Board of Education
Newtown, Connecticut

Minutes of the Board of Education meeting on December 2, 2014 in the council chambers,
3 Primrose Street.

K. Alexander, Chair	J. Erardi
L. Roche, Vice Chair	L. Gejda
K. Hamilton, Secretary	12 Staff
D. Leidlein	10 Public
J. Vouros	8 Press
D. Freedman	
M. Ku	

Item 1 – Call to Order
Mr. Alexander called the meeting to order at 6:38 p.m.
MOTION: Mrs. Roche moved that the Board of Education go into executive session to discuss
nurses and paraeducators negotiations and the security grant and invited Dr. Erardi, Dr. Gejda,
Mr. Bienkowski and Mr. Joe Spurgeon. Mr. Freedman seconded. Motion passes unanimously.

Item 2 – Executive Session
The Board exited executive session at 7:35 p.m.
Item 3 – Celebration of Excellence
Dr. Erardi introduced Connor Vignola, Newtown Middle School student, who was being
recognized for his project to collect 10,000 shoes to donate to third world countries.
He also introduced Tom Kuroski, President of the Newtown Federation of Teachers who spoke
about the six fallen educators lost on 12/14 and that he and Liesl Frassola were part of the
dedication ceremony at the National Teachers Hall of Fame this past June to honor them as
well as other educators who were lost. Mr. Kuroski introduced Randi Weingarten, President of
the American Federation of Teachers and AFT Connecticut First Vice President Steve
McKeever who presented a collage honoring the six Sandy Hook educators.

Item 4 – Public Session/Pledge of Allegiance

Item 5 – Consent Agenda
MOTION: Mrs. Roche moved that the Board of Education approve the consent agenda which
includes the correspondence report, the resignation of Katherine Matz, and the donation to
Sandy Hook School. Mr. Vouros seconded. Motion passes unanimously.

Item 6 – Public Participation - none
Item 7 – Reports
Chair report: Mr. Alexander spoke about the joint meeting with the Board of Selectman, Board of
Finance and Legislative Council which included a discussion about the enrollment report. He
would attend the Legislative Council meeting to discuss the CIP and the high school auditorium
project.

Superintendent's Report: Dr. Erardi stated that at the December 16 meeting per Board policy
two Newtown High School students will join the Board. They are senior Megan Milano and
junior Riland Abazi. He included a letter from Philip Ambrosino who lives in New York and had

a conversation with some of our band students at a New Jersey Turnpike rest stop. He complimented their behavior and also spoke to the band director.

We are taking a more direct approach to establish residency. A meeting was held with representatives of each school regarding procedures we will put in place.

Educational rounds with our administrators will take place at Newtown High School on December 17.

Committee Reports: Ms. Hamilton said the policy committee cancelled their December 15 meeting and will schedule one in January.

Mr. Vouros said the Curriculum and Instruction committee met November 25. They discussed state assessments, a draft of the Curriculum Development Guide, the proposed school calendars and the GATES program.

Ms. Hamilton asked if there was a discussion about anything added for high school graduation next year to which Mr. Vouros said there was not.

Mrs. Ku said it would be added to the next agenda. She spoke about the Strategic Planning Committee where there was a lot of discussion on what they should be looking at regarding locations for Hook and Ladder, the Senior Center and the Children's Adventure Center. The group will be requesting $60,000 for a consultant for a space needs study. The schools were discussed for possible closures and if schools should be included in these studies. They will wait to hear what our plans are for the schools. We need to make our plan more public.

Dr. Erardi said the joint facilities study is not including the school side. We are now in the process of doing a space analysis for the next school year which will be completed in the next two weeks. We also need to speak about the new Sandy Hook School which could hold 600 students.

Ms. Hamilton said there is confusion about what the school board's role is on that committee and who was going to make a decision on the schools.

Mr. Alexander said they need more guidance from the Board would talk to town officials regarding school decisions.

Mrs. Ku feels we have to look at the cost and benefits of opening and closing schools. This can't be left up to a municipal group to analyze but to the Board of Education.

Mr. Freedman said we should be more involved and a vocal player in this group.

Ms. Hamilton said she and Mrs. Ku are on the committee and assumed there would be a vote.

Mr. Vouros stated that if there is a negative impact to closing something and we haven't vetted it thoroughly then we are remiss.

Ms. Hamilton said she and Mr. Vouros went to the high school PTA meeting this morning and spoke about district communication and that a letter should go out to the community on what is going on in the schools. Tomorrow night is the freshman forum on underage drinking and drugs. Dr. Rodrigue spoke about her school improvement plan and her goals for the high school.

Mr. Vouros clarified that this is not a newsletter from the PTAs. They offered to gather information for us for the Board of Education newsletter.

Mrs. Roche said she attended the Sandy Hook PTA meeting last night where they discussed the budget, school closings and the joint board meeting. We also now have a button on the town webside for Board of Education agendas and minutes.

Mrs. Ku said the security meeting agenda items were updated on threat assessment protocol, integration of SSOs and unarmed security guards schedules, and communication between the schools and town services.

Ms. Hamilton asked for a list of what has been done.

Dr. Erardi would send that out.

Transportation Report:

All-Star Transportation owner John Dufour, Richard Dufour and Alan Colangelo, the new location manager, attended.

Mr. Freedman asked how routes were assigned. Some students live close to their school but are on the bus for 40 minutes.

Richard Dufour said past practice was the first one on was the first one off.

Mr. Freedman asked if they received any calls regarding the length of the rides and if there were any plans to modify the runs for next year.

Richard Dufour said there were not a lot of complaints. There are a number of high school parents that drive their children to school.

Ms. Hamilton asked for data on how many students are riding compared to how many are assigned.

Richard Dufour said we don't keep track of that. At Reed and the elementary schools there is about 90% ridership. It varies at the high school.

John Dufour said they would need help from the schools to do an actual survey. It changes daily depending upon the weather and sports season.

Mrs. Roche asked how the contract worked.

Mr. Bienkowski said the contract specifies that each bus is allowed 2,200 gallons for the 183 days. All-Star also does field trips and athletic trips with the cost for fuel added on to that.

John Dufour said if we go over the 2,200 gallons we pay for anything over the cap.

Ms. Hamilton asked if we have had any overtime charges on transportation runs.

Mr. Bienkowski said overtime is only for early dismissals on conference days and PLC days.

Ms. Hamilton said she looked at last year's routes compared to this year. She asked if they thought about combining RIS routes with St. Rose. A number of routes were for both but this year they were divided.

Richard Dufour said that was a way to cut the four buses. There were some gaps with schools that don't have a second tier run. We were able to cut five to eight minutes off the run.

Ms. Hamilton said that when you look at 23, 17, 31 and 11 students assigned to 77-passenger buses she questioned how efficient that was. If we had 4 tiers or combined tier 1 and 2 we would save money.

John Dufour said that would extend the school day. One tier dictates the number of buses you need. We could consolidate some Reed groups but it would make the runs longer and make us later for the next school.

Ms. Hamilton said years ago we had four tiers. We should look at moving the middle school tier.

Rich Dufour said that since we had that system we added more time to the school day.
Dr. Erardi felt we would be remiss if we didn't do the homework. We would have information in two to three weeks. He thanked All-Star and stated he was impressed with their leadership. Parent concerns are addressed quickly. All-Star also stepped forward to create a program for our enrichment program at no cost.

Item 8 – Old Business
Girls' Golf and Boys' Volleyball:
MOTION: Mrs. Roche moved that the Board of Education approve the addition of Girls' Golf and Boys' Volleyball to the high school sports program. Mr. Vouros seconded.

Dr. Erardi said Gregg Simon was unable to attend. Both sports can be funded at no cost to the Board of Education.
Mrs. Ku asked if it was likely to remain no cost for the Board of Education.
Dr. Erardi said it was possible in future years to look at that for consideration.
Ms. Hamilton felt we owed it to the students to offer these sports and thanked the parents for their support. There are no golf fees at the local country club.
Motion passes unanimously.

2015-2017 Calendars:
Dr. Erardi wrote to Dr. Thibodeau at Education Connection asking when the superintendents could share the regional calendar with their boards and also when board action would be needed. Most superintendents are looking to move forward with a two-year endorsement.

Mr. Freedman asked if there was any consideration for his request of not having conference days the week before Thanksgiving and a professional development day the week after.

Dr. Erardi said the before school professional development opportunity is being spoken about.
Mr. Vouros stated the two hour delayed opening gives the teachers an extra hour. Also it's easier for parents to go to work late than leave early.

Item 9 – New Business
MOTION: Mrs. Ku moved that the Board of Education approve the Algebra I, Algebra II and Geometry curricula. Mr. Vouros seconded. Motion passes unanimously.

Action on Board Policies Series 0000 Mission-Goals-Objectives:
Mrs. Roche moved that the Board of Education approve the Board Policies Series 0000 Mission-Goals-Objectives. Mr. Freedman seconded.

The question was asked if Form 0521 was part of the policy.
Dr. Erardi said it is not part of the policy but just a guideline for the administration.

Ms. Hamilton made an amendment to the motion to remove policy 9271 from the current list of policies which was accepted by Mrs. Roche and Mr. Freedman.
Motion passes unanimously.

November 18, 2014 Minutes:
MOTION: Mrs. Roche moved to approve the minutes of November 18, 2014. Mr. Vouros seconded. Vote: 6 ayes, 1 abstained (Mrs. Leidlein)

Minutes of November 19, 2014:
MOTION: Mr. Vouros moved that the Board of Education approve the minutes of November 19, 2014. Mrs. Roche seconded. Motion passes unanimously.

Item 10 – Public Participation
Eric Poupon, 23 Split Rock Road, spoke about the lock in drills. He received notification of the drills from Reed and the middle school but not from Head O'Meadow School. He also said the timing was bad because there were a lot of news reports that week. Feedback from parents was there was no way to get help if someone in the schools was having anxiety issues. The teachers did a great job.

Dr. Erardi thanked Mr. Poupon. He spoke to the administration from Head O'Meadow School. A notice was sent to parents in August or September of the date for the drill but there was no notification two or three days before the drill. He also heard from other parents. He believed we had counselors and support staff in place during these drills. He would get back to him with that information. Our lock down drills will not be in November or December next year.

MOTION: Mrs. Roche moved to adjourn the meeting. Mr. Vouros seconded. Motion passes unanimously.

Item 11 – Adjournment
The meeting adjourned at 9:24 p.m.

Respectfully submitted:

_____
            Kathryn Hamilton
            Secretary

BOE Communications Report, 12/02/2014
Kathy Hamilton, Board of Education Secretary

From	Date	Description
Justin Pegnataro	11/18/2014	Two Coyotes Wilderness School: Creating Connected Communities
Wolfgang Halbig	11/20/2014	Freedom of Information Requests
Jessie Young	11/25/2014	Shipping Exchange.Com
CT Lyric Opera & Virtuosi Chamber Orchestra	12/1/2014	Premiere of "DER ROSENKAVALIER", Thur 12/4

November 19, 2014

Dr. Joseph Erardi
Newtown Public Schools
3 Primrose Street
Newtown, CT 06482

Dear Dr. Erardi,

I'm writing to inform you that I am resigning from the position of Special Education Teacher at Newtown High School and as Extended School Year Coordinator for Newtown Public Schools, as I have accepted the position of Principal of Touchstone School in Litchfield, CT.

I intend to work through December 1, 2014, in order to advance my teaching certification from the provisional level to the professional level, but I would request that you consider waiving the remaining forty-five school day notice so that I may begin my work at Touchstone School. I will of course continue in Newtown for all forty-five days if the district requires such.

It has truly been my pleasure to launch my career in education at my own high school, and this feels a little like a second graduation, including some of the same teachers that were here for the first one in 2001. I recognize and appreciate that the education I received as a student at NHS is what prepared me for success in college, and similarly, the opportunities for professional growth I have been afforded in Newtown are the reason that I am prepared to succeed in this new leadership role.

It is bittersweet to leave Newtown, but I am confident that the students are in good hands. I look forward to the possibility of collaborating in the future.

Sincerely,

Katherine Matz, M.A.

cc: Julie Haggard, Director of Pupil Services
    Lorrie Rodrigue, Principal of Newtown High School
    David Abbey, Interim Director of Human Resources
    Sherry Earle, Special Education Department Chair
    Tom Kuroski, President Newtown Federation of Teachers

DONATIONS

12/2/2014

To BOE for Approval on December 2, 2014

SHES

Travelers Employee Giving Campaign, Andover, MA
B.Zalcman-Employee $60.00

SHES Library	Total	$ 60.00	$ 60.00
Newtown Public Schools		$ -	$ -
Middle Gate School			$ -
NPS Teachers	Total		$ -
			$ 60.00
			$ 60.00

Administrative Report

December 2, 2014

1. Student Representatives:
   a. Megan Milano   Class of 2015
   b. Riland Abazi   Class of 2016
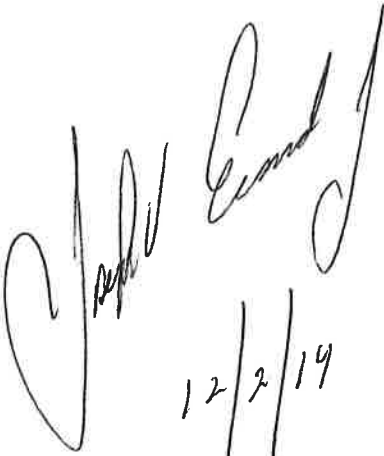
2. Commendation   **NHS Marching Band**   (ATTACH 1)

3. Residency

4. Professional Learning Community
   a. Educational Rounds – NHS Wednesday, December 17th

12/2/14

181 Longfellow Avenue
North Babylon, NY, 11703
November 2, 2014

Dr. Joseph V. Erardi Jr.
Superintendent of Schools
Newtown Public Schools
3 Primrose Street
Newton, Ct. 06470

NOV 0 6 2014

Dear Dr. Erardi,

I feel compelled to write this letter to you in reference to a wonderful experience I had with some of the high school band students in your district.

My wife and I were returning home from visiting one of our grand-daughters who attends Franklin and Marshall College when we decided to stop at a Snack/Rest Stop on the New Jersey Turnpike. Within a few minutes your high school band students entered the rest stop as well. I was happy to witness perfect behavior as far as their mannerisms and speech were involved. I took it upon myself to strike up a conversation with one of your students (he is a junior and one of the trumpet players), who filled me in about their weekend activities. He was very mature, and a joy to talk with. He was very happy to share the great news that they had placed number 7 out of 34? Bands. Bravo! Terrific job. Being a retired high school chorus teacher, I can appreciate everything I witnessed with this fabulous group of youngsters. Yes, they were fabulous. Too bad members of the news media weren't around to report on this lovely group of youngsters.

I approached two people who I assume mother/chaperones, and expressed the joy that we were experiencing with their young men and women. They took it upon themselves to draw their band director into the conversation. He had only accolades for his students. It was obvious that he loved his job and loved his students to go the extra mile to a competition on a weekend. It was also obvious that his students thought very highly of their teacher/director. This brought back many fond memories for me.

America is in great shape if these students are going to lead and represent us in the future. I would appreciate it if you would share this letter of commendation with the band director as well as the band students and other members of your community.

Sincerely yours,

Philip N. Ambrosino

Philip N. Ambrosino

Newtown Public Schools
2014-2015 Regular Ed
Transportation Outline

44 units are used to transport the student body for in-town regular ed transportation including Saint Rose Parochial, Henry Abbott Tech, Danbury Magnet, Frasier Woods and Housatonic Valley Waldorf School. This is the amount of vehicles needed to service Newtown which is the fifth largest town in Connecticut covering an area of 60.38 square miles. Newtown Public Schools currently operates on a three tier schedule.

Tier 1
- Newtown High, Middle School, and Henry Abbott Tech
- Largest population
  - 1750 students for NHS
  - 832 students for NMS
  - 38 students for HAT
  - 2620 students.
- Tier 1 dictates how many buses are required
- Current equipment operating
  - 32 – 77passenger buses
  - 12 – 47passenger buses
- Maximum capacity for grades K to 6 sitting 3 to a seat is 3028
- Maximum capacity for grades 7 to 12 is 51passengers for the large buses and 31passengers for the medium buses sitting 2 to a seat is 2004 seats

Tier 2
- Reed Intermediate, St Rose Parochial, Frasier Woods and Housatonic Valley Waldorf School
- Population for this tier as of October 31, 2014 is 991students.
- Tier 2 is our lowest populated tier however we have a large area to cover in a limited amount of time.

Tier 3
- Hawley, Head O'Meadow, Middle Gate and Sandy Hook
- Population for this tier as of October 31, 2014 is 1390 students

Overview
Given the student population and current configuration of the tiers, we feel that 44 units is the minimum number of units needed to safely transport students. Once the bubble (class of 2020) passes through the high school or tiers are reconfigured it will most likely be possible to cut buses.

Respectfully submitted by Rich Dufour, Operations Supervisor, All-Star Transportation, Nov. 25, 2014.

Newtown Public Schools - School Bus Outline
2014-2015 School Year

Bus	Cap	Tier 1	Assigned	Time	Tier 2	Assigned	Time	Tier 3	Assigned	Time
1	77p	HS/MS	75	35	RIS	23	30	SHS	56	35
2	77p	HS/MS	77	30	RIS	17	25	SHS	33	35
3	77p	HS/MS	71	30	RIS	31	25	SHS	36	30
4	77p	HS/MS	69	30	RIS	24	25	SHS	34	35
5	77p	HS/MS	73	25	RIS	27	25	SHS	27	35
6	77p	HS/MS	83	25	RIS	28	25	MGS	41	35
7	77p	HS/MS	61	25	STR	27	40	MGS	38	30
8	77p	HS/MS	70	25	RIS/STR	35	30	HAW	51	35
9	77p	HS/MS	69	25	RIS/STR	40	30	HAW	55	30
10	77p	HS/MS	75	25	RIS	22	30	HAW	37	30
11	77p	HS/MS	64	25	RIS	20	35	HAW	19	30
12	77p	HS/MS	72	25	RIS	32	35	HOM	26	25
13	77p	HS/MS	64	35	RIS	20	35	HOM	39	25
14	77p	HS/MS	60	35	RIS	27	35	HOM	3	25
15	77p	HS/MS	63	35	RIS	11	35	HOM	44	25
16	77p	HS/MS	70	35	RIS	27	35	HOM	46	25
17	77p	HS/MS	58	35	RIS	24	35	HOM	34	25
18	77p	HS/MS	56	35	RIS	32	35	MGS	31	30
19	77p	HS/MS	64	35	RIS	23	35	MGS	57	35
20	77p	HS/MS	70	35	RIS/STR	30	30	MGS	41	25
21	77p	HS/MS	74	35	RIS	20	30	SHS	35	30
22	77p	HS/MS	74	35	HVWS	2	25	Tier 2 cont	Tier 2 cont	
23	77p	HS/MS	75	30	RIS/STR	16	25	MGS	39	25
24	77p	HS/MS	58	30	RIS	37	30	MGS	38	30
25	77p	HS/MS	71	30	RIS/STR	43	30	MGS	18	30

26	77p	HS/MS	77	35	STR am	13	25	SHS	54	25
27	77p	HS/MS	78	35	FWS	5	30	MGS	39	25
28	77p	HS/MS	75	35	HAT am	33	30	MGS	33	25
29	77p	HS/MS	53	35	FWS	4	30	Tier 2 cont	Tier 2 cont	
30	77p	HS/MS	73	45	RIS	21	25	HOM	54	30
31	77p	HS/MS	70	35				MAG	33	25
32	77p	HS/MS	70	45	STR am	11	25	HOM	30	25
33	47p	HS/MS	53	30	RIS	9	25	SHS	42	25
34	47p	HS/MS	47	25	RIS/STR	45	25	SHS	19	25
35	47p	HS/MS	38	25	RIS/STR	26	25	HAW	36	25
36	47p	HS/MS	38	25	RIS/STR	18	25	HAW	29	25
37	47p	HS/MS	39	30	RIS	18	30	HAW	31	35
38	47p	HS/MS	45	30	RIS	10	30	SHS	21	35
39	47p	HS/MS	45	30	RIS	21	30	HAW	24	30
40	47p	HS/MS	22	25	RIS	28	30	HAW	27	35
41	47p	HS/MS	47	30	STR	26	50	Tier 2 cont	Tier 2 cont	
42	47p	HS/MS	42	25	STR	29	50	Tier 2 cont	Tier 2 cont	
43	47p	HS/MS	40	30	STR	28	50	Tier 2 cont	Tier 2 cont	
44	47p	HS/MS	40	30	STR	24	50	Tier 2 cont	Tier 2 cont	

DRAFT   NEWTOWN PUBLIC SCHOOLS 2015-2016 SCHOOL CALENDAR   **DRAFT**

AUGUST   3(6)

M	T	W	TH	F
24	*25*	*26*	27	28
31				

24-All Teachers Report
24, 25 & 26 –Staff Development Days
27-Students Report

SEPTEMBER   19(19)

M	T	W	TH	F
	1	2	3	4
--	8	9	10	11
--	15	16	17	18
21	22	--	24	25
28	29	30		

7-Labor Day, Schools Closed
14-Rosh Hashanah, Schools Closed
23-Yom Kippur-Schools Closed

OCTOBER   22(22)

M	T	W	TH	F
			1	2
5	6	*7	8	9
12	13	14	15	16
19	20	21	22	23
26	27	28	29	30

*7-Early Dismissal-Staff Dev.

NOVEMBER   18(19)

M	T	W	TH	F
2	--	4	5	6
9	10	11	12	13
16	17	18	19	20
23	24	*25	--	--
30				

3-Election Day-Schools Closed For Students, Staff Development Day
25-Early Dismissal for Thanksgiving
26-27-Thanksgiving Recess

DECEMBER   17(17)

M	T	W	TH	F
	1	*2	3	4
7	8	9	10	11
14	15	16	17	18
21	22	23	--	--
--	--	--	--	

*2-Early Dismissal-Staff Dev.
24-31-Holiday Recess

JANUARY   19(19)

M	T	W	TH	F
				--
4	5	6	7	8
11	12	*13	14	15
--	19	20	21	22
25	26	27	28	29

1-New Year's Day 2
*13-Early Dismissal-Staff Dev.
18-Martin Luther King Day, Schools Closed

FEBRUARY   19(19)

M	T	W	TH	F
1	2	*3	4	5
8	9	10	11	12
15	16	17	18	19
--	--	24	25	26
29				

*3-Early Dismissal-Staff Dev.
22-23-Schools Closed

MARCH   22(22)

M	T	W	TH	F
	1	*2	3	4
7	8	9	10	11
14	15	16	17	18
21	22	23	24	--
28	29	30	31	

*2-Early Dismissal-Staff Dev.
25 -Good Friday- Schools Closed

Student Days – 183
Teacher Days – 187

APRIL   16(16)

M	T	W	TH	F
				1
4	5	*6	7	8
--	--	--	--	--
18	19	20	21	22
25	26	27	28	29

*6-Early Dismissal-Staff Dev.
11-15 Schools Closed

MAY   21(21)

M	T	W	TH	F
2	3	*4	5	6
9	10	11	12	13
16	17	18	19	20
23	24	25	26	27
--	31			

*4-Early Dismissal-Staff Dev.
30-Memorial Day, Schools Closed

JUNE   7(7)

M	T	W	TH	F
		1	2	3
6	7	8	☼9	10
13	14	15	■16	17
20	21	22	23	24
27	28	29	30	

☼-Projected last day of school without emergency closing days
■-Projected last day of school if the 5 built-in days are used

The calendar builds-in five emergency closings, with the last day of school projected as June 16th. Unused closings will be deducted from this date. Extra closings will be added on June 17 and 20 with additional days taken from the April break starting with 4/15, 4/14, etc.

Open House Dates:
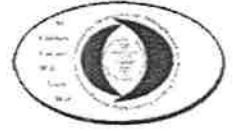Elementary –
Reed Intermediate –
Middle School –
High School –

Conferences/Early Dismissals:
Elementary –
Reed Intermediate –
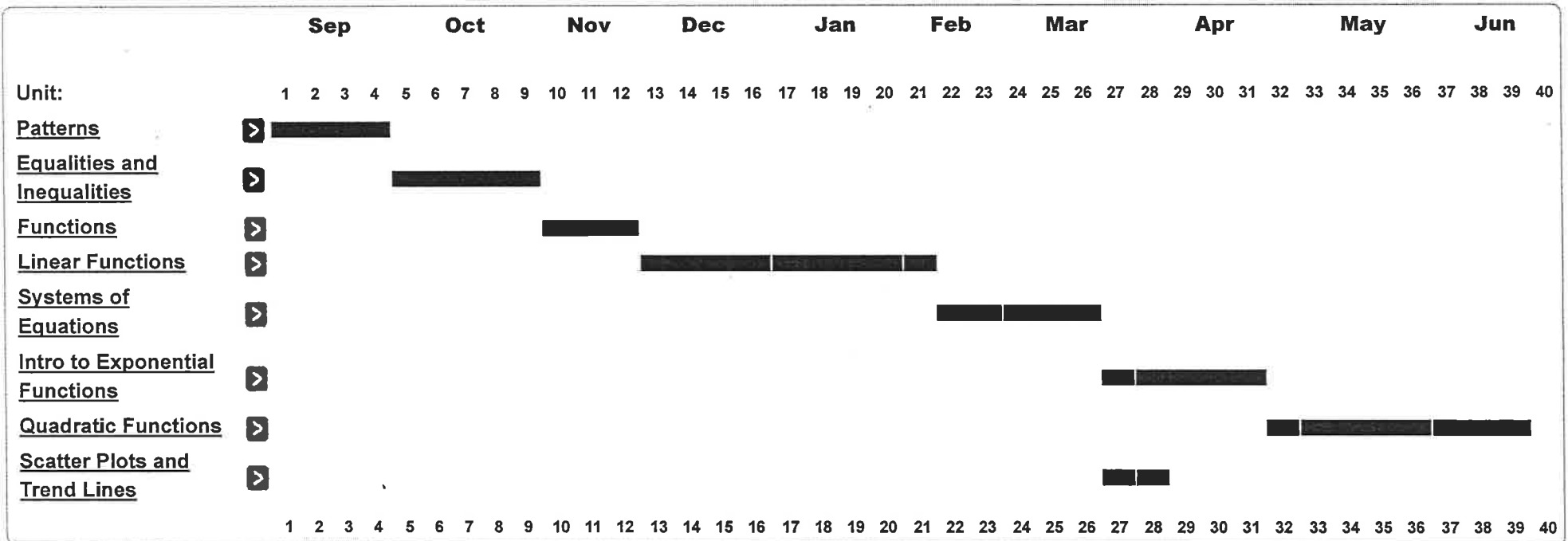Middle School –
High School –

Adopted

DRAFT   NEWTOWN PUBLIC SCHOOLS 2016-2017 SCHOOL CALENDAR   DRAFT

AUGUST — 3(6)

M	T	W	TH	F
		24	*25*	*26*
29	30	31		

24-All Teachers Report
24, 25 & 26 –Staff Development Days
29 Students Report

SEPTEMBER — 21(21)

M	T	W	TH	F
			1	2
--	6	7	8	9
12	13	14	15	16
19	20	21	22	23
26	27	28	29	30

5-Labor Day, Schools Closed

OCTOBER — 19(19)

M	T	W	TH	F
--	4	*5	6	7
10	11	--	13	14
17	18	19	20	21
24	25	26	27	28
31				

*5-Early Dismissal-Staff Dev.
3 – Rosh Hashanah-Schools Closed
12-Yom Kippur-Schools Closed

NOVEMBER — 19(20)

M	T	W	TH	F
	1	2	3	4
7	--	9	10	11
14	15	16	17	18
21	22	*23	--	--
28	29	30		

8-Election Day-Schools Closed For Students, Staff Development Day
23-Early Dismissal for Thanksgiving
24-25-Thanksgiving Recess

DECEMBER — 17(17)

M	T	W	TH	F
			1	2
5	6	*7	8	9
12	13	14	15	16
19	20	21	22	23
--	--	--	--	--

*7-Early Dismissal-Staff Dev.
26-30-Holiday Recess

JANUARY — 20(20)

M	T	W	TH	F
--	3	4	5	6
9	10	*11	12	13
--	17	18	19	20
23	24	25	26	27
30	31			

*11-Early Dismissal-Staff Dev.
2-New Year's Day
16-Martin Luther King Day,
Schools Closed

FEBRUARY — 18(18)

M	T	W	TH	F
		*1	2	3
6	7	8	9	10
13	14	15	16	17
--	--	22	23	24
27	28			

*1-Early Dismissal-Staff Dev.
20-21-Schools Closed

MARCH — 23(23)

M	T	W	TH	F
		*1	2	3
6	7	8	9	10
13	14	15	16	17
20	21	22	23	24
27	28	29	30	31

*1-Early Dismissal-Staff Dev.

Student Days – 183
Teacher Days – 187

APRIL — 14(14)

M	T	W	TH	F
3	4	*5	6	7
10	11	12	13	--
--	--	--	--	--
24	25	26	27	28

*5-Early Dismissal-Staff Dev.
14-Good Friday- Schools Closed
17-21 Schools Closed

MAY — 22(22)

M	T	W	TH	F
1	2	*3	4	5
8	9	10	11	12
15	16	17	18	19
22	23	24	25	26
--	30	31		

*3-Early Dismissal-Staff Dev.
29-Memorial Day- Schools Closed

JUNE — 7(7)

M	T	W	TH	F
			1	2
5	6	7	8	☼9
12	13	14	15	■16
19	20	21	22	23
26	27	28	20	30

☼-Projected last day of school
   without emergency closing days
■-Projected last day of school
   if the 5 built-in days are used

The calendar builds-in five emergency closings, with the last day of school projected as June 16th. Unused closings will be deducted from this date. Extra closings will be added on June 19 and 20 with additional days taken from the April break starting with 4/21, 4/20, etc.

Open House Dates:
Elementary –
Reed Intermediate –
Middle School –
High School –

Conferences/Early Dismissals:
Elementary –
Reed Intermediate –
Middle School –
High School –

Adopted

Newtown Public Schools
Course Assignments › Algebra I

Collaboration | Grade 9 | Mathematics | Newtown High School

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

Unit: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

Patterns ▶

Equalities and Inequalities ▶

Functions ▶

Linear Functions ▶

Systems of Equations ▶

Intro to Exponential Functions ▶

Quadratic Functions ▶

Scatter Plots and Trend Lines ▶

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

Last Updated: Thursday, October 23, 2014, 4:50PM

Atlas Version 8.0.4

Unit: Patterns (Week 1, 4 Weeks) 📅

Enduring Understanding(s)/ Generalization(s)

Analyzing patterns and writing recursive and explicit algebraic rules provides a powerful way to extend patterns and make predictions.

Essential Question(s)	Guiding Questions
What is a sequence? How can patterns be represented? What are the advantages and disadvantages of a recursive rule compared to an explicit rule?	*Factual, Conceptual, Provocative* How can analyzing patterns and writing recursive and explicit algebraic rules provide a powerful way to extend patterns and make predictions?

Standard(s)	Objective(s)
Content and CCSS **CCSS: Mathematics, CCSS: HS: Algebra, Seeing Structure in Expressions** HSA-SSE.A. Interpret the structure of expressions. • HSA-SSE.A.1. Interpret expressions that represent a quantity in terms of its context. • HSA-SSE.A.1a. Interpret parts of an expression, such as terms, factors, and coefficients. **CCSS: Mathematics, CCSS: HS: Functions, Interpreting Functions** HSF-IF.A. Understand the concept of a function and use function notation. • HSF-IF.A.3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. **CCSS: Mathematics, CCSS: HS: Functions, Building Functions** HSF-BF.A. Build a function that models a relationship between two quantities. • HSF-BF.A.1. Write a function that describes a relationship between two quantities. • HSF-BF.A.1a. Determine an explicit expression, a recursive process, or steps for calculation from a context. • HSF-BF.A.2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. **CCSS: Mathematics, CCSS: HS: Functions, Linear, Quadratic, and Exponential Models** HSF-LE.A. Construct and compare linear and exponential models and solve problems.	**Bloom/ Anderson Taxonomy / DOK Language** To identify and extend patterns in sequences To represent arithmetic sequences using function notation To write and use recursive formulas for geometric sequences

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- HSF-LE.A.2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

Content/Topics

*Critical content that students must **KNOW***
Recursive rule
Explicit rule
Arithmetic sequence
Geometric sequence

Skills

*Transferable skills that students must be able to **DO***
- 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks.
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Core Learning Activities

Exit Slips
Hydrocarbon Lab
Sierpinski Tetrahedron
Activity 1.4.2 Applications of Geometric Sequences.doc
Activity 1.4.1 Doubling Your Money Geometric.doc
arithmetic geometric review.doc
Activity 1.3.3 Arithmetic Sequences with Calculators.doc
Activity 1.3.1 Recursive and Explicit Rules for Arithmetic Sequences.doc
Activity 1.3.1 building bridges arithmetic.doc
Activity 1.1.1 Exploring Patterns with Hydrocarbons.docx
Sierpinski Tetrahedron lab

Resources

Professional & Student
Professional
Fractal Geometry Workshop resources
teachers edition textbook
Student
Textbook: *Algebra 1,* 2007
computer with internet access

Assessments (Titles)

Patterns Test
Summative: Written Test

Algebra 1 Unit 1 Patterns Test

Graduation Standards

Information Literacy
Problem Solving
Spoken Communication
Written Performance
- Problem Solving

Interdisciplinary Connections

Find (specific term)
Write (recursive rule)
Write (explicit rule)
Draw (next in sequence)
Predict (nth term)

Equalities and Inequalities

Unit: Equalities and Inequalities (Week 5, 5 Weeks) 🖾

Enduring Understanding(s)/ Generalization(s)

To obtain a solution to an equation, no matter how complex, always involves the process of undoing the operations.

Essential Question(s)	Guiding Questions
 • How can we use linear equations and linear inequalities to solve real world problems? • What is a solution set for a linear equation or linear inequality? • How can models and technology aid in the solving of linear equations and linear inequalities?	*Factual, Conceptual, Provocative* • What is an equation? • What is an expression? • What does equality mean? • What is an inequality?

Standard(s)	Objective(s)
Content and CCSS **CCSS: Mathematics, CCSS: HS: Num/Quantity, Quantities** HSN-Q.A. Reason quantitatively and use units to solve problems. • HSN-Q.A.1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. • HSN-Q.A.2. Define appropriate quantities for the purpose of descriptive modeling. • HSN-Q.A.3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **CCSS: Mathematics, CCSS: HS: Algebra, Seeing Structure in Expressions** HSA-SSE.A. Interpret the structure of expressions. • HSA-SSE.A.1. Interpret expressions that represent a quantity in terms of its context. • HSA-SSE.A.1a. Interpret parts of an expression, such as terms, factors, and coefficients. • HSA-SSE.A.1b. Interpret complicated expressions by viewing one or more of their parts as a single entity. • HSA-SSE.A.2. Use the structure of an expression to identify ways to rewrite it. **CCSS: Mathematics, CCSS: HS: Algebra, Creating Equations** HSA-CED.A. Create equations that describe numbers or relationships.	**Bloom/ Anderson Taxonomy / DOK Language** Students will . . . • Interpret the structure of Expressions • Write expressions in equivalent form to solve problems • Create equations that describe numbers or relationships • Solve equations and inequalities in one variable • Understand solving equations as a process of reasoning and explain the reasoning • Reason quantitatively and use units to solve problems

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- HSA-CED.A.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
- HSA-CED.A.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

CCSS: Mathematics, CCSS: HS: Algebra, Reasoning with Equations & Inequalities
HSA-REI.A. Understand solving equations as a process of reasoning and explain the reasoning.

- HSA-REI.A.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

HSA-REI.B. Solve equations and inequalities in one variable.

- HSA-REI.B.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

CCSS: Mathematics, CCSS: HS: Algebra, Mathematical Practice
MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- MP.1. Make sense of problems and persevere in solving them.
- MP.2. Reason abstractly and quantitatively.
- MP.4. Model with mathematics.
- MP.6. Attend to precision.
- MP.7. Look for and make use of structure.
- MP.8. Look for and express regularity in repeated reasoning.

Content/Topics	Skills
Critical content that students must KNOW Students must be able to: • Solve linear equations and inequalities in one variable • Model a real world problem with an equation/inequality and interpret the solution • Rearrange equations with multiple variables in terms of a given variable	*Transferable skills that students must be able to DO* • 2. Work independently and collaboratively to solve problems and accomplish goals. • 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions. • 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Core Learning Activities	Resources
Combining like terms with Classwork notes and Practice sheets "Around the Room" Activities Equations in Education activity 📎 **Solving Equations Scavenger Hunt Mixed Practice.ppt** 📎 **Solving equations review stations.docx** 📎 **solving 2 step equations practice.doc** 📎 **Literal Equations Student version.pptx** 📎 **Inequalities Packet.docx** 📎 **Activity 2.6.6 Putting it All Together.docx** 📎 **Activity 2.4.5a Practice Solving Equations.docx** 📎 **Activity 2.3.3 Solving Equations with Variables on Both Sides.docx** 📎 **Activity 2.3.2 Solving Equations that Contain Like Terms.docx** 📎 **Activity 2.2.4 Equations in Education.docx** 📎 **Activity 2.2.3 Solving Equations CPA.docx** 📎 **Activity 2.2.1 Solving Equations using Flowcharts.docx** 📎 **Activity 2.1.4 Evaluating Algebraic Expressions.docx** 📎 **Activity 2.1.2 Representing Expressions using Flowcharts (after Unit 1 test).docx** 📎 **Activity 2.1.1 The Magic of Algebra.docx**	*Professional & Student* Professional department developed materials Internet, textbook, Pearson's Algebra 1 , 2007 State of Ct Algebra 1 Moodle Student Textbook, Pearson's *Algebra 1,* 2007 internet, handouts

Assessments (Titles)	Graduation Standards	Interdisciplinary Connections
Two-step solving equations quiz (including fractions) **Summative: Other written assessments** **Solving Equations Test including variables on both sides** **Summative: Other written assessments** **Solving inequalities Quiz** **Summative: Other written assessments** **Ipod performance task** **Other written assessments** 📎 **Test on solving equations.doc** 📎 **Unit 2 Performance Task iPods.docx** 📎 **End of Unit 2 test.doc**	**Information Literacy** **Problem Solving** **Spoken Communication** **Written Performance**	Students solve literal equations for multiple variables, useful for Science formulas

<< Previous Year

Unit: Functions (Week 10, 3 Weeks) ▦

Enduring Understanding(s)/ Generalization(s)

- Functions are a mathematical way to describe relationships between two quantities that vary.

Essential Question(s)

- How can functions be used to model real world situations, make predictions, and solve problems?

Guiding Questions

Factual, Conceptual, Provocative

- What is a function?
- What is function notation?
- How can we tell if a relationship is a function from multiple representations?
- What are the different ways in which functions may be represented?

Standard(s)

Content and CCSS

CCSS: Mathematics, CCSS: Grade 8, Functions
8.F.A. Define, evaluate, and compare functions.

- 8.F.A.1. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
- 8.F.A.2. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.

8.F.B. Use functions to model relationships between quantities.

- 8.F.B.5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

CCSS: Mathematics, CCSS: HS: Algebra, Creating Equations
HSA-CED.A. Create equations that describe numbers or relationships.

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language
Students will
- Create equations that describe numbers or relationships
- Represent and solve equations and inequalities graphically
- Understand the concept of a function and use function notation
- Interpret functions that arise in applications in terms of the context
- Analyze functions using different representations

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- HSA-CED.A.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CCSS: Mathematics, CCSS: HS: Algebra, Mathematical Practice
MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- MP.4. Model with mathematics.
- MP.5. Use appropriate tools strategically.

CCSS: Mathematics, CCSS: HS: Functions, Interpreting Functions
HSF-IF.A. Understand the concept of a function and use function notation.

- HSF-IF.A.1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).
- HSF-IF.A.2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

HSF-IF.B. Interpret functions that arise in applications in terms of the context.

- HSF-IF.B.4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- HSF-IF.B.5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

HSF-IF.C. Analyze functions using different representations.

- HSF-IF.C.7b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
- HSF-IF.C.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

Content/Topics	Skills
Critical content that students must **KNOW** Students must know:	Transferable skills that students must be able to **DO** • 1. Use real-world digital and other research tools to

- how to represent functions in multiple formats
- how to determine whether a relationship is a function
- how functions apply to real life situations

access, evaluate and effectively apply information appropriate for authentic tasks.
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Core Learning Activities

- Representing Relations
- Is it a Function?
- Bottled Water
- Hartford Precipitation
- Introduction to Function Notation
- Piecewise Functions
- Parent Functions

📎 **Parent functions Graphs.docx**

📎 **mapping diagram hw.docx**

📎 **Activity 3.4.3 Free Throws.docx**

📎 **Activity 3.3.2 Intro to Function Notation.docx**

📎 **Activity 3.3.1 Function Machines.docx**

📎 **Activity 3.2.3 Functions Everywhere (independent-dependent variables).docx**

📎 **Activity 3.2.2a Hartford Precipitation.docx**

📎 **Activity 3.2.1 Bottled Water.docx**

📎 **Activity 3.1.2 Is it a Function.docx**

📎 **Representing Relations.docx**

Resources

Professional & Student
Professional
Department developed materials
Internet, textbook: Pearson's, Algebra 1, 2007,
SDE Algebra 1 Moodle,
computer/projector
Student
computer with internet access, textbook, handouts, Kahn Academy

Assessments (Titles)

Unit 3 Quiz: Functions
Summative: Written Test
End of Unit Test including is a function with explanations,
Independent/Dependent variables with function rules, domain and range and function notation

Function Applications Pack
Summative: Group Project
Pack of function application problems including linear, quadratic, cubic, exponential growth, inverse, square root and step

Function Applications Quiz (Free

Graduation Standards

Information Literacy
Problem Solving
Spoken Communication
Written Performance
- Problem Solving

Interdisciplinary Connections

- For Bottled Water Activity discussed how long it takes for a plastic bottle to decompose and how many bottles of water were created/recyled every year.

Throws)
Summative: Written Test
Students use a linear model to create a table, graph and function rule and make predictions.

📎 **What is a Function journal entry.docx**

📎 **Unit 3 Quiz.docx**

📎 **Functions Applications key.docx**

📎 **Activity 3.4.3 Free Throws application quiz.docx**

<< Previous Year

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Linear Functions

Collaboration Algebra I|Grade 9|Mathematics|Newtown High School|2014-2015

Wednesday, October 29, 2014, 2.24PM

Unit: Linear Functions (Week 13, 9 Weeks)

Enduring Understanding(s)/ Generalization(s)

Linear functions are characterized by a constant average rate of change (or constant additive change).

Essential Question(s)

- What is a linear function?
- What are the different ways that linear functions may be represented?
- What is the significance of a linear function's slope and *y*-intercept?

Guiding Questions

Factual, Conceptual, Provocative

- How may linear functions model real world situations?
- How may linear functions help us analyze real world situations and solve practical problems?

Standard(s)

Content and CCSS
CCSS: Mathematics, CCSS: HS: Algebra, Mathematical Practice
MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- MP.1. Make sense of problems and persevere in solving them.
- MP.2. Reason abstractly and quantitatively.
- MP.3. Construct viable arguments and critique the reasoning of others.
- MP.4. Model with mathematics.
- MP.5. Use appropriate tools strategically.
- MP.6. Attend to precision.
- MP.7. Look for and make use of structure.
- MP.8. Look for and express regularity in repeated reasoning.

CCSS: Mathematics, CCSS: HS: Functions, Interpreting Functions
HSF-IF.B. Interpret functions that arise in applications in terms of the context.

- HSF-IF.B.6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

HSF-IF.C. Analyze functions using different representations.

- HSF-IF.C.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- HSF-IF.C.7a. Graph linear and quadratic functions

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language
Students will

- Interpret functions that arise in applications in terms of the context
- Analyze functions using different representations
- Construct and compare linear [and exponential] models and solve problems
- Interpret expressions for functions in terms of the situation they model

and show intercepts, maxima, and minima.
- HSF-IF.C.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

CCSS: Mathematics, CCSS: HS: Functions, Linear, Quadratic, and Exponential Models
HSF-LE.A. Construct and compare linear and exponential models and solve problems.

- HSF-LE.A.1. Distinguish between situations that can be modeled with linear functions and with exponential functions.
- HSF-LE.A.1a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
- HSF-LE.A.1b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
- HSF-LE.A.2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

HSF-LE.B. Interpret expressions for functions in terms of the situation they model.

- HSF-LE.B.5. Interpret the parameters in a linear or exponential function in terms of a context.

Content/Topics

Critical content that students must KNOW
Using graphs to represent two quantities
Linear patterns
Graphing using a function rule
Writing a function rule from arithmetic sequence
Formalizing relations and functions

Skills

Transferable skills that students must be able to DO
- 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks.
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Core Learning Activities

- What makes a function Linear
- Recognizing Linear Functions from Words, Tables and Graphs
- Using Tables to Determine if a Function is Linear
- Recognizing Linear Functions from Geometric Applications, Draining a Swimming Pool, Ordering DVD's, Teddy Bear Sale, (pack)

Resources

Professional & Student
Professional
Teachers edition textbook: Pearson's *Algebra 1*
SDE of CT Algebra 1 Moodle
Texas Instruments TI-84+
Calculator Based Ranger (CBR)
Student
Textbook

- Calculating and Interpreting Slope
- Slope-Intercept Form of a Line
- Horizontal and Vertical Lines
- Standard Form of a Linear Equation

internet
handouts
graphing calculator

Assessments (Titles)	Graduation Standards	Interdisciplinary Connections
Slope and Slope-Intercept Form of a Line Assessment **Summative: Written Test** Test on slope and slope-intercept form including horizontal and vertical lines 🖉 **End of unit test solving equations**	**Information Literacy** **Problem Solving** **Spoken Communication** **Written Performance**	

<< Previous Year

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Unit: Systems of Equations (Week 22, 5 Weeks) 📅

Enduring Understanding(s)/ Generalization(s)

Using algebra to describe lines.

Essential Question(s)	Guiding Questions
What does the slope of a line indicate about the line? What information does the equation of a line give you? How can you make a prediction based on a scatter plot?	*Factual, Conceptual, Provocative* What is unique about the rate of change for all lines? What is a direct variation? What is the difference between slope-intercept, point slope, and standard form of a line? How do you recognize parallel and perpendicular lines from their equations? What does the graph of an absolute value look like?

Standard(s)

Content and CCSS

CCSS: Mathematics, CCSS: HS: Algebra, Seeing Structure in Expressions
HSA-SSE.A. Interpret the structure of expressions.

- HSA-SSE.A.1a. Interpret parts of an expression, such as terms, factors, and coefficients.

CCSS: Mathematics, CCSS: HS: Algebra, Creating Equations
HSA-CED.A. Create equations that describe numbers or relationships.

- HSA-CED.A.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
- HSA-CED.A.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- HSA-CED.A.3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
- HSA-CED.A.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

CCSS: Mathematics, CCSS: HS: Algebra, Reasoning with Equations & Inequalities
HSA-REI.A. Understand solving equations as a process of reasoning and explain the reasoning.

- HSA-REI.A.1. Explain each step in solving a simple

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language
Students will:

- Identify rate of change and slope
- Develop Direct Variation functions
- Write equations of lines in different forms
- identify Parallel and Perpendicular line equations
- Graph absolute value functions

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equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

HSA-REI.B. Solve equations and inequalities in one variable.

- HSA-REI.B.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

HSA-REI.C. Solve systems of equations.

- HSA-REI.C.5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
- HSA-REI.C.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

HSA-REI.D. Represent and solve equations and inequalities graphically.

- HSA-REI.D.10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
- HSA-REI.D.11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
- HSA-REI.D.12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Content/Topics	Skills
Critical content that students must **KNOW** Linear equations and system of equations Linear inequalities and systems of inequalities Equations of lines in standard, point-slope and slope-intercept form Graph piece-wise and absolute value functions x- and y- intercepts	Transferable skills that students must be able to **DO** • 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks. • 2. Work independently and collaboratively to solve problems and accomplish goals. • 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.

| | • 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving. |

Core Learning Activities

Group work
individual practice
Round the Room activities
Geometer Sketchpad activities

Resources

Professional & Student
Department developed materials
text: Pearson's Algebra 1, 2007
SDE of Ct Algebra 1 Moodle
TI 84 calculators

Assessments (Titles)

Walker vs Runner
Summative: Personal Project
Performance task relating speed to graphs of a person walking to the speed of someone running in the same direction.

Graduation Standards

Information Literacy
Problem Solving
Spoken Communication
Written Performance

Interdisciplinary Connections

<< Previous Year

15

Intro to Exponential Functions

✉ **Collaboration** Algebra I|Grade 9|Mathematics|Newtown High School|2014-2015

Wednesday, October 29, 2014, 2:27PM

Unit: Intro to Exponential Functions (Week 27, 5 Weeks) 📅

Enduring Understanding(s)/ Generalization(s)

Extending the idea of exponents to include zero and negative exponents.

Essential Question(s)

How can you represent numbers less than one using exponents?
How can you simplify expressions involving exponents?
What are the characteristics of an exponential function?

Guiding Questions

Factual, Conceptual, Provocative
How can you explain how to use negative and zero exponents?
Can you give examples of operations that represent the properties of exponents?
Can you apply exponents to growth and decay problems?

Standard(s)

Content and CCSS
CCSS: Mathematics, CCSS: HS: Functions, Linear, Quadratic, and Exponential Models
HSF-LE.A. Construct and compare linear and exponential models and solve problems.

- HSF-LE.A.1. Distinguish between situations that can be modeled with linear functions and with exponential functions.
- HSF-LE.A.1a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
- HSF-LE.A.1c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
- HSF-LE.A.2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
- HSF-LE.A.3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
- HSF-LE.A.4. For exponential models, express as a logarithm the solution to $ab^{??} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.

HSF-LE.B. Interpret expressions for functions in terms of the situation they model.

- HSF-LE.B.5. Interpret the parameters in a linear or exponential function in terms of a context.

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language
Students will:
Identify growth and decay factors
Write the equation of the exponential represented by a geometric sequence
Apply exponentials to interest problems

Content/Topics

Skills

16

Critical content that students must **KNOW**	Transferable skills that students must be able to **DO**
Exponential properties Growth and Decay models Compound interest Geometric sequence	• 2. Work independently and collaboratively to solve problems and accomplish goals. • 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. • 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions. • 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Core Learning Activities

Graphing
Group work
Pairs
TI 84

Resources

Professional & Student
Text: Pearson's *Algebra 1,*2007
Department developed materials
SDE of Ct Algebra 1 Moodle
Khan Academy
Online resources

Assessments (Titles)

College fund activity
Summative: Lab Assignment
Students will be given an allowance and must determine if they have enough to go to college under the given circumstances

Graduation Standards

Information Literacy
Problem Solving
Spoken Communication
Written Performance
• Problem Solving

Interdisciplinary Connections

17

Quadratic Functions

Unit: Quadratic Functions (Week 32, 8 Weeks) 📅

Enduring Understanding(s)/ Generalization(s)

The quadratic function is a type of non-linear functions that models certain situations where the rate of change is not constant. The graph of a quadratic function is a symmetric smooth curve, called a parabola, with a highest point or lowest point corresponding to the maximum or minimum value, called its vertex.

Essential Question(s)	Guiding Questions
What are the characteristics of quadratic functions? How can you use quadratic functions to model real world situations?	*Factual, Conceptual, Provocative* How do you solve quadratic equations by taking the square root? What do you look for to solve quadratic equations by factoring? What are the steps necessary to complete the square? What is the difference between the vertex form and the standard form of a quadratic function?

Standard(s)

Objective(s)

Content and CCSS
CCSS: Mathematics, CCSS: HS: Algebra, Seeing Structure in Expressions
HSA-SSE.A. Interpret the structure of expressions.

- HSA-SSE.A.1a. Interpret parts of an expression, such as terms, factors, and coefficients.
- HSA-SSE.A.2. Use the structure of an expression to identify ways to rewrite it.

HSA-SSE.B. Write expressions in equivalent forms to solve problems.

- HSA-SSE.B.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
- HSA-SSE.B.3a. Factor a quadratic expression to reveal the zeros of the function it defines.
- HSA-SSE.B.3b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

Bloom/ Anderson Taxonomy / DOK Language
Students will:

- Recognize and Solve quadratics three different ways.
- Use quadratic functions to represent real world situations
- Use the axis of symmetry to graph quadratics
- Find the vertex of a quadratic and analyze its meaning in real world situations
- Identify the discriminate, evaluate it and translate its meaning
-
-

Content/Topics

Skills

Critical content that students must KNOW
Quadratics and their properties
Quadratics functions model situations
Solve quadratic equations
Complete the square
The Quadratic formula to solve quadratics
The Discriminate
Systems of quadratics or linear and quadratics

Transferable skills that students must be able to DO
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and

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	• 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Core Learning Activities

Learning activities include:

- group work
- investigation
- lab work
- online research
- Applying to real world situations

Resources

Professional & Student
Text: Pearson's *Algebra 1*, 2007
Department developed materials shared on Google.doc
SDE Moodle CCSM core curriculum and activities
Khan Academy
Ancillaries

Assessments (Titles)

The Tennis Problem
Summative: Personal Project
The Tennis problem asks students if it is possible to ace your opponent by just touching the net and still having the ball land in the service area. They must research court dimensions, discuss size of the player, type of racquet and distance to the sweet spot. They must research the speed of the tennis ball and its trajectory.
Students will use the Graduation Standard Rubric for Problem Solving to communicate their solution to the Tennis Problem

Graduation Standards

Information Literacy
Problem Solving
Spoken Communication
Written Performance

- Problem Solving

Interdisciplinary Connections

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Unit: Scatter Plots and Trend Lines (Week 27, 2 Weeks) 🗓

Enduring Understanding(s)/ Generalization(s)

- Although scatter plots and trend lines may reveal a pattern, the relationship of the variables may indicate a correlation, but not causation.

Essential Question(s)

- How do we make predictions and informed decisions based on current numerical information?
- What are the advantages and disadvantages of analyzing data by hand versus by using technology?
- What is the potential impact of making a decision from data that contains one or more outliers?

Guiding Questions

Factual, Conceptual, Provocative
Is there a pattern to the data?
Is there a Arithmetic or Geometric pattern?
Can this data be analyzed using technology?

Standard(s)

Content and CCSS
CCSS: Mathematics, CCSS: Grade 8, Statistics & Probability
8.SP.A. Investigate patterns of association in bivariate data.

- 8.SP.A.1. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
- 8.SP.A.2. Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
- 8.SP.A.3. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.

CCSS: Mathematics, CCSS: HS: Algebra, Mathematical Practice
MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- MP.4. Model with mathematics.
- MP.5. Use appropriate tools strategically.

CCSS: Mathematics, CCSS: HS: Stats/Prob, Interpreting

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language
Students will

- Analyze functions using different representations
- Summarize, represent, and interpret data on a single count or measurement variable
- Summarize, represent, and interpret data on two categorical and quantitative variables
- Interpret linear models
- Use Central Tendencies to interpret and compare sets of data

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Categorical & Quantitative Data
HSS-ID.A. Summarize, represent, and interpret data on a single count or measurement variable

- HSS-ID.A.2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
- HSS-ID.A.3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

HSS-ID.B. Summarize, represent, and interpret data on two categorical and quantitative variables

- HSS-ID.B.6. Represent data on two quantitative variables on a scatter plot and describe how the variables are related.
- HSS-ID.B.6c. Fit a linear function for scatter plots that suggest a linear association.

HSS-ID.C. Interpret linear models

- HSS-ID.C.7. Interpret the slope (rate of change) and the intercept (constant term) of a linear fit in the context of the data.
- HSS-ID.C.8. Compute (using technology) and interpret the correlation coefficient of a linear fit.
- HSS-ID.C.9. Distinguish between correlation and causation.

Content/Topics

Critical content that students must KNOW
Patterns in data
Trend lines
Use of TI-84 to analyze data
Central tendencies
Quartiles
Residuals

Skills

Transferable skills that students must be able to DO
- 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks.
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Core Learning Activities

Group work
Lab work
TI 84 activities
individual practice

Resources

Professional & Student
Text: Pearson's *Algebra 1* , 2007
Department developed materials
SDE Moodle CCSM Algebra 1 curriculum
Khan Academy
Additional Ancillaries

Assessments (Titles)	Graduation Standards	Interdisciplinary Connections
Unit test **Summative: Written Test** Students will be given scenarios and asked to produce sample data and analyze it, find trend lines and mid range information	**Information Literacy** **Problem Solving** **Spoken Communication** **Written Performance** • Information Literacy • Problem Solving	

<< Previous Year

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Newtown Public Schools
Course Assignments › Algebra II
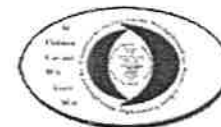
✉ Collaboration   Grade 11 | Mathematics | Newtown High School
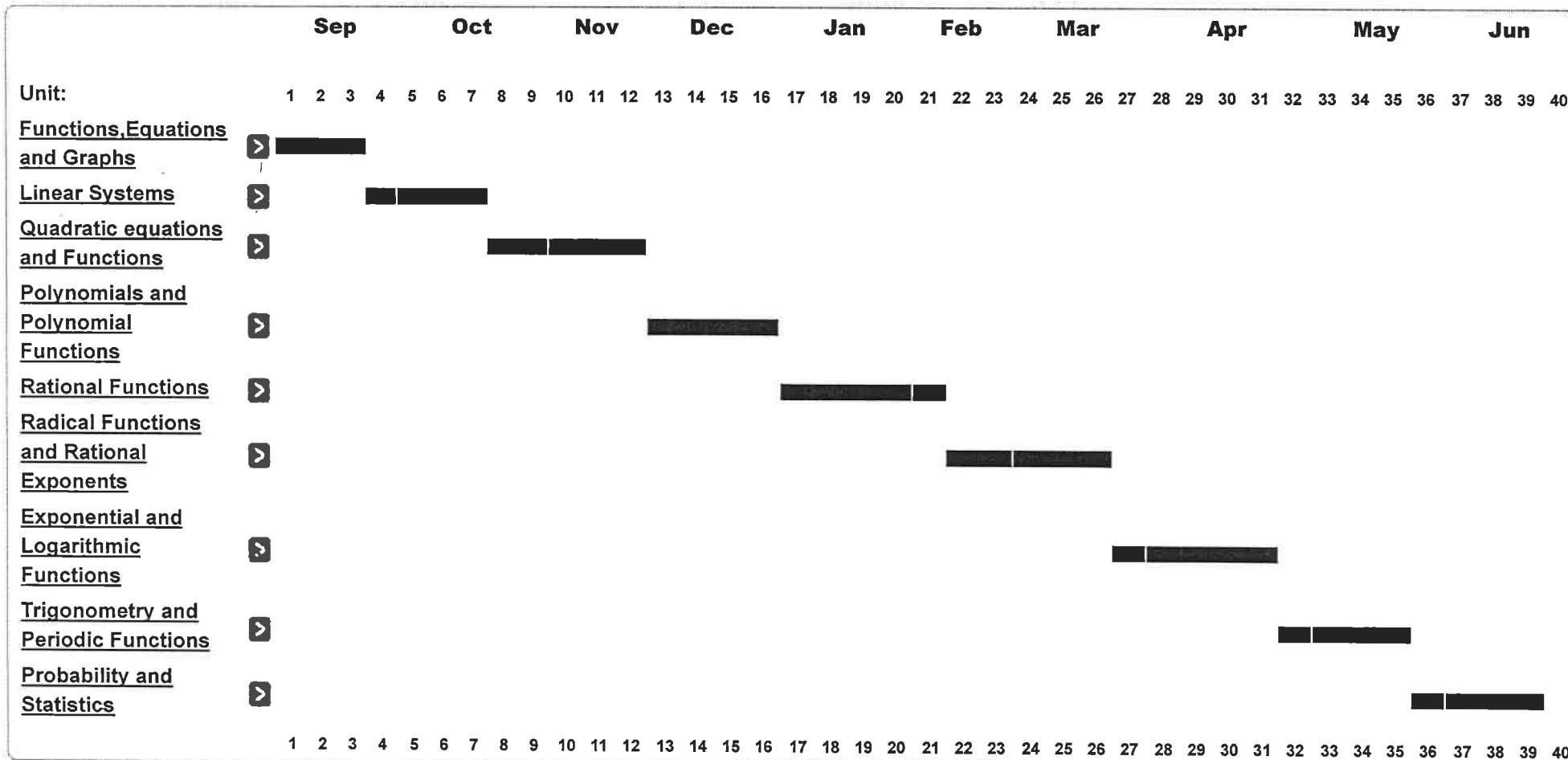
Unit:	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

Week numbers: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

- **Functions, Equations and Graphs** — weeks 1–3
- **Linear Systems** — weeks 4–7
- **Quadratic equations and Functions** — weeks 8–12
- **Polynomials and Polynomial Functions** — weeks 13–16
- **Rational Functions** — weeks 17–21
- **Radical Functions and Rational Exponents** — weeks 22–26
- **Exponential and Logarithmic Functions** — weeks 27–31
- **Trigonometry and Periodic Functions** — weeks 32–35
- **Probability and Statistics** — weeks 36–40

Last Updated: Friday, June 20, 2014, 12:26PM

Unit: Functions, Equations and Graphs (Week 1, 3 Weeks) 🗓

Enduring Understanding(s)/ Generalization(s)

Relations may be functions which can be used to model data which can be classified into families of functions. Each family of functions can be contrasted by unique mathematical patterns, and compared by similar methods of transformation.

Essential Question(s)

How are functions related to their respective graphs?

Guiding Questions

Factual, Conceptual, Provocative
In what ways can you distinguish between a relation and a function?
How can you compare and contrast different methods to represent mathematical relationships?
How can you modify an existing function to create a new one?

Standard(s)

Content and CCSS
CCSS: Mathematics, CCSS: HS: Functions, Interpreting Functions
HSF-IF.A. Understand the concept of a function and use function notation.

- HSF-IF.A.1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).
- HSF-IF.A.2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
- HSF-IF.A.3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

HSF-IF.B. Interpret functions that arise in applications in terms of the context.

- HSF-IF.B.4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- HSF-IF.B.5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- HSF-IF.B.6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the

Objective(s)

<u>Bloom/ Anderson Taxonomy / DOK Language</u>
Students will

- define relation, function, domain/range
- map diagrams to represent functions and relations
- apply function notation to relations that pass the vertical line test
- restrict domain and range
- represent real world situations using piecewise functions through graphing
- Assess functions and any restrictions set on the graph (asymptotes)

rate of change from a graph.

HSF-IF.C. Analyze functions using different representations.

- HSF-IF.C.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- HSF-IF.C.7a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
- HSF-IF.C.7b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
- HSF-IF.C.7c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
- HSF-IF.C.7d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
- HSF-IF.C.7e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
- HSF-IF.C.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
- HSF-IF.C.8a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
- HSF-IF.C.8b. Use the properties of exponents to interpret expressions for exponential functions.
- HSF-IF.C.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

Content/Topics

Critical content that students must KNOW
Students will be able to:

- Write a linear equation, using appropriate notation, in multiple forms given varied data.
- Construct piecewise graphs from functions or data.
- Construct piecewise graphs from graphs.
- Categorize family of functions by inspection of an equation, a graph, or a set of data.
- Graph an absolute value function and identify distinguishing characteristics.
- Interpret how parameters cause transformations in absolute value and other families of functions.
- Illustrate linear inequalities and systems of inequalities in one and two variables.

Skills

Transferable skills that students must be able to DO
- 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks.
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Core Learning Activities	Resources
• Graphing exploration for transformations • Equation Stations Also attached are three related worksheets asking students to compare different functions through graphs and tables. 📎 **HowShouldIMove-AS-Graphs.pdf** 📎 **HowShouldIMove-AS-Comparison.pdf** 📎 **HowShouldIMove-AS-Questions.pdf**	*Professional & Student* • Text: *Bellman, Bragg, Charles, Hall, Handlin, Kennedy,* **Algebra 2** , Prentice Hall, 2009 • Ancillaries • Math department generated materials • Department reference books • Internet resources

Assessments (Titles)	Graduation Standards	Interdisciplinary Connections
Functions Equations & Graphs Summative: Written Test	**Information Literacy** **Problem Solving** **Spoken Communication** **Written Performance**	

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Last Updated: Friday, June 20, 2014, 11:49AM

3

Unit: Linear Systems (Week 4, 4 Weeks) 📅

Enduring Understanding(s)/ Generalization(s)

The study of linear systems provides students with a powerful tool to model and solve real-world applications.

Essential Question(s)	Guiding Questions
How do linear systems enable you to make choices for maximum profit, minimum cost and business applications? What is linear programming?	*Factual, Conceptual, Provocative* What methods can be used to solve linear systems? What method is best suited to solve a particular system? What is the connection between the graph of a system and its solution set? How could these methods be expanded to solve other types of systems, including non-linear? How do we extend our learning to solve linear inequalities and linear inequality systems?

Standard(s)	Objective(s)
Content and CCSS **CCSS: Mathematics, CCSS: HS: Algebra, Creating Equations** HSA-CED.A. Create equations that describe numbers or relationships. • HSA-CED.A.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. • HSA-CED.A.3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. **CCSS: Mathematics, CCSS: HS: Algebra, Reasoning with Equations & Inequalities** HSA-REI.C. Solve systems of equations. • HSA-REI.C.5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. • HSA-REI.C.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. HSA-REI.D. Represent and solve equations and inequalities graphically. • HSA-REI.D.12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear	**Bloom/ Anderson Taxonomy / DOK Language** Students will • define linear functions as a having a constant rate of change and a degree of one. • construct graphs from equations and equations from graphs • apply three techniques to solving systems • apply real world meaning to graphical representations given a situation • classify systems and how to solve based on information provided • find interpret feasible regions while linear programming • optimize results in linear programming feasible region

inequalities in two variables as the intersection of the corresponding half-planes.

CCSS: Mathematics, CCSS: HS: Modeling, Mathematical Practice
MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- MP.1. Make sense of problems and persevere in solving them.
- MP.2. Reason abstractly and quantitatively.
- MP.4. Model with mathematics.
- MP.5. Use appropriate tools strategically.

Content/Topics

Critical content that students must KNOW
Students will be able to:

- Graph lines
- Use graphing calculator to find intersection of lines
- Write systems of equations and equations using word problems
- Solve systems using appropriate methods (graphing, substitution, combination)
- Graph linear inequalities
- Find maximum profit or minimum cost in linear programming

Skills

Transferable skills that students must be able to DO
- 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks.
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Core Learning Activities

- Linear Programming Packet

Attached also is a problem solving project involving supply and demand comparisons within a system of equations.
📎 **Supply-AS-sheet1.pdf**
📎 **Supply-AS-sheet2.pdf**

Resources

Professional & Student

- Text: *Bellman, Bragg, Charles, Hall, Handlin, Kennedy,* **Algebra 2** , Prentice Hall, 2009
- Ancillaries
- Math department generated materials
- Department reference books
- Internet resources

Assessments (Titles)

How do we solve systems?
Formative: Other Visual Assessments
White board exercises

How do we graph system of inequalities?
Formative: Other Visual Assessments

Graduation Standards

Information Literacy
Problem Solving
Spoken Communication
Written Performance
- Problem Solving

Interdisciplinary Connections

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| White Board exercises

Linear Programming Assessment
Summative: Written Report
Take-home quiz

Unit Test on linear systems
Summative: Written Test | | |

6

Quadratic equations and Functions

Unit: Quadratic equations and Functions (Week 8, 5 Weeks) 📅

Enduring Understanding(s)/ Generalization(s)

Real-world applications of projectile motion, minimum cost/value, maximum profit use quadratic models and the characteristics of the related graph including vertex, maximum or minimum value, intercepts, etc. to visually link algebra to life models.

Essential Question(s)

- How are quadratic functions used to model actual data?
- How are characteristics of graphs of parabolas related to real-world applications i.e. projectile motion?

Guiding Questions

Factual, Conceptual, Provocative

- What patterns are found in the graph of the parent function of y=x squared ?
- How do changes to the parent function impact the graph of the parent function?
- Can you model data using a quadratic function? When?
- How do you find x-intercepts or solve when y=0?
- How does this function differ/same as linear model?

Standard(s)

Content and CCSS

CCSS: Mathematics, CCSS: HS: Algebra, Seeing Structure in Expressions

HSA-SSE.B. Write expressions in equivalent forms to solve problems.

- HSA-SSE.B.3a. Factor a quadratic expression to reveal the zeros of the function it defines.

CCSS: Mathematics, CCSS: HS: Algebra, Reasoning with Equations & Inequalities

HSA-REI.B. Solve equations and inequalities in one variable.

- HSA-REI.B.4. Solve quadratic equations in one variable.
- HSA-REI.B.4a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.
- HSA-REI.B.4b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language

Students will be able to:

- Apply Skilll & concepts-solving quadratic equations
- Analyze data tables using strategic thinking/reasoning to determine if quadratic
- Evaluate how to most efficiently solve quadratics by describing, comparing and contrasting solution methods.

Content/Topics	Skills
Critical content that students must KNOW Students will be able to: • How to graph parabolas given standard and vertex form. • How to solve all types of quadratic equations for real and/or complex roots. • How to analyze a graph for maximum, minimum, y-intercept and x-intercepts. • How to factor quadratics • How to find quadratic regression equation on graphing calculator • How to apply characteristics of a quadratic function and graph to real-world applications	*Transferable skills that students must be able to DO* • 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks. • 2. Work independently and collaboratively to solve problems and accomplish goals. • 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. • 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions. • 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving. • 6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Core Learning Activities	Resources
• Graph parabolas given function in both forms. • Solve quadratics using all methods. Problem solving activity representing a quadratic function with an egg launch, looking at trajectories of flying objects. (Two sheets included are how to use the calculator) 🔗 **EggLaunch-AS-sheet1.pdf** 🔗 **MaxMinZeros-OV-UsingCalc.pdf** 🔗 **Regression-OV-UsingCalc(1).pdf**	*Professional & Student* • Text: *Bellman, Bragg, Charles, Hall, Handlin, Kennedy,* **Algebra 2** , Prentice Hall, 2009 • Ancillaries • Math department generated materials • Department reference books • Internet resources

Assessments (Titles)	Graduation Standards	Interdisciplinary Connections
Solving quadratic equation in one variable - factoring **Summative: Written Test** **Use completing the square to solve.** **Formative: Other Visual Assessments** Use white boards **Use completing the square to solve quadratic equation - including complex #** **Summative: Written Test** **Solving all types of quadratic equations** **Formative: Other written assessments** 1 of each problem **Solving quadratics using all**	**Information Literacy** **Problem Solving** **Spoken Communication** **Written Performance** • Problem Solving	Projectile Motion

methods Summative: Written Test		

9

Polynomials and Polynomial Functions

☒Collaboration **Algebra II**|Grade 11|Mathematics|Newtown High School|2014-2015

Wednesday, October 29, 2014, 2:35PM

Unit: Polynomials and Polynomial Functions (Week 13, 4 Weeks) 🖩

Enduring Understanding(s)/ Generalization(s)

Polynomial functions provide an opportunity for students to use a variety of learned algebra skills: factoring, solutions, and zeros; degree of polynomial, number of solutions/zeros, and end behavior; etc, to see related characteristics between a polynomial expression, a related polynomial equation, function and graph.

Essential Question(s)	Guiding Questions
What is the relationship between a polynomial function and its graph? How can we find the characteristics of a polynomial function? How do polynomial functions help find answers to relative minimum/maximum values, particularly in geometry?	*Factual, Conceptual, Provocative* How is degree of a polynomial related to its end behavior? How is degre of a polynomial related to its zeros? How does the x-intercepts relate to the structure of the poynomial?

Standard(s)

Content and CCSS
CCSS: Mathematics, CCSS: HS: Algebra, Seeing Structure in Expressions
HSA-SSE.A. Interpret the structure of expressions.

- HSA-SSE.A.1b. Interpret complicated expressions by viewing one or more of their parts as a single entity.
- HSA-SSE.A.2. Use the structure of an expression to identify ways to rewrite it.

CCSS: Mathematics, CCSS: HS: Algebra, Arithmetic with Polynomials & Rational Functions
HSA-APR.A. Perform arithmetic operations on polynomials.

- HSA-APR.A.1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

HSA-APR.B. Understand the relationship between zeros and factors of polynomials.

- HSA-APR.B.2. Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.
- HSA-APR.B.3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

HSA-APR.C. Use polynomial identities to solve problems.

- HSA-APR.C.4. Prove polynomial identities and use

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language

- Understand the relationship between a graph and its factors, degree and # of zeros, both real and complex.
- Describe, compare and constrast solution methods to find x-intercepts
- Apply long and synthetic division to solve polynomial equations.

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them to describe numerical relationships.

Content/Topics

Critical content that students must KNOW

- Given a graph, find factors of polynomial.
- Given factors, write in standard form.
- Given factors, sketch a graph.
- Use Remainder Theorem to identify zeros.
- Use Rational Roots Theorem and synthetic division to find all zeros.

Skills

Transferable skills that students must be able to DO

- 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks.
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Core Learning Activities

Three polynomial activities are attached to be used with the problem solving standard
these activities are manipulating what students know about specific types of functions to create relationships between linear, quadratic and cubic functions.

📎 **BuildingPolys-AS-Building.pdf**

📎 **BuildingPolys-AS-Backwards.pdf**

📎 **BuildingPolys-AS-HigherDegree.pdf**

Resources

Professional & Student

- Text: *Bellman, Bragg, Charles, Hall, Handlin, Kennedy,* **Algebra 2** , Prentice Hall, 2009
- Ancillaries
- Math department generated materials
- Department reference books
- Internet resources

Assessments (Titles)

Graduation Standards

Information Literacy
Problem Solving
Spoken Communication
Written Performance
- Problem Solving

Interdisciplinary Connections

11

Rational Functions

☒ **Collaboration** Algebra II|Grade 11|Mathematics|Newtown High School|2014-2015

Wednesday, October 29, 2014, 2:36PM

Unit: Rational Functions (Week 17, 5 Weeks) 🗓

Enduring Understanding(s)/ Generalization(s)

There is a continuity of structure that seamlessly connects fundamental arithmetic operations with fractions to more sophisticated algebraic rational expressions.

Essential Question(s)

How do algebraic rational expressions relate to arithmetic rational numbers?

Why is factoring expressions valuable in simplifying and/or performing mathematical operations with rational expressions?

How can rational functions be used to model real world scenarios and solve complex problems that involve ratios of key variables?

Guiding Questions

Factual, Conceptual, Provocative

How can we compare the rules for simplifying and performing operations for rational numbers with the related rules for rational expressions?

How can we maximize the volume of a 3 dimensional object while managing/minimizing the surface area of the object?

How can we utilize knowledge of critical points, pints of discontinuity and end-bahvior to predict, visualize and sketch a graph of a rational function?

Standard(s)

Content and CCSS

CCSS: Mathematics, CCSS: HS: Algebra, Arithmetic with Polynomials & Rational Functions

HSA-APR.D. Rewrite rational expressions.

- HSA-APR.D.7. (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

CCSS: Mathematics, CCSS: HS: Algebra, Reasoning with Equations & Inequalities

HSA-REI.A. Understand solving equations as a process of reasoning and explain the reasoning.

- HSA-REI.A.2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

HSA-REI.D. Represent and solve equations and inequalities graphically.

- HSA-REI.D.11. Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language

- Define rational function.
- Classify families of functions and translations
- Analyze limiting behavior including asymptotes
- Interpret domain and range restrictions
- Compute products, quotients, sums and differences of rational expressions
- Find removable discontinuities, asymptotes and end behavior of rational functions
- Graph complex rational functions using aforementioned properties
- Compare expressions versus equations, connect manipulation versus alteration
- Solve rational equations by eliminating the denominator
- Investigate extraneous roots

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CCSS: Mathematics, CCSS: HS: Functions, Interpreting Functions

HSF-IF.C. Analyze functions using different representations.

- HSF-IF.C.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

Content/Topics

Critical content that students must KNOW
Students will be able to:

- Factor and simplify rational expressions.
- Understand domain/range and restricted domain values.
- Multiply and divide rational expressions, include simple complex fractions.
- Define and determine LCM/LCD of polynomial/rational expressions.
- Add and subtract rational expressions, include harder complex fractions.
- Solve rational equations and identify extraneous solutions.
- Set-up and solve applications of rational equation problems (e.g. related rate, shared work)
- Find inverse variations (all variations for honors)
- Graph and transform reciprocal functions.
- Graph relational functions *points of discontinuity

* vertical and horizontal asymptotes

- Solve application problems with function given

Skills

Transferable skills that students must be able to DO

- 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks.
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.
- 6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Core Learning Activities

Problem solving graduation standard activity attached as a link.

📎 **Grad standard rational functions.pdf**

Resources

Professional & Student

Assessments (Titles)	Graduation Standards	Interdisciplinary Connections
	Information Literacy **Problem Solving** **Spoken Communication** **Written Performance** - Problem Solving	

<< **Previous Year**

13

Radical Functions and Rational Exponents

Unit: Radical Functions and Rational Exponents (Week 22, 5 Weeks) ▦

Enduring Understanding(s)/ Generalization(s)

Extending students' knowledge of radical expressions to rational exponents we enable a more sophisticated set of tools to model and understand more complicated real-world phenomena.

Essential Question(s)

How are radical expressions and rational exponents related?
What is the value of transforming a radical expression into simplest form?
How can the inverse of a function help us find the set of conditions that produce a certain output?

Guiding Questions

Factual, Conceptual, Provocative
What are the key questions that students should ask to determine if a radical expression is in simplest form?
How can the techniques and procedure for radical operations be used to manipulate formulas and equations?
What are some of the various methods that can be used to determine if two functions/relations are inverse of each other?

Standard(s)

Content and CCSS
CCSS: Mathematics, CCSS: HS: Num/Quantity, The Real Number System
HSN-RN.A. Extend the properties of exponents to rational exponents.

- HSN-RN.A.2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.

CCSS: Mathematics, CCSS: HS: Algebra, Creating Equations
HSA-CED.A. Create equations that describe numbers or relationships.

- HSA-CED.A.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

CCSS: Mathematics, CCSS: HS: Functions, Interpreting Functions
HSF-IF.B. Interpret functions that arise in applications in terms of the context.

- HSF-IF.B.4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- HSF-IF.B.5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- HSF-IF.B.6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language
Students will

- compute and simplify with radicals, employing rationalization techniques
- calculate then check answers for extraneous solutions when solving through squaring once then twice and so on
- compare outcomes with handling arbitrary constants, applying patterns to the Fundamental theorem of Variation
- define direct and inverse variation
- identify patterns found using compositions of functions
- apply general and particular equations to phenomena in the real world

rate of change from a graph.

HSF-IF.C. Analyze functions using different representations.

- HSF-IF.C.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- HSF-IF.C.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

CCSS: Mathematics, CCSS: HS: Functions, Building Functions
HSF-BF.B. Build new functions from existing functions.

- HSF-BF.B.3. Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

Content/Topics

Critical content that students must KNOW
Students will

- simplify radical expressions
  - using square roots and nth roots considering only the real number system and using absolute value for even roots with honors.
- multiply, divide and rationalize radical expressions
  - including binomial rationalization
- use rational exponents
  - convert between rational exponents and radical expressions
  - apply properties of exponents to simplify and perform operations with rational exponents
- Solve radical equations, including equations involving rational exponents
- graph and translate radical functions (mainly square root and cube functions)
- revisit inverse functions to find inverses of radical and higher degree polynomials functions through
  - graphs with their inverses
  - the use of composition of functions to prove/disprove inverse relations
  - identify inverse functions through analyzing the domain and range

Skills

Transferable skills that students must be able to DO
- 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks.
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.
- 6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Core Learning Activities

Resources

	Professional & Student	
Assessments (Titles)	**Graduation Standards**	**Interdisciplinary Connections**
	<u>Information Literacy</u> <u>Problem Solving</u> <u>Spoken Communication</u> <u>Written Performance</u> • Problem Solving	

<< Previous Year

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Exponential and Logarithmic Functions

☒ **Collaboration** Algebra II Grade 11|Mathematics|Newtown High School|2014-2015

Wednesday, October 29, 2014, 2:38PM

Unit: Exponential and Logarithmic Functions (Week 27, 5 Weeks) 📅

Enduring Understanding(s)/ Generalization(s)

Patterns of exponential growth and decay are commonplace in both the man-made and physical world. Logarithms are uniquely and critically important to solve the real world problems that require finding solutions that are exponential in nature.

Essential Question(s)

What is the relationship between exponential functions and logarithmic functions?

How are logarithms a different representation of an exponent?

What does it mean if a scientific scale of measure is logarithmic?

Guiding Questions

Factual, Conceptual, Provocative

How can you plan how much time it will take for an initial amount of money to grow to a specific sum?

How can you find the growth/decay rate for something that is changing exponentially, and then use that rate to make predictions about subsequent values?

Why are logarithms a valuable tool to mathematicians, scientists, and others for computational purposes before the advent of technology?

Standard(s)

Content and CCSS

CCSS: Mathematics, CCSS: HS: Algebra, Creating Equations

HSA-CED.A. Create equations that describe numbers or relationships.

- HSA-CED.A.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- HSA-CED.A.3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
- HSA-CED.A.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

CCSS: Mathematics, CCSS: HS: Functions, Interpreting Functions

HSF-IF.C. Analyze functions using different representations.

- HSF-IF.C.7e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
- HSF-IF.C.8b. Use the properties of exponents to interpret expressions for exponential functions.
- HSF-IF.C.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language

Students will:

- Identify exponential growth/decay functions, and indicate rate of growth or decay
- Model and build functions for a variety of real-world applications (population, half-life, finance, etc.)
- Derive the concept of logarithms from the inverse of an exponential function
- Apply properties of logarithms, as expansion and contraction of log expressions
- Convert between logarithmic and exponetial form
- Evalute logarithms, including solving for missing values in a logarithmic statement
- Analyze a situation to formulate an exponetial function in order to solve for a missing value in the given scenario
- Solve exponential and logarithmic equations, and test the validity of solutions
- Use common log, natural logs or log with selected base to solve a problem situation.
- Use the change of base formula as needed
-

CCSS: Mathematics, CCSS: HS: Functions, Building Functions HSF-BF.A. Build a function that models a relationship between two quantities. • HSF-BF.A.1c. (+) Compose functions. HSF-BF.B. Build new functions from existing functions. • HSF-BF.B.4. Find inverse functions. **CCSS: Mathematics, CCSS: HS: Functions, Linear, Quadratic, and Exponential Models** HSF-LE.A. Construct and compare linear and exponential models and solve problems. • HSF-LE.A.4. For exponential models, express as a logarithm the solution to ab?? = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.	

Content/Topics	**Skills**
Critical content that students must KNOW Students will be able to: • Review and understand basic exponential functions • Write exponential functions from rates, given information or points • Identify growth function/decay function, as well as rate of growth or decay • Model various real-world exponential growth and decay scenarios such as population groth/decay, half life, simple interest,etc. • For the exponential functions, evaluate and model using compound interest formula; use the natural base, e, evaluate and model using the formula: $P=e^{rt}$, and related applications (positive r for growth and negative r for decay) • Understand anduse the fundamental definition of a logarithm • Graphically demonstrate log as inverse of exponential function • Evaluate logarithms • Convert between exponential and logarithmic form • Apply applications (mainly scientific like Ph, decibel scale, and Richter scale) • Use properties of logarithms: expand and contract logarithmic expressions, and change of base formulas • Solve exponential and logarithmic equations including integer base, common log, base e, and natural log	*Transferable skills that students must be able to DO* • 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks. • 2. Work independently and collaboratively to solve problems and accomplish goals. • 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. • 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions. • 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Core Learning Activities	**Resources**
Two potential problem solving activities attached	*Professional & Student*

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• Exponents with banking • Using a slide ruler to predict logarithmic values. 📎 **CompInterest-AS-SavingsAccount.pdf** 📎 **CompInterest-AS-CreditCard.pdf** 📎 **LogarithmsDemystified-AS.pdf** 📎 **LogarithmsDemystified-SlideRuleTemplates.pdf**	• Text: *Bellman, Bragg, Charles, Hall, Handlin, Kennedy,* **Algebra 2** , Prentice Hall, 2009 • Ancillaries • Math department generated materials • Department reference books • Internet resources

Assessments (Titles)	Graduation Standards	Interdisciplinary Connections
	Information Literacy **Problem Solving** **Spoken Communication** **Written Performance**	

<< Previous Year

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Unit: Trigonometry and Periodic Functions (Week 32, 4 Weeks) 🗓

Enduring Understanding(s)/ Generalization(s)

Trigonometric functions can be used to mode, monitor and study many physical, mechanical and natural phenomena in the real world that are critical or periodic in nature.

Essential Question(s)	Guiding Questions
What the value of radian measure of angles compared to degrees? How can you compare and contrast phase shifts and frequency compression/expansion of periodic functions with more fundamental transformation of functions? What is the inter-relationship between the six trig functions?	*Factual, Conceptual, Provocative* What patterns can be discovered using radian measures? In what way is the unit circle helpful when graphing trig functions? How would you mathematically model the height of a boat deck from a dock under a period of shifting tides?

Standard(s)	Objective(s)
Content and CCSS **CCSS: Mathematics, CCSS: HS: Functions, Trigonometric Functions** HSF-TF.A. Extend the domain of trigonometric functions using the unit circle. • HSF-TF.A.1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. • HSF-TF.A.2. Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle. HSF-TF.B. Model periodic phenomena with trigonometric functions. • HSF-TF.B.5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline. HSF-TF.C. Prove and apply trigonometric identities. • HSF-TF.C.8. Prove the Pythagorean identity $\sin^2(?) + \cos^2(?) = 1$ and use it to calculate trigonometric ratios.	<u>Bloom/ Anderson Taxonomy / DOK Language</u> • Define radians as a ratio of arclength to radius • Convert degrees to radians and vice-versa • Find arclength and area of sectors • Define sine, cosine and tangent of an angle using the unit circle • Connect that tangent = sine/cosine • Investigate reciprocal functions with critical values • Connect the definition of sine and cosine to graphs from x = 0 to x = 2pi • Analyze periodicity and critique the period, frequency and amplitude • Discuss how changes affect graphs • Modeling periodic data with sinusoidal curves

Content/Topics	Skills
Critical content that students must KNOW Students will be able to: • Recall/Review right triangle trig (SOH, CAH, TOA) and special rights. • Use general periodicity (vocab: period, cycle,	*Transferable skills that students must be able to DO* • 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks. • 2. Work independently and collaboratively to solve problems and accomplish goals.

amplitude)
- Use key trig terminology: angles, standard position, co-terminal angles.
- Use the Unit Circle (degree measure)
- Calculate radian measure (conversions, arc length)
- Graph trig functions (all six and with transformations)
- Model periodic phenomena by employing an appropriate trig function.
- Calculate trig identities.

- 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.
- 6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Core Learning Activities

graduation standard activity attached

📎 **grad standard problem.pdf**

Resources

Professional & Student

Assessments (Titles)	Graduation Standards	Interdisciplinary Connections
	Information Literacy **Problem Solving** **Spoken Communication** **Written Performance** • Problem Solving	

<< Previous Year

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Unit: Probability and Statistics (Week 36, 4 Weeks) 📅

Enduring Understanding(s)/ Generalization(s)

Understanding the basic tenets of the collection, display and analysis of data is a critical life skill in a world wehere we are constantly exposed to statistical references and data.

Essential Question(s)	Gulding Questions
How can the statistical study of a population in general help make predictions about a group in the future and/or quantify the likelihood of a specific outcome? What is the value of using statistical methods and models to make decisions and answer questions in a variety of situations? How dies the understanding of statistics help a person be a critical consumer of information?	*Factual, Conceptual, Provocative* How can we choose an appropriate method to collect, display, summarize and analyze a data set? What is a standard deviation an indicator of and what does standard deviation tell you about the nature of your data set? How does the assumption of normal data allow us to make prediction about a population?

Standard(s)

Content and CCSS
CCSS: Mathematics, CCSS: HS: Stats/Prob, Interpreting Categorical & Quantitative Data
HSS-ID.A. Summarize, represent, and interpret data on a single count or measurement variable

- HSS-ID.A.2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
- HSS-ID.A.3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
- HSS-ID.A.4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets and tables to estimate areas under the normal curve.

CCSS: Mathematics, CCSS: HS: Stats/Prob, Making Inferences & Justifying Conclusions
HSS-IC.A. Understand and evaluate random processes underlying statistical experiments

- HSS-IC.A.1. Understand that statistics is a process for making inferences about population parameters based on a random sample from that population.

CCSS: Mathematics, CCSS: HS: Stats/Prob, Using Probability to Make Decisions
HSS-MD.B. Use probability to evaluate outcomes of decisions

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language
Students will

- define "random"
- differentiate between population vs samples
- observe studies vs experiments, pros/cons, correlations/causation
- illustrate general probability distributions
- interpret margins of error, looking at where 90% or 95% of sample means fall after repeated simulations to estimate a margin of error
- compare distributions from two treatments to estimate significant differences between treatments
- apply percentages using area, spreadsheets, bar graphs

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- HSS-MD.B.6. (+)Use probabilities to make fair decisions
- HSS-MD.B.7.(+) Analyze decisions and strategies using probability concepts

Content/Topics

Critical content that students must KNOW
Students will be able to

- use measures of central tendency
- understand and apply percentiles
- read and create histogram/box and whisker plots
- use standard deviation
- use and apply Z-scores
- apply normal distributions and probability
- (optional) create and understand binomial distributions

Skills

Transferable skills that students must be able to DO
- 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks.
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.
- 6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Core Learning Activities

Attached are two problem solving activities.

- Debris in orbit dealing with stats and modeling the probability of orbital collisions
- Portion sizes and caloric in take using statistics

📎 **Calories-AS1.pdf**

📎 **Calories-AS2.pdf**

📎 **Orbit-AS-Debris.pdf**

📎 **Orbit-AS-Effects.pdf**

Resources

Professional & Student

Assessments (Titles)

Graduation Standards

Information Literacy
Problem Solving
Spoken Communication
Written Performance
- Problem Solving
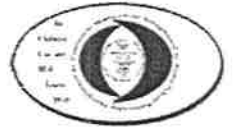
Interdisciplinary Connections

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Newtown Public Schools
Course Assignments › Geometry

High School | Mathematics | Newtown High School

Unit:		Sep					Oct				Nov				Dec				Jan				Feb				Mar				Apr				May				Jun		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Transformations, Congruence, and Constructions	▷	███████████████████																																							
Polygons	▷									████████████████																														
Similarity, Right Triangles, and Trigonometry	▷																██████████████																							
Geometric Measurement and Dimension	▷																							██████████																
Circles and Other Conic Sections	▷																												██████████										
Applications of Probability	▷																																	██████████						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
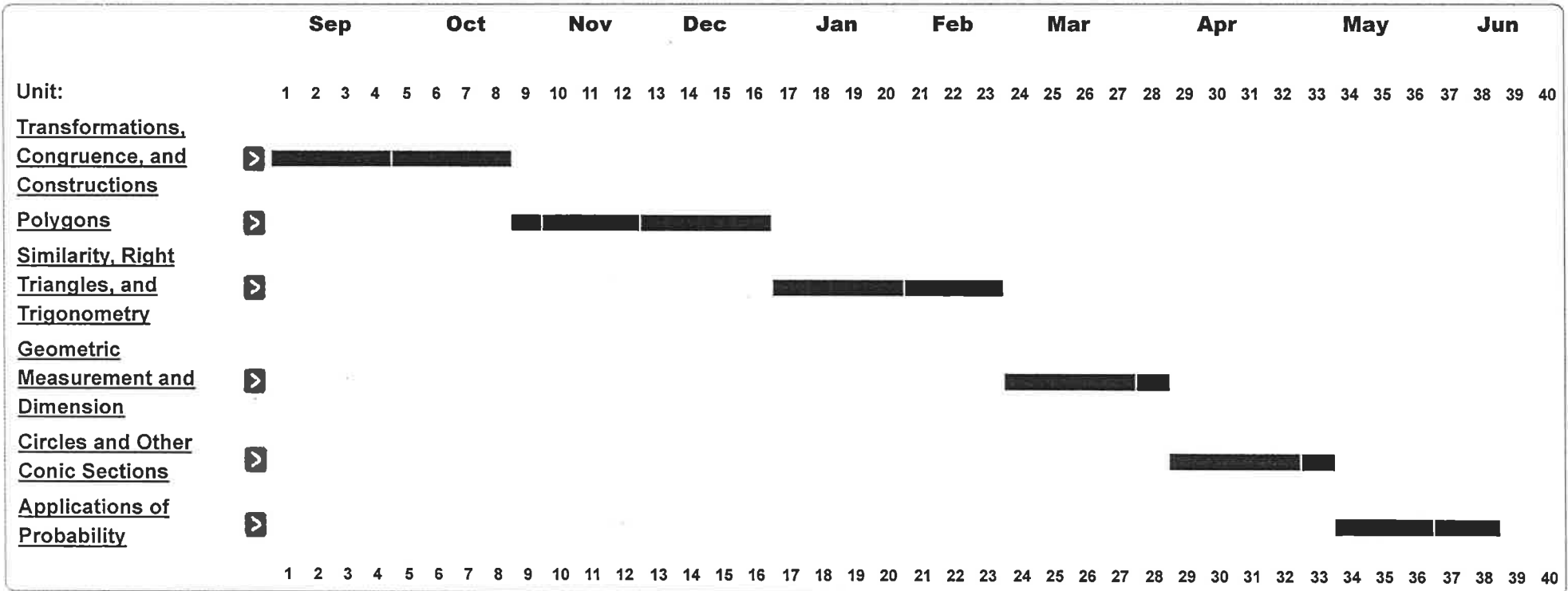
Last Updated: Friday, October 17, 2014, 5:03PM

10/29/2014 1:45 PM

Unit: Transformations, Congruence, and Constructions (Week 1, 8 Weeks) ▦

Enduring Understanding(s)/ Generalization(s)

You can change the position of a figure and preserve angle measure and the distance between points.

Essential Question(s)	Guiding Questions
How can you change a figure's position without changing its size and shape? How can you change a figure's size without changing its shape? How can you represent transformations in the coordinate plane? how do you recognize congruence and similarity?	*Factual, Conceptual, Provocative* What makes a transformation a translation? What makes a transformation a dilation? What makes a transformation a rotation? What makes a transformation a reflection?

Standard(s)	Objective(s)
Content and CCSS **CCSS: Mathematics, CCSS: HS: Geometry, Congruence** HSG-CO.A. Experiment with transformations in the plane • HSG-CO.A.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. • HSG-CO.A.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch). • HSG-CO.A.4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. • HSG-CO.A.5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another. HSG-CO.B. Understand congruence in terms of rigid motions • HSG-CO.B.6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent. • HSG-CO.B.7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides	**Bloom/ Anderson Taxonomy / DOK Language** Students will: • develop the properties of all transformations • recognize image and pre-image • define isometry •

①

and corresponding pairs of angles are congruent.
- HSG-CO.B.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

HSG-CO.C. Prove geometric theorems

- HSG-CO.C.9. Prove theorems about lines and angles.

HSG-CO.D. Make geometric constructions

- HSG-CO.D.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.
- HSG-CO.D.13. Construct an equilateral triangle, a square and a regular hexagon inscribed in a circle.

CCSS: Mathematics, CCSS: HS: Geometry, Expressing Geometric Properties with Equations
HSG-GPE.B. Use coordinates to prove simple geometric theorems algebraically

- HSG-GPE.B.4. Use coordinates to prove simple geometric theorems algebraically.
- HSG-GPE.B.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
- HSG-GPE.B.6. Find the point on a directed line segment between two given points that divide the segment in a given ratio.
- HSG-GPE.B.7. Use coordinates to compute perimeters of polygons and areas for triangles and rectangles, e.g. using the distance formula.

CCSS: Mathematics, CCSS: HS: Geometry, Mathematical Practice
MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- MP.1. Make sense of problems and persevere in solving them.
- MP.2. Reason abstractly and quantitatively.
- MP.3. Construct viable arguments and critique the reasoning of others.
- MP.4. Model with mathematics.
- MP.5. Use appropriate tools strategically.
- MP.6. Attend to precision.
- MP.7. Look for and make use of structure.

- MP.8. Look for and express regularity in repeated reasoning.

Content/Topics

Critical content that students must KNOW
Translations
reflections
Rotations
dilations
congruence transformations
similarity transformations

Skills

Transferable skills that students must be able to DO
- 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks.
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.
- 6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Core Learning Activities

constructions
partner work
internet research

Resources

Professional & Student
Department developed materials
text: Pearson's *Geometry, 2007*
Geometer sketchpad
online resources

Assessments (Titles)

Transformation unit assessment
Summative: Written Test

Construction Project
Lab Assignment

Graduation Standards

Information Literacy
Problem Solving
Spoken Communication
Written Performance
- Problem Solving

Interdisciplinary Connections

<< Previous Year

3

Unit: Polygons (Week 9, 8 Weeks) 🗓

Enduring Understanding(s)/ Generalization(s)

The sum of the interior angles of a polygon depends on the number of sides.
The sum of the exterior angels of any polygon is always constant
Quadrilaterals have special properties regarding their angles and sides.

Essential Question(s)

What is the Polygon-Sum Theorem?
How can we prove a quadrilateral is a parallelogram?
What are the properties of special quadrilaterals?
How can you use the coordinate plane to prove geometric figures?

Guiding Questions

Factual, Conceptual, Provocative
How can you find the sum of the measures of the angles of any polygon?
How do you classify Quadrilaterals?
How can you use coordinate geometry to prove general relationships?

Standard(s)

Content and CCSS
CCSS: Mathematics, CCSS: HS: Geometry, Congruence
HSG-CO.A. Experiment with transformations in the plane

- HSG-CO.A.3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

HSG-CO.C. Prove geometric theorems

- HSG-CO.C.10. Prove theorems about triangles.
- HSG-CO.C.11. Prove theorems about parallelograms.

HSG-CO.D. Make geometric constructions

- HSG-CO.D.13. Construct an equilateral triangle, a square and a regular hexagon inscribed in a circle.

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language
Students will:
identify congruence
use the coordinate plane for geometric proof
apply all the properties of special quadrilaterals
find the sum of the measures of the angles in any polygon

Content/Topics

Critical content that students must KNOW
Polygon-Sum Theorem
Regular polygons
properties of all special quadrilaterals

Skills

Transferable skills that students must be able to DO
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

Core Learning Activities

Resources

Group activities round the room investigations	*Professional & Student* Department developed materials Text: Pearson's Geometry, 2007 Online resources Geometer sketchpad

Assessments (Titles)	Graduation Standards	Interdisciplinary Connections
quadriaterals quiz Formative: Written Test Polygon Sum investigation Formative: Lab Assignment	**Information Literacy** **Problem Solving** **Spoken Communication** **Written Performance** • Problem Solving	

<< Previous Year

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Unit: Similarity, Right Triangles, and Trigonometry (Week 17, 7 Weeks) 🗓

Enduring Understanding(s)/ Generalization(s)

- congruence is a special case of similarity (with a 1-1 ratio)
- corresponding sides of similar figures have a content ratio
- corresponding angles must be equal
-

Essential Question(s)

How are the concepts of similarity and congruence related to each other?
How would you use similarity in a real world application?
Is it necessary to have AAS or ASA theorem to prove two triangles are similar?

Guiding Questions

Factual, Conceptual, Provocative
How do you show figures are similar?
How is theconcept of similarity used to make scale drawings?

Standard(s)

Content and CCSS
CCSS: Mathematics, CCSS: HS: Geometry, Similarity, Right Triangles, & Trigonometry
HSG-SRT.A. Understand similarity in terms of similarity transformations

- HSG-SRT.A.1. Verify experimentally the properties of dilations:
- HSG-SRT.A.1b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
- HSG-SRT.A.2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar;explain using similarity transformations the meaning of similarity for triangles as the equality of all pairs of angles and the proportionality of all pairs of sides.
- HSG-SRT.A.3. Use the properties of similarity transformations to establish the AA criterion for similarity of triangles.

HSG-SRT.B. Prove theorems involving similarity

- HSG-SRT.B.4. Prove theorems about triangles using similarity transformations.
- HSG-SRT.B.5. Use triangle congruence and similarity criteria to solve problems and to prove relationships in geometric figures.

HSG-SRT.C. Define trigonometric ratios and solve problems involving right triangles

- HSG-SRT.C.6. Understand that by similarity, side

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language
Students will be able to:

- write and simplify ratios
- set up proportions and use them to solve problems
- Identify similar polygons
- solve real world problems by applying properties of similar polygons
- prove triangles similar using various methods
- solve problems involving similar triangles
- use properties of similar triangles to find lengths
- apply properties involving similar triangles
- use ratios for indirect measurement
- use coordinate plane to prove two figures similar

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ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
- HSG-SRT.C.7. Explain and use the relationship between the sine and cosine of complementary angles.
- HSG-SRT.C.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

HSG-SRT.D. Apply trigonometry to general triangles

- HSG-SRT.D.9. (+) Derive the formula A = ½ ab sin© for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
- HSG-SRT.D.10. (+) Prove the Laws of Sines and Cosines and use them to solve problems.
- HSG-SRT.D.11. (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

CCSS: Mathematics, CCSS: HS: Geometry, Modeling with Geometry
HSG-MG.A. Apply geometric concepts in modeling situations

- HSG-MG.A.1. Use geometric shapes, their measures and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
- HSG-MG.A.2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).
- HSG-MG.A.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy constraints or minimize cost; working with typographic grid systems based on ratios).

Content/Topics	Skills
Critical content that students must KNOW	*Transferable skills that students must be able to DO*
Triangle similarity: AA, SSS, SAS	• 1. Use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks.
	• 2. Work independently and collaboratively to solve problems and accomplish goals.
	• 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
	• 4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions.
	• 5. Effectively apply the analysis, syntheses, and evaluative processes that enable productive problem solving.

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	• 6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Core Learning Activities	Resources
	Professional & Student

Assessments (Titles)	Graduation Standards	Interdisciplinary Connections
	Information Literacy Problem Solving Spoken Communication Written Performance	

<< Previous Year

Last Updated: Thursday, January 16, 2014, 3:55PM

8

Unit: Geometric Measurement and Dimension (Week 24, 5 Weeks) 🗓

Enduring Understanding(s)/ Generalization(s)

Students will understand why particular formulas and units are to used find measurements in both 2-D and 3-D

Essential Question(s)

How is the Pythagorean Theorem improtant in finding the area of polygons?
How is the area of a polygon of n-sides calculated?
Why does tripling the radius not triple the area of a circle?
Can you determine the geometric probability of a variety of events occurring?

Guiding Questions

Factual, Conceptual, Provocative
How is the area of a regular polygon affected as the number of sides increases and the radius remains constant?

Standard(s)

Content and CCSS
CCSS: Mathematics, CCSS: HS: Geometry, Geometric Measurement & Dimension
HSG-GMD.A. Explain volume formulas and use them to solve problems

- HSG-GMD.A.1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.
- HSG-GMD.A.2. (+) Given an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.
- HSG-GMD.A.3. Use volume formulas for cylinders, pyramids, cones and spheres to solve problems.

HSG-GMD.B. Visualize the relation between two-dimensional and three-dimensional objects

- HSG-GMD.B.4. Identify cross-sectional shapes of slices of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

CCSS: Mathematics, CCSS: HS: Geometry, Modeling with Geometry
HSG-MG.A. Apply geometric concepts in modeling situations

- HSG-MG.A.1. Use geometric shapes, their measures and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
- HSG-MG.A.2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language
Students will be able to:

- find the area and perimeter of of triangles
- find the area and perimeter of various quadrilaterals
- Find the area and circumference of circles
- find the area and perimeter of regular polygons
- find the area and perimeter of composite figures
- find the area and perimieter of figures in the coordinate plane
- approximate area of irregular shapede figures
- describe the effect on perimeter and area when one or more dimensions of a figure are changed
- determine basic probabilites of events involving geometric models
-

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Content/Topics	Skills
Critical content that students must KNOW	*Transferable skills that students must be able to DO*

Core Learning Activities	Resources
	Professional & Student

Assessments (Titles)	Graduation Standards	Interdisciplinary Connections
	Information Literacy **Problem Solving** **Spoken Communication** **Written Performance** • Problem Solving	

<< Previous Year

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Circles and Other Conic Sections

✉Collaboration GeometryHigh School|Mathematics|Newtown High School|2014-2015

Wednesday, October 29, 2014, 2:45PM

Unit: Circles and Other Conic Sections (Week 29, 5 Weeks) 🗓

Enduring Understanding(s)/ Generalization(s)

There is a special relationship between the radius of a circle and its tangent at the point of tangency.
A circle has a special relationship to any triangle inscribe in it or circumscribed about it.
There are unique relationships between arcs, chords, segments and the circle that hold for all circles.
A parabola, circle, ellipse or hyperbola can be expressed as a locus of points in a plane.

Essential Question(s)

What is the relationship between segments and arcs in a circle?
What is the relationship between angles and arcs in a circle?
What is the relationship between angles and segments in a circle?
How can the equation of a circle be written from information on the coordinate plane?
How can a circle be discussed as a locus of points?

Guiding Questions

Factual, Conceptual, Provocative
How can you prove relationships between angles and arcs in a circle?
When segments intersect a circle or within a circle, how do you find the measures of the resulting angles, arcs and segments?
Can you sketch a circle and its tangent at a given point of tangency?
Can you sketch the situation in which two secant segments intersect at a given point outside the circle?
What is the difference between inscribed and circumscribed polygons?
Can you write the equation of a parabola using the focus and directrix?
Can you write the equation of an ellipse or hyperbola as defined by a locus of points?

Standard(s)

Content and CCSS
CCSS: Mathematics, CCSS: HS: Modeling, Mathematical Practice
MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- MP.2. Reason abstractly and quantitatively.
- MP.5. Use appropriate tools strategically.
- MP.6. Attend to precision.
- MP.7. Look for and make use of structure.

CCSS: Mathematics, CCSS: HS: Geometry, Circles
HSG-C.A. Understand and apply theorems about circles

- HSG-C.A.1. Prove that all circles are similar.
- HSG-C.A.2. Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.
- HSG-C.A.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language
Students will:

- Define tangents, secants and chords
- Define special angles and arcs
- Write the equations of a conic from a locus of points
- Find the measures of angles, arcs and segments formed by intersecting segments within or with a circle.

circle.
- HSG-C.A.4. (+) Construct a tangent line from a point outside a given circle to the circle.

HSG-C.B. Find arc lengths and areas of sectors of circles

- HSG-C.B.5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

CCSS: Mathematics, CCSS: HS: Geometry, Expressing Geometric Properties with Equations
HSG-GPE.A. Translate between the geometric description and the equation for a conic section

- HSG-GPE.A.1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.
- HSG-GPE.A.2. Derive the equation of a parabola given a focus and directrix.
- HSG-GPE.A.3. (+) Derive the equations of ellipses and hyperbolas given two foci for the ellipse, and two directrices of a hyperbola.

HSG-GPE.B. Use coordinates to prove simple geometric theorems algebraically

- HSG-GPE.B.4. Use coordinates to prove simple geometric theorems algebraically.

Content/Topics

Critical content that students must KNOW

- Interior and exterior angles
- chord, secant and tangent segments
- Parabolas and their features
- Ellipses and their features
- Hyperbolas and their features
- circles and their features

Skills

Transferable skills that students must be able to DO
- 2. Work independently and collaboratively to solve problems and accomplish goals.
- 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.

Core Learning Activities

Locus: A set of points
Anglegrams
"Sunshine Sailboat Company Logo" performance task

Resources

Professional & Student
Text: Pearson's Geometry, 2007
Ancillaries
Department developed materials

Assessments (Titles)	Graduation Standards	Interdisciplinary Connections
Segements Related to Circles Summative: Written Test Angles, Arcs and Segments	Information Literacy Problem Solving Spoken Communication Written Performance	

measures **Summative: Group Project** **Conic Sections** **Summative: Personal Project**	• Problem Solving	13

<< Previous Year

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Unit: Applications of Probability (Week 34, 5 Weeks) 🗓

Enduring Understanding(s)/ Generalization(s)

Students expand their knowledge of probability.

Essential Question(s)

What is the difference between experimental probability and theoretical probability?
What is a frequency table and how can it be used?
What does it mean for an event to be random?
How can you model randomness to make fair decisions?

Guiding Questions

Factual, Conceptual, Provocative

Standard(s)

Content and CCSS
CCSS: Mathematics, CCSS: HS: Stats/Prob, Conditional Probability & the Rules of Probability
HSS-CP.A. Understand independence and conditional probability and use them to interpret data

- HSS-CP.A.1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").
- HSS-CP.A.2. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
- HSS-CP.A.3. Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.
- HSS-CP.A.4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.
- HSS-CP.A.5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.

HSS-CP.B. Use the rules of probability to compute probabilities of compound events in a uniform probability model

- HSS-CP.B.6. Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A and interpret the answer in terms of the model.

Objective(s)

Bloom/ Anderson Taxonomy / DOK Language

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- HSS-CP.B.7. Apply the Addition Rule, P(A or B) = P(A) + P(B) − P(A and B), and interpret the answer in terms of the model.
- HSS-CP.B.8. (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.
- HSS-CP.B.9. (+) Use permutations and combinations to compute probabilities of compound events and solve problems.

Content/Topics

Critical content that students must KNOW

Skills

Transferable skills that students must be able to DO

Core Learning Activities

Resources

Professional & Student

Assessments (Titles)	Graduation Standards	Interdisciplinary Connections
	Information Literacy Problem Solving Spoken Communication Written Performance	

<u><< Previous Year</u>

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NEWTOWN PUBLIC SCHOOLS

MISSION-GOALS-OBJECTIVES

SERIES 0000

Mission-Goals-Objectives

Mission of the Newtown Public Schools

The Mission of the Newtown Public Schools, a partnership of students, families, educators, and community is to *INSPIRE EACH STUDENT TO EXCEL*, in attaining and applying the knowledge, skills and attributes that lead to personal success while becoming a contributing member of a dynamic global community. To achieve this goal, which is a responsibility shared by the Board of Education, staff, students, parents, and community, we subscribe to the following tenets:

1. that our obligation is to help students mature into independent, reasoning, and responsible individuals who can adapt constructively to an ever-changing, global society;

2. that this obligation can be accomplished by challenging students and staff to perform at their highest capabilities;

3. that students will best attain these capabilities if their unique needs, interests, strengths, weaknesses, backgrounds, learning styles, and range of scholastic and creative abilities are acknowledged;

4. that students need to develop self-esteem, an appreciation of the worth of others, a joy in learning, and a desire and willingness to achieve a standard of excellence commensurate with their abilities;

5. that students need to develop a respect for the earth's unique and diverse human and natural resources;

6. that the schools must convey to students the purpose of the educational program and help them to understand that they must share responsibility for its success;

7. that the curriculum will provide comprehensive programs and a range of instructional strategies to meet the requirements of students with varied backgrounds, abilities, aspirations, and needs, and that this curriculum will be evaluated periodically to ensure that it does so;

8. that the schools actively will seek community support and involvement through close communication and cooperation;

9. that our educational aim will best be achieved in an atmosphere of mutual respect, concern, and support;

10. that in the final analysis, we are all to be accountable for the present and the future success of the Newtown Public Schools.

11. it's our responsibility to employ qualified staff and provide appropriate supervision, evaluation, and training for the continual improvement and updating of skills and knowledge;

12. it's our responsibility to work with elected officials at the local, state and national levels to insure sufficient financial support.

Policy adopted: NEWTOWN PUBLIC SCHOOLS
                                                               Newtown, Connecticut

(Reviewed and approved by Policy Review Committee)

Newtown's existing Code of Ethics currently codified as bylaw #9271.

Mission-Goals-Objectives

Code of Ethics

The success of every school system depends on an effective working relationship between the Board of Education and Superintendent of Schools. This code incorporates those standards and responsibilities most critical to productive Board and Superintendent relations.

- Board members and Superintendents ensure the opportunity for high quality education for every student and make the well-being of students the **fundamental goal** of all decision-making and actions.

- Board members and Superintendents are **staunch advocates** of high quality free public education for **all** Connecticut children.

- Board members and Superintendents **honor all** national, state and local laws and regulations pertaining to education and public agencies.

- Board members and Superintendents recognize that clear and appropriate communications are key to the successful operation of the school district.

- Board members and Superintendents will always carry out their respective roles with the highest levels of **professionalism, honesty** and **integrity**.

- Board members recognize that they represent the **entire** community and that they must ensure that **the** community remains fully informed on school-related matters.

- Superintendents and Board members recognize that the Superintendent serves as the Board of Education's **agent** and will, in that role, **faithfully apply** the policies and contracts adopted by the Board.

- Board members adhere to the principle that they shall confine the Board's role to **policy-making, planning** and **appraisal** while the Superintendent shall **implement** the Board's policies.

- Board members and Superintendents both recognize that they serve as a part of an educational team with **mutual respect, trust, civility** and **regard** for each other's respective roles and responsibilities.

- Board members are committed to the concept that the strength of the Superintendent is in being the **educational leader** of the school district.

- Board members and Superintendents practice and promote ethical behavior in the **Boardroom** as described in Newtown's Code of Ethics.

- Board members and Superintendents consider and decide all issues **fairly** and **without bias**.

(cf. 2000.1 – Board-Superintendent Relationship)
(cf. 2300 – Statement of Ethics for Administrators)

Policy adopted: NEWTOWN PUBLIC SCHOOLS
                                                          Newtown, Connecticut

(Reviewed and approved by Policy Review Committee)

Mission-Goals-Objectives

Goals and Objectives

Goals of District

The Newtown Board of Education believes that the effectiveness of the educational program of Newtown Public Schools is based upon an agreed-upon set of goals, high expectations, continuous improvement, quality of instruction and learning environment, and civic responsibility.

Goals for Newtown Public Schools include:

1. Students develop and consistently demonstrate a skill set that includes problem-solving, critical and creative thinking, collaboration and application of technology.

2. In order to increase the quality of instruction and student knowledge, there needs to be a continuous process of evaluation of teaching and learning.

   For both staff and students, continuous evaluation includes:
   - Creating goals in collaboration with mentors
   - Defining timeframes by which goals will be completed
   - Defining measurement tools by which progress can be determined
   - Evaluating the effectiveness of goals and/or processes

3. In order to support a continuous evaluation of teaching and learning and chart a course for the future of Newtown Public Schools:
   - A strategic plan will be developed and evaluated at least every five (5) years.
   - The Newtown Board of Education and the Superintendent will develop, publish and evaluate district goals on a yearly basis.
   - The capital project planning will include providing the required facilities and technological infrastructure to support the staff and student body.

4. Clear and concise communication will keep the community informed of the successes experienced in the Newtown Public Schools.

5. Communication outside of the town of Newtown will provide students an opportunity for a broader perspective and appreciation of global affairs.

6. To create an environment of optimal safety and security for teaching and learning.

Policy adopted: NEWTOWN PUBLIC SCHOOLS
                                                                      Newtown, Connecticut

(Reviewed and approved by Policy Review Committee)

A new policy to consider.

Mission – Goals – Objectives

Nondiscrimination

The District shall promote nondiscrimination and an environment free of harassment based on an individual's race, color, religion, sex, sexual orientation, gender identity/expression, national origin, ancestry, disability, (including, but not limited to, intellectual disability, past or present history of mental disorder, physical disability or learning disability), genetic information, marital status or age or because of the race, color, religion, sex, sexual orientation, gender identity or expression, national origin, disability, genetic information, marital status or age of any other persons with whom the individual associates. The District provides equal access to the Boy Scouts and other designated youth groups.

In keeping with requirements of federal and state law, the District strives to remove any vestige of discrimination in employment, assignment and promotion of personnel; in educational opportunities and services offered to students; in student assignment to schools and classes; in student discipline; in location and use of facilities; in educational offerings and materials; and in accommodating the public at public meetings.

The Board encourages staff to improve human relationships within the schools and to establish channels through which citizens can communicate their concerns to the administration and the Board.

The Superintendent shall appoint and make known the individuals to contact on issues concerning the Americans with Disabilities Act (ADA), Section 504 of the Rehabilitation Act of 1974, Title VI, Title VII, Title IX and other civil rights or discrimination issues. The Board will adopt and the District will publish grievance procedures providing for prompt and equitable resolution of student and employee complaints.

Federal civil rights laws prohibit discrimination against an individual because he/she has opposed any discrimination act or practice or because that person has filed a charge, testified, assisted or participated in an investigation, proceeding or hearing. ADA further prohibits anyone from coercing, intimidating, threatening or interfering with an individual for exercising the rights guaranteed under the Act.

(cf. 4111 – Recruitment and Selection)
(cf. 4111.1/4211.1 – Affirmative Action)
(cf. 4118.11 – Nondiscrimination)
(cf. 4118.111 – Grievance Procedure-Title IX)
(cf. 4118.113/4218.113 – Harassment)
(cf. 5145.4 – Nondiscrimination)
(cf. 5145.5 – Sexual Harassment)
(cf. 5145.51 – Peer Sexual Harassment)
(cf. 5145.52 – Harassment)
(cf. 5145.6 – Student Grievance Procedure)
(cf. 6121 – Nondiscrimination)
(cf. 6121.1 - Equal Educational Opportunity)

Mission – Goals – Objectives

Nondiscrimination

Legal Reference: Title VII, Civil Rights Act, 42 U.S.C. 2000e, et seq.
29 CFR 1604.11, EEOC Guidelines on Sex Discrimination.
Title IX of the Educational Amendments of 1972, 20 U.S.C. 1681 et seq.
34 CFR Section 106.8(b), OCR Guidelines for Title IX.
Definitions, OCR Guidelines on Sexual Harassment, Fed. Reg. Vol 62, #49, 29 CFR Sec. 1606.8 (a0 62 Fed Reg. 12033 (March 13, 1997) and 66 Fed. Reg. 5512 (January 19, 2001)
20 U.S.C. 7905 (Boy Scouts of America Equal Access Act contained in No Child Left Behind Act of 2001)
Meritor Savings Bank. FSB v. Vinson, 477 U.S. 57 (1986)
Faragher v. City of Boca Raton, No. 97-282 (U.S. Supreme Court, June 26,1998)
Gebbser v. Lago Vista Indiana School District, No. 99-1866, (U.S. Supreme Court, June 26,1998)
Davis v. Monro County Board of Education, No. 97-843, (U.S. Supreme Court, May 24, 1999.)
The Vietnam Era Veterans' Readjustment Act of 1974, as amended, 38U.S.C. §4212
Title II of the Genetic Information Nondiscrimination Act of 2008
Connecticut General Statutes
46a-60 Discriminatory employment practices prohibited.
10-15c Discrimination in public schools prohibited. School attendance by five-year olds. (Amended by P.A. 97-247 to include "sexual orientation" and P.A. 11-55 to include "gender identity or expression")
10-153 Discrimination on account of marital status.
17a-101 Protection of children from abuse.
The Americans with Disabilities Act as amended by the ADA Amendments Act of 2008
Public Law 111-256
Meacham v. Knolls Atomic Power Laboratory 128 S.Ct. 2395, 76 U.S.L.W. 4488 (2008)
Federal Express Corporation v. Holowecki 128 S.Ct. 1147, 76 U.S.L.W. 4110 (2008)
Kentucky Retirement Systems v. EEOC 128 S.Ct. 2361, 76 U.S.L.W. 4503 (2008)
Sprint/United Management Co. v. Mendelsohn 128 S.Ct. 1140, 76 U.S.L.W. 4107 (2008)

Policy adopted: NEWTOWN PUBLIC SCHOOLS
Newtown, Connecticut

(Reviewed and approved by Policy Review Committee)

NEWTOWN PUBLIC SCHOOLS
Newtown, Connecticut

REPORT FORM FOR COMPLAINTS OF DISCRIMINATION

Complainant: _____

Home Address: _____

Home Phone: _____

School building: _____

Date of Alleged Incident(s): _____

Alleged harassment was based on: (Check all that apply.)

☐ Race ☐ Color ☐ National Origin ☐ Gender Identity or Expression

☐ Gender ☐ Disability ☐ Religion

☐ Ancestry ☐ Age ☐ Sexual Orientation

Name of person you believe violated the District's nondiscrimination policy:

_____

If the alleged discrimination was directed against another person, identify the other person:

_____

Describe the incident as clearly as possible, including any verbal statements (i.e., threats, derogatory remarks, demands, etc.) and any actions or activities. Attach additional pages if necessary:

_____

_____

_____

_____

_____

When and where incident occurred: _____

List any witnesses who were present: _____

_____

This complaint is based on my honest belief that _____ has discriminated against me or another person. I certify that the information provided in this complaint is true, correct and complete to the best of my knowledge.

_____   _____
Complainant's Signature   Date

_____   _____
Received By   Date

A new policy to consider.

Mission-Goals-Objectives

Monitoring and Reporting: State

Reporting Accomplishments to the Public

The Board shall keep the public informed of the school system's progress in accomplishing its goals and indicators of success, including programs established to achieve them. The Superintendent shall maintain a communication program for this purpose, which shall include, but not be limited to, public meetings, publications in local newspapers and school newsletters, PTA meetings, and other appropriate methods.

Policy adopted: NEWTOWN PUBLIC SCHOOLS
                                                                            Newtown, Connecticut

(Reviewed and approved by Policy Review Committee)

Board of Education
Newtown, Connecticut

Minutes of the Board of Education meeting on November 18, 2014 in the council chambers, 3 Primrose Street.

K. Alexander, Chair	J. Erardi
L. Roche, Vice Chair	L. Gejda
K. Hamilton, Secretary	R. Bienkowski
D. Leidlein (absent)	7 Staff
J. Vouros	4 Public
D. Freedman	1 Press
M. Ku	

Item 1 – Call to Order
Mr. Alexander called the meeting to order at 6:50 p.m.
MOTION: Mrs. Ku moved that the Board of Education go into executive session and invited Dr. Erardi, Mr. Bienkowski and Dr. Gejda to discuss litigation with transportation contracted services, an update on nurses and paraeducators negotiations, contract considerations pertaining to NFT and NASA, and the security grant. Mr. Vouros seconded. Motion passes unanimously.

Item 2 – Executive Session
The Board exited executive session at 7:31 p.m.
Item 3 – Public Session/Pledge of Allegiance
Item 4 – Consent Agenda
MOTION: Mrs. Roche moved that the Board of Education approve the consent agenda which included the donation to Newtown High School, the Newtown High School varsity softball team field trip, the extension of a child rearing leave of absence for Brandi Oatis, the extension of a leave of absence for Kathryn Spallone, and the correspondence report. Mrs. Ku seconded. Motion passes unanimously.

Item 5 – Public Participation - none
Item 6 – Reports
Chair Report: Mr. Alexander said he and Ms. Hamilton attended the Public Building and Site Commission meeting. Ms. Hamilton reported that the state approved the phase 4 construction of the new Sandy Hook School so we can go out to bid.
Mr. Alexander spoke about attending the tabletop emergency exercise last week with Mrs. Ku and Ms. Hamilton. Mrs. Ku attended the CABE conference was this past weekend. She said there were excellent speakers including an educator from Finland and Rick Mastracchio who was schooled in Waterbury and is now an astronaut.
Mr. Alexander sent out the standing committees list to update and would vote on at the next meeting.
Ms. Hamilton commented that the security tabletop exercise was interesting to watch. The biggest key is communication between the police and fire departments and the school system.

Superintendent's Report:
Dr. Erardi said the Newtown Public Schools was featured in the Education Connection newsletter regarding the $1.2M grant they received from the U.S. Department of Education which will bring more counselors to our elementary schools. He is looking for a conversation

with the Board in December or January regarding possibly adding a student to the Board of Education as a non-voting member.

Gregg Simon was here regarding a field trip and as a supporter girls' golf and boys' volleyball which will be an agenda item at the next meeting. These are self-funded programs for the spring of 2015. He mentioned the joint meeting tomorrow night with the Legislative Council, Board of Finance and Board of Selectman for a budget discussion and enrollment report. The aspirant administrator group that he and Dr. Gejda are meeting with consists of 24 educators in the district pursuing administrator status.

Mr. Vouros asked how many were new to the program.

Dr. Erardi said the range is from those that have their 092 certification to those who are just thinking about it. Of the 24, 25% already have their certification and are looking to gain experience here. Others are just starting coursework.

Committee Reports:

Mrs. Ku spoke about the community forum which focused on the language arts curriculum.

Ms. Hamilton said the policy committee continues to meet and have almost completed the 1000 series. They will start the 2000 series at the next meeting. The finance committee met to discuss the budget document. They also discussed the transfer report. She and Mr. Vouros toured the business and technology classes at the high school.

Mrs. Roche thanked Dr. Erardi for working with the policy committee.

Mrs. Ku said the Curriculum and Instruction committee met this week discussing the grade 7 and 8 math curriculum and the alignment of the advanced math program for students from Reed through the middle school. There was an update on homebound instruction from Julie Haggard. They looked at the proposal to offer daycare for children of our staff members. They currently have a center for Monroe staff located in Sandy Hook School. This is being vetted through legal counsel. They also discussed the possibility of foreign language in kindergarten to grade two. They are scheduled to visit the Southington program. There were updates on the GATES program, class size, professional development days and they will look at attendance on the early release days.

Mrs. Roche said there was a move to involve more students in higher level math or to offer it to more students.

Mrs. Ku said they don't have a goal for that. The goal is to meet the needs of the students.

Ms. Hamilton asked for an explanation of the process for students to take high level math.

Dr. Gejda said we have additional information like NWEA which allows us to look at the students. The shift of standards has impacted some of the assessments. The conversation extends from Reed to the high school. Students need to demonstrate their readiness for advancement.

Ms. Hamilton said there is compacted math at Reed but there is no information for parents.

Dr. Erardi stated that as a student leaves fourth grade, the intent is that in fifth and sixth grades they will have three years of math prep for algebra in grade seven.

Ms. Hamilton asked what happens with a student who is advanced in math but is not put in any advanced classes.

Dr. Erardi said there would be a time for the students to be placed and move forward.

Ms. Hamilton asked if Julie Haggard had a reason for the need for more homebound tutoring. Mrs. Ku said we can invite her to talk about that. This year it is significantly below last year. Dr. Erardi said we are presently looking to review our two contracts for homebound tutoring so there could be a savings there.

Mr. Freedman said the technology committee nominated Mrs. Leidlein as chair. They received an inventory of technology in the district broken down by school and year. They talked about moving the obsolescence forward to 6 years. They also spoke to Mrs. Amodeo about leveling spending. Leasing instead of buying equipment was discussed and there will be a replacement program for the Ipads we have.

Mrs. Ku attended the Education Connection Board meeting. They discussed the state offering mini grants to evaluate student assessments and there was a discussion about the regional calendar. They may also move their Danbury office to Brookfield.

Mrs. Roche said the Climate and Culture Committee discussed the staff survey. Three of the members would review the whole document and come back with a summary.

Full Day Kindergarten Report:
Dr. Gejda introduced Peggy Kennedy, lead teacher at Middle Gate School, kindergarten teachers Janet Vollmer, Beth Taverna, Melissa Massett and Dorothy Schmidt and first grade teacher Chandra Salvatore who presented the attached report on the full day kindergarten program.

Mr. Freedman asked if it was easier to identify student issues with them in school all day and how they are dealing with them.
Mrs. Schmidt said they found that some problems manifested being in school all day and they are handled by the various support provided in the schools.

Ms. Hamilton was concerned about stamina lasting for students being in school all day and if there were any changes to accommodate higher level learners.
Mrs. Vollmer said one was that there was an increase in the number of site words students are expected to know.
Mrs. Kennedy said there were also higher level readers coming in.

Mr. Alexander asked for any parent response to the full day program.
Mrs. Schmidt said most were happy it was a full day program and amazed at what their children were doing.
Mrs. Vollmer mentioned that there were always full time assistants in kindergarten and it's difficult at times without that extra help.

Financial Report:
MOTION: Ms. Hamilton moved that the Board of Education approve the financial report for the month ending October 31, 2014. Mr. Vouros seconded.
Mr. Bienkowski reviewed the report. He mentioned that the electricity rates would be going up 26% in January. We are looking at another provider with the town.
Ms. Hamilton asked if the numbers for the excess cost grant were reflected in the budget detail report. Mr. Bienkowski said they were not.
Motion passes unanimously.

Item 7 – Old Business
2015-2017 Calendars:
Dr. Erardi referred to Dr. Gejda's attached student attendance information on the early release Fridays which also included that Wednesday and Thursday. Mr. Bienkowski provided professional development information from districts in CASBO. A suggestion was made to start the professional development here at the beginning of the day. In Darien, South Windsor, Weston, and Wilton the students come in two hours later to allow professional development in the morning. He also received a revised draft of the proposed regional calendar.

Mrs. Roche said the regional calendar shows two professional development days.
Dr. Erardi stated that we first have to decide if we are interested in following a regional calendar which by statute we do not. If buying into that calendar we have to be ready to explain our reasons to the community.

Mr. Freedman said having conference days the week before Thanksgiving is a significant challenge. He recommended not having them just before Thanksgiving. He also suggested putting them on the master calendar.
Ms. Hamilton asked to also gather any staff absences on these three days.

Additional Budget Calendar Dates:
MOTION: Mrs. Ku moved that the Board of Education approve the dates in items 16 through 26 on the 2015-2016 school budget development calendar. Mrs. Roche seconded.

Mr. Alexander asked where we got these dates.
Dr. Erardi said Mr. Bienkowski worked with Bob Tait for the additional dates. Two dates are still to be determined. He would like to present this tomorrow evening.

Ms. Hamilton said we posted this on our website but we only should have listed 1 through 15. We should only be posting the dates we have control of. We don't control the Board of Finance and Legislative Council so it's best for the public to go to the town calendar for their information. She was not comfortable posting dates for other boards.

Mrs. Roche suggested a disclaimer that these dates are subject to change and to check the town calendar.
Mr. Alexander also feels there should be a link to the town to verify other boards meeting dates.
Vote: 5 ayes, 1 nay (Ms. Hamilton)

Item 8 – New Business
First Read of Curriculum: Algebra I, Algebra II and Geometry
Dr. Gejda said these have been worked on for the past several years. They've been revised after looking at updated resources.

Ms. Hamilton said some of this learning takes place in 6th and 8th grades and she was concerned about the vertical alignment.
Dr. Gejda said she would do some research and provide examples. There is a greater movement of algebra concepts moving down to the 8th grade.

First Read of Board Policies Series 0000 Mission-Goals-Objectives:
Ms. Hamilton said these are a combination of samples from other districts.

Mr. Alexander asked policy 600 regarding monitoring and reporting. There are no specific details.
Ms. Hamilton said the specific details involve keeping the Newtown public aware of what was going on in the district.
Dr. Gejda asked if changes could be made to the form without affecting the policy.
Ms. Hamilton said they could.

Minutes of November 5, 2014:
MOTION: Ms. Hamilton moved that the Board of Education approve the minutes of November 5, 2014. Mr. Vouros seconded. Vote: 5 ayes, 1 abstained (Mrs. Roche)

Schedule of 2015 Meetings:
MOTION: Mr. Freedman moved that the Board of Education approve the schedule of 2015 Board of Education meetings. Ms. Hamilton seconded. Motion passes unanimously.

Item 9 – Public Participation - None
MOTION: Mrs. Roche moved to adjourn. Mr. Freedman seconded. Motion passes unanimously.

Item 10 – Adjournment
The meeting adjourned at 9:43 p.m.

Respectfully submitted:

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                    Kathryn Hamilton
                    Secretary