



PINBALL HEROES
TECHNICAL

Team Manager Workbook

2023-2024 Challenge Season

Introduction

The purpose of this workbook is to help team managers with this year's technical challenge: Pinball Heroes. Team manager(s), you can **teach, guide, and mentor**, while team members can **do, create, and interpret**. This workbook helps team managers to teach. The workbook contains activities you can use during team meetings to teach your team.

In this year's challenge, teams have been asked to design and build a Pinball System, design and build 3 Pinball Modules that use different technical methods, and create and present an action adventure story about a hero who goes on an extraordinary mission. Teams will be scored on their technical design, technical innovation, length and completion of a successful pinball round, storytelling, risk taking, and two team selected Team Choice elements. This workbook provides activities for most of these elements.

Team managers; please remember the rules regarding **interference** when using these activities with your team.

Let us begin!

Activity #1 Technical Design and Innovation

This activity helps with teaching your team about the meaning of technical design and innovation. Technical design and technical innovation are components of the modules they must build. Understanding technical design and innovation is key for success.

Technical design relates to the reliability of the design. Will each device work the same way every time? Is the design reproducible? A device that easily breaks and doesn't work all the time may score low in technical design.

Technical innovation relates to the newness, uniqueness, originality and creativity of the design. How are the devices being powered (a motor, a computer, electricity)? Were the devices purchased or built by the team? The more unique, the higher the technical innovation.

Materials: 1 large sheet of paper (about 3 ft x 3ft).

Sticky Notes Pens, Pencils and or Markers

Homework: A good way to teach your team about technical design and innovation is to ask each team member to bring one examples of an “invention” that does a Machine Module Type Action (Change Direction, Stop and Start, Raise or Lower, Hide, Light Up, Make a Noise, Spin, Release) to the next team meeting. These “inventions” could be existing items or created by the team member.

Ask them to search through their room, garage and toy boxes for invention ideas. Remind them that they need to search for the items: no help from parents. Resist giving your team examples – ask them for examples.

Team Meeting: During your team meeting, talk about each invention and have each team member demonstrate how the invention works.

On the big sheet of paper, draw the following scale:

0	15	30
---	----	----

Write the name of each “invention” on a sticky note. Ask your team to rank each invention by technical innovation (how new, unique, creative the invention is). Roughly speaking,

0 – may be a rock

15 – may be the average you would expect a team your age to create

30 – may be the most awesome thing that could be built in 3 months for a team your age!

The scale is subjective: it's up to your team to create. Ask them to compare each "invention." What Action does the invention fit? How was the invention made? Similarly, "inventions" that are completely store bought may rank lower: if everyone can buy it, it's not technically innovative (it's not unique or creative).

Use the same scale for technical design and have the team rate each invention again based on its technical design. How well does the invention work? Does it do what it was designed to do? Does it work the same way every single time? An invention that falls apart or does not work consistently might score lower than an invention that is very reliable and works every time.

Keep the big sheets of paper around with their rankings. Don't throw it away! Whenever the team gets a new invention idea, ask them to go back to their rankings and try placing the new invention on the scale.

Activity #2 Story

As part of the challenge, your team needs to create an action/adventure story about a hero who goes on an extraordinary mission. A hero for this challenge is a character with great courage, outstanding achievements, and/or noble qualities. The story must include an Antagonist to the hero, someone who tries to thwart the hero's efforts during the mission.

Materials: Note Cards, Pens, Pencils and or Markers

Homework: Ask each team member to bring to the next team meeting 3 examples of a hero, 3 examples of an antagonist, and 3 locations where an action story might take place. Make sure the team members come up with the examples themselves: no help from parents. Resist giving your team examples – ask them for examples.

Team Meeting: During your team meeting, talk about each example they brought in.

Create the following note cards (or put all the elements into a random generator):

Past **Present** **Future**

Ask your team to create a 2-minute play randomly selecting a Hero, an Antagonist, and a setting (from the lists they brought). Then select the time frame (Past, Present or Future). Give them 5-minutes to plan their play.

Repeat the challenge several times and talk to the team about how every story has a beginning, middle and end. Sometimes it can help to start with the end in mind and then create a story that leads to the agreed upon ending.

If the team is up for it record these mini plays and watch them back at a later time, see if their thoughts or feelings change over time.

Activity #4 Integration

The icing on the cake in the Technical Challenge is integration. In fact, integration is a lot like baking a cake; when you're baking a cake if you take out ANY of the ingredients (the egg, the flour, or something else) you no longer have a cake! A well-integrated scoring element should be like an ingredient in a cake, without it the presentation just isn't the same.

A good way to teach teams about integrating elements into their story is through self-evaluation.

Below is a rubric for the team to evaluate integration wherever it may be: in their solution, after an instant challenge, or in a movie.

Materials: Integration Rubric

Team Meeting: During your meeting hand out the rubrics to each team member to evaluate integration at different times:

- After practicing the team solution/skit
- After practicing a performance based Instant Challenge
- After writing the script
- When choosing Team Choice Elements
- When reviewing the video recording from the previous activity

You can also have team members evaluate the Integration of elements in non-DI related realms like in a movie, or scoring elements of their bedroom. Some example questions: How well integrated are the items you find in hunt rounds of Fall Guys, what about the holiday theme of the challenges? How integrated is the guitar poster in a space themed bedroom, what about an Einstein poster?

As a team manager, you need to be thoughtful about how you present this activity to avoid interference. It is not interference to ask questions like "did you score those reasonably?" or to have them score a particular element, but you cannot say "This integration is actually a 1" or score one of their elements yourself.

Integration Rubric

Element:	
What is lost if we remove this element?	

What would be lost if we changed this element to something else?					
	1 Not at All	2 A little	3 Some	4 A lot	Why?
If we remove this item how much will the story change?					
How significant is this loss?					
How much did including this element improve the performance?					
Total Score: <i>(a higher score means the element is more integrated)</i>					

Activity #5 Risk Taking

This activity helps encourage the team to think about Risk Taking in terms of the challenge. Risk taking in this challenge is all about novelty, difficulty, complexity, and going above and beyond in your design.

Materials: A Shoe box, several sheets of paper, Popsicle sticks, rubber bands, paperclips, tape, straws, and small ball (can be a small wadded up piece of paper, bouncy ball etc.)

Team Meeting: Ask the team to build a miniature pinball machine inside the shoebox with at least 2 machine modules

This can be done as a whole team activity or by individual team members.

Once finished have the team test their solutions then ask the team evaluate the risk taking of the machine as a whole and each individual module using the scoring rubric provided.

As a team manager, you need to be thoughtful about how you present this activity to avoid interference. It is not interference to ask questions like "did you score those reasonably?" or "why did you score it that way", but you cannot score the device for the team.

Device:					
	1 Not at All	2 A little	3 Some	4 A lot	Why?
Novelty					
Difficulty					
Complexity					
Above & Beyond					
Total Score: <i>(a higher score means the device has more risk taking.)</i>					

Have the team repeat the activity again, this time have them focus on risk taking while they build. Discuss your results.

Activity #6 Workmanship

This activity helps with teaching your team about the meaning of workmanship and some guiding questions to increase your team's workmanship. Workmanship is one of the three elements scored in Team Choice Elements.

Workmanship quality or effort that is evident in a solution is based on the age group (EL, ML, SL, or UL) of the team. It has to do with how well implemented an idea is. Remember, a team will only be scored on their own workmanship. If a part of the solution is store-bought, only the team's modifications will be scored for workmanship. An element that can be easily reproduced with not much time or effort might score lower for workmanship.

Team Meeting: During your meeting hand out the Workmanship rubrics to each team member to evaluate workmanship at different times throughout the process.

This can be done as a whole team activity or by individual team members.

As a team manager, you need to be thoughtful about how you present this activity to avoid interference. It is not interference to ask questions like "did you score those reasonably?" or to have them score a particular element, but you cannot score the elements for the team.

Workmanship Rubric

Element:		
Questions	Team Answer	Low/Medium/High Workmanship
How long would it take us to rebuild this element?		
What parts of our element are high quality?		
What parts of this element have lower quality?		
How well put together is this element?		
Where did we put effort into this element?		
What parts of this element could we put more effort into?		

Are there any commercially produced or store-bought items we could reproduce ourselves?		
---	--	--

Affiliate Challenge Master Contact Info

Amber Hudson

arh415@yahoo.com

Justin Willson

jt.will.525@gmail.com

Trystan Bink

tcbinkleyj@gmail.com