
Nurturing the Next Gen

JJ

Creating Kid-Friendly Challenges for Fun and Mayhem

By Ed Skoudis
(featuring Josh Wright & Kevin Johnson)

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Motivation



- We are geeks
- Surprisingly, we are in short supply
- Astonishingly, the world needs more of us
- Miraculously, some of us have managed to have children
 - How can we repurpose this precious raw material to make the next generation of geeks...
 - ...while, at the same time, building bonds with these beautiful gifts called “children”?
 - Truth be told... that’s what this is really all about

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One Solution: Challenges!

- Back in 2004, I started writing interactive challenges for my kids & the neighborhood kids
 - Mostly for kids age 7 through 11
- Continued through 2007
 - I stopped doing them because “I got too busy” -- FAIL!
- Christmas 2010, my kids begged me to do another challenge!
 - The new one was for 8 to 14 year olds
- It melted my heart
 - I’m back in the challenge writing business!

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Structure of Challenges

- 10 to 12 clues, hidden around the house or yard
 - Each is numbered so kids can track their advancement
- Children are presented with the first clue
 - Most clues are on a single sheet of paper, but that varies depending on the nature of a clue
 - I give them N copies of each clue, where N is approximately the number of kids playing
- Each clue, when solved, leads to the next clue
- Not a lot of complex rules:
 - First team to find next clue gets a point... team with most points wins
 - NO RUNNING! And... No whining
- CHALLENGE MASTER MUST HAVE A PRINTED COPY OF A CLUE MAP
 - Single sheet that you carry around, along with a sheet to award and track points

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Challenge Dynamics & Prizes

- I use three teams of ten (In the old days, they were all solo)
 - Approximately (scale up or down to suit)
- When a clue is solved and the next clue is discovered, all teams get it
 - No team can fall way behind
 - Everyone stays in the game that way
 - Keep them interested, keep them involved
- Everyone gets a prize
- Not everyone gets the *same* prize
 - We divide it into 1st, 2nd, and 3rd place teams, with groups of prizes
 - Prize budget: \$ 100 total (for 30 kids!)
- Try to get a fun and/or silly prize
 - Integrate it into your theme if you can
- Let kids trade prizes if they want
- Some day, I may do a really serious prize

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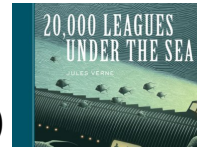
Adult Involvement

- During a party, most of the adults like the idea of having the kids off doing their own thing
 - Makes the parties more fun for everyone
 - In some ways, my challenges make me just a big, geeky baby sitter during our parties
- Some mommies cheat mercilessly
 - Especially with the little kids... You gotta watch `em

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Challenge Ideas I have Used

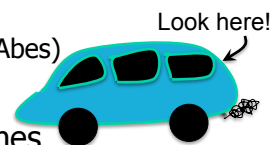
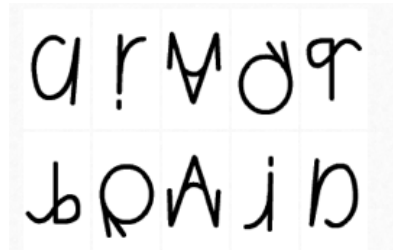
- A book that points the way
- A song that points the way (on CD)
- DTMF (on a CD) anyone?
 - Make sure they have landline phone available
- Custom Poetry
 - Roses are Red,
Violets are Blue...
- Video (DVD, files on computers, or YouTube)
- Rebus!



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More Ideas I've Used

- Acrostics
- Anagrams (with URL for Internet Anagram Generator)
- Ambigrams
 - <http://www.ambigram.com/matic>
- Substitution ciphers
 - "man ascii" is your friend
 - Decimal, Hex, Octal... I prefer Hex
 - But, decimal is nice with coins (3 Georges + 2 Abes)
- Photos (try varying perspective or lens)
- Hand-drawn, highly stylized maps & sketches
- URLs pointing to Tweets, YouTube, URL Shorteners, etc.
- A script that talks
 - Mac OS X "say" command, with clue of "In a term, run: \$ /clue7.sh"



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Gotchas to Watch Out For

- Make sure teams are evenly balanced
 - Never underestimate the implications of your kids having a copy of your genetic structure
 - Joshua Skoudis (age 9) scares me
 - I advise against having the kids choose the teams
 - Especially your own kid
 - Choose teams for them
- Make sure you have enough computers available for at least one per team (maybe more)
- Your neighbors will think you are nuts
 - That's ok, as long as you have permission for their kids to participate and your own kids are involved
 - NEVER be in a room alone with a child that is not your own
 - I stay close to my own kids while the challenge runs
 - Another reason for team challenges

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Tiny Tot Version

- When my son was four, I wrote a challenge that required no reading for the 3 to 5 year old crowd
- All picture-based clues
- Only 5 clues (limited attention span)
 - Mommy cheating allowed
- All clues located within a narrow area of back yard
- Pictures of swing, fence, flag, watering can
- Lots of fun, and the little guys got to play like the big kids

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Challenge Tips

- While writing the challenge, lay out all clues on the floor, and make sure each clue properly points to next clue
 - Build your one page clue map from the clues on the floor
 - Then, hide them in reverse order so you can verify that they work
- Don't make it too hard
 - Solvable in 3 to 10 minutes each
- Be whimsical and fun, but not scary
- Theme your challenge
 - Party type (e.g., Christmas, Fourth of July, Jungle, etc.), or other
- Make each individual puzzle in a challenge a different kind
- Be multi-media
 - Written word, photos, figures, hand sketches (pen, pencil, crayon), audio, video, and Internet URLs, Twitter, YouTube, and more!



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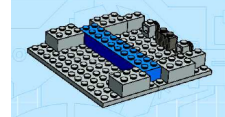
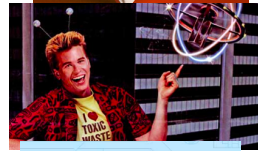
More Challenge Tips

- Forward and reverse referencing:
 - Make later clues refer to earlier ones
 - In early clue, give them items that they will need to solve later clues
 - Example: a key included in an earlier clue opens a door that they encounter later
- Physical objects as parts of clues are nice
 - Coins, keys, walkie-talkies, etc.
 - With food, watch out for food allergies
- Be encouraging and supportive
- Be fair
 - Don't favor one team, even a team with your own kids
 - Be careful giving hints, unless everyone gets them, which can be tough if teams are in separate locations of the house or yard

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Future Plans – Challenge Ideas I Plan to Use Next

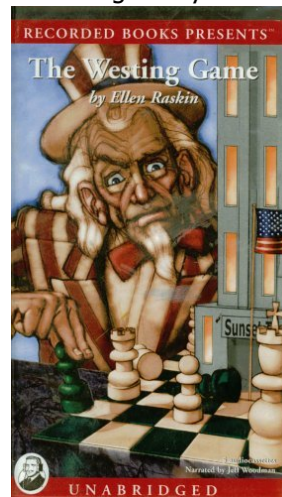
- I provide circuit diagram, kids build it with Snap Circuits
 - It builds a pre-tuned radio receiver, and I'll broadcast next clue on a loop
- Origami
 - The clue paper is a collection of gibberish and spots, but with instructions for folding
 - Fold the paper just as instructed, and the next clue will appear
- Laser bounce
 - Laser pointer bounces off of several mirrors, pointing to next clue (very hard to keep steady!)
- Lego build directions
 - When done, it spells something on an obscured wall



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Conclusions

- Fundamentally, what we are talking about here is sharing a way of looking at the world...
 - ...and inspiring an infosec geek's mindset in our kids
 - Try to understand how things work, tear them apart, put them together again better
 - Question why, test assumptions to identify bad ones, make educated guesses, don't fear from mistakes as long as you learn from them
- DO NOT GET TOO BUSY TO DO THIS!
- Make sure your kids see your own enthusiasm for such things
- But, always remember, you can't make them into little clones of yourself
- You have to let them be who they are destined to be, while guiding them
- And, finally... some day... I shall prepare my ultimate challenge!



SDG

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And Now... A Few Words From...

Kevin Johnson

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Encourage Technology Use

- Both of my kids have computers
 - iPads and other tech
- They use these items to play
 - But learning is a big focus
 - It is used for classes
- We have made technology part of everyday
 - It's a tool
 - Not an event to use
- The girls explore their interests
 - But we guide to topics
 - Of course this picture worries us ☺

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Security is Important

- The Internet is scary
 - Especially for Dads!
- Security awareness is important
 - Two factor auth
 - Passphrases
- The girls use social features
 - No NOT Facebook
- We teach them that technology does not change the rules
 - People are still strangers
 - The rules matter
 - Dad is always right...
 - ... I have to try!

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And Now... A Few Words From...

Josh Wright

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Codes and Ciphers

- My daughter Maya is 9, my son Ethan is 6
- Since they could read, we've been experimenting with ciphers and code
- I make lunches every day I'm home
 - Always have a pad and pen handy
- Special activity we share, messages are secret from everyone (even Mom!)

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Substitution Ciphers

- Simple code sharing system with lots of variety
 - Simple enough for very early (future) cryptographers
 - Use tables or lines to make transposition easier

ABCDEFGHIJKLMNOPQRSTUVWXYZ



OPQRSTUVWXYZABCDEFGHIJKLMN



MCIF DFWNS SLHFO QVODHSF OH PSRFWAS

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Cipher Wheel

- Easy way to use a substitution cipher, kid-friendly project
- Turn wheel to the "code" letter
- Transcribe



www.kidsmakestuff.com/files/articles/48/KidsMakeStuff_Cipher_Disk.pdf

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














St. Cyr Slide

- Similar to Crypto Wheel, uses a sliding alphabet list twice
- Align on fixed alphabet pointing to "key"
- Use a fixed-width font

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Rosicrucian Cipher

- When my daughter got bored of standard substitution ciphers, we moved on to more creative techniques
- Each letter is represented by a symbol

ABC	DEF	GHI						
JKL	MNO	PQR	→					
STU	VWX	YZ						

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Other Code and Cipher Methods

- Early readers may find substitution ciphers too complex, alternatives:
 - Book cipher "23,2,9" Page,Line,Word
 - Grille Cipher

	<i>Ed,</i>			
<i>You</i>				<i>must</i>
		<i>raw</i>	<i>try</i>	
<i>fish</i>				

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Message Selection

- Selecting the message itself is a big part of what makes this fun
- The answers to codes often earn my kids small prizes
 - Very rarely is this purchased items
 - Passes on chores
 - Bonus attention (we'll read an extra chapter in your book together tonight)
 - Special events (Do you want to go see Rango this weekend?)
- Special shared moments between Dad and Kids

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Message Breaking

- Maya (my 9yo) is learning statistics in 4th grade
- We are applying it to break some codes

THE 0	XLI 4	BPM 8	FTQ 12	JXU 16	NBY 20	RFC 24
UIF 1	YMJ 5	CQN 9	GUR 13	KYV 17	OCZ 21	SGD 25
VJG 2	ZNK 6	DRO 10	HVS 14	LZW 18	PDA 22	
WKH 3	AOL 7	ESP 11	IWT 15	MAX 19	QEB 23	

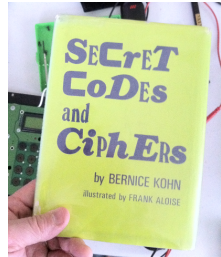
Using each trigraph, search for matching text in the coded message.

FGWFM FRXNS PTAKN WXYBT WPJIF XFHWD
 UYTQT LNXYB NY**MYM** JBFWI JUFWY RJSY

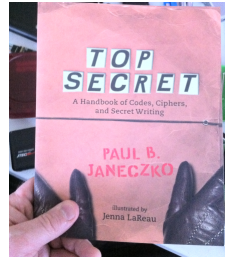
With "5" as our potential code, use the cipher wheel to decode the remainder of the message. This was a technique used by British codebreakers in Bletchley Park during WWII to decrypt Enigma-encoded messages. Enigma machines lack a numeric keypad, so word such as "Eins" (one) were used as search terms.

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Resources



Secret Codes and Ciphers, published 1969. Out of print now, but a wonderful introduction to codes, if a little old-fashioned.



Top Secret: A Handbook. Available new from a variety of sellers, great illustrations and explanations



www.kidsmakestuff.com
www.nku.edu/~christensen
www.nsa.gov/kids/
www.scouting.org.za/codes/bit.ly/dMF6su (AES stick figure guide, awesome, but not for kids)