UP, is not the highest ranking solution, OR is either Circular, a Restatement, uses an Absolute KVP or Purpose, is Unrelated to, Broadens or Ignores the Future Scene, OR had no KVP or Purpose.

CLARITY (1 for Critical Error and 2 -10 Even Numbers) – Clarity measures the clearness and conciseness of the writing throughout the Action Plan. Teams will use this scoring element to support the selection of the best solution from Step 5. Action Plans that are difficult to understand, are limited in the support of the actions to be completed, or takes leaps in reasoning, will score very low.

> **Awarding the Clarity Score**
> ❑ Measures clearness and conciseness of expression; effective communication of ideas.
> ❑ Verify the Clarity score in the Step 6.
> • **10 points**: Excellent; clear, concise expression of ideas throughout AP.
> • **6 or 8 points**: Contains mostly clear and concise descriptions.
> • **4 points**: Writing inconsistent; may be difficult to understand in places; some wordiness detracts
> • **2 points**: Overall AP difficult to understand; wordiness confuses main idea or vague, takes leaps in reasoning
> • **1 point**: If the AP does not address the UP, is not the highest ranking solution, OR is either Circular, a Restatement, uses an Absolute KVP or Purpose, is Unrelated to, Broadens or Ignores the Future Scene, OR had no KVP or Purpose.

HUMANENESS (2-10) – This scale measures the productive, positive potential of the AP as opposed to its destructive, negative potential. To score this section, the evaluator must anticipate the practical consequences in implementing the Action Plan. Humaneness of an Action Plan is scored independently of the other scoring elements in Step 6. While an AP may score poorly in the other Step 6 criteria, it can still score well in Humaneness. The evaluator must score Humaneness on a 2-10 scale. **A score of 4 on the scale represents a neutral solution**. Higher numbers are awarded if the solution actively seeks to be constructive; lower scores are assigned if it is actively destructive. Use the descriptors on the scoresheet to determine the numerical score.

> **Awarding the Humaneness Score**
> ❑ Use the descriptors to evaluate whether the potential of the Action Plan is destructive for the Future Scene, neutral, or productive and positive.
> ❑ Verify the Humaneness score in the Step 6.
> • **10 points**: team booklet is practical, positive, constructive AP is written.
> • **6-8 points**: team booklet's potential outweighs negative potential in AP.
> • **4 points:** team booklet is neutral, neither negative nor positive.
> • **2 points**: team booklet is negative or destructive.

CRITERIA IN THE DEVELOPMENT OF ACTION PLAN (2-10) – measures the extent to which the Criteria, Grid and Action Plan validate the solution receiving the highest total rank will be used as the Action Plan. **Evaluation of this element does not require that the booklet contains verbatim discussion of each criterion in the Action Plan.** More creative teams will connect to the criteria with a relevant explanation of the best solution.

❑ Use the descriptors to evaluate the Criteria in the Development of the Action Plan.
❑ Verify the Criteria in the Development of Action Plan score in the Step 6.
- **10 points**: AP addresses specific criteria in a convincing manner.
- **6 or 8 points**: AP makes some valid connections to the specific criteria.
- **4 points**: AP's connection to the criteria is minimal or unclear
- **2 points:** AP does not address the criteria.

COMPLETENESS (2 – 20 even numbers) – measures the extent to which a team creates a strategy for addressing the UP. An AP that scores high in this area would fully describe the action to be taken and outline the steps that are necessary to complete the plan. The idea is to paint a complete picture of the plan.
- A well-developed Action Plan is fully explained and elaborated.
- The AP may also explain the challenges that should be overcome to achieve its goal.
- An AP that simply restates the solution idea from Step 3 would score on the low end of this scale.
- The AP may describe any obstacles to overcome in implementing the plan.
- The AP explains why and how the plan has a positive impact on the Future Scene, topic and society.
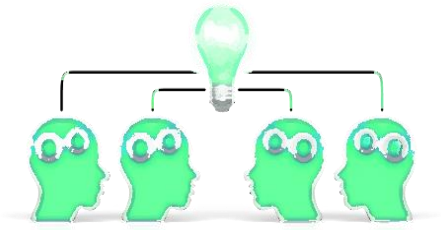
Awarding Completeness Score

❑ Use the descriptors to evaluate the Completeness.
❑ Verify the Completeness score in the Step 6.
- **18 to 20 points**: AP is elaborated, amplifies action to be taken, and considers obstacles that may occur. Presents organized, comprehensive explanation of process needed to achieve AP
- **12, 14 or 16 points**: AP illustrates the who, what, why, and how in detail. Contains many elements of AP implementation
- **6, 8 or 10 points**: AP provides some elaboration; more support of ideas is needed, Provides some considerations needed to carry out AP
- **2 or 4 points**: Minimal description of AP; team rewrites Step 3 solution ideas

Step 6 – Additional Evaluation Issues for Action Plan

Two plans are presented	**Description**
	• If an Action Plan has combined two or more <u>unrelated</u> solution ideas, the result is essentially presenting two separate plans. (Ideas from other solutions are allowed if they support the best solution, but both cannot be the focus of the AP.)
	Scoring
	• Score only the first solution for Impact on Future Scene, Relationship to UP and Clarity.
Action Plan unrelated to the UP	**Description**
	• It is possible for an Action Plan to be unrelated to the UP.
	Scoring
	• A score of one (1) is awarded for Impact on Future Scene, Relationship to UP, and Clarity.
Action Plan unrelated to Future Scene	**Description**
	• It is possible for an Action Plan to be completely unrelated to the Future Scene.
	Scoring
	• A score of one (1) is awarded for Impact on Future Scene, Relationship to UP, and Clarity.

FUNDAMENTAL CONCEPTS - Fundamental Concepts for FPS include Research, Creativity and Futurism. Research Applied, Creative Strength, and Futuristic Thinking are scored in the same manner in Steps 1, 3, and 6. Each step is scored independently of the others, based on the work submitted within the step under consideration. All work provided

in a step, whether scored Relevant or not, should be considered for determining the scores for Fundamental Concepts. Scores will fall into three ranges that include Developing (1-2 points), Very Good (3-4 points), and Exemplary (5 points). Booklets with **minimal** evidence of the Fundamental Concepts will score 1 or 2 points. If **some** evidence is present, then scores of 3 or 4 can be awarded. Booklets written to **integrate** the Fundamental Concepts will score 5 points.

❑ **RESEARCH APPLIED (Range of 1-5 points)** Uses appropriate research and demonstrates knowledge of future issues and trends as related to the Future Scene. Indications of Research Applied include vocabulary terms, concepts, facts, and incidents from the research. Booklets with minimal or no evidence of research, terms, concepts issues or trends will be scored in box with scores of 1 or 2.
❑ **CREATIVE STRENGTH (Range of 1-5 points)** Skillfully uses productive, creative, and innovative thinking. Responses showing Creative Strength are those requiring intellectual energy to make mental leaps beyond obvious or commonplace responses.
❑ **FUTURISTIC THINKING (Range of 1-5 points)** Utilizes knowledge of future issues and time frame as related to the Future Scene. Futuristic Thinking is demonstrated by addressing and extrapolating relevant trends and technologies from their research to the Future Scene as they identify futuristic, workable ideas, and how they could impact future society.

UP to be used to score the Action Plan

Because America's biological heritage is being threatened in the forests, how might we expand control measures of the Asian Long-horned Beetle in order to minimize ALB's range of destruction in 2041 and beyond?

SIMULATION FINGERPRINTING MODEL
What is it?

The simulation model is a super-computer created by bioengineers. Using "fingerprints" or unique identification information about the multiple species including the Asian Long-horned Beetle (ALB), it will allow viewers to see how different control methods will affect eh ALB and the surrounding area. Information such as niche, habitat, DNA and taxonomy will be included in this model. As a result, President O'Hanson will be able to choose the best way to control the ALB. Once a set plan for control is entered, you will be able to watch a simulation of how the environment will react over a set span of time. President O 'Hanson and his viewers will be able to see if the impact will be positive or negative and what the chances are for an invasion meltdown. The simulation model will contain genetic algorithms. This means it can learn and grow over time so each time a solution to the beetle problem is entered, it will memorize the solution and the outcomes. It will bring these to memory next time to give enhanced and more effective suggestions. The genetic algorithms will also be able to take past results of solutions before it was created which will be entered into the model by the creator and produce suggestions. The algorithm will continue to grow over time, so it will constantly be up to date with the changing environment. This feature will ensure that few mistakes occur, and information given by the simulation will always be accurate and helpful, controlling the ALV and minimizing ALB's range of destruction.

Minimizing Range of Destruction

The simulation model allows for the beetles to be stopped before they can move on to create more destruction. Any other solution may allow you to control the beetle, but who said it was going to control it to a point where it wouldn't move on, increase ALB's range of destruction? Scientists using the simulation model will be able to see which plan of action the best way is to keep the ALB in one area, assuring that their range of destruction will be minimized. Control options will be given using mechanical, biological and human controls. To prevent an invasive meltdown and more destruction from occurring, the simulation will not only show the reaction of the ALB, but other species in the environment. What other solution can eliminate destruction so thoroughly?

Mechanical

This involves direct human interaction with the ALB. It could mean hurting their target. To Find these options, bioengineers will enter information about past human attempts at controlling invasive species. President O'Hanson Testimonial: "Oh WOW! When I first discovered the problem of the ALB, I was really worried about our biodiversity.

With the simulation model, everything will be under control." Eddie Money, Environmentalist Testimonial: "The ALBs will be successfully contained and their destruction has been almost eliminated."

Control

This type of control is basically the introduction of an enemy species that will control the population of the ALB. To do this, one must first find the origin of the ALB, which will allow them to discover its natural predators. Introducing these predators into the environment runs the risk of creating an invasion meltdown. This risk will also be predicted by the simulation model.

Chemical

As its name suggests, this includes using chemicals to control the beetle population. Available chemicals will be entered into the simulation model which will rearrange the ingredients to form new chemicals.

Procedures

1 Mass procedure Simulation Model 2 Collect Information for and complete fingerprints
3 Train President O'Hanson and staff to use simulation model. 4. Insert fingerprints, watch simulations and choose best plan of action. 5 Watch ALB be controlled, and their range of destruction minimized

Obstacles; just roads to more clever problem solving: *cost of technology *chance of fatal error *difficulty finding information for fingerprinting
RESOLUTIONS TO OBSTACLES — "Some say give me a solution. I say give me a problem and let me solve it."
*Fundraisers and open philanthropy will be done to raise money.   *Experts will examine each plan before doing anything. Even with errors the risk of not using a simulation is 200% greater   *Most information is already known, especially in a wildlife reserve like the Riparian Woodlands.

Simulation Screen and Explanation of Screen

Fingerprints entered for ALB, Black Maple, White Elm and English Sparrow: tells what animals or plants are being tested as control agents—You will be able to watch simulation at this link: Simulation of Fingerprints

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The Action Plan is the result from the written content in the previous steps of the written booklet.

REVIEW for Step 6 Scores

Content: The Action Plan is a written proposal that demonstrates the major area of concern from the Step 2 UP. The action plan moves from creative ideas into the action to be implemented to solve the UP and impact the overall Future Scene.

Critical Errors will be scored as 1 for Impact on FS, Relationship to FS and Clarity. All other scores are listed below and are assigned as even points.

Scores up to 20 points
- **Impact on FS:** Positive effect on the FS situation
Scores up to 10 points
- **Relationship to UP:** Assesses if AP solves UP
- **Clarity:** Clearness and conciseness of expression: effective communication of ideas
- **Humaneness:** Productive, positive and potential of AP
- **Criteria in the Development of the Action Plan:** Degree to which criteria is integrated in AP
Scores up to 20 points
- **Completeness:** Extent to which the AP is thoughtfully elaborated

Notes about requirements for Step 6 Action Plan
- The **Action Plan** must be written from the highest ranking solution identified from the solutions generated in Step 3, assessed with criteria written in Step 4 and ranked using the Grid in Step 5.
- The Action Plan is an extension of the Solution generated in Step 3.
- Caution should be taken to avoid combining solution ideas from Step 3. If a solution idea that was not selected as the best solution becomes the major or equal focus of the Action Plan, the Action Plan will be scored with 0 in Step 5 and only the first solution identified with be scored for points in Step 6.

Finalizing the Booklet Score

- Review to be sure that comments have been written for each step. (See Feedback in Evaluation).
- Check that all of the scores have been accurately transferred into the score boxes for each step.
- Verify totals for each step and double-check the math for accuracy.
- After completing all of the booklets in the set, verify the Rank.

SUCCESS!

The evaluator's certification session is now completed.

DONE!

You will receive an email with your password and link to complete the FPS Certification process. You are to score one booklet and a few extra Underlying Problems, Criteria and Grid examples. Once you have completed this booklet, it will be scored and returned to you with feedback. If you are attending Coaches Conference, it will take approximately one week to update the attendance records. Your 14 days will begin at the time you receive your password. If completed booklets are not returned within 14 days, you will be required to attend another FPS training session.

For questions, contact Brenda Darnell at bdarnell@kaac.com.

This section of the Evaluation Manual does not include all Rules and information about FPS yearly topics. That information is available by download after Conference.

Elementary Governor's Cup
Deadline for Sending FPS Booklets to KAAC to Request Official or Coach Certification Numbers – Dec. 11
ASAP Online Student Entry Period – Dec. 13 to Wed. Jan 26
Deadline for Entering Student Names Online – Wednesday, Jan. 26
Deadline to for District Host to receive District Entry Form – Wednesday, February 2
District--Coaches' Planning Meeting - Thursday, February 3
District--Future Problem Solving and Composition - Tuesday, February 8
District--Assessment, Quick Recall, Awards - Saturday, February 12
Deadline for Confirming Students for Regional Online - Midnight Wed., February 16
Regional--Coaches' Planning Meeting - Thursday, February 24
Regional--Future Problem Solving and Composition - Monday, February 28
Regional-- Assessment, Quick Recall, Awards - Saturday, March 5

Middle Grades Governor's Cup
Deadline for Sending FPS Booklets to KAAC to Request Official or Coach Certification Numbers – Dec. 11
ASAP Online Student Entry Period – Dec. 13 to Jan. 5
Deadline for Entering Student Names Online - Wednesday, January 5
Deadline to for District Host to receive District Entry Form – Wednesday, January 5
District--Coaches' Planning Meeting - Thursday, January 6
District--Future Problem Solving and Composition - Tuesday, January 11
District--Assessment, Quick Recall, Awards - Saturday, January 15
Deadline for Confirming Students for Regional Online - Midnight Wednesday, January 19
Regional--Coaches' Planning Meeting - Thursday, January 27
Regional--Future Problem Solving & Composition - Monday, January 31
Regional--Assessment, Quick Recall, Awards - Saturday, February 5
Deadline for Confirming Students for State Online - Midnight Wed., Feb. 9
Governor's Cup State Finals- March 18-21, Galt House, Louisville—Schedule TBA

High School Governor's Cup
Deadline for Sending FPS Booklets to KAAC to Request Official or Coach Certification Numbers – Dec. 11
ASAP Online Student Entry Period – Dec. 13 to Jan. 12
Deadline for Entering Student Names Online – Wednesday, January 12
Deadline to for District Host to receive District Entry Form – Wednesday, January 12
District--Coaches' Planning Meeting - Thursday, January 13
District--Future Problem Solving and Composition - Tuesday, January 18
District--Assessment, Quick Recall, Awards - Saturday, January 22
Deadline for Confirming Students for Regional Online - Midnight Wednesday, January 26
Regional--Coaches' Planning Meeting - Thursday, February 10
Regional--Future Problem Solving & Composition - Monday, February 14
Regional--Assessment, Quick Recall, Awards - Saturday, February 19
Deadline for Confirming Students for State Online - Midnight Wed., Feb. 23
Governor's Cup State Finals- March 18-21, Galt House, Louisville—Schedule TBA

Other KAAC FPS Component Events—These events require an additional registration at the KYFPS homepage.
Deadline to Register for FPS Junior Division – Thursday, November 5, 2021
FPS Junior Division Qualifying Competition- Thursday, December 9, 2021
Deadline for Intent to Submit and to Register CmPS Team or Individual – Week of November 29 - December 3, 2021
Deadline to Register for Scenario Writing with Submissions– Monday, January 10, 2022
Deadline to Register Scenario Performance – Monday, January 10, 2022
Deadline for Written Proposal CmPS Team or Individual - Winter Break through January 7, 2022
Deadline for Scenario Performance submissions to KAAC Office- Monday, January 31, 2022
Deadline for Final CmPS Report to KAAC office- Monday, February 28, 2022
Deadline to Register for Individual FPS Competition—Sunday, March 6, 2022
State Participants in Junior FPS- March 19, 2022, Galt House, Louisville
State Participants in Individual FPS Competition—Monday March 21, 2022, Galt House, Louisville (Notification of winners will be announced in April)
CmPS Supporting Documents and Interview Required. Media Video (optional) Requires confirmation of date and time for team interview by KAAC Program Director, Galt House, Louisville

Junior Division FPS Awards, Scenario Writing Awards, Scenario Performance Awards, CmPS Awards Presented at State – Monday, March 21, Galt House, Louisville