49th Annual

WASHINGTON STATE MATHEMATICS CONFERENCE

Gathering for a Primal Howl

MAY 18-20, 2017

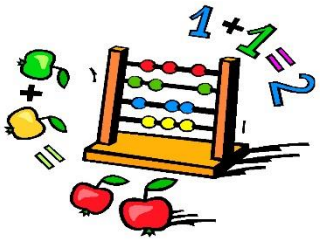
KEYNOTE SPEAKER
Dr. Robert J. Lang

OPENING SPEAKER
Dr. Jennifer J. Quinn

Great Wolf Lodge
Grand Mound, WA

HOSTED BY

HIGHLINE COLLEGE



Program Highlights

All highlight events take place in Chehalis Grand Ballroom except Thursday's social.

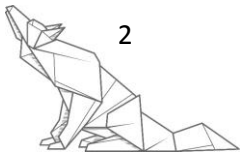
Thursday	Event
7:30pm – 8:30pm	**Dr. Jennifer Quinn** *University of Washington, Tacoma*
8:45pm – 10:00pm	Social Co-hosted by Cengage and McGraw Hill (Northwest Territory Ballroom)

Friday	Event
7:30am – 8:50am	Breakfast
11:00am – 12:15pm	Lunch (Ice Breaker due at 1:00 pm at the registration table)
6:00pm – 7:00pm	Dinner
7:00pm – 8:00pm	**Dr. Robert Lang** *Nasa, JPL, Origami Master*
8:15pm – 11:00pm	Social hosted by Pearson with Karaoke (Puzzle contest due at the registration table at 8:15 pm)

Saturday	Event
7:30am – 8:50am	Breakfast and Awards

Conference Schedule

Date	Time	Event
Thursday, May 18, 2017	5:00 – 7:00 pm	Registration
	7:30 – 8:30 pm	Opening Speaker
	8:45 – 10:30 pm	Social
Friday, May 19, 2017	7:30 – 8:50 am	Breakfast
	9:00 – 9:50 am	Session I
	10:00 – 10:50 am	Session II
	11:00am – 12:15 pm	Lunch
	1:00 pm	Icebreaker due
	12:20 – 1:10 pm	Session III
	1:10 – 1:30pm	Snack Break
	1:30 – 2:20 pm	Session IV
	6:00 – 7:00 pm	Dinner Prizes for Icebreaker / Awards
	7:00 – 8:00 pm	Keynote Speaker
	8:15 pm	Puzzle Contest due
	8:15 – 11:00 pm	Social / Karaoke
Saturday, May 20, 2017	7:30 – 8:50 am	Breakfast Prizes for puzzle contest
	9:00 – 9:50 am	Session V
	10:00 – 10:50 am	Session VI
	11:00 am	Checkout and Departure



Thursday Evening Speaker – Dr. Jennifer Quinn

Jennifer Quinn is a professor of mathematics in the School of Interdisciplinary Arts & Sciences at the University of Washington Tacoma and interim director for the campus's Teaching & Learning Center. She earned her B.A., M.S., and Ph.D. from Williams College, the University of Illinois at Chicago, and the University of Wisconsin, respectively. After twelve years teaching at Occidental College, rising to the rank of full professor and serving as Department Chair, Jenny left her tenured position to follow her husband to the Pacific Northwest. During that uncertain time, she had the privilege to serve as Executive Director for the Association for Women in Mathematics for two years while lecturing part-time at local Tacoma institutions. She was hired by UW Tacoma in 2007 to help create a previously non-existent mathematics curriculum in the newly expanded four-year institution and has thrived there ever since.

Jenny received one of MAA's 2007 Haimo Awards for Distinguished College or University Teaching, the MAA's 2006 Beckenbach Book award for *Proofs That Really Count: The Art of Combinatorial Proof*, co-authored with Arthur Benjamin, and had the honor to co-edit *Math Horizons* (also with Arthur Benjamin) from 2004-2008. Over the years she has served on the boards or steering committees of the Spectrum Book series, *Mathematics Magazine*, *Math Horizons*, Phi Beta Kappa Alpha Alumni Association of California, and Oregon Public Broadcasting's production *Mathematics Illuminated*.

As a combinatorial scholar, Jenny thinks that beautiful proofs are as much art as science. Simplicity, elegance, and transparency should be the driving principles. She strives to bring this same ethic to her professional service and administrative work.

Friday Evening Speaker – Dr. Robert Lang

Robert J. Lang has been an avid student of origami for over forty years and is now recognized as one of the world's leading masters of the art, with over 500 designs catalogued and diagrammed. He is noted for designs of great detail and realism, and includes in his repertoire some of the most complex origami designs ever created. His work combines aspects of the Western school of mathematical origami design with the Eastern emphasis upon line and form to yield models that are at once distinctive, elegant, and challenging to fold. They have been shown in exhibitions in New York (Museum of Modern Art), Paris (Carrousel du Louvre), Salem (Peabody Essex Museum), San Diego (Mingei Museum of World Folk Art), and Kaga, Japan (Nippon Museum Of Origami), among others.

In 1992 Dr. Lang became the first Westerner ever invited to address the *Nippon Origami Association*'s annual meeting; he has since been an invited guest at international origami conventions around the world. He lectures widely on origami and its connections to mathematics, science, and technology, and teaches workshops on both artistic techniques and applications of folding in industrial design.

Dr. Lang is one of the pioneers of the cross-disciplinary marriage of origami with mathematics; he has been one of the few Western columnists for *Origami Tanteidan Magazine*, the journal of the *Japan Origami Academic Society*, and has presented refereed and invited technical papers on origami-math at mathematical and computer science professional meetings. He has consulted on applications of origami to engineering problems ranging from air-bag design to expandable space telescopes. He is the author or co-author of thirteen books and numerous articles on origami art and design and in 2011 was elected an Honorary Member of the *British Origami Society*.

Dr. Lang was born in Ohio and raised in Atlanta, Georgia. Along the way to his current career as a full-time origami artist and consultant he worked as a physicist, engineer, and R&D manager, during which time he authored or co-authored over 80 technical publications and 50 patents awarded and pending on semiconductor lasers, optics, and integrated optoelectronics. He is a Fellow of the Optical Society of America, a member and past Vice-President of the IEEE Photonics Society, and from 2007–2010 was the Editor-in-Chief of the *IEEE Journal of Quantum Electronics*. In 2009, he received the highest honor of Caltech, the Distinguished Alumni Award, and in 2013, he was chosen as one of the inaugural Fellows of the American Mathematical Society. Dr. Lang resides in Alamo, California.

Workshop Abstracts

Abstracts (in alphabetical order by presenter's last name) as given by presenters

Patrick Averbeck – Chehalis Salon E
Edmonds Community College
Pre-College Math Programs in Washington State
As part of an Edmonds Community College Professional Leave project Dr. Pat Averbeck investigated the current state of pre-college math programs in community and technical colleges in Washington State. During this session, he will present preliminary results of two stages of his research: (1) development and analysis of flowchart of mathematics course offerings at each CTC and (2) analysis of interviews about the development of the programs, typical mode of instruction and placement.

Helen Burn and Pete Wildman – Chehalis Salon E
Highline College and Spokane Falls Community College
Washington Math Pathways (MPC) to Completion Project
In Fall of 2015, Washington accepted an invitation to join the MPC project led by The Charles A. Dana Center at the University of Texas at Austin. This session provides an update on work completed and the plan for next year to bring together all public higher education institutions in the state to dramatically improve the success of students in developmental and gateway mathematics courses by implementing math pathways at scale within the state.

Mark Clark – Chehalis Salon F
Palomar College
Fun Classroom Activities for Beginning and Intermediate Algebra Classrooms
Come and experience activities that you can use in your beginning and intermediate algebra courses to set the tone, deepen understanding of concepts, and connect skills with applications. Attendees will participate in the activities and receive access to templates of all activities presented.

Jacqueline Coomes – Fallen Timbers Salon A
Eastern Washington University
Inspiring Inquiries
Instructors in Successful Transitions to College, a three-year cross-sector math and ELA project, developed tools to change and study their teaching in order to improve students' successful transitions from high school to college. The leaders of the project share the process, inquiries, and challenges of the project.

Leslie Glen – Chehalis Salon F

Whatcom Community College

"Fake" World Problems: Teaching Mathematics through Narrative

Undergraduate mathematics students often fail to see the relevance of course content. Using alternative delivery methods, we can help to engage students with the mathematics needed to solve problems. In particular, creating a world in which students encounter situations for which they need mathematics to proceed from one task to the next helps motivate the need for a particular concept, as well as keeping interest in the underlying story high. I am currently running a pilot study with two sections of elementary algebra and using narrative as a delivery method for teaching the concepts in a specific part of that course (plotting points in the Cartesian plane, equations of lines, graphing lines and solving linear systems of equations). This talk explores the use of a fantasy world as the setting for the narrative in which students encounter various situations, and how the story line is created to ensure that the concepts required by the curriculum of a particular course are covered. I will discuss data from the pilot study and how this data will help to shape formal research. Some hands on exploration will be included to give participants an idea of how the story line and the mathematics are interwoven.

Jenny Hughes – Chehalis Salon D

Columbia Basin College

A Pathway to Introductory Statistics

A large portion of degrees require students to successfully complete Introductory Statistics and a growing number of students are struggling to complete the math sequence leading up to Introductory Statistics as well as the statistics course itself. Inspired by the talk given by Jay Lehmann at last years' math conference, I have designed a two-course sequence to prepare students for Introductory Statistics. I will share how the course is designed, the group activities used and the latest results from the first cohort of students.

Mary Ann Kelso and Suzanne Stevenson – Fallen Timbers Salon A

Olympic College

Math Professor - Using Computational Class Notes for the First Time in Hybrid College Algebra Classes

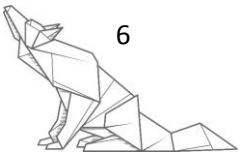
Mary Ann will share her experience deploying CCN technology in College Algebra courses at Olympic College. She has spent time with CCN designing a customized curriculum providing the full spectrum of course materials. All are fully integrated into the LMS. She works more in a collaborative way with her students, focusing, during the class on the students on a one-to-one basis and answering questions as they arise. The results Winter Quarter were successful.

Kris Kissel – Fallen Timbers Salon B

Green River College

Calculus + Linear Algebra = Artificial Intelligence

How does Google's AlphaGo beat world champion Go players? How does Netflix decide which movies to recommend I watch? How does my spam filter work? How do Siri and Alexa understand my speech?



John Klassen – Fallen Timbers Salon A

North Idaho College

Making Any Course College Level

Presently, no regular, reliable method of demonstrating student reasoning has bridged the gap between all courses in the mathematics curriculum. This is critical for the following reasons:

1. students of mathematics need a predictable format for their work
2. 75% credit given for the process (25% for the answer)
3. learning requires depth of reasoning
4. depth of reasoning translates into transferability and impacts retention/graduation
5. content alone is not the determiner of whether a course is college level
6. current state rubrics require demonstration of critical thinking ability

I would like to share a simple method that provides answers to all of these difficulties.

Murali Krishna – Fallen Timbers Salon B

Clark College

Formulas Pertaining to the Goldback Conjecture

1. An Algorithm for finding the number of ways an even number can be expressed as the sum of two primes (denoted by GB(N)). The Algorithm provides an insight to finding the formula for GB(N).
2. A formula for GB (N). Formula estimates GB(N) with errors under 0.1 percent and observed error falls as N increases.
3. A direct formula for GB(2p) where p is prime.
4. Comparison of our direct formula with Hardy & Littlewood's formula.

David Lippman – Fallen Timbers Salon A

Pierce College

WAMAP: Clickers, Interactive Text, and Video Lessons

Learn about three newer, lesser-used features in WAMAP:

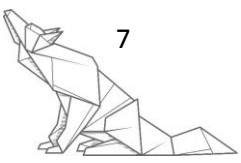
1. Using WAMAP's LivePoll to do clicker-style activities in class
2. Embedding questions into text material to check understanding
3. Embedding questions into video lessons to encourage viewing and engagement.

Megan Luce – Chehalis Salon F

Cascadia College

Math in a Learning Community? Is that Possible?

Are you interested in combining a math class with another discipline in order to teach an integrated learning community? Come hear more about a MATH&107/ENG&102 learning community taught in Winter 2017 titled "The Information Game". The speaker will discuss both successes and mistakes in implementation. The syllabus, including required books and articles, and selected assignments will be available. Attendees will be invited to share other examples of learning communities from their own campuses that have included a math course.



D. Bradley McIlquham – Chehalis Salon E

Arizona State University

Impact of Adaptive Learning in College Mathematics

Knewton's Global Director of Academic Programs will walk through the data derived from innovative Math partnerships with area schools. We'll look at the types of insight Adaptive technology can provide faculty, and we'll talk through some ideas on how these programs can drive outcomes for all types of students. Over the course of the presentation, we'll take a look at programs taking advantage of learning initiatives like OER, adaptive intervention, student learning profiles, and predictive analytics. We'll show examples from college bridge programs, traditional classroom usage, and hybrid class models.

Sherry McLean – Chehalis Salon D

Lake Washington Institute of Technology

Committing to Curriculum Changes

Inspired by the conference buzz words? Feeling constrained by no money and less time, yet experiencing that driving desire to improve your curriculum? Come share in ways to make those big changes happen! See a two-year journey converting a traditional elementary/intermediate algebra sequence into a single-quarter accelerated algebra course using OER resources with a flipped-classroom delivery. As a bonus, walk away with Sherry's CC-licensed algebra materials ready to adopt or adapt.

William Meacham - Chehalis Salon E

Scottsdale Community College and Phoenix College

Sharing the growth of OER development at Scottsdale CC and Phoenix College

It started with WAMAP! This talk shares the OER materials developed by Scottsdale CC and Phoenix CC and the story of how they came to be. What started as a grass roots effort grew to include a district wide initiative promoting OER across all disciplines and a Title V Grant for the development of Assessable Mathematical Virtual Manipulatives. Participants will leave with complete OER Curriculum for Basic Math through College Math and College Algebra and Virtual Manipulatives they can use for free on any platform. William Meacham teaches Mathematics and Computer Science at Scottsdale Community College and is currently working on a Title V grant developing Mathematical Virtual Manipulatives for Phoenix College.

Lara Michaels – Chehalis Salon D

Green River College

Updating and Expanding High School Transcript Math Placement

I have been on sabbatical this year working on a project to update and expand our high school transcript math placement. I will talk about the results of this project, including 1) extending the use of this method from 2 to 5 years, 2) incorporating Smarter Balanced Assessment placement, and 3) how Common Core has effected placement. My presentation will include example placement tables and other resources available.

John Mitchell – Chehalis Salon F

Clark College

Mindfulness Essentials for Mathematics Teachers

Mathematics teachers have the unenviable task of communicating ideas that require focused attention to an audience whose attention span, it seems, is getting shorter and shorter. Many teachers are aware that mindfulness can be used to work with focus and attention; but without a detailed understanding of the idea, it's hard to bring it to their teaching in a systematic way. This presentation will give a crash course in the essential ideas of mindfulness as they pertain to teaching mathematics. Specifically, we'll explore how mindfulness can enhance focus, both for teachers and their students; help students work with their mathematics; and enable teachers to interact with students more skillfully. Guided handouts will allow attendees to continue building on the basics after the conference.

Yves Nievergelt – Fallen Timbers Salon B

Eastern Washington University

P-Adic Tests of Square and Cube Roots

For each positive prime integer p, factoring integral powers of p out of integral numerators and denominators leads to the definition of the p-adic metric on the rational numbers. For $p = 2$, arithmetic modulo powers of 2 then leads to W. Kahana's tests of accuracy of your computer's or you own square-root function. Is there a relation between $p = 2$ and square root as the inverse function of x^2? Is there a p-adic test for cube roots?

Stay tuned.

Debby Olson – Chehalis Salon D

Spokane Falls Community College

Neurodiversity, Autism, and the Classroom

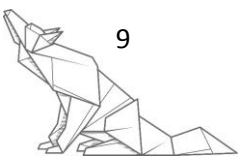
Neurodiversity is a civil rights movement that began in the 1990s and challenges the flaw-based and stigmatizing approach to less typical neurologies, such as autism. Various self-advocacy groups and their allies are changing the conversation about autism and other forms of neurodiversity in powerful ways. These messages are important to all of us as citizens and as educators. This presentation will discuss many of these messages and their potential impact on the classroom.

Christopher Quarles – Chehalis Salon F

Everett Community College

Placement, Personalized Learning, and Structural Inequality

Individualized learning and intricate placement models are hot topics in math education. But how can we use placement to help students succeed, rather than just predict who will fail? Can personalized learning actually INCREASE inequality? We'll take a mathematician's look at the large-scale effects of these ideas. We'll look at mathematical models, use them to help us make decisions as educators, and walk away with a classroom exercise involving the Central Limit Theorem.



Ananya Rabeya – Chehalis Salon D

Edmonds Community College

Two of a Kind: Born With a Math Gene

It is a remarkable phenomenon that children can learn to speak coherently without ever being consciously aware of the sophisticated grammar they are using. In the long journey of the discipline, while mathematics became pure, mathematics education still struggles to acculturate novices to the discipline itself. While it is tautologous to say that a knowledge of basic grammar hugely enhances one's understanding of language, could we be over-emphasizing on mathematical grammar too early on?

Zachary Rutledge – Chehalis Salon D

Peninsula College

Combining Literature and Mathematics via a Historical Approach

This talk will discuss the development and implementation of a linked course structure between math in society and second-quarter English composition. The curriculum centers on a historical approach to both the mathematics and the literature with an emphasis on the cultural context out of which both grew. Discussion will be encouraged as the speaker is interested in learning from the experiences of others in this area.

Olga Shatunova – Chehalis Salon E

University of Washington

Ohh here comes that O word

Undergraduate mathematics would benefit from including more topics from discrete mathematics aka concrete mathematics. My goal is to show the relevance and practicality of discrete mathematics. What is discrete math? My talk will discuss a particular kind of problem examined in discrete mathematics. I will discuss asymptotic behavior, growth of functions and need for Big-O Notation. We will examine Big-O estimates for some important functions algebraically and graphically. We will talk about how the efficiency of an algorithm can be analyzed. Questions like that involve the computational complexity of the algorithm. We will restrict our attention to time complexity of algorithms. As time allows we will examine worse-case complexity of sorting algorithm.

Lee Singleton – Fallen Timbers Salon B

Whatcom Community College

Grasp the Math: Using 3-D Printing and Active Learning in Trigonometry

Experience how 3D-printing can transform a mathematics classroom. Students can now physically, visually, and conceptually grasp the math, enabling them to make firmer connections between experience and theory. Preliminary results will be shared from a 2-year NSF grant investigating how 3D-printing can help students succeed in Pre-calculus II (Trigonometry).

Trung Tran, Sellie Clark, Sara Ketelsen, Sue McCrummen – Fallen Timbers Salon A
Tacoma Community College
Core-to-College (Spark Grant Project)
Join us for a look back on the three-year project between Tacoma Community College and five high schools in the Tacoma School District. We have been implementing a grant from College Spark of Washington on Postsecondary Alignment where we have focused on reducing gaps between high school and college, better preparing students for college entry, and building relationships.

Paul Verschueren – Chehalis Salon F
Seattle Central Community College
WA Teaches Statway: Six Years In
Seattle Central was one of 19 colleges nation-wide that piloted the Statway program in 2011 (Tacoma Community College was another). The program, developed by The Carnegie Foundation, addressed the issue of low completion rates for students who place into the developmental math sequence. Success rates have raised significantly by providing an alternate pathway to non-STEM students who place into Algebra 1. Statway covers all content of an introductory statistics course, and provides instruction and support for developmental material needed to understand statistics. Statway acted as a catalyst for a redesign of Seattle Central's developmental math sequence. Interest in the program has grown and more Washington schools have adopted it, but transfer of credits remains an issue. Join us to hear and share successes and struggles. Presentation will include a brief description of the program but will be designed to share the experience of bringing it here to Washington. Questions and discussion encouraged.

Jose Vidot – Fallen Timbers Salon A
Columbia Basin College
How Formative Assessment Informs Teacher and Learner
The presentation will be an interactive discussion on formative assessment strategies for teaching and learning. The seminar will include concrete examples of strategies and tools that promote learning within the classroom. The participants will have the opportunity to experience an assessment strategy where the instructor uses a free app, a short vignette of other formative assessment strategies and resources that can be modified and implemented in their own courses.

Eve Wallis – Fallen Timbers Salon B
Peninsula College
Turning "Students" into "Math Students"
Many students taking math classes now have math anxiety and do not know how to be a math student. Some even have little experience working with a computer and they all struggle to properly use the resources provided in a hybrid, flipped, or online math class.

William Webber – Fallen Timbers Salon B

Whatcom Community College

Using Animation and 3-D Printing to Motivate the Learning of Parametric Equations

Let's put some life into parametric equations. We will show how to create claymation type animations using parametric equations and a 3D printer. From the movements of a bug along a curve to a herd of wild horses galloping across the prairie, we can make things come to life with parametric equations.

Whenhong Wang – Chehalis Salon E

The Evergreen State College

A Dance of Poetry and Math: Teaching Math in an Interdisciplinary Context

Math and poetry are usually considered two subjects that are as different as left and right brains. Yet, that cannot be farther from the truth. In this presentation, we're going to share how we taught these two different subjects in our interdisciplinary program Filling the Silence: News, Numbers and Poetry. We're going to share the challenges and fruits of teaching these subjects together and our pedagogical approaches to it. Filling the Silence: News, Numbers and Poetry is an interdisciplinary program which explores how math and quantitative reasoning informs poetry and news. In a nutshell, it is about three forms of storytelling – math, poetry and journalism – and their intersections as a model for exploring racial, political, economic and environmental justice. The first challenge we faced was that both math and poetry are intimidating topics on their own. Few students have had exposure to, let alone a fondness, for both subjects. In particular, many students entered the program with math phobia. Similarly, very few students were confident in their ability to write poems. To address these psychological barriers, we introduced the growth mindset (Dweck, 2007) in the first class session. This mindset encourages students to challenge themselves to try new approaches and skills, and to consider mistakes as learning tools. To support this type of metacognitive learning, throughout the quarter we asked students to write a series of "Me and Numbers" essays reflecting on their relationship between themselves and learning of math. The other challenge we faced was to make the two seemingly disparate subjects of math and poetry connect. Consequently, we used Discovering Patterns in Mathematics and Poetry by Marcia Birken and Anne C. Coon as our main text joining the two disciplines. The book identifies the many different ways that poetry and math are related to each other, such as in patterns and shapes. Accompanying the readings, we did joint workshops in class, usually starting with a math workshop that went over the basics of the topic covered in the reading, followed by a poetry workshop that applied the math concept in poetic writing. Examples included the Fibonacci sequence, fractals, and symmetry in which students learned and practiced applying the math to specific poetic formal patterns. Through the workshops, students and faculty experienced some surprising understanding and connections of these two subjects:

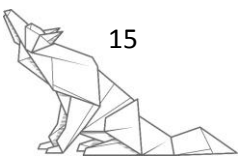
1. Math is not just about following rules and formulae – it is a way to explore the world.
2. Poetry humanizes math, for example in "Simple Division" a poem from the collection Stone, Bow, Prayer, in which mathematician/poet Amy Uyematsu uses simple math to paint a stark picture of Japanese-Americans in WWII internment camps. As such, math demonstrates the precision aspect of poetry.
3. Both subjects are fun and live. Results of the class included students' abilities to do both math and poetry well. One math phobic student wrote in her "Me and Numbers" essay: "Me and math are at least touching hands". Reference: Dweck, Carol. (2017). Mindset: The New Psychology of Success. Ballantine Books.

History of Washington State Mathematics Conference

The first Washington State Community Colleges Mathematics Conference and Retreat was held in 1969. The organizers were Phil Heft, Jim Relf, Larry Larson, and John Van Duff. We are told that the per-person cost at the time was $16.68 and that 33 people attended the conference. It was held at "The Lodge" at Ashford where accommodations required sleeping bags. The menu for the first banquet and the name of the first guest speaker remain unsolved mysteries. There are usually a few invited talks, but the bulk of the program is contributed by inspired volunteers. Responsibility for conference planning is passed among the 34 Washington community colleges. There is no particular formula for who hosts when; and there is no set location where the meetings are held. As if by magic, volunteers appear and destination meeting sites are found in the Cascade Mountain corridor, on the Olympic Peninsula, or in the Columbian Gorge. There is a traveling fund that helps the host institution with start-up costs. This year there are over 200 registered participants!

Year	Conference Host Schools	Location of Conference
1969	Green River/Highline/Ft. Steilacoom CC's	The Lodge
1970	Spokane Falls CC	The Lodge
1971	Everett CC	Snoqualmie Pass
1972	Everett CC	Snoqualmie Pass
1973	Seattle Central CC	Snoqualmie Pass
1974	Green River CC	Lake Wilderness
1975	Highline CC	Providence Heights
1976	Bellevue CC	Snoqualmie Pass
1977	Shoreline CC	Providence Heights
1978	Edmonds CC	Providence Heights
1979	Olympic College	Port Ludlow
1980	Spokane Falls CC	Sun Mountain
1981	Spokane Falls CC	Sun Mountain
1982	Highline CC	Lake Chelan
1983	Olympic College	Port Ludlow
1984	Green River CC	Alderbrook
1985	Shoreline CC	Sun Mountain
1986	North Seattle CC	Alderbrook
1987	Lower Columbia CC	Alderbrook
1988	Olympic College	Port Ludlow
1989	Bellevue CC	Lake Chelan
1990	Clark College	Alderbrook
1991	Pierce College & Tacoma CC	Lake Chelan
1992	Yakima CC	Yakima
1993	Highline CC	Wenatchee
1994	South Seattle CC	Silverdale
1995	Skagit Valley & Whatcom CC	Wenatchee
1996	Spokane Falls CC & ORMATYC	Skamania Lodge
1997	Green River CC	Lake Chelan
1998	Tacoma CC & Big Bend	Lake Chelan
1999	Edmonds CC	Ocean Shores
2000	Bellevue CC	Wenatchee
2001	Peninsula College & ORMATYC	Skamania Lodge
2002	Clark CC	Yakima
2003	Spokane CC & North Idaho CC	Wenatchee
2004	Pierce CC	Yakima
2005	Highline CC	Ocean Shores
2006	Olympic College & ORMATYC	Skamania Lodge
2007	Wenatchee Valley CC	Wenatchee
2008	North Seattle CC	Lake Chelan
2009	Columbia Basin Cc	Pasco
2010	Yakima CC	Yakima
2011	Green River CC & ORMATYC	Skamania Lodge
2012	Tacoma CC	Wenatchee
2013	Whatcom CC	Bellingham
2014	Everett CC & Shoreline CC	Wenatchee
2015	Bellevue College	Lake Chelan
2016	Clark CC & ORMATYC	Salishan Resort, OR
2017	Highline College	Great Wolf Lodge
2018	Edmonds CC	Yakima
2019		
2020		

Session	Fallen Timbers Salon A	Fallen Timbers Salon B	Chehalis Salon F
I **Friday** **9:00 – 9:50**	How formative assessment informs teacher and learners Vidot	Calculus + Linear Algebra = Artificial Intelligence Kissell	Math in a learning community. Is that possible? Luce
II **Friday** **10:00 – 10:50**	Using computational class notes for hybrid college algebra classes Kelso, Stevenson	Turning "students" into "math students" Wallis	Placement, personalized learning & structural Inequality Quarles
III **Friday** **12:20 – 1:10**	Making any course college level Klassen	P-Adic tests of square and cubic roots Nievergelt	Fake word problems: teaching mathematics through narrative Glen
IV **Friday** **1:30 – 2:20**	Inspiring inquiries Coomes	Formulas pertaining to the Goldbach Conjecture Krishna	Fun classroom activities for beginning and intermediate algebra Clark
V **Saturday** **9:00 – 9:50**	WAMAP: Clickers, interactive text, and video lessons Lippman	Grasp the math: Using 3-D printing and active learning in trig Singleton	WA teaches Statway: six years in Verschueren
VI **Saturday** **10:00 – 10:50**	Core-to-College (Sparks Grant Project) Tran, Clark, Ketelsen, McCrummen	Animation and 3-D printing to motivate parametric equations Webber	Mindfulness essentials for mathematics teachers Mitchell



Chehalis Salon E	Chehalis Salon D	Session
Sharing the growth of OER development Meacham	Committing to curriculum changes McLean	**I** **Friday** **9:00 – 9:50**
Oh – here comes that O word Shatunova	Two of a kind: Born with the math gene Rabeya	**II** **Friday** **10:00 – 10:50**
Impact of adaptive learning in college mathematics McIlquham	A pathway to introductory statistics Hughes	**III** **Friday** **12:20 – 1:10**
A dance of poetry and math Wang	Updating High School transcript placement policies Michaels	**IV** **Friday** **1:30 – 2:20**
WA Math Pathways (MPC) to completion project update Burn, Wildman	Neurodiversity, autism, and the classroom Olson	**V** **Saturday** **9:00 – 9:50**
Precollege math programs in WA state Averbeck	Combining literature and mathematics via a historical approach Rutledge	**VI** **Saturday** **10:00 – 10:50**

Special Thanks

The Highline Conference Planning Committee* extends a special thanks to:

Speakers
Dr. Jennifer Quinn
Dr. Robert Lang

The Program
Tony Johnson, Director of Marketing, Designs and Production – Cover
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Suanne Oh
Dusty Wilson

Human Diversity Icebreaker

Get the signature of someone registered at this conference who…
If the signature is unreadable, please print the name below it.
(Due at the registration table by 1:00pm Friday)

Rules:

1) The person you find cannot be from your school or organization (except for 25).
2) Don't yell across the room. Go talk to people.
3) You must have a different name for each question.

1. _____can fold origami animals.
2. _____has played cricket.
3. _____has at least 5 siblings.
4. _____has a tattoo.
5. _____has piloted an aircraft.
6. _____has climbed a mountain at least 10,000 feet tall.
7. _____has eaten fried grasshoppers, frog legs, snakes, or snails.
8. _____has never flown.
9. _____has seen a human birth in person, other than their own children's.
10. _____saw the aurora borealis.
11. _____can juggle.
12. _____speaks three languages.
13. _____served in the military.
14. _____can name all of Disney's seven dwarves.
15. _____collects rare coins.
16. _____plays the cello.
17. _____can touch his/her nose with the tip of his/her tongue.
18. _____has at least three college degrees (bachelor's, master's, etc…).
19. _____has at least 5 children.
20. _____has met a famous scientist or mathematician in person.
21. _____has never been off of the North American Continent.
22. _____has no social media accounts.
23. _____doesn't own a television.
24. _____has three living grandparents.
25. _____shares a birthday with someone else at this conference.
26. _____has been to at least fifteen countries outside the United States.
27. _____has a degree in a field other than mathematics or education.
28. _____owns a pet other than a bird, cat, dog, or fish.
29. _____has a published book that has sold at least 100 copies.

2017 Exhibitors

Cengage – Stephanie Sornsin
Debbie McFarland
Alysun Burns
Katherine Safar

Knewton – Brad McIlquham

McGraw Hill Education – Morgan Nelson

Pearson Higher Education Math & Sciences – John Biernat

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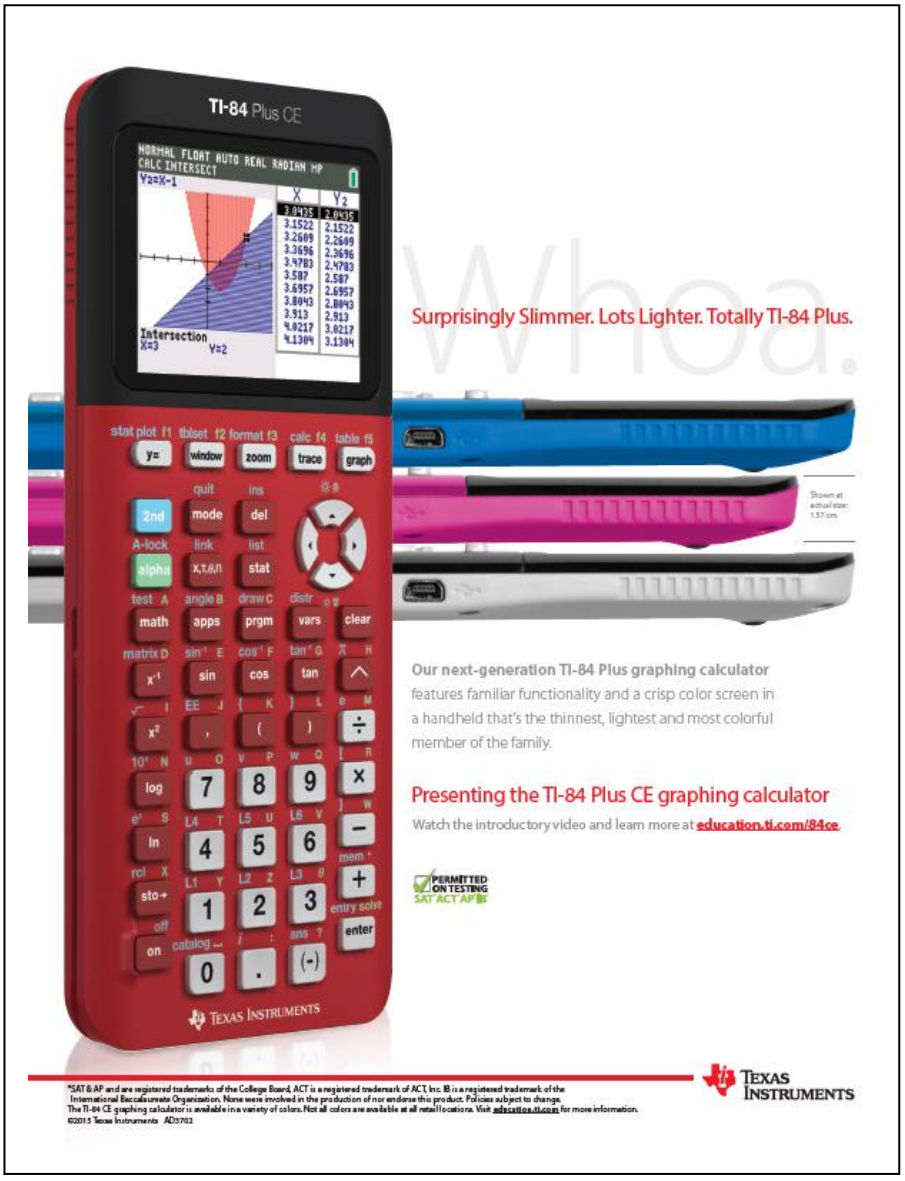
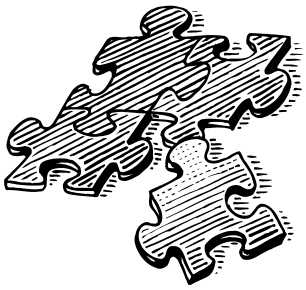




2017 Puzzle Contest

Show your work and/or explain your reasoning.
(Due at the registration table by 8:15 pm Friday)

1. The Painting Cubes problem as given by Lewis Carroll is as follows: *You want to paint a set of cubes with six colors such that each face is a different color. How many unique cubes are there*?

2. Spot it! Is a children's game consisting of a set of circular cards. Each card has eight items pictured on it. Any pair of cards has exactly one item in common. The idea of the game is to be the first to spot the common item. Given these conditions, how many different items are needed to create the maximum number of cards in a Spot it! Set? How many cards will the set have?

    - ❖ Bonus: If there are n items pictured on a card, what is the formula describing the relationship between p, the total number of pictures, and c, the maximum number of cards that can be in the set?

3. A party is at a house on a street which contains more than twenty, but fewer than five hundred houses, all numbered one, two, three, four, etc., throughout. All the numbers from one upward to the house where the party is inclusive, sum to exactly half the sum of all the house numbers on the street. What is the number of the house where the party is?

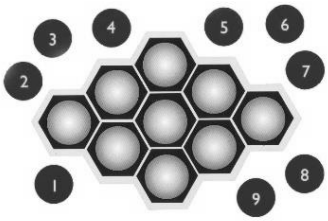
4. A man has nine children, all born at regular intervals. The sum of the squares of their ages is equal to the square of the man's age. Each is a whole number of years. What is the age of each?

5. Mary and her spouse attended a dinner party with four other couples. When they arrived, there were handshakes between some of the people. No one shook hands with his or her spouse. Mary noticed that each of the other nine people shook hands with a different number of people. How many times did Mary's spouse shake hands?

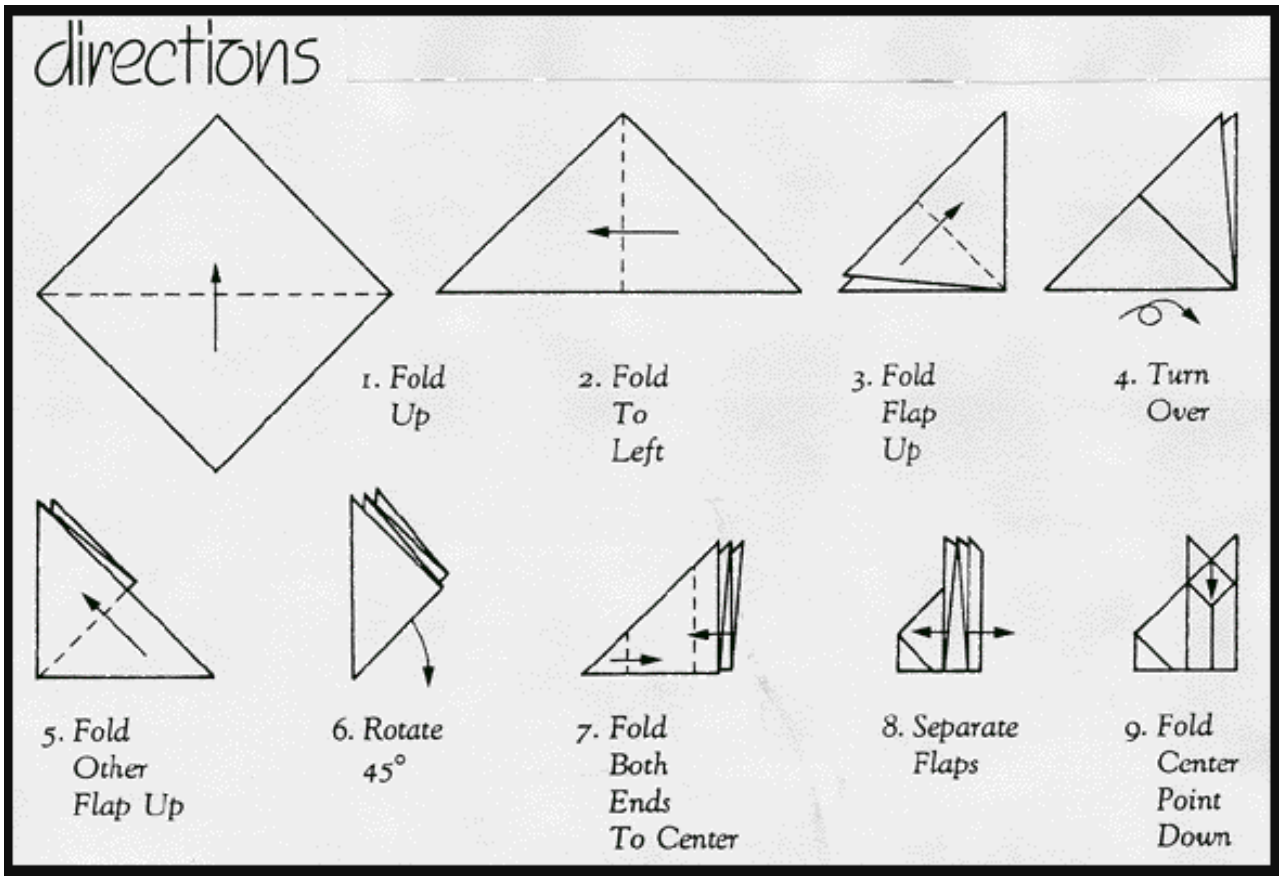
6. With how few straight line segments can you make exactly 100 squares?

7. Find the smallest pair of natural numbers such that the difference of their squares is a perfect cube and the difference of their cubes is a perfect square.

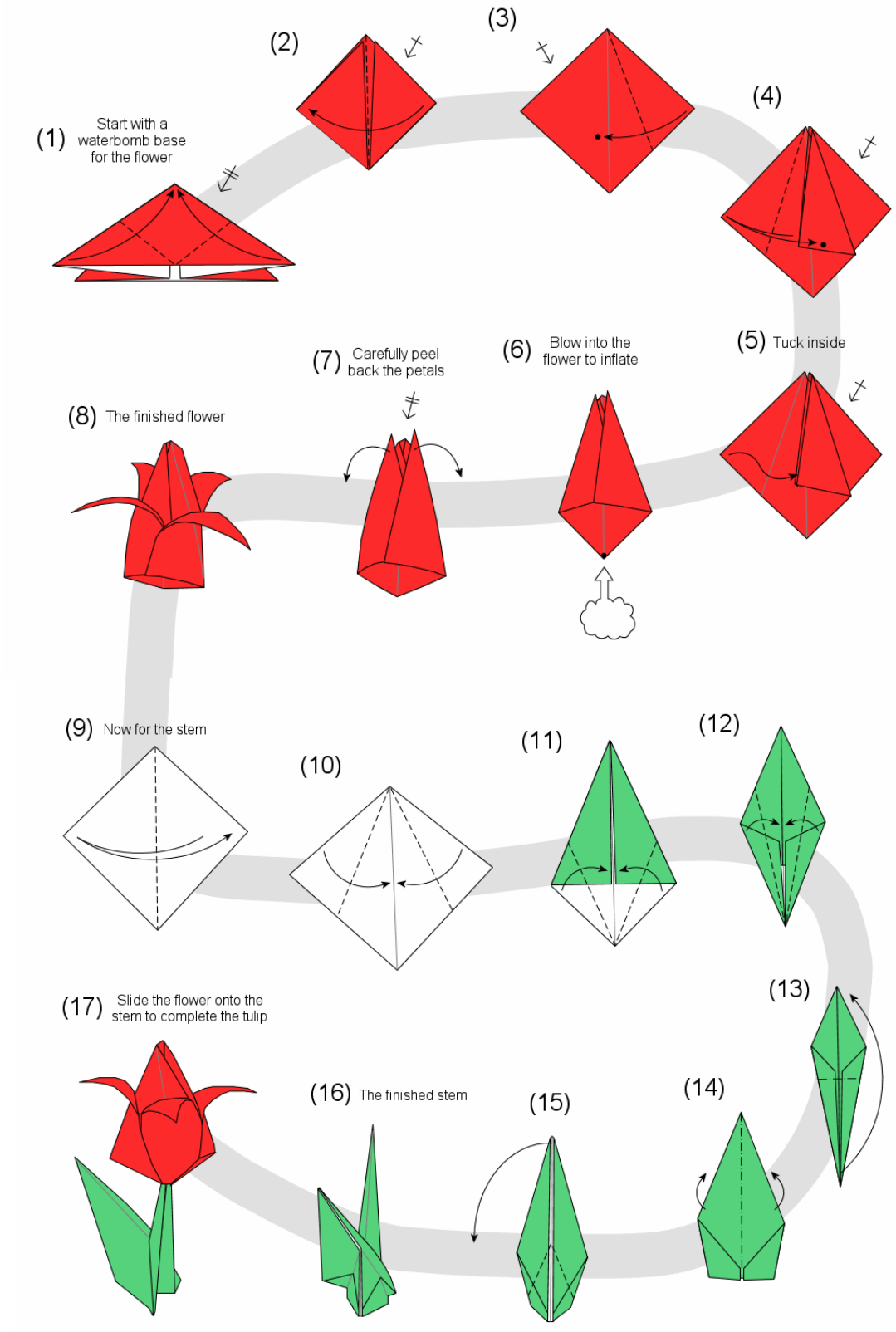
8. Place the natural numbers 1 through 9 in this honeycomb in each of the following three ways (this calls for three separate solutions):
    a. So that no two adjacent hexagons contain consecutive numbers or numbers whose English language names have the same number of letters.
    b. So that no two adjacent hexagons sum to a number divisible by 4 or 5.
    c. So that for any given hexagon, the sum of the numbers in the adjacent hexagons will be a multiple of that hexagon's number.
    d. One large circle and two smaller ones.



Wolf Origami



Tulip Origami



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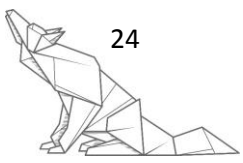

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Notes

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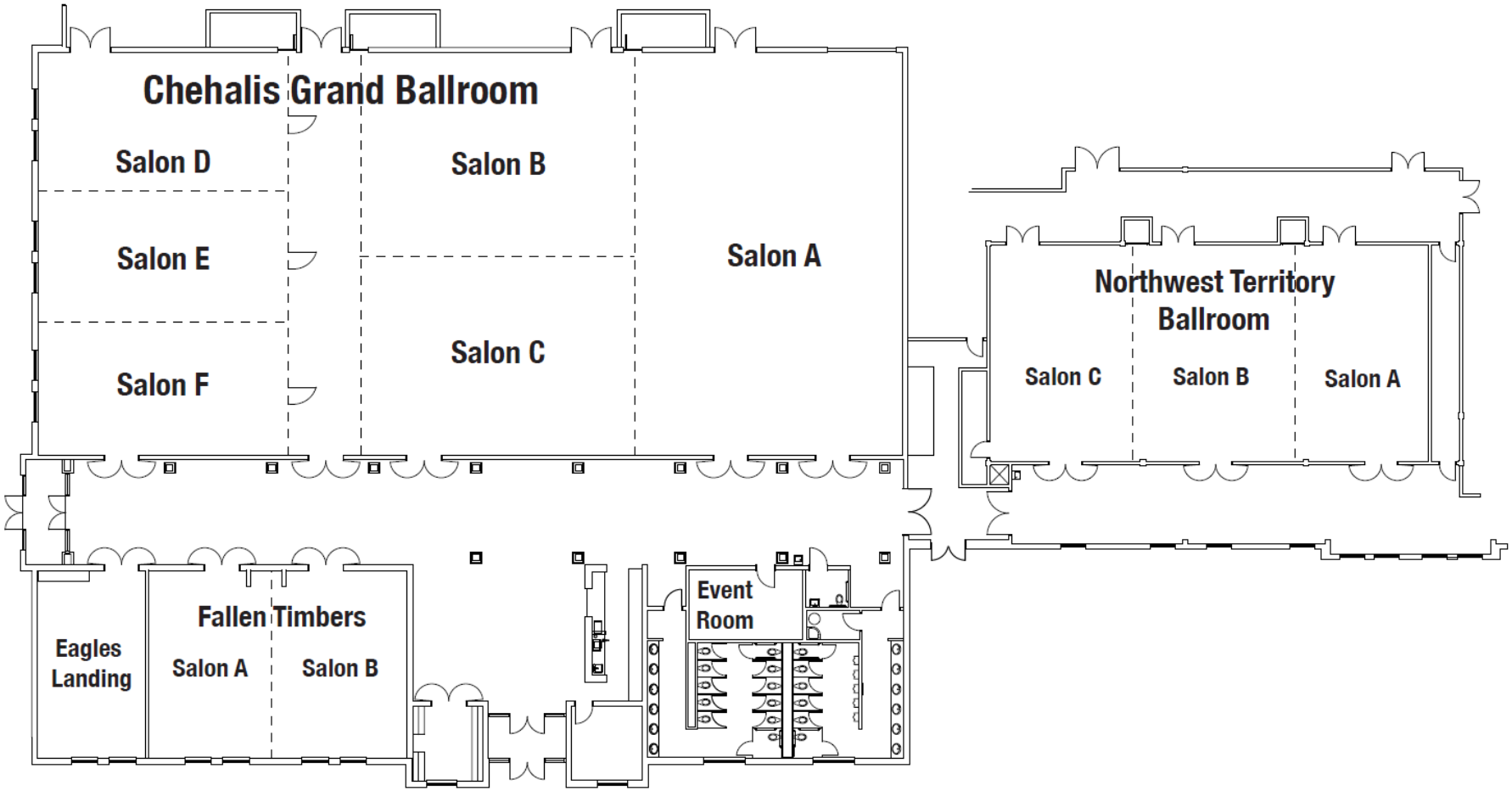
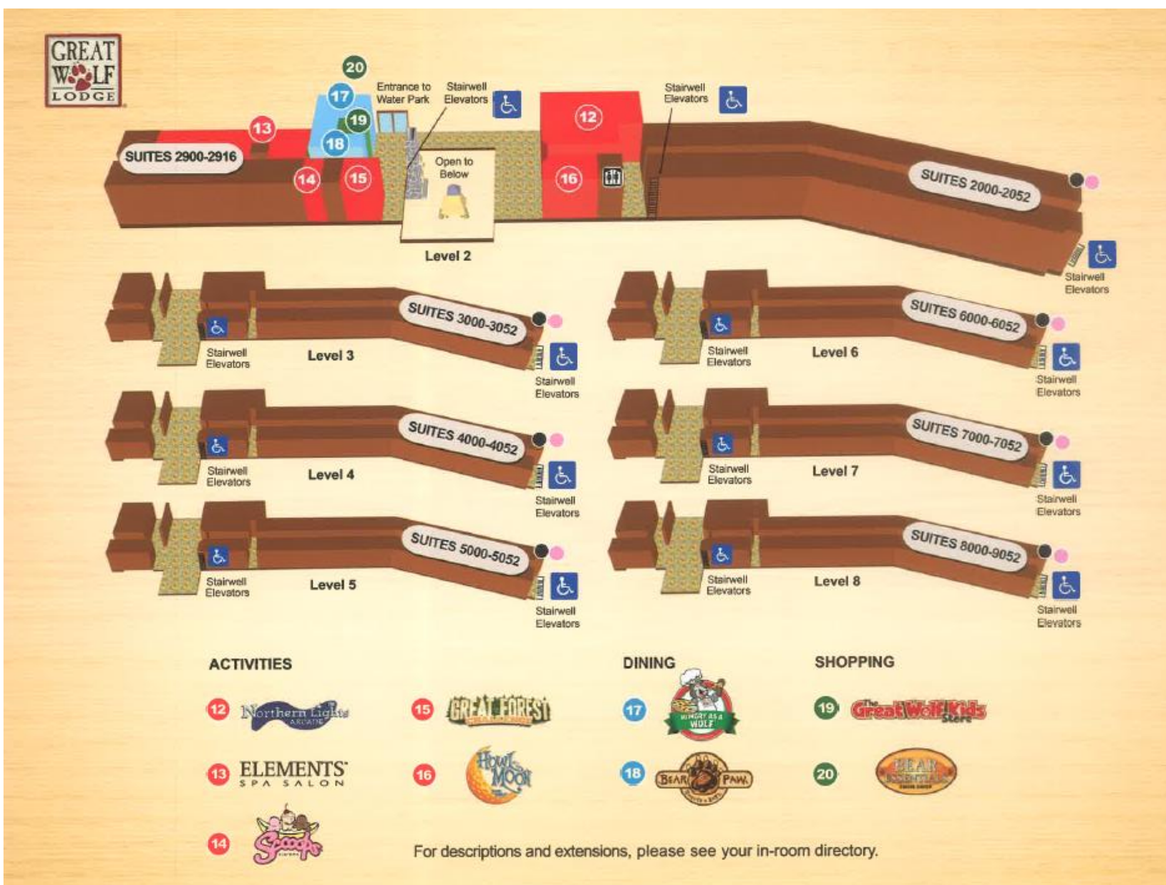

Chehalis Grand Ballroom
Salon D
Salon B
Salon E
Salon A
Salon C
Salon F
Northwest Territory Ballroom
Salon C
Salon B
Salon A
Event Room
Fallen Timbers
Eagles Landing
Salon A
Salon B


GREAT WOLF LODGE
ROAM THROUGH OUR WILD HABITAT!
Grand Mound, WA
SUITES 1001-1052
Stairwell Elevators
Stairwell Elevators
Main Entrance Level 1
Stairwell Elevators
ACTIVITIES
DINING
SHOPPING
Front Desk / Guest Services
Guest Laundry
Vending
Ice
Restrooms
CONFERENCE CENTER
Conference Room


GREAT WOLF LODGE
Entrance to Water Park
Stairwell Elevators
Stairwell Elevators
SUITES 2900-2916
Open to Below
SUITES 2000-2052
Level 2
Stairwell Elevators
SUITES 3000-3052
Level 3
SUITES 6000-6052
Level 6
SUITES 4000-4052
Level 4
SUITES 7000-7052
Level 7
SUITES 5000-5052
Level 5
SUITES 8000-9052
Level 8
ACTIVITIES
DINING
SHOPPING
ELEMENTS SPA SALON
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