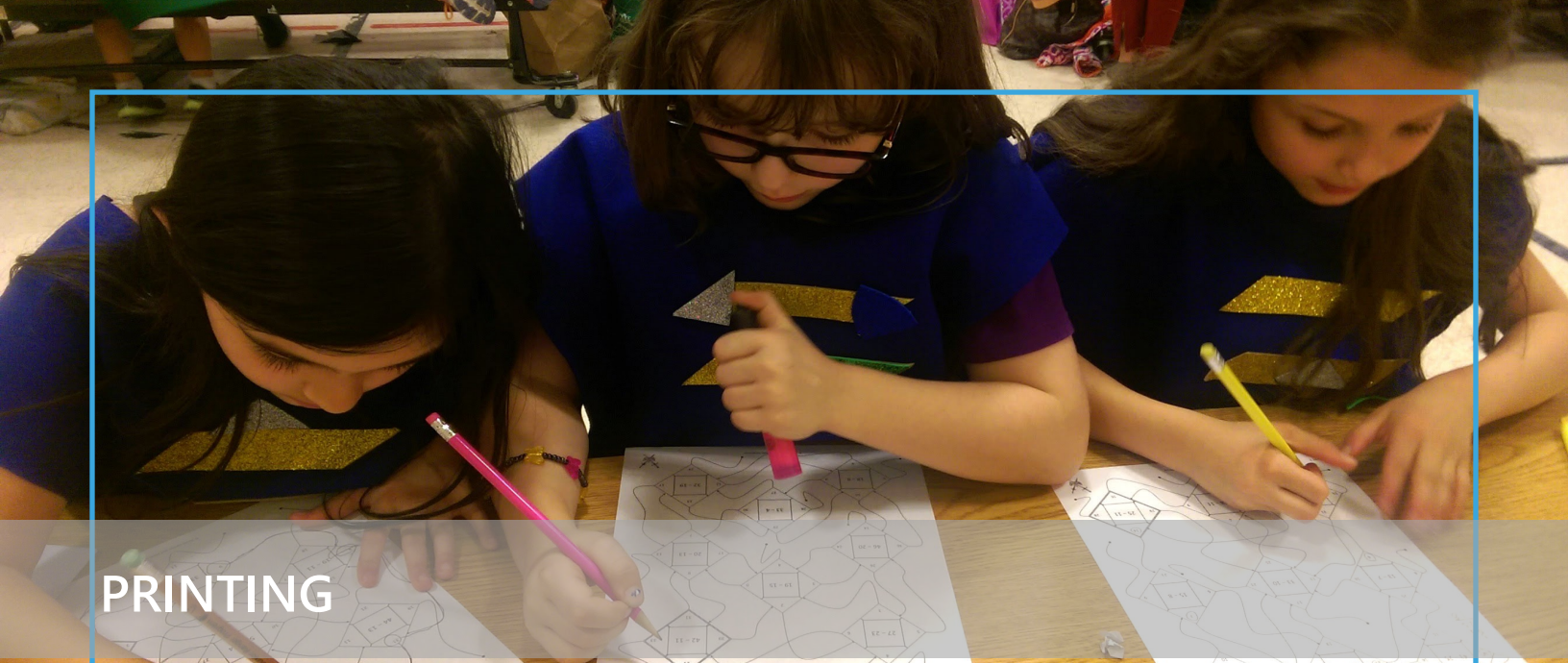# MATH ADVENTURE KIT

Printing

PRINTING

This chapter gives more details for the person that will be handling printing duties for the event.

By volume, most of the printing is puzzles. But there are a number of other buckets too: props, scripts, team lists, posters, etc.

1. PUZZLE PRINTING AND PACKAGING

PRINT COUNT

First, you need to know how many teams to expect at each level. There are dozens of print jobs, and you need different quantities of each document, depending on how many teams you expect will need them.

Second, you should pad those numbers. Two reasons: 1) teams sometimes damage their puzzle packet, and need another one. 2) occasionally there are teams that get flustered by the math they encounter in the packet, and it's wonderful to be able to offer to shift them down a level without making a big deal out of it.

Although we offer two levels per grade, most events use either the A puzzles or the B puzzles. But downshifting means offering a few spare puzzles of the opposite set. Some schools allow teams to choose to play up ½ level, so those schools would have a more balanced distribution.

With that in mind, here's a typical grid for a spring event (where most teams are using B puzzles):

Levels	Teams per Level	Padding for Mistakes	Padding for Down-shifting	Total
1a	0	0	1	1
1b	5	1		6
2a	0	0	2	2
2b	8	2		10
3a	0	0	2	2
3b	6	1		7

In higher grades, where the math gets harder, you might print extra down-shift packets. Don't worry about having extra unused copies at the end of the event. Kids love taking copies home from other levels than the one they did. Plan to just give them out at the end of the night.

Prep night practice puzzles

If your committee plans to host a prep night, where team coaches get to practice the puzzles, print out a few copies of each demo puzzle. These are different than the puzzles the students get to solve, and usually set at a first-grade difficulty. 4-5 copies of each puzzle type is usually enough. After printing, give these to the Event Lead, to use during the prep night.

Print job requests

Make sure when you fill out the instructions for your print job that you specify all of the following:
- Single-sided
- Stapled (in any corner)
- Black ink (any puzzles that require color ink will be called out boldly in the instructions)
- (Optional) colored paper, based on the puzzle title.
  Print all the puzzles for station A, regardless of level, on one color of paper.
  Stations B, C, and D each get a different color of paper.

PACKAGING

The different puzzles need to go to different stations, to be handed out over the course of the event.

Theatric stations

Puzzle A's theatric station gives out puzzle B. Puzzle B's station gives out puzzle C. C leads to D, while D leads back around to A.

Each station also needs the signs that lead to it. If you printed on colored paper, that means the signs shouldn't match the puzzles. The signs lead to *THIS* station. The puzzles are for the *NEXT* station.

Puzzle solving station

The starting puzzle for each team needs to be sent to the puzzle solving station, to be handed out during the kick-off.

It's tempting to start each team with the first puzzle. However, if you did, Station A would be overrun at the start of the adventure, and then vacant for the rest. This same fate would fall on the other stations in turn. This causes waiting lines and stress for busy stations, and boredom for the rest.

Math Adventure puzzles are designed in a loop. Teams can start anywhere in the loop, and then work around until they've done all 4. With that in mind, it's much better to scatter-start the teams, so roughly ¼ are headed to each station initially.

The exception is very small events, with 1-5 teams. Crowding is unlikely to be a problem, but instead, an actor shortage may be. In that special case, let the teams all start at station A, and actors can cover each station in turn.

PRINTING

When scatter-starting, we have found that it doesn't really matter how thoroughly randomized the initial distribution is. We try to arrange for teams seated adjacently to not be working on the same puzzle. A thorough approach would be for teams 1, 5, 9, etc. to start with puzzle A. Teams 2, 6, 10, etc. start on puzzle B. 3, 7, 11… start on C. 4, 8, 12… start on D.

A trick that separates the printer's job from registration and table assignment is divide the teams into four groups by grade. Given team counts such as those in the grid in section 1 earlier, I might assign starting puzzles like this:

Levels	Teams starting at A	Teams starting at B	Teams starting at C	Teams starting at D
1b	5			
2b		4	4	
3b				6

In this example, pull out 5 copies of puzzle A level 1b, 4 copies each of puzzle B level 2b and puzzle C level 2b, and finally 6 copies of puzzle D level 3b. Set these in the box to go to the event kick-off at puzzle solving station.

Other printouts destined for the solving station include table assignments and table numbers, and signs for the wrap-up activity, if any.

Extra puzzles

Ideally, the extra puzzles that were printed to allow for mistakes or level changes should also go to the puzzle solving station, or be split between there and the theatric stations. If the theatric stations are all located close by, it may be easier to not do such tedious sorting. A team in need can go to the appropriate area receptionist to get an extra puzzle when they need it.

However, it is nice for the math mentors to have the ability to help a team in trouble by abruptly changing their level. If you have send one spare puzzle of every type and level to the solving area, they have that option.

Printing cost

In our home school district, the district printer charged 4¢ per page for b/w copies. Our packets are 6 or 7 pages each (including cover sheet and instructions). Each team needs 4 packets (1 for each puzzle). So the printing cost for each team is about $1 for the whole event. If you instead use a professional printer like Kinkos, your costs could be $4-5 per team.

Keep that in mind when calculating how many bonus puzzles to print. The above examples add 50%, between the mistake buffer and for down-shifting. At an event with 20 teams, that's 10 teams' worth of wasted packets (of course, they aren't really wasted if you give them away afterwards).

2. SCRIPTS, SIGNS, AND PROPS

The print spreadsheet lists a number of items other than puzzles. Unlike the fairly consistent puzzle printing needs, these have a wide variety of printing requirements: double-sided, color, large-paper, etc.

Props - These are items used in the stories at each station. Some are re-usable, while others get cut up or drawn on every time a team passes through. The print spreadsheet will recommend appropriate amounts.

Organizers - Handy pages for making things easier on event staff. Packing lists, sign-up sheets, and the like.

Signs - Each station takes place in a part of the school away from the solving area. The students have no way to know where they should go after solving a puzzle unless there is a clear path marked out through the hallways. If color paper is used, signs should match their respective puzzles.

Scripts - Each station has a detailed script. The station leads should read theirs well in advance, but the actors at the event often won't have. Print out plenty of extra copies so the staffs can read them through.

Demo puzzles - These are only needed if a prep night, or other pre-event, wants to have them available for practice. As such, they may need to be printed as part of a separate print job from the rest.

Team lists - Each station will want a copy of the team list, to check teams in as they come through. The **registrar** may be able to print these themselves, but if not, hopefully you can add them to your print job.

> Print a copy for each theatric station on letter-size paper, stapled.

> Then print 3-4 more copies on large ledger paper, to be sent to the solving area. These don't need staples. One of the copies can be sliced into rows, by team, after which they make great table numbers!

Marketing - There are flyers and posters that your committee may want to distribute around the school. These are covered primarily under the **Marketing** instructions. But as printer, you may be asked to print them.

3. PRINTING WITH COLOR

Over the years, we've tried a variety of techniques for using color in our printing. In the early days, we often used color in our puzzles. That meant that printing needed to be on white bond paper, and the cost per page was significantly higher.

Over time, we shifted most of our puzzles to black/white. This lowered costs, and opened the door to using colorful paper. We tried a couple different uses for paper colors, but one arrangement was the clear winner: *Each puzzle type should use a different color of paper.*

Doing this has one big advantage, and several small ones.

Pacing. As teams solve puzzles in the solving area, they accumulate piles of colorful scrap paper. These get shoved to the side when they get their next puzzle. At any time, staff can see which teams are on pace, which are falling behind, or if any are on the verge of finishing early. Simply count the number of different colors of paper on their table.

In a normal 2-hour event, the average team needs 30 minutes to solve each puzzle and participate in the related dramatic story. So, a team that is moving at pace should have a 2nd paper color on their table after 30 minutes, a 3rd color after 60 minutes, and a 4th color after 90 minutes. If your event has mentors helping in the solving area, coach them to look for teams with too few colors, and offer extra help until they catch up. Also look for teams that have all 4 colors earlier than expected, so you can warn the staff in charge of any wrap-up activity to get ready.

Lost pages. As the evening wears on, more and more loose paper accumulates on teams' tables. Assuming that teams use white paper for scratch paper, and each puzzle is its own color, it is easier to find a missing puzzle page when you only have to search for a specific color.

Last call. Toward the end of the evening, after many teams are done, the remaining teams should all be working on their last puzzles. Assuming you've first verified that no team is working on its 2nd-to-last puzzle, you can relatively quickly scan the cafeteria, to see how many are working on pink, how many on blue, etc. If no team is working on green any more, then the theatric station to which the green puzzle leads can safely begin to shut down for the night.

Printing distribution. It's a lot easier to check if a pile of printed puzzles has arrived at the right place while setting up the stations. Check the top puzzle versus that station's manifest. Then, assuming all the puzzles for that station are the same color, you shouldn't need to double check all the puzzles in the stack (although a quick riffle isn't such a bad idea).

4. USING THE SPREADSHEET

The online resources include a Printing spreadsheet.

It contains 3 tabbed worksheets. The first two are for you to fill out. That data is automatically copied into the 3rd sheet, which you print out and give to the printer, along with the puzzle, prop, and other .pdf files.

SHEET 1: TEAM COUNT BY LEVEL
a) Enter the number of teams expected in each level. These numbers come from Registration.
b) By default, this sheet estimates how many extras to print, based on 20% of the teams from the nearby level. However, you can change this number if you like.
c) There is also a field to note if parallel stations will be used. That doesn't affect how many puzzles are printed, but it changes how many scripts and props you'll need.
d) The totals column automatically adds the other columns together. It's values are automatically plugged into the Print instructions on sheet 3.

No need to print this sheet out.

SHEET 2: PUZZLE TYPES

    a) Talk to your printer, to find out what paper colors are available, and if using them changes the per-page cost.

    b) If the cost is acceptable, pick 4 colors, and assign one to each puzzle type. If the cost is too high, or no good colors are available, change the colors to white.

    c) Leave the other columns on this sheet alone.

No need to print this sheet out.

SHEET 3: PRINT INSTRUCTIONS

No input is needed for this sheet. The print quantities are taken from sheet 1, and the paper colors are taken from sheet 2.

Print this sheet out – it should be 3 pages. If your printer lets you, submit this sheet directly. If they need you to use their own form, copy the counts over. Alas, there are a lot of them.

Don't forget to also specify the extra instructions for each job. They are summarized at the end of each block of print items. But here are the highlights:

Puzzles - Print single-sided, with each packet stapled (usually in the top-left corner).

Scripts - Color ink is optional. Print double-sided, with packets stapled.

Props - Might be single– or double-sided. Usually color ink, but not always. Not stapled.

6. EVENT MILESTONE CHECKLIST

Following is a recap of the various tasks of the Printing role, and when they need to happen…

Task	Timeline	Completed?
Get team counts by level from Registration	2 weeks before	
Calculate final print counts	2 weeks before	
Submit print order to printer	10 days before	
Pull out first puzzles and extra puzzles	1 week before	
Assembles boxes for each station	1 week before	
Deliver boxes to station leads	1 day before, or at event	

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