

# Future Problem Solving

## Future Problem Solving UK

Inspiring the Creative Problem Solvers of Tomorrow



STARTUP KIT

FPS involves learning a 6 step problem solving process alongside a current global issue, projected into the future.

## Background

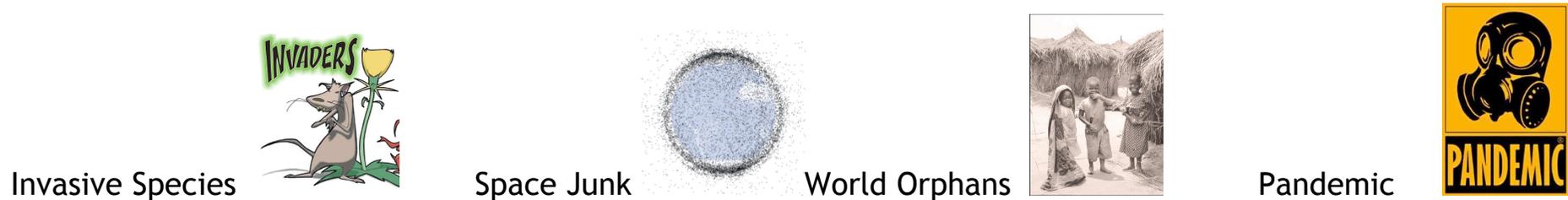
Dr. E. Paul Torrance, a professor of educational psychology from the University of Georgia created the Future Problem Solving Program in 1973 to give students a chance to be both creative and analytical while assessing real-world science, technology, and social trends for the future.

The program has since evolved into an international program with 41 affiliate programs and over 250,000 students participating. FPS can be used as a standalone enrichment activity or schools can enter the competitive aspect and give pupils the opportunity of competing with likeminded, talented young people across the UK and the world.



# HOW IT WORKS

Pupils are given a topic to research e.g



Armed with their own prior knowledge and further informed with supplied readings, discussions etc. pupils gain awareness of the extent of the issue.

They are then given a scenario on the given topic which is set in the future but based on real possibilities resulting from present trends.

**THEN** ..they use the 6 a step problem solving process, and record their findings and responses in a booklet.

In the competitive aspect the booklets, completed in teams of four are sent to FPSUK for evaluation, scored and returned. Several 'practice problems' are done this way, from September onwards and then teams meet for the UK final in February where a booklet on a pre publicised topic, but an unseen scenario is completed in exam conditions in a two hour period. Winning teams from this final are invited to represent the UK and compete at the World Finals held each year in June in the United States.

## FPS 6 STEPS

1. Find possible challenges/problems in the scenario [16 problems]
2. Choose **one** problem they see as especially significant to the issue and decide what it is they want to see happen.[Underlying Problem]
2. Write 16 solutions to address that **one** chosen problem.
3. Design criteria to use to choose the best solution.
4. Apply the criteria using a ranking system
6. Write up an Action Plan for putting the best solution into practice.

## GETTING STARTED

### Introductory Lesson

Begin with an interesting topic [we suggest 'Invasive Species']

Ascertain prior knowledge/discuss. Show some short clips on the topic.

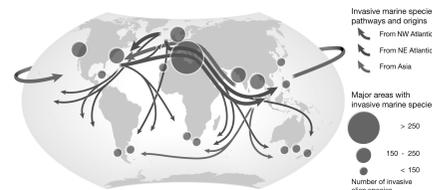
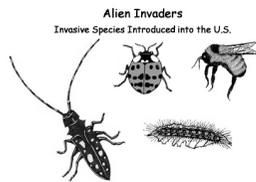
[www.youtube.com/watch?v=ZoxU--bmTMI&feature=relmfu](http://www.youtube.com/watch?v=ZoxU--bmTMI&feature=relmfu) Japanese Knotweed

[www.youtube.com/watch?v=gX1FLXEo96g](http://www.youtube.com/watch?v=gX1FLXEo96g) Cane Toads

[www.youtube.com/watch?v=-V5513w1XSk](http://www.youtube.com/watch?v=-V5513w1XSk) Ballast tanks

Explain that they will be looking at this issue and then they will be given a scenario set in the future and they will use a six step process to approach the scenario and come up with some solutions.

Have pupils gather articles, newspaper clippings, web research etc. perhaps on a variety of plant/sea/bird/insect invasive species examples with information on how they came to be introduced and what problems they have caused.



## Lesson 2

## STEP 1. PROBLEMS

Discuss any findings research from previous lesson.

Distribute the scenario\* [or 'future scene'] and read together. (BEWARE *Students often love to rush in with solutions which is a great opportunity to introduce **problem solving 'process'** or set of steps that you will be following to help organise our thinking and create more effective, relevant solutions.*)

Instead ask the students to look again to **what they have been asked to do** at the end of the scenario and to highlight it. In the case of 'Invasive Species' it reads

'we are asking you to **examine the invasive species impact on the island's ecosystem** and apply the FPS process to once again help us - this time to protect our living national treasures.'

In FPS speak we call this the '**CHARGE**' .

\*Explain to students that scenarios are used to improve understanding ,productivity and response in a myriad of management, leadership industry, technology applications. Many law firms even provide prospective employees with a scenario to discuss as part of the interview process.

## FPS STEP ONE

## PROBLEMS

Finding actual facts stated in the scene and considering possible consequences. Have pupils go thru the scene with a highlighter and highlight stated facts that could have a consequence on **the invasive species impact on the island's ecosystem.**

You could use a table like this on whiteboard or flip chart to help organize and record responses.

Fact	Consequence	Why is this a problem? [Could lead to.....]
<p>Animals like the Juan Fernandez fur seal and several bird species exist only on this island.</p> <p>Island residents who have supported the conservation efforts in the past are conflicted about efforts to destroy the maqui as it is thought to be a "super-berry"</p> <p>The coatis have few predators.</p>	<p>Enthusiasts might start rushing to the island and trying to get specimens</p> <p>Residents might be tempted to cultivate the maqui berry to sell it</p> <p>They have nothing to stop them multiplying</p>	<p><b>which could lead to</b> the number declining even more.</p> <p><b>which could lead to</b> further spread of the berry and more native plants destroyed.</p> <p><b>which could lead to</b> increasing number and more firecrown eggs being eaten.</p>

**Activity idea:** Use 3 large cards **Fact** **Consequence** **Why this is a problem?** Pass **Fact** card to one student and ask them to provide one fact from the scenario, **Consequence** card to another pupil to suggest a consequence for the chosen fact, **Why is this a problem?** to a third pupil.



### Lesson 3

### STEP 2 UNDERLYING PROBLEM [U.P]

In this step the students must, as a team agree on **one** problem that they see **most** impacts the scenario. In this case;

Which of these problems relating to invasive species has the biggest impact on the islands ecosystem?

(It is interesting that you may coach a number of teams, all of whom choose entirely different underlying problems)

#### SAMPLE UNDERLYING PROBLEM

the problem is first repeated

standard phrase in all U.Ps

**Because** the coatis have few predators on the island so no natural method of their numbers being controlled this could lead to increasing numbers of the firecrown eggs being eaten, causing further depletion in their number.**HOW MIGHT WE FUTURE PROBLEM SOLVERS IN 2060 AND BEYOND,** decrease the numbers of coatis on Robinson Crusoe Island **SO THAT** the native species on whom they prey may have a greater chance of survival.

*it is here that pupils write what is they want to do*

*now pupils go on to say the result of solving*

*this problem..what will be achieved as a result*

Students now have a focus, one problem to solve, and because they have stated what the result will look like 'decreased number of coatis' this will make it easier to find effective solutions. This is probably the most difficult step in the process and seems very specific in its layout, however it does provide a necessary narrow focus from which to create inventive solutions.

## LESSON 4

## STEP 3 SOLUTIONS

Time now to get really creative, to consider what might reasonably be available in future technology, science development etc. Start with some round robin sharing, listing ideas on the whiteboard, uninhibited creativity **before** going on to the more formal wording of solutions below. Three simple things to watch for in this wording of solutions.

**Who** will do it , The **idea**, and **HOW** it solves the problem.

Who	Solution	How it solves the problem [how it leads to <b>decreased coati population</b> ]
National Park rangers  Robinson Crusoe Island council  Zoologists	Will distribute birth control drug left in food only coatis eat.  will pay Islanders to catch coatis for relocation  will identify a predator for the coati, and introduce males only on the island	less new coatis being born  fewer numbers on island  coatis will decrease in numbers and the predators will not continue to breed as there are only males.

Students will have come across a number of possible ‘whos’ in their research and within the scenario. When new to FPS students will try and use ‘They’ or ‘The Government’ before each solution and must learn to consider just who would be the appropriate profession, agency etc to carry out their solution.

### 1.3 Produce Solution Ideas

Generate as many solution ideas as you can to your underlying problem.

1.	National Park rangers will distribute birth control drug left in food only coatis eat. This will lead to less new coatis being born and so fewer on the island to interfere with native species.
2.	Robinson Crusoe Island council will pay Islanders to catch coatis for relocation. This will decrease the number of coatis on Robinson Crusoe Island.
3.	Zoologists will identify a predator for the coati, and introduce males only on the island. This way coatis will decrease in numbers and the predators will not continue to breed as there are only males.
4.	

Recording solutions in the booklet .

note the use of **WILL** in solutions

## LESSON 5

## STEP 4

## DESIGNING CRITERIA

This step teaches an invaluable higher order skill by teaching students to consider designing their own criteria, specifically applicable to a particular issue in order to determine the best possible solution.

A fun way to introduce this concept to young pupils, or even the not so young, is to provide 4 different brands of chocolate cookies and ask the pupils to decide on 3 criteria for judging the best chocolate cookie e.g. best texture; best aroma; best ratio of biscuit and cream. Once they have designed the criteria let them taste each type and judge them according only to their criteria.



Some examples of suitable criteria for our solutions for Invasive species, considering our underlying problem .

1. Which solution will allow the best long term decrease of the coatis?

2. Which solution will be least likely to have any negative effects on the native creatures on the island?

3. Which solution will be most readily acceptable to the islands residents?

**5 criteria are needed for the booklet.** Criteria like ‘which solution will cost the least’ are considered weak criteria.

## STEP 5 APPLYING CRITERIA

Scores are awarded to each solution from 1 to 5 ,5 being the solution best fitting the criteria and 1 , the least. In the case below solution number 3, ‘introducing a predator for the coati’ has ‘won’ and will now go on to be developed into an Action Plan in Step 6.

Solutions written in shorthand

### STEP 5. Apply Criteria

From your list of solution ideas, select the 5 ideas you think have the most potential to solve your underlying problem. Use each criterion to compare/rank the solutions on a scale from 1 (poorest) to 5 (best). Enter the numbers in the appropriate columns. Add the ranks given to each solution and enter the sum in the appropriate TOTAL column.

Step 3		Criteria					Total
Sol'n #	Solution Ideas	1	2	3	4	5	
#2	Pay island residents to catch	2	4	3	1	2	12
#3	Introduce predator for coati	5	3	1	5	4	18
#		1	2	5	4	3	15
#		3	5	4	2	1	15
#		4	1	2	3	5	15

## LESSON 6

## STEP 6 ACTION PLAN

This is the final step where the chosen solution is described in greater detail, explaining how it will work, the organisation of it, timing. Tell pupils It should be a document that anyone could pick up and use to carry out the solution. Possible 'hitches' could be discussed and how these can be dealt with.

### STEP 6. Develop an Action Plan

The last task is to develop your most promising solution into an action plan. Explain what the solution/plan will do, how it will work, why it will solve your underlying problem, and how it relates to the future scene.

Include a description of your action plan to carry out the solution idea. You might consider some of the following concerns: Who will be involved? What actions will be taken? When and where will the plan be carried out? How might you overcome any obstacles? What are some sources of assistance for your plan? What are some sources of resistance to your plan? Do not write on the back of any page. If needed, additional blank pages are provided.

Solution # \_\_\_\_\_

Robinson Crusoe Island national park will enlist the services of Zoologists expert in the area of predator behavior who will identify potential predators of the Coati. They will also consider which of these is least likely to also be a predator to other native species on the island. Males of this species will then be shipped to the island and released, at first in small numbers and in a confined area, under close supervision of the park rangers. The rangers will be looking for any behaviors that could cause further problems to any native species of birds and animals. Once it is deemed safe to go ahead, predators will be released across the island and coati numbers monitored. Island residents could play a role here in recording coatis near their homes and alerting rangers to any significant changes in numbers seen. At the same time rangers will continue to monitor Firecrown and other bird species for evidence of less nest pilfering. As the predator numbers die off, more males will be introduced until the coati population is zero. The predators will eventually die off themselves having no way of reproducing, leaving Robinson Crusoe Island free of one of its most aggressive invasive species and giving the firecrown hummingbird a greater chance of survival and more successful breeding. |