Please Note: These minutes are pending Board approval.

Board of Education
Newtown, Connecticut

Minutes of the Board of Education meeting held on February 22, 2023, at 7:00 p.m. in the Reed Intermediate School library, 3 Trades Lane.

D. Zukowski, Chair
J. Vouros, Vice Chair
D. Ramsey, Secretary
D. Cruson
J. Kuzma
J. Larkin
A. Plante
K. Kunzweiler
D. Godino
C. Melillo
A. Uberti
T. Vadas
6 Staff
5 Public
1 Press

Ms. Zukowski called the meeting to order at 7:05 p.m.

Item 1 – Pledge of Allegiance

MOTION: Mrs. Plante moved to table the Legislative Update to be untabled no later than before Item 6. Mrs. Larkin seconded. Motion passes unanimously.

Item 3 – Consent Agenda

MOTION: Mrs. Plante moved that the Board of Education approve the consent agenda which includes the correspondence report. Mr. Cruson seconded. Motion passes unanimously.

Item 4 – Public Participation

Item 5 – Reports

Chair Report: Ms. Zukowski spoke about the busy January and thanked the Board on behalf of the students, families, staff and Town for their dedication during the budget process. Mr. Melillo introduced our budget to the Board of Finance last Thursday and was well received.

Superintendent's Report: Mr. Melillo reported that the State of Connecticut unanimously approved free meals for the rest of the school year. The Newtown High School drama production "Into the Woods" will be held March 16 to 19. The K-12 art teachers will have two shows at the Municipal center April 1 to 16 and the Hawley art show will be April 20 to 27.

Committee Reports:

Mr. Cruson said there were two Policy meetings where the suspension and expulsion policy was discussed along with the 4000 series regarding staff. They also approved the tutoring policy to bring to the Board and will work on health-related staff policies.

Mr. Vouros said the Curriculum and Instruction Committee met February 14 and discussed the Myth and the Modern World curriculum. There was also a discussion on the training plan for the new K-4 reading program.

Mrs. Larkin reported that the CFF Committee met last week and discussed the financial report and the extension of Smart funds for the free lunch. They discussed transportation and Mr. Gerbert gave an update on the Hawley HVAC project which is on time and they are expected to be out of Hawley in April. There was an update on the Middle Gate playground a potential update to the non-lapsing fund policy.

Mr. Cruson noted the Security and Safety Committee met last Thursday. Three items discussed were the middle school students behavior in Town. The administrators have been in contact with the busineses so it is being dealt with. The second item was regarding the building project next to Hawley School. They will put up a 5-foot security fence which will include plantings. The third item was regarding the table top exercise on April 4 which Board members are invited to observe. Please let him know if anyone will attend and he will share that with Mark Pompano.

Mr. Vouros reported that the high school PTSA announced the five first place winners in their Reflections Contest. The winners are Daniella Guerrieri, grade 12, for her essay "Fragments of a Broken Home," Ella Rena, grade 10, with a dance titled "The Language of Satin and Ribbons," Jules Kessler, grade 11, for his music submission "Another 10 Years," Lily Mindenhall, grade 12, for a film titled "When you Least Expect It,", and Julia Arbesman, grade 10, for a film titled "Inspiring Characters." He thanked the committee headed by Melissa Beylouni and congratulated the students.

Student Representatives Report:
Ms. Kirtana reported that students from the Hope Squad organized a Valentine's Day activity. Winter sports are approaching their championship competition. The Jazz Band visited UCONN for the 2023 Jazz Festival. French and Spanish students celebrated Mardi Gras and Carnavale last week.
Mr. Godino reported that English I students performed the famous balcony scene from Romeo and Juliet. Members of the Hawks Honors Association visited the middle school regarding what to expect at NHS.

MOTION: Mrs. Plante moved to untable the Legislative Update. Mrs. Larkin seconded. Motion passes unanimously.

Item 2 – Legislative Update
Senator Hwang thanked the Board and acknowledged the student Board members.
Representative Bolinsky thanked the Board for having them at the meeting.

Mrs. Larkin asked about the ECS and how cost sharing would impact Newtown.
Senator Hwang said the ECS formula is critical to update Boards. We also have a concept bill raised on school buses and how to correct this critical issue. He complimented Mr. Melillo who is cognizant of learning loss and the fiscal challenges on the community.

Mrs. Kuzma asked if there were any regulations regarding special education outplacement and how much they can charge districts.
Representative Bolinsky said we don't have a good handle on the costs and need to have someone accountable at the State level. We intend to put in protections.

Ms. Zukowski asked them to define fully funded.
Representative Bolinsky said the concept is to fully fund excess cost but they are not sure what the number will be.
Senator Hwang urged the Board to be disciplined in understanding the budget. There's a lot of money in these proposals but to use caution to not count on all of that money coming to you.

Representative Bolinsky spoke about reading literacy programs The Commissioner's office understands the waiver process is complicated with a February 28 deadline.

Mrs. Larkin asked if there was transportation help for districts because the families are paying the price and will there be help from the State or Department of Education.

Senator Hwang said this is a student safety process and operational nightmare. He spoke to three points regarding this issue. The first is to fully understand why there is a critical shortage so they asked to the Commissioner of the DMV to accelerate the cdl licensing process. The second is to have the conversation with bus companies to ask them the structural needs and policy assistance they could offer them and the third is that the owners said it isn't much about salary but about the benefits to keep drivers. He proposed some cost saving recommendations. They are working on a bill that will incorporate those things because this is a priority.

Representative Bolinsky said we have to look at the statutory requirements. A consolidation is also possible because some students never take the bus.

Ms. Zukowski said the higher number of tiers allows the drives to make more money. We have a two-tier system now and some have said we should have three tiers.

Mr. Melillo said we went to a two-tier system which allows the high school to start later and was educationally sound. The bus company decided how to compensate their drivers. We are almost being pushed to compromise an educationally sound system by moving the tiers.

Mr. Vouros said to keep in mind that we spent years on this and did wonderful research on the health and benefit of students to have a schedule that was best for them. We aren't going to jeopardize that by discussing the school start time.

Mrs. Larkin noted that insurance is big piece of our budget.
Senator Hwang spoke about the expense of insurance and that they are looking at solutions to minimize the costs. Their proposal is using benchmarking which we've never had. They also asked the pharmaceutical companies to lower costs.

Representative Marty Foncello joined the meeting.
Mr. Ramsey was concerned about the shortage of teachers and asked strategies the State would adopt to assist districts.

Mr. Cruson asked if there was any discussion about providing free lunches into the 2023-2024 school year.
Representative Bolinsky said there were a couple of bills regarding that. Some districts feel it's a necessity and needs to be justified.

Representative Foncello noted that his wife is a teacher and was an administrator. He also taught at WesConn as an adjunct professor.

Item 5 – Reports (continued)
Financial Report:
Mrs. Vadas spoke about the financial report and transfers.

MOTION: Mrs. Plante moved that the Board of Education approve the financial report and transfers for the month ending January 31, 2023. Mr. Cruson seconded. Motion passes unanimously.

Item 6 – Presentations

First Read of Honors Physics Curriculum:
This curriculum was presented by Kim Lowell and Chris Canfield.

iReady Mid-Year Data Update:
Kara DiBartolo presented this information.

Mr. Ramsey asked if Mrs. DiBartolo accepted the fact that the mastering of the six domains of reading may enhance social and emotional well-being and was it also true that vocabulary enhances the domains of reading. If so, can we incorporate vocabulary to enhance reading?
Mrs. DiBartolo believes social emotional learning and the six domains will be enhanced with vocabulary which enhances comprehension and should be dispersed throughout the day.

Mrs. Plante wasn't sure how to compare us to other districts and was concerned about students who are one grade level behind.
Mrs. DiBartolo said the data is based on where our students are. It's hard to compare with other districts because they don't use the same programs. It's best to compare within our district.

Mrs. Larkin was concerned about fifth grade students and the use of technology for intervention and support.
Mrs. DiBartolo said we have been having that conversation with grade K-8 administrators. We do not want students in front of a computer because that does not replace a teacher. The interventionists work with the teacher and a computer component.

Mrs. Larkin encouraged less use of technology. Regarding action steps, she hopes we move more away from what we are going to do regarding the five to seven years of recovery from COVID and implement quickly.

Mr. Vouros said for the students that have a learning loss what is the game plan for parental involvement to help the teacher focus in on how they get their child where they need to be before the end of the year? Are their parental meetings?

Mrs. DiBartolo said iReady has reports that are sent to parents. Teachers are in constant communication with parents. There may not be the support children need at home so we look at what else we can do for these students.

Mr. Melillo said we are taking the data points to drive instruction. The tools used in the remote world carried over into the classroom. We are working with our teachers and bringing best practice back into the classroom and bringing those discussions into PD and with our interventionists. We have expectations that there is loss of learning but we are seeing a lot of growth in our students.

Mrs. Uberti spoke about our comparison with other districts. iReady implemented a chart and the four Newtown schools were in the upper percentage regarding growth and are performing in the upper quadrant. We feel there are students on track. Teachers feels students are making outstanding growth, particularly in math. Interventions are being used by teachers.

Ms. Zukowski spoke about the two facets of growth performance.
Mrs. Uberti said typical growth is what you expect after a full year. To catch students up may take more than one year.
Ms. Zukowski ask if there was a way to know how much progress we are making.

Mrs. Uberti said learning is not linear. This test is helping us identify how we are catching them up.
Ms. Zukowski asked if there was any way we can get information from the aggregate data regarding interrupted learning.
Mr. Melillo said the goal line changes over time and changes mid-year. Students are learning at an accelerated pace.

Item 7 – Old Business
MOTION: Mrs. Plante moved that the Board of Education approve Policy 4118.12/4218.12 Freedom of Speech and Use of Media Including Social Media. Mr. Cruson seconded. Motion passes unanimously.

MOTION: Mrs. Plante moved that the Board of Education approve Policy 4118.5/4218.5 Acceptable use of Computer Systems and Electronic Communications. Mr. Cruson seconded. Motion passes unanimously.

MOTION: Mrs. Plante moved that the Board of Education rescind Policy 9300 Methods of Operation. Mr. Cruson seconded. Motion passes unanimously.

Transportation Update:
Mrs. Vadas noted that we are fully staffed with two drivers from different towns and two employees who have CDLs who can help. We have nine who started classes in January and will be ready in mid-March. A lot of applications are coming in.

Item 8 – New Business
MOTION: Mrs. Plante moved that the Board of Education approve the minutes of February 7, 2023. Mr. Cruson seconded. Motion passes unanimously.

Item 9 – Public Participation
MOTION: Mr. Cruson moved to adjourn. Mrs. Plante seconded. Motion passes unanimously.

Item 10 – Adjournment
The meeting adjourned at 9:47 p.m.

Respectfully submitted:

_____
Donald Ramsey
Secretary

Correspondence Report
02/07/2023 – 02/21/2023

Date	Name	Subject
02/07/2023	Ramsey, Donald	Correspondence Report for BOE Meeting 02/07/2023
02/07/2023	Melillo, Christopher	Fwd: 113405317, Newtown High School Water Damage Mitigation Update
02/07/2023	Melillo, Christopher	High School Open Tomorrow
02/08/2023	June, Kathy	Expulsion Hearing
02/10/2023	Kiley Gottchalk	2-13-23 BOF Agenda
02/10/2023	June, Kathy	Expulsion Hearing
02/12/2023	Melillo, Christopher	02/12 Superintendent's Sunday Update
02/12/2023	Melillo, Christopher	Update to the Update
02/12/2023	Zukowski, Deborra	February 12, 2023 Week in Preview
02/13/2023	Melillo, Christopher	Friday Early Dismissal
02/14/2023	Melillo, Christopher	Phone issues
02/15/2023	Kiley Gottschalk' via...	Public Hearing Notice and BOF Agenda (2-16-2023)
02/17/2023	June, Kathy	BOE Mailing – February 22, 2023
02/17/2023	June, Kathy	Budget Summary Detail
02/17/2023	June, Kathy	BOE Hearing
02/17/2023	DiBartolo, Kara	Data Review Presentation
02/18/2023	Kiley Gottschalk	BOF 2-22-2023
02/19/2023	Melillo, Christopher	2/19/2023 Superintendent's Sunday Update
02/19/2023	Zukowski, Deborra	February 19, 2023 Week in Preview
02/21/2023	Kiley Gottschalk	BOF 2-23-23 Agenda

NEWTOWN BOARD OF EDUCATION
MONTHLY FINANCIAL REPORT
JANUARY 31, 2023

SUMMARY

The seventh financial report for the year continues to provide year to date expenditures, encumbrances and information for anticipated obligations. Many of the accounts within our major objects have been forecasted as "full budget spend" in order to more accurately project an estimated year-end balance. These balances are monitored closely and adjusted each month in order to capture any changes and fluctuations that occur throughout the year.

During the month of January, the district spent approximately $8.1M for all operations. About $4.1M was spent on salaries with the remaining balance of $4.0M spent on all other objects ($2.1M was spent on the 3rd installment of our employee health benefits). All expenditures appear to be within normal limits at this time.

The change over the last month's year-end projection has resulted in an increase of $6,833; now showing a total projected balance of $393,158.

This report also includes a transfer request in the amount of $48,554.

- $25,000 from salaries and benefits to benefits *(object 100 & 200).*
  - Requesting to transfer $12,875 from educational assistant's salary plus $12,125 from medical benefits to cover the shortfall in pensions. The shortfall in pensions is due to additional and unforeseen costs in the defined contribution pension plan. It is possible that this account may require one more adjustment before year-end as fluctuations are unpredictable due to employee turnover.

- $23,554 from transportation services to contracted services *(all within object 500).*
  - Requesting to transfer $20,000 for the remaining balance due to Partner's for Educational Leadership. This company was approved by the board on September 6th as facilitators for the NPS strategic plan. The total cost for this project is $40,000 of which half has already been paid. We are requesting to transfer $20,000 from the surplus in our transportation account to cover this balance due.
  - The request to transfer $3,554 will be used to offset the deficit in in the board of education's contracted service line.

MAJOR MOVERS

SALARY OBJECT

The overall salary object currently displays a positive position of $476,304. Combined, these accounts increased over the prior month by $36,547.

- **CERTIFIED SALARIES** – the overall balance in this sub-object is showing a negative balance of -$50,137.
  The balance in this sub-object changed slightly over the prior month, adding $4,003 to the year-end projection. All certified accounts have been analyzed and adjusted based on staff changes and full-year forecasts.

- **NON-CERTIFIED SALARIES** – the overall balance in this sub-object is showing a positive balance of $526,441.
  The balance in this sub-object increased by $32,544 over the prior month and continues to drive our overall year-end projected balance. We are still experiencing many vacancies throughout our unions and have made adjustments in our technology, nursing and special education projections.

- As of January, the following non-certified positions remain open:
  - Sixteen paraprofessionals (10 from special education), five behavioral therapists and one network specialist

EMPLOYEE BENEFITS - the overall balance in this object is showing negative -$7,563.
The driver behind this negative balance is found in the pension account and we are requesting a transfer (see above) that will rectify this negative position.

OTHER PURCHASED SERVICES – the overall position of this object is displaying a negative balance of -$326,361, having incurred additional costs of $35,242 over the prior month.

- **Contracted Services** – this account has experienced a negative balance over several months due to the inclusion of an outside service that provides behavioral therapists for our students. We have been unsuccessful in filling our open BT positions and these therapists are mandatory for students as outlined in their IEP plan. Currently we have 5 unfilled therapist positions.

- We now have an opportunity to use funding from the Special Education American Rescue Plan Grant as this budget has been adjusted. We will be preparing journal entry to move expenses from this line item over the grant in the amount of $141,429. This adjustment has already been accounted for in this report.

- **Out-of-District Tuition** – this account is showing a negative balance -$449,847. Over the prior month, the deficit in this account has increased by $122,065 and includes anticipated additional costs in special education out-of-district tuition.

- A portion of the Excess Cost Grant revenue was received (75% of the state's estimate which included a small adjustment from our estimate). The reimbursement rate at this time was 70%. However, there is legislation that will potentially address the funding gap that exists in the reimbursement formula and our district could potentially receive up to 85% reimbursement. We are hopeful that more information will come forth in the next few weeks.

  There is concern that our special education tuition costs may be on the rise. We are anticipating additional costs in the upcoming month to be somewhere in the $150,000 range. These anticipated costs are not included in this report.

SUPPLIES – the overall balance here is in a good position showing a positive balance of $140,232.

- **Natural gas** – we have projected additional expenses of $15,000 in these accounts as the cost of natural gas has been on the rise. However, based on the mild winter that we have been experiencing, we will most likely make further adjustments to these projections and we are anticipating that the negative balance will be temporary.

- **Electric** – this account now shows a positive balance of $145,000. Included in this balance is a projected increase to the surplus of $15,000. The large balance in these accounts has been driven by virtual net metering credits. This project has proven to be a winner as credits for this solar power roll forward into our Eversource bills; thus, lowering our overall expenses. We will continue to monitor this program and will keep the board apprised as changes occur.

ALL OTHER OBJECTS
Our account-by-account analysis will continue throughout the year and we will keep the board apprised of any issues or concerns as they arise.

FOOD SERVICES
It's been just over six months since Chartwell's has become a part of our district and they have been instrumental in revitalizing our food service program. We have made many positive changes and I can't thank our staff enough for the effort they have put forth in recruitment, retention and creating a cohesive and motivated team. Not only have there been environment upgrades in each school, but Chartwells has introduced our student's to new and exciting foods by way of their educational (and fun) programs.

Attached is a YTD timeline on the lunch program, highlighting the programs and progress that we have made.

As many of you have now heard, legislation was recently signed that will provide free meals to students for the remainder of the school year. We are waiting for more information and guidance to come from the state. Once this becomes available, we will notify families as well s the board.

EMERGENCY REPAIRS
There were no emergency repairs to report in the month of January.

REVENUE
The board of education received $3,056.63 in tuition and $1,658.61 in miscellaneous revenue. We also received a portion of our state aid as well as the non-public health grant. The health grant came in at $29,997 which is over the budgeted amount of $23,000.

We have also received a check for the fuel excise tax credit in the amount of $36,197.40. This credit is a federal credit issued for the use of alternative fuel (propane) and was for the 2021 calendar year.

Tanja Vadas
Director of Business
February 16, 2023

NEWTOWN BOARD OF EDUCATION
2022-23 BUDGET SUMMARY REPORT
FOR THE MONTH ENDING JANUARY 31, 2023

OBJECT CODE	EXPENSE CATEGORY	EXPENDED 2021 - 2022	2022 - 2023 APPROVED BUDGET	YTD TRANSFERS 2022 - 2023	CURRENT BUDGET	YTD EXPENDITURE	ENCUMBER	BALANCE	ANTICIPATED OBLIGATIONS	PROJECTED BALANCE	% EXP
	GENERAL FUND BUDGET										
100	**SALARIES**	$ 51,681,024	$ 53,701,233	$ -	$ 53,701,233	$ 26,052,295	$ 26,219,906	$ 1,429,032	$ 952,728	**$ 476,304**	99.11%
200	**EMPLOYEE BENEFITS**	$ 11,744,808	$ 11,955,016	$ (12,626)	$ 11,942,390	$ 8,613,080	$ 2,261,889	$ 1,067,421	$ 1,074,984	**$ (7,563)**	100.06%
300	**PROFESSIONAL SERVICES**	$ 543,087	$ 687,141	$ (14,000)	$ 673,141	$ 216,344	$ 85,160	$ 371,637	$ 371,637	**$ -**	100.00%
400	**PURCHASED PROPERTY SERV.**	$ 2,093,569	$ 1,814,663	$ -	$ 1,814,663	$ 915,475	$ 380,803	$ 518,385	$ 507,839	**$ 10,546**	99.42%
500	**OTHER PURCHASED SERVICES**	$ 9,327,010	$ 10,095,326	$ 26,626	$ 10,121,952	$ 6,668,282	$ 4,592,304	$ (1,138,635)	$ (812,274)	**$ (326,361)**	103.22%
600	**SUPPLIES**	$ 3,474,903	$ 3,365,464	$ -	$ 3,365,464	$ 1,742,333	$ 201,104	$ 1,422,027	$ 1,281,795	**$ 140,232**	95.83%
700	**PROPERTY**	$ 536,285	$ 339,710	$ -	$ 339,710	$ 75,865	$ 9,799	$ 254,046	$ 254,046	**$ -**	100.00%
800	**MISCELLANEOUS**	$ 59,271	$ 76,086	$ -	$ 76,086	$ 62,837	$ 3,268	$ 9,981	$ 9,981	**$ -**	100.00%
910	**SPECIAL ED CONTINGENCY**	$ -	$ 100,000	$ -	$ 100,000	$ -	$ -	$ 100,000	$ -	**$ 100,000**	0.00%
	TOTAL GENERAL FUND BUDGET	$ 79,459,957	$ 82,134,639	$ -	$ 82,134,639	$ 44,346,511	$ 33,754,233	$ 4,033,895	$ 3,640,736	**$ 393,158**	99.52%
900	**TRANSFER NON-LAPSING** *(unaudited)*	$ 237,879									
	GRAND TOTAL	$ 79,697,836	$ 82,134,639	$ -	$ 82,134,639	$ 44,346,511	$ 33,754,233	$ 4,033,895	$ 3,640,736	$ 393,158	99.52%

NEWTOWN BOARD OF EDUCATION
2022-23 BUDGET SUMMARY REPORT
FOR THE MONTH ENDING JANUARY 31, 2023

OBJECT CODE	EXPENSE CATEGORY	EXPENDED 2021 - 2022	2022 - 2023 APPROVED BUDGET	YTD TRANSFERS 2022 - 2023	CURRENT BUDGET	YTD EXPENDITURE	ENCUMBER	BALANCE	ANTICIPATED OBLIGATIONS	PROJECTED BALANCE	% EXP
100	**SALARIES**										
	Administrative Salaries	$ 4,245,732	$ 4,312,038	$ (121,271)	$ 4,190,767	$ 2,415,722	$ 1,791,271	$ (16,226)	$ (8,428)	$ (7,798)	100.19%
	Teachers & Specialists Salaries	$ 32,745,539	$ 33,817,522	$ 149,271	$ 33,966,793	$ 15,742,102	$ 18,299,022	$ (74,331)	$ (21,092)	$ (53,239)	100.16%
	Early Retirement	$ 81,000	$ 81,000	$ -	$ 81,000	$ 89,000	$ -	$ (8,000)	$ -	$ (8,000)	109.88%
	Continuing Ed./Summer School	$ 96,279	$ 97,846	$ 1,161	$ 99,007	$ 77,015	$ 21,497	$ 494	$ 494	$ -	100.00%
	Homebound & Tutors Salaries	$ 104,026	$ 189,413	$ 45,185	$ 234,598	$ 74,011	$ 66,568	$ 94,019	$ 74,019	$ 20,000	91.47%
	Certified Substitutes	$ 677,354	$ 742,610	$ -	$ 742,610	$ 362,848	$ 189,965	$ 189,798	$ 214,623	$ (24,825)	103.34%
	Coaching/Activities	$ 659,048	$ 737,184	$ -	$ 737,184	$ 375,413	$ 4,000	$ 357,771	$ 337,771	$ 20,000	97.29%
	Staff & Program Development	$ 188,833	$ 155,128	$ -	$ 155,128	$ 55,021	$ 16,644	$ 83,463	$ 79,738	$ 3,724	97.60%
	CERTIFIED SALARIES	$ 38,797,811	$ 40,132,741	$ 74,346	$ 40,207,087	$ 19,191,133	$ 20,388,967	$ 626,988	$ 677,125	$ (50,137)	100.12%
	Supervisors & Technology Salaries	$ 1,010,203	$ 1,103,470	$ 4,960	$ 1,108,430	$ 551,397	$ 400,343	$ 156,690	$ 63,526	$ 93,164	91.59%
	Clerical & Secretarial Salaries	$ 2,305,020	$ 2,361,178	$ 200	$ 2,361,378	$ 1,260,095	$ 1,056,137	$ 45,145	$ 1,875	$ 43,270	98.17%
	Educational Assistants	$ 2,751,027	$ 2,965,151	$ 60,477	$ 3,025,628	$ 1,470,474	$ 1,414,754	$ 140,400	$ 10,000	$ 130,400	95.69%
	Nurses & Medical Advisors	$ 939,312	$ 902,273	$ 31,615	$ 933,888	$ 414,963	$ 470,170	$ 48,755	$ 22,935	$ 25,820	97.24%
	Custodial & Maint. Salaries	$ 3,218,689	$ 3,395,484	$ (45,604)	$ 3,349,880	$ 1,826,348	$ 1,429,873	$ 93,660	$ 25,030	$ 68,630	97.95%
	Non-Certied Adj & Bus Drivers Salaries	$ -	$ 155,981	$ (155,981)	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!
	Career/Job Salaries	$ 122,065	$ 171,116	$ 4,257	$ 175,373	$ 77,963	$ 111,745	$ (14,335)	$ (17,858)	$ 3,523	97.99%
	Special Education Svcs Salaries	$ 1,348,349	$ 1,456,181	$ 20,937	$ 1,477,118	$ 697,250	$ 672,123	$ 107,745	$ (3,543)	$ 111,288	92.47%
	Security Salaries & Attendance	$ 684,773	$ 679,888	$ 293	$ 680,181	$ 340,659	$ 275,344	$ 64,177	$ 13,839	$ 50,338	92.60%
	Extra Work - Non-Cert.	$ 119,364	$ 109,770	$ 4,500	$ 114,270	$ 66,413	$ 450	$ 47,407	$ 45,014	$ 2,392	97.91%
	Custodial & Maint. Overtime	$ 356,554	$ 236,000	$ -	$ 236,000	$ 141,211	$ -	$ 94,789	$ 97,173	$ (2,384)	101.01%
	Civic Activities/Park & Rec.	$ 27,857	$ 32,000	$ -	$ 32,000	$ 14,388	$ -	$ 17,612	$ 17,612	$ -	100.00%
	NON-CERTIFIED SALARIES	$ 12,883,213	$ 13,568,492	$ (74,346)	$ 13,494,146	$ 6,861,163	$ 5,830,939	$ 802,044	$ 275,603	$ 526,441	96.10%
	SUBTOTAL SALARIES	**$ 51,681,024**	**$ 53,701,233**	**$ -**	**$ 53,701,233**	**$ 26,052,295**	**$ 26,219,906**	**$ 1,429,032**	**$ 952,728**	**$ 476,304**	99.11%
200	**EMPLOYEE BENEFITS**										
	Medical & Dental Expenses	$ 8,538,506	$ 8,790,863	$ -	$ 8,790,863	$ 6,599,735	$ 2,160,835	$ 30,293	$ 18,168	$ 12,125	99.86%
	Life Insurance	$ 88,568	$ 87,000	$ -	$ 87,000	$ 51,844	$ -	$ 35,156	$ 35,156	$ -	100.00%
	FICA & Medicare	$ 1,624,911	$ 1,706,549	$ -	$ 1,706,549	$ 840,889	$ -	$ 865,660	$ 865,660	$ -	100.00%
	Pensions	$ 954,029	$ 852,347	$ -	$ 852,347	$ 771,592	$ 500	$ 80,255	$ 105,000	$ (24,745)	102.90%
	Unemployment & Employee Assist.	$ 102,469	$ 81,600	$ -	$ 81,600	$ 25,600	$ -	$ 56,000	$ 51,000	$ 5,000	93.87%
	Workers Compensation	$ 436,325	$ 436,657	$ (12,626)	$ 424,031	$ 323,420	$ 100,554	$ 57	$ -	$ 57	99.99%
	SUBTOTAL EMPLOYEE BENEFITS	**$ 11,744,808**	**$ 11,955,016**	**$ (12,626)**	**$ 11,942,390**	**$ 8,613,080**	**$ 2,261,889**	**$ 1,067,421**	**$ 1,074,984**	**$ (7,563)**	100.06%

NEWTOWN BOARD OF EDUCATION
2022-23 BUDGET SUMMARY REPORT
FOR THE MONTH ENDING JANUARY 31, 2023

OBJECT CODE	EXPENSE CATEGORY	EXPENDED 2021 - 2022	2022 - 2023 APPROVED BUDGET	YTD TRANSFERS 2022 - 2023	CURRENT BUDGET	YTD EXPENDITURE	ENCUMBER	BALANCE	ANTICIPATED OBLIGATIONS	PROJECTED BALANCE	% EXP
300	**PROFESSIONAL SERVICES**										
	Professional Services	$ 404,089	$ 493,643	$ -	$ 493,643	$ 161,980	$ 72,516	$ 259,147	$ 259,147	$ -	100.00%
	Professional Educational Serv.	$ 138,998	$ 193,498	$ (14,000)	$ 179,498	$ 54,364	$ 12,645	$ 112,489	$ 112,489	$ -	100.00%
	SUBTOTAL PROFESSIONAL SERV.	**$ 543,087**	**$ 687,141**	**$ (14,000)**	**$ 673,141**	**$ 216,344**	**$ 85,160**	**$ 371,637**	**$ 371,637**	**$ -**	100.00%
400	**PURCHASED PROPERTY SERV.**										
	Buildings & Grounds Contracted Svc.	$ 672,697	$ 683,600	$ -	$ 683,600	$ 431,412	$ 192,269	$ 59,920	$ 59,920	$ -	100.00%
	Utility Services - Water & Sewer	$ 160,597	$ 144,770	$ -	$ 144,770	$ 69,271	$ -	$ 75,499	$ 59,999	$ 15,500	89.29%
	Building, Site & Emergency Repairs	$ 710,231	$ 450,000	$ -	$ 450,000	$ 175,522	$ 55,171	$ 219,307	$ 221,503	$ (2,196)	100.49%
	Equipment Repairs	$ 289,596	$ 269,051	$ -	$ 269,051	$ 122,350	$ 36,208	$ 110,493	$ 112,509	$ (2,016)	100.75%
	Rentals - Building & Equipment	$ 260,448	$ 267,242	$ -	$ 267,242	$ 116,920	$ 97,156	$ 53,167	$ 53,908	$ (742)	100.28%
	Building & Site Improvements	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
	SUBTOTAL PUR. PROPERTY SERV.	**$ 2,093,569**	**$ 1,814,663**	**$ -**	**$ 1,814,663**	**$ 915,475**	**$ 380,803**	**$ 518,385**	**$ 507,839**	**$ 10,546**	99.42%
500	**OTHER PURCHASED SERVICES**										
	Contracted Services	$ 1,019,495	$ 886,545	$ 130,200	$ 1,016,745	$ 763,107	$ 296,577	$ (42,939)	$ (12,703)	$ (30,237)	102.97%
	Transportation Services	$ 4,229,179	$ 4,919,428	$ (116,200)	$ 4,803,228	$ 2,496,724	$ 1,724,632	$ 581,872	$ 410,872	$ 171,000	96.44%
	Insurance - Property & Liability	$ 425,660	$ 422,766	$ 12,626	$ 435,392	$ 318,303	$ 122,339	$ (5,250)	$ -	$ (5,250)	101.21%
	Communications	$ 189,488	$ 152,524	$ -	$ 152,524	$ 100,119	$ 58,145	$ (5,740)	$ 7,387	$ (13,127)	108.61%
	Printing Services	$ 19,859	$ 24,789	$ -	$ 24,789	$ 7,737	$ 171	$ 16,881	$ 16,881	$ -	100.00%
	Tuition - Out of District	$ 3,252,787	$ 3,450,187	$ -	$ 3,450,187	$ 2,824,898	$ 2,374,035	$ (1,748,746)	$ (1,298,899)	$ (449,847)	113.04%
	Student Travel & Staff Mileage	$ 190,540	$ 239,087	$ -	$ 239,087	$ 157,396	$ 16,404	$ 65,287	$ 64,187	$ 1,100	99.54%
	SUBTOTAL OTHER PURCHASED SERV.	$ 9,327,010	$ 10,095,326	$ 26,626	$ 10,121,952	$ 6,668,282	$ 4,592,304	$ (1,138,635)	$ (812,274)	$ (326,361)	103.22%
600	**SUPPLIES**										
	Instructional & Library Supplies	$ 799,649	$ 854,242	$ -	$ 854,242	$ 567,884	$ 106,055	$ 180,303	$ 180,303	$ -	100.00%
	Software, Medical & Office Supplies	$ 217,455	$ 194,940	$ -	$ 194,940	$ 99,163	$ 43,640	$ 52,137	$ 52,137	$ -	100.00%
	Plant Supplies	$ 423,279	$ 366,100	$ -	$ 366,100	$ 230,803	$ 35,616	$ 99,681	$ 100,449	$ (768)	100.21%
	Electric	$ 995,294	$ 1,022,812	$ (93,500)	$ 929,312	$ 376,960	$ -	$ 552,352	$ 407,352	$ 145,000	84.40%
	Propane & Natural Gas	$ 415,377	$ 424,980	$ 40,000	$ 464,980	$ 214,358	$ -	$ 250,622	$ 269,622	$ (19,000)	104.09%
	Fuel Oil	$ 88,194	$ 63,000	$ 53,500	$ 116,500	$ 41,335	$ -	$ 75,165	$ 75,165	$ -	100.00%
	Fuel for Vehicles & Equip.	$ 191,173	$ 216,258	$ -	$ 216,258	$ 100,849	$ -	$ 115,409	$ 100,409	$ 15,000	93.06%
	Textbooks	$ 344,482	$ 223,132	$ -	$ 223,132	$ 110,981	$ 15,793	$ 96,357	$ 96,357	$ -	100.00%
	SUBTOTAL SUPPLIES	$ 3,474,903	$ 3,365,464	$ -	$ 3,365,464	$ 1,742,333	$ 201,104	$ 1,422,027	$ 1,281,795	$ 140,232	95.83%

NEWTOWN BOARD OF EDUCATION
2022-23 BUDGET SUMMARY REPORT
FOR THE MONTH ENDING JANUARY 31, 2023

OBJECT CODE	EXPENSE CATEGORY	EXPENDED 2021 - 2022	2022 - 2023 APPROVED BUDGET	YTD TRANSFERS 2022 - 2023	CURRENT BUDGET	YTD EXPENDITURE	ENCUMBER	BALANCE	ANTICIPATED OBLIGATIONS	PROJECTED BALANCE	% EXP
700	**PROPERTY**										
	Technology Equipment	$ 278,825	$ 156,024	$ -	$ 156,024	$ 40,736	$ -	$ 115,288	$ 115,288	$ -	100.00%
	Other Equipment	$ 257,460	$ 183,686	$ -	$ 183,686	$ 35,129	$ 9,799	$ 138,758	$ 138,758	$ -	100.00%
	SUBTOTAL PROPERTY	$ 536,285	$ 339,710	$ -	$ 339,710	$ 75,865	$ 9,799	$ 254,046	$ 254,046	$ -	100.00%
800	**MISCELLANEOUS**										
	Memberships	$ 59,271	$ 76,086	$ -	$ 76,086	$ 62,837	$ 3,268	$ 9,981	$ 9,981	$ -	100.00%
	SUBTOTAL MISCELLANEOUS	**$ 59,271**	**$ 76,086**	**$ -**	**$ 76,086**	**$ 62,837**	**$ 3,268**	**$ 9,981**	**$ 9,981**	**$ -**	100.00%
910	**SPECIAL ED CONTINGENCY**	**$ -**	**$ 100,000**	**$ -**	**$ 100,000**	**$ -**	**$ -**	**$ 100,000**	**$ -**	$ 100,000	0.00%
	TOTAL LOCAL BUDGET	**$ 79,459,957**	**$ 82,134,639**	**$ -**	**$ 82,134,639**	**$ 44,346,511**	**$ 33,754,233**	**$ 4,033,895**	**$ 3,640,736**	**$ 393,158**	99.52%
900	Transfer to Non-Lapsing	$ 237,741									
	GRAND TOTAL	**$ 79,697,698**	**$ 82,134,639**	**$ -**	**$ 82,134,639**	**$ 44,346,511**	**$ 33,754,233**	**$ 4,033,895**	**$ 3,640,736**	**$ 393,158**	99.52%

SPECIAL REVENUES

	EXCESS COST GRANT REVENUE	EXPENDED 2021-2022	APPROVED BUDGET	STATE PROJECTED 1-Jan	PROJECTED 1-Mar	ESTIMATED Total	VARIANCE to Budget	FEB DEPOSIT	MAY DEPOSIT	% TO BUDGET
51266	*Special Education Svcs Salaries ECG*	*$ (7,170)*		*$ (7,843)*		***$ (7,843)***	$ 7,843			#DIV/0!
54116	*Transportation Services - ECG*	*$ (333,218)*	$ (320,028)	*$ (469,245)*		***$ (469,245)***	$ 149,217			146.63%
54160	*Tuition - Out of District ECG*	*$ (1,193,144)*	$ (1,300,484)	*$ (1,348,899)*		***$ (1,348,899)***	$ 48,415			103.72%
	Total	*$ (1,533,532)*	$ (1,620,512)	*$ (1,825,987)*	*$ -*	***$ (1,825,987)***	$ 205,475	$ -	$ -	112.68%
								Total*	$ -	
	SDE MAGNET TRASNPORTATION GRANT	*$ (9,100)*	*$ (13,000)*	*$ (11,700)*		***$ (11,700)***	$ (1,300)			90.00%

OTHER REVENUES

BOARD OF EDUCATION FEES & CHARGES - SERVICES	APPROVED BUDGET	ANTICIPATED	RECEIVED	BALANCE	% RECEIVED
LOCAL TUITION	$32,430	$32,430	$23,800	$8,630	73.39%
HIGH SCHOOL FEES FOR PARKING PERMITS	$30,000	$30,000		$30,000	0.00%
MISCELLANEOUS FEES	$6,000	$6,000	$14,840	($8,840)	247.34%
TOTAL SCHOOL GENERATED FEES	$68,430		$38,640	$29,790	56.47%

	OTHER GRANTS	TOTAL BUDGET	21-22 EXPENSED	YTD EXPENSE	ENCUMBER	BALANCE	% EXPENSED
214	ESSER II	$625,532	$573,735	$16,243		$35,554	94.32%
218	ESSER III (estimated $809k for 21-22 use)	$1,253,726	$709,840	$220,557	$291,642	$31,688	97.47%

2022 - 2023
NEWTOWN BOARD OF EDUCATION
TRANSFERS RECOMMENDED
JANUARY 31, 2023

AMOUNT	FROM CODE	FROM DESCRIPTION	TO CODE	TO DESCRIPTION	REASON
ADMINISTRATIVE					
$12,875	100	EDUCATIONAL ASSISTANTS	200	PENSIONS	TO PROVIDE PROJECTED FUNDS NEEDED
$12,125	200	MEDICAL & DENTAL EXPENSES			FOR THE PENSION PLANS
$25,000					
$23,554	500	TRANSPORTATION SERVICES	500	CONTRACTED SERVICES	TO COVER COST OF THE STRATEGIC PLAN AND CONSULTING SERVICES
$48,554		**TOTAL TRASNFERS REQUESTED**			

2022 - 2023
NEWTOWN BOARD OF EDUCATION
DETAIL OF TRANSFERS RECOMMENDED
JANUARY 31, 2023

FROM				TO			
OBJECT CODE	**AMOUNT**			**OBJECT CODE**	**AMOUNT**		
100	$12,875	EDUCATIONAL ASSISTANTS		200	$25,000	PENSIONS	
		$12,875 001750630000 - 51232 SP ED - H S SP ED	ED ASSISTANTS			$25,000 001860900000 - 52500 DISTRICT - BENEFITS	PENSION PLANS
200	$12,125	MEDICAL & DENTAL EXPENSES					
		$12,125 001860900000 - 52000 DISTRICT - BENEFITS	PERSONNEL INSURANCE				
500	$23,554	TRANSPORTATION SERVICES		500	$23,554	CONTRACTED SERVICES	
		$23,554 001920870000 - 54110 DISTRICT - TRANSPORT	TRANS - LOCAL REG ED.			$23,554 001840830000 - 54000 DISTRICT - BOE	CONTRACTED SERVICES
	$48,554	**TOTAL TRANSFER REQUEST**			**$48,554**	**TOTAL TRANSFER REQUEST**	

chartwells
serving up happy & healthy

Newtown Public Schools Dining

September/October 2022

Dining Configuration and Opening

- **Sono Station Concept** – Our most popular concept features made to order Burritos. Taco and Burrito bowls are made fresh at the students request with Tortillas or tortilla chips with a choice of Taco Beef or Chicken w/rice and a toppings selection of Diced Tomatoes, Diced Onions, Shredded Lettuce, Olives, Jalapenos, Salsa, Black Beans, Sour Cream, Shredded Cheddar & Guacamole.
- **So Deli** – This station features freshly sliced Boars Head meats and cheeses with some special choices like roasted buffalo chicken or chipotle chicken breast. The topping selection features Sliced Tomatoes, Sliced Onions, Banana Peppers, Jalapenos, Shredded Lettuce & House made Pickles. The sauces are Ranch, Honey Mustard, Mustard, Mayonnaise, Balsamic Vinaigrette & Hot Sauce. These are served on either whole grain rolls or wraps. Also available at the deli are grilled gluten free wraps that accommodate the students that are gluten free.
- **2 mato** – Freshly Baked pizzas are prepared each day with four choices. Including the standard Cheese - Cheese and Pepperoni.

- Fresh Rotisserie Chicken is prepared daily at NHS.

- Freshly made in house pickles are quite a favorite especially at the So Deli Station.

November 2022

- **Night Hawk Express** – The Nighthawk Express room was setup in October and opened on November 3rd to provide students an innovative and exciting opportunity to access some snacks and nutritional items that is adjacent to the dining area. This room features Whole Grain mozzarella stuffed bread twists, pizza crunchers, miniature corn dogs in heated display cases where the homemade soups are. In the air screen area, there are freshly made yogurt and fruit parfaits, fruit salads and many drink selections. Ice Cream treats are a popular selection also.




December 2022

- **Soup Program** – We Featured 4 soups with a tasting in the Cafeteria that students could sample and vote on, this allowed us to create student favorites Broccoli Cheddar, Rotisserie Chicken Taco, Chicken Noodle & Tomato. These soups are made from prepared in-house stocks where the chefs use fresh vegetables and the bones from Rotisserie Chickens. Both chicken and vegetable stocks are made to produce authentic and full-flavored soups.

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serving up happy & healthy

December 2022

- **Mac & Cheesyology** - is a student favorite served at the American Classic station which provides students with Baked Macaroni and Cheese with choices of Buffalo Chicken, Oven baked Taco Beef, Sauteed Onions & Peppers, and Steamed Broccoli for toppings.

January – February 2023

- **Student Choice** – This concept is in three choices which students can sample and vote through an online portal or hyper link. Once the votes are tallied – the winner will be come part of the high school menu. The first sampling was the first week of February and featured a Quinoa bowl with rice, diced squash, garbanzo beans, Chopped Kale, and Soy Lime Dressing.

MOOD BOOST

Starting the second week of January 2022 students in the elementary schools are having the opportunity to experience a program called "Mood Boost". This is designed to help students make the connection between what they eat and how they feel, Mood Boost brings new lunch menus, fun activities and a collection of characters called "Moodie's" into the cafeteria.
Emerging research has shown that the foods we eat the most often may have an effect on how we feel, not just physically, but mentally. When eaten regularly Mood Boost foods, especially nutrient rich fruit and vegetables can help to elevate a person's mood and enhance their sense of well-being. These foods contain vitamins, minerals and antioxidants that communicate with our brain to support personal characteristics such as happy, alert, strong, calm and confident. This is the foundation for Mood Boost!
This is quite a success as the students are enjoying both the nutritious food and the fun swag.

Mood Boost Schedule

1/10 - 1/12 Week 1 Strong: Apple, Beet, Carrot, Citrus Mint Vinaigrette - MG, SH, HOM
1/16 – 1/19 Week 2 Happy: Red Cabbage, Pineapple, Apple salad – MG, SH, HOM
1/23 – 1/26 Week 3 Alert: Fresh Cantaloupe, Honeydew, Pineapple and Watermelon – MG, SH, HOM
2/06 – 2/10 Week 4 Confident: Fresh Kiwi Slices MG. SH, HOM
2/13 – 2/17 Week 5 Calm: Broccoli and Raisin Salad – MG, SH, HOM
2/20 – 2/24 Week 6 Smart: Mashed Sweet Potatoes – MG, SH, HOM

Reed / Hawley and NMS Mood Boost Schedule

3/03 Week 1 Strong: Apple, Beet, Carrot, Citrus Mint Vinaigrette
3/10 Week 2 Happy: Red Cabbage, Pineapple, Apple salad
3/17 Week 3 Alert: Fresh Cantaloupe, Honeydew, Pineapple and Watermelon
3/24 Week 4 Confident: Fresh Kiwi Slices
3/31 Week 5 Calm: Broccoli and Raisin Salad
4/07 Week 6 Smart: Mashed Sweet Potatoes

chartwells
serving up happy & healthy

Marketing Environment

The marketing has been completed in all the schools in District – please see photos of completion.

Upcoming:

Global Eats –

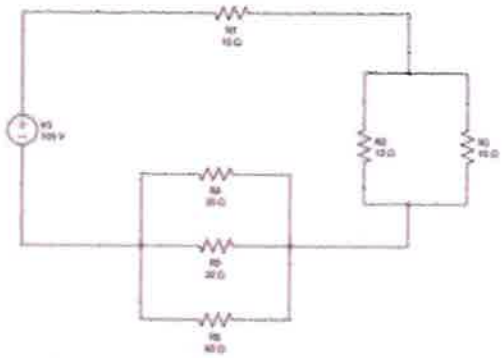
With the many different Cultures that are in the Newtown district including both students and staff we are presenting the Global Eats Concept which will allow us to provide a cultural and diverse station to not only share some cuisine from different culinary venues but also provide educational backgrounds and the history associated with the culture food being served.

The students will have the opportunity also to bring some ideas for future cuisine.

Honors Physics Curriculum

Kim Lowell and Melissa Torrance
January 10, 2023

Honors Physics



Kinematics

Forces

Momentum and Energy

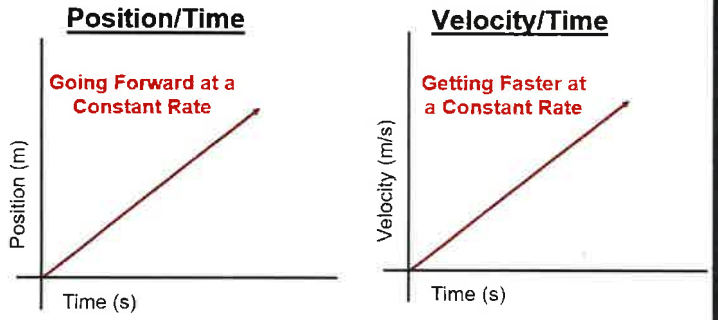
Rotational Motion

Electricity and Magnetism

Waves

NGSS: Science and Engineering Practices

1. Asking questions and defining problems
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence



Two Different Graphs With Different Meanings

Kinematics

- 1-D Motion
  - Motion Detector Lab
  - Free fall Lab
- 2-D Motion
  - Vector Maps
  - Projectile Launcher Lab

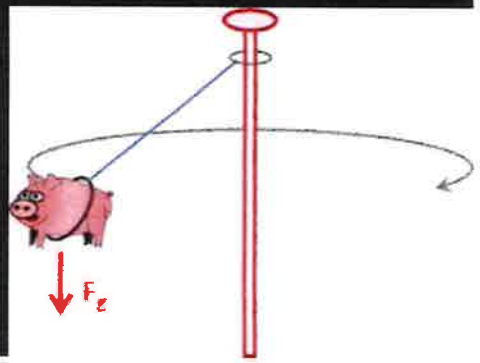
Forces

Newton's Laws

- First Law Videos
- Atwood Lab (Pulleys)

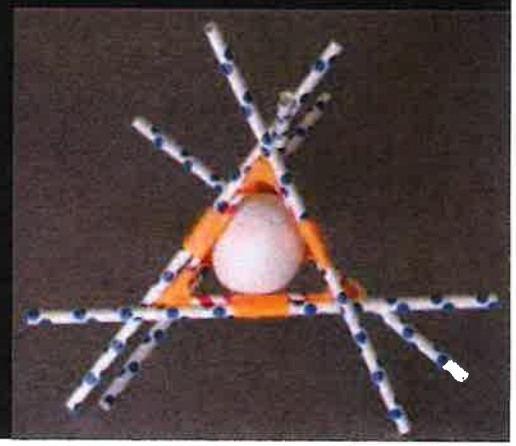
Centripetal Force and Gravity

- Flying Pig Lab



Momentum and Energy

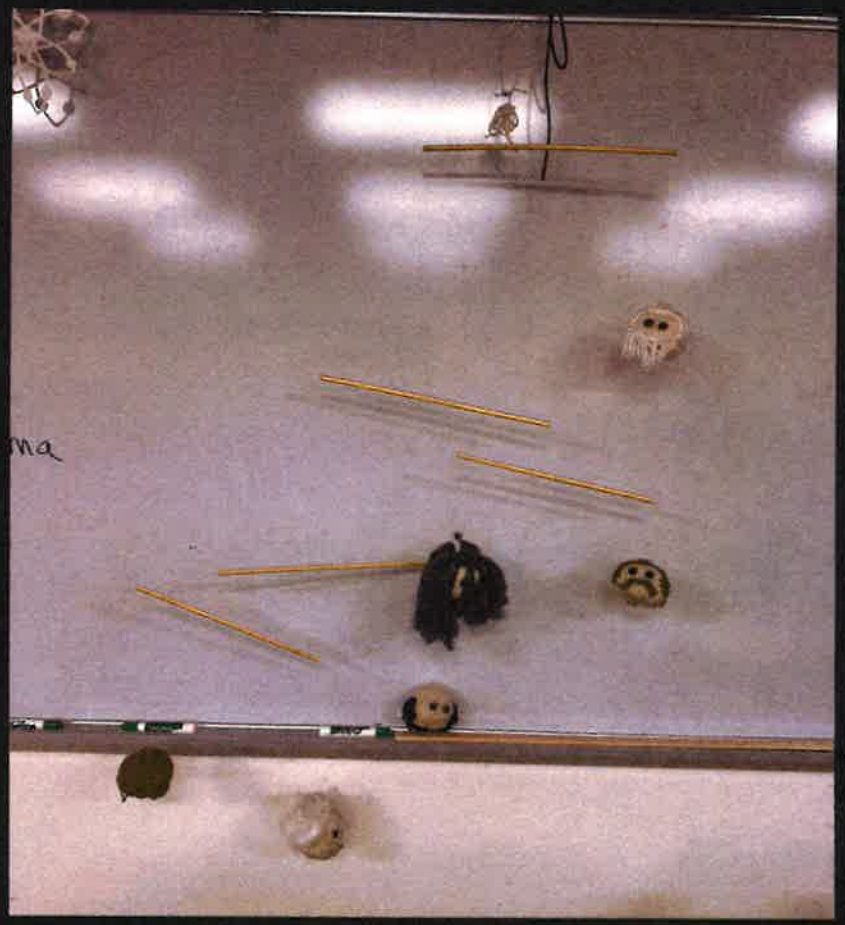
- Energy
  - Stair Lab
  - Conservation of Energy Lab
- Momentum
  - Inelastic Collision Lab
  - Egg Drop



Rotational Motion

Rotational Motion

- Torque Lab
- Mobile Project



Electricity and Magnetism

Electrostatics

- Pith Ball and Electroscope Lab
- Coulomb's Law and Balloon Lab

Circuits

- Play-Doh Lab
- Kirchhoff's Law Lab

E&M

- Drawing Electric Field Lines
- Making a simple electric motor

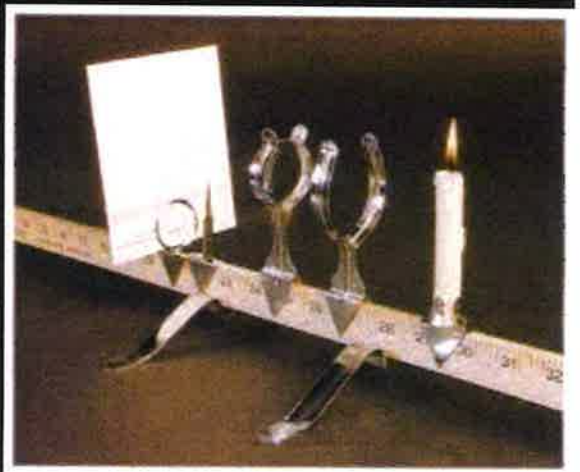
Waves

Sound

- Speed of Sound Lab
- Making a Musical Instruments

Light

- Snell's Law Lab
- Optical Bench Lab



Honors Physics Curriculum

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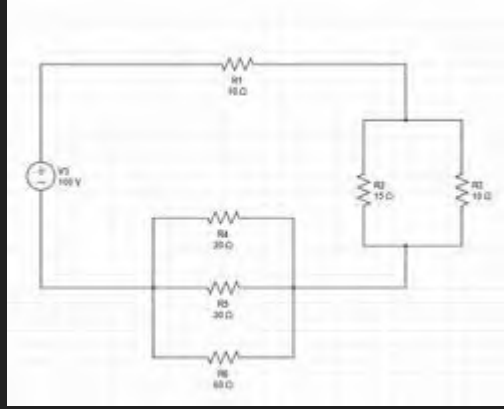

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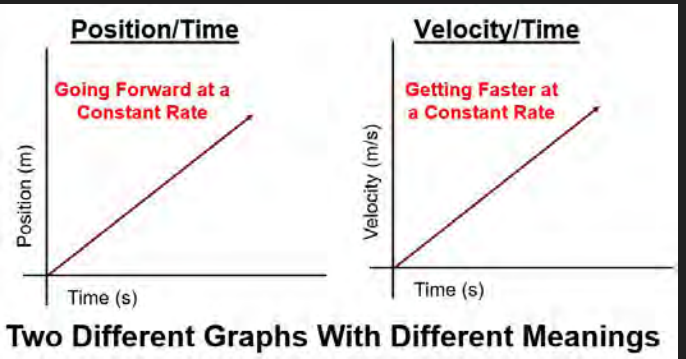

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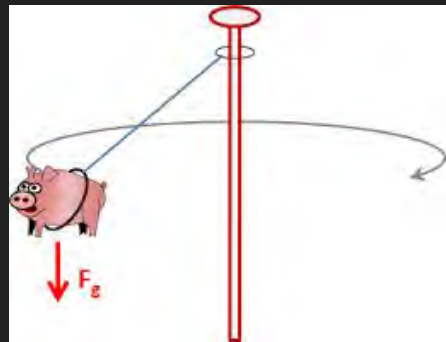

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Energy

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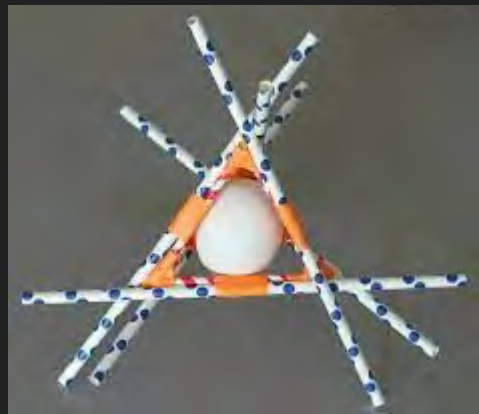
- Conservation of Energy Lab

Momentum

- Inelastic Collision Lab
- Egg Drop



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Rotational Motion

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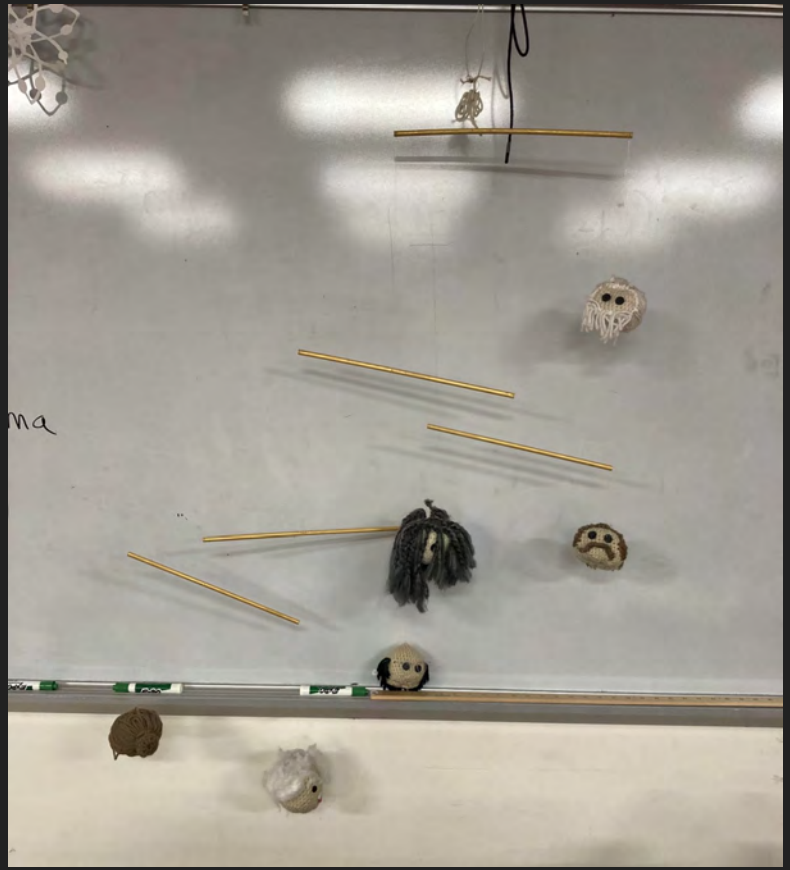

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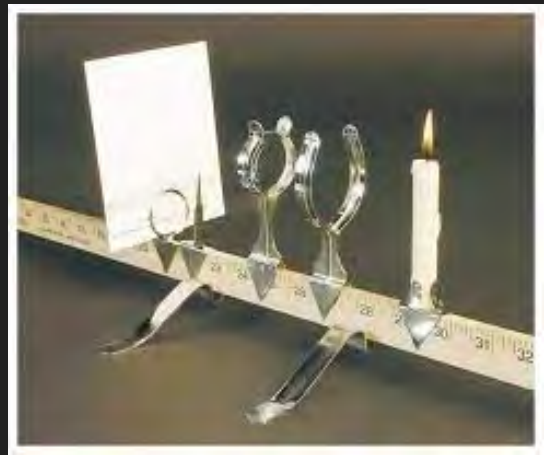


Thank you!

Newtown Public Schools

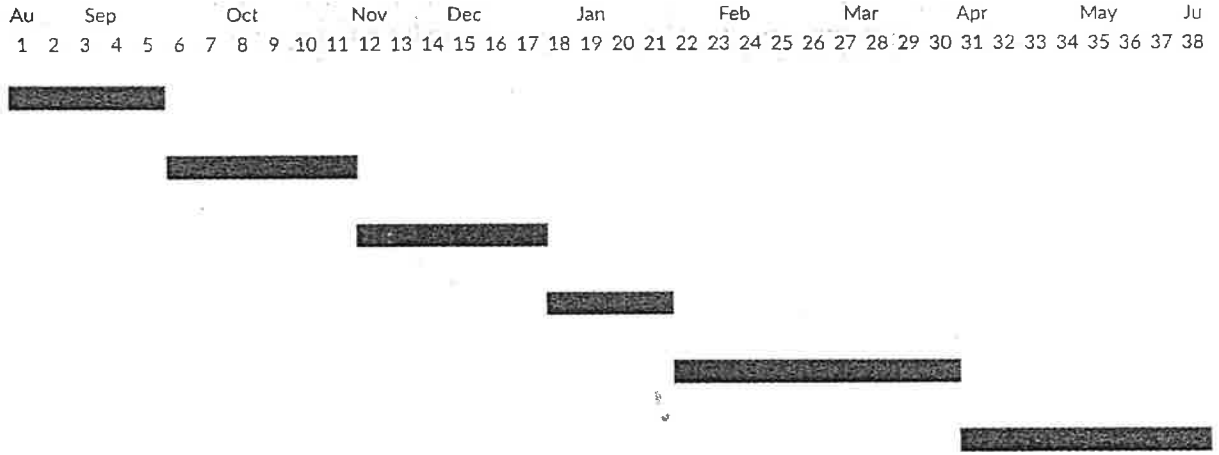
Atlas

Honors Physics

5 Curriculum Developers | Last Updated: Friday, Jan 14, 2022 by Lowell, Kim

Unit Calendar by Year

Unit	Lessons
Kinematics	0
Forces	0
Momentum and Energy	0
Rotational Motion	0
Electric and Magnetic Phenomena	0
Waves	0



6 Units found

Previous Year

Unit Planner: Kinematics
Honors Physics

Monday, January 3, 2022, 10:00 AM

Newtown High School / 2022-2023 / Grade 11 / Science / Honors Physics / Week 1 - Week 5

Last Updated: Tuesday, November 2, 2021 by Kim Lowell

Kinematics

Canfield, Christian; Dyer, Michael; Lowell, Kim; Smith, Timothy; Torrance, Melissa

- Unit Planner
- Lesson Planner

Concept-Based Unit Development Graphic Organizer (Download)

Unit Web Template (Optional)

Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Motion

Concepts: kinematics, rates, vector, projectiles, graphical analysis

G

Generalizations / Enduring Understandings

1. Graphical analysis or kinematic equations illustrate motion.

2. Time rates of change convey the motion of an object.

3. The independent and different nature of vertical and horizontal components of motion contribute to the parabolic path of a projectile.

4. Vector quantities have both magnitude and direction.

Guiding Questions

Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]

1.

What is slope? (F)

What is the difference between distance and displacement? (C)

How is velocity and acceleration determined from a position-time graph? (C)

How is acceleration and position determined from a velocity-time graph? (C)

How do the characteristics of motion, position, velocity, acceleration, and time, relate to each other for motion in a given direction? (C)

2.

What is speed? (F)

What is velocity? (F)

What is acceleration? (F)

How are speed and velocity different? How are they the same? (C)

How is the motion of objects predicted and/or explained? (C)

3.

What is a vector? (F)

What is a scalar? (F)

How do vector and scalar quantities differ from each other, and in what ways do calculations with each quantity differ from each other? (C)

How do vectors help in describing motion in more than just one direction? (C)

What effect does gravity have on vertical motion? (C)

If there is no air resistance, how and why would it be dangerous to go outdoors on a rainy days? (C)

Is the layman term for free fall accurate for the physics definition? (P)

Which is more important, vectors or scalars? (P)

Standard(s)

Connecticut Core Standards / Content Standards

CCSS: Literacy in History/Social Studies, Science, & Technical Subjects 6-12

CCSS: Grades 11-12

Reading: Science & Technical Subjects

3. Analyze how and why individuals, events, or ideas develop and interact over the course of a text.

RST.11-12.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

RST.11-12.7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

Writing

Text Types and Purposes

1. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.

WHST.11-12.1. Write arguments focused on discipline-specific content.

WHST.11-12.1e. Provide a concluding statement or section that follows from or supports the argument presented.

NGSS: Science and Engineering Practices

NGSS: 9-12

Practice 1. Asking questions (for science) and defining problems (for engineering)

Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

Ask questions that arise from careful observation of phenomena, or unexpected results, to clarify and/or seek additional information.

Ask questions that arise from examining models or a theory, to clarify and/or seek additional information and relationships.

Ask questions to determine relationships, including quantitative relationships, between independent and dependent variables.

Ask questions to clarify and refine a model, an explanation, or an engineering problem.

Evaluate a question to determine if it is testable and relevant.

Ask questions that can be investigated within the scope of the school laboratory, research facilities, or field (e.g., outdoor environment) with available resources and, when appropriate, frame a hypothesis based on a model or theory.

Ask and/or evaluate questions that challenge the premise(s) of an argument, the interpretation of a data set, or the suitability of a design.

Practice 2. Developing and using models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

Design a test of a model to ascertain its reliability.

Develop, revise, and/or use a model based on evidence to illustrate and/or predict the relationships between systems or between components of a system.

Develop and/or use multiple types of models to provide mechanistic accounts and/or predict phenomena, and move flexibly between model types based on merits and limitations.

Develop and/or use a model (including mathematical and computational) to generate data to support explanations, predict phenomena, analyze systems, and/or solve problems.

Practice 3. Planning and carrying out investigations

Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.

Plan an investigation or test a design individually and collaboratively to produce data to serve as the basis for evidence as part of building and revising models, supporting explanations for phenomena, or testing solutions to problems. Consider possible confounding variables or effects and evaluate the investigation's design to ensure variables are controlled.

Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.

Select appropriate tools to collect, record, analyze, and evaluate data.

Make directional hypotheses that specify what happens to a dependent variable when an independent variable is manipulated.

Practice 4. Analyzing and interpreting data

Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible.

Consider limitations of data analysis (e.g., measurement error, sample selection) when analyzing and interpreting data.

Evaluate the impact of new data on a working explanation and/or model of a proposed process or system.

Practice 5. Using mathematics and computational thinking

Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Use mathematical, computational, and/or algorithmic representations of phenomena or design solutions to describe and/or support claims and/or explanations.

Apply techniques of algebra and functions to represent and solve scientific and engineering problems.

Apply ratios, rates, percentages, and unit conversions in the context of complicated measurement problems involving quantities with derived or compound units (such as mg/mL, kg/m3, acre-feet, etc.).

Practice 6. Constructing explanations (for science) and designing solutions (for engineering)

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

Make a quantitative and/or qualitative claim regarding the relationship between dependent and independent variables.

Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.

Apply scientific ideas, principles, and/or evidence to provide an explanation of phenomena and solve design problems, taking into account possible unanticipated effects.

Apply scientific reasoning, theory, and/or models to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion.

Practice 7. Engaging in argument from evidence

Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.

Construct, use, and/or present an oral and written argument or counter-arguments based on data and evidence.

NGSS: Crosscutting Concepts

NGSS: 9-12

Crosscutting Statements

1. Patterns – Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.

Mathematical representations are needed to identify some patterns.

4. Systems and System Models – A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.

When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models.

Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales.

Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models.

7. Stability and Change – For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.

Much of science deals with constructing explanations of how things change and how they remain stable.

Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible.

CT: Science Framework (2005)

CT: Grades 9-12

I. Inquiry

SCIENTIFIC INQUIRY • Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. • Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation. • Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists. SCIENTIFIC LITERACY • Scientific literacy includes the ability to read, write, discuss and present coherent ideas about science. • Scientific literacy also includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media. SCIENTIFIC NUMERACY • Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas.

D INQ10. Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

D INQ6. Use appropriate tools and techniques to make observations and gather data.

D INQ7. Assess the reliability of the data that was generated in the investigation.

D INQ8. Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.

D INQ.9 Articulate conclusions and explanations based on research data, and assess results based on the design of the investigation.

Critical Content & Skills

*What students must **KNOW and be able to DO***

Students must know-

Displacement, Distance, Speed, Velocity, Acceleration, Vector, Scalar, free fall, range, projectile motion,

instantaneous, average, resultant vector, vector components

Students must be able to-
-justify the selection of a mathematical routine to solve problems.
-apply mathematical routines to quantities that describe natural phenomena.
-design a plan for collecting data to answer a particular scientific question.
-analyze data to identify patterns or relationships.
-use representations and models to analyze situations or solve problems qualitatively and quantitatively

-analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

-develop and/or use a model to generate data to support explanations, analyze systems, or solve problems.

Core Learning Activities

- Motion Detector Lab (https://www.cbsd.org/cms/lib/P...)
- Alternate Online Virtual Motion Detector Lab (http://ngsir.netfirms.com/englishhtm/Kinematics.htm)
- Alternate Online Virtual Motion Detector Lab (http://www.mste.uiuc.edu/murphy/MovingMan/MovingMan.html)
- Projectile Motion Lab (https://www.cbsd.org/cms/lib/P...)
- Alternate Online Virtual Projectile Motion Lab (https://phet.colorado.edu/en/simulation/legacy/projectile-motion)

Suggested Activities

- "Picket Fence" Laboratory (https://www.mustangps.org/Down...)
- Galileo Incline Lab (https://sites.google.com/site/...)
- Vector Treasure Hunt Activity (http://thephysicsaviary.com/Ph...)
- Alternate Online Virtual Vector Lab (https://phet.colorado.edu/en/simulation/vector-addition)

Assessments

Motion Detector Lab
Formative: Lab Assignment
Students move to match the graphs of different motion characteristics as a function of time. Student motion is captured and reproduced using motion detectors.
Motion Detector Lab.docx
Free Fall Lab
Formative: Lab Assignment
Student will analyze free fall motion moving through six different stations.
Free Fall Lab- Stations.docx
Test on 1-D Motion
Summative: Written Test
This is the summative assessment for 1-D Motion
test 1415.doc
Vector Map Lab

Resources

Professional & Student

Professional

- Giancoli, Douglas C. *Physics: Principles with Applications.* 5th ed. Upper Saddle River, NJ: Prentice Hall, 1998. Print. Teacher Edition.

Student

- Giancoli, Douglas C. *Physics: Principles with Applications.* 5th ed. Upper Saddle River, NJ: Prentice Hall, 1998. Print. Student Edition.
- http://www.physicsclassroom.com Basic background information on concepts in physics.

Formative: Lab Assignment Students will use vectors mathematically and graphically to find locations on a map/ vector map lab.doc **Projectile Lab** **Formative: Lab Assignment** Students will predict the range of a projectile launcher. Projectile Lab.doc **Projectile Motion Test** **Summative: Written Test** Summative test on projectile motion and vectors.	• Colorado PhET (https://phet.colorado.edu/)
Student Learning Expectation & 21st Century Skills Information Literacy Critical Thinking Spoken Communication Written Performance	Interdisciplinary Connections Students review and apply techniques learned in previous mathematics coursework on rates, algebraic rearrangement, and trigonometric functions.

Unit Planner: Forces
Honors Physics

Newtown High School / 2022-2023 / Grade 11 / Science / Honors Physics / Week 6 - Week 11

Last Updated: Friday, January 14, 2022 by Kim Lowell

Forces

Canfield, Christian; Dyer, Michael; Lowell, Kim; Smith, Timothy; Torrance, Melissa

- Unit Planner
- Lesson Planner

Concept-Based Unit Development Graphic Organizer (Download)

Unit Web Template (Optional)

Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Interaction

Concepts- Newton's laws, inertia, net force, equilibrium, weight, mass, centripetal, gravitational field

G

Generalizations / Enduring Understandings

1. Newton's three laws predict changes in motion.
2. Centripetal forces produce circular motion.
3. Objects with mass create a gravitational field.
4. Mass is a measure of the inertia of a body.
5. A new force produces an acceleration, an object in equilibrium experiences no acceleration.
6. Weight is dependent upon the position of a mass within a gravitational field.

Guiding Questions

Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]

1.
What are Newton's Three Laws? (F)

What are the types of friction? (F)

What is normal force? (F)

How must normal force be drawn? (F)

How are forces physically/pictorially represented? (F)

How is a net force on an object determined? (C)

How can any side of a tug of war win if Newton's 3rd law is true? (C)

How is force related to changes in motions of objects? (C)

How can variables be manipulated to affect the movement of objects? (C)

How are various applications such as inclines and elevators represented with Newton's laws, force diagrams, and motion diagrams? (C)

Why does the same push change the motion of a

shopping cart more than the motion of a car? (C)

Can an athlete improve their performance using one of Newton's three laws of motion? (P)

2.

What is centripetal acceleration? (F)

How does centripetal acceleration depend upon the object's speed and the radius of the circle? (F)

Why is an object moving in a circle at a constant speed accelerated? (C)

What force causes centripetal acceleration? (C)

How is circular motion like and unlike linear motion? (C)

3.

What is the universal law of gravitation? (F)

What is a gravitational field? (F)

What is a field force? (F)

What is the difference between a field force and a contact force? (F)

How does Kepler's law relate to the law of universal gravitation? (C)

How can the speed of a satellite change? (C)

How does gravity affect the motion of planets and satellites? (C)

Why is the acceleration due to gravity constant on Earth's surface? (C)

Based on the law of gravity should the US create a colony on the moon? (P)

Standard(s)

Connecticut Core Standards / Content Standards

CCSS: Literacy in History/Social Studies, Science, & Technical Subjects 6-12

CCSS: Grades 11-12

Reading: Science & Technical Subjects

3. Analyze how and why individuals, events, or ideas develop and interact over the course of a text.

RST.11-12.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

RST.11-12.7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

Writing

Text Types and Purposes

1. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.

WHST.11-12.1. Write arguments focused on discipline-specific content.

WHST.11-12.1a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.

WHST.11-12.1e. Provide a concluding statement or section that follows from or supports the argument presented.

NGSS: Science Performance Expectations (2013)

NGSS: HS Physical Sciences

HS.Forces and Interactions

Performance Expectations

HS-PS2-1. Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

HS-PS2-4. Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.

NGSS: Science and Engineering Practices

NGSS: 9-12

Practice 3. Planning and carrying out investigations

Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.

Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.

Select appropriate tools to collect, record, analyze, and evaluate data.

Manipulate variables and collect data about a complex model of a proposed process or system to identify failure points or improve performance relative to criteria for success or other variables.

Practice 4. Analyzing and interpreting data

Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible.

Consider limitations of data analysis (e.g., measurement error, sample selection) when analyzing and interpreting data.

Practice 5. Using mathematics and computational thinking

Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Use mathematical, computational, and/or algorithmic representations of phenomena or design solutions to describe and/or support claims and/or explanations.

Apply techniques of algebra and functions to represent and solve scientific and engineering problems.

Apply ratios, rates, percentages, and unit conversions in the context of complicated measurement problems involving quantities with derived or compound units (such as mg/mL, kg/m3, acre-feet, etc.).

Practice 6. Constructing explanations (for science) and designing solutions (for engineering)

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

Make a quantitative and/or qualitative claim regarding the relationship between dependent and independent variables.

Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws

that describe the natural world operate today as they did in the past and will continue to do so in the future.

Apply scientific ideas, principles, and/or evidence to provide an explanation of phenomena and solve design problems, taking into account possible unanticipated effects.

CT: Science Framework (2005)

CT: Grades 9-12

I. Inquiry

SCIENTIFIC INQUIRY • Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. • Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation. • Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists. SCIENTIFIC LITERACY • Scientific literacy includes the ability to read, write, discuss and present coherent ideas about science. • Scientific literacy also includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media. SCIENTIFIC NUMERACY • Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas.

D INQ1. Identify questions that can be answered through scientific investigation.

D INQ10. Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

D INQ3. Formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.

D INQ4. Design and conduct appropriate types of scientific investigations to answer different questions.

D INQ6. Use appropriate tools and techniques to make observations and gather data.

D INQ7. Assess the reliability of the data that was generated in the investigation.

D INQ8. Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.

D INQ.9 Articulate conclusions and explanations based on research data, and assess results based on the design of the investigation.

High School Physics

Motion and Forces Newton's laws predict the motion of most objects

When forces are balanced, no acceleration occurs; thus an object continues to move at a constant speed or stays at rest.

The law F = ma is used to solve motion problems that involve constant forces.

When one object exerts a force on a second object, the second object always exerts a force of equal magnitude and in the opposite direction.

Applying a force to an object perpendicular to the direction of its motion causes the object to change direction.

Circular motion requires the application of a constant force directed toward the center of the circle.

Newton's laws are not exact but provide very good approximations unless an object is small enough that quantum effects become important.

Critical Content & Skills

*What students must **KNOW and be able to DO***

Students must know-

force, Newton's Laws, net force, inertia, friction, mass, weight, gravitational force, normal force, tension, coefficient of friction, equilibrium, free body diagrams, centripetal force, centripetal acceleration, frequency, period,

weightlessness, gravity, orbital speed, gravitational field, Newton's law of universal gravitation

Students must be able to-
-justify the selection of a mathematical routine to solve problems.
-apply mathematical routines to quantities that describe natural phenomena.
-design a plan for collecting data to answer a particular scientific question.
-analyze data to identify patterns or relationships.
-use representations and models to analyze situations or solve problems qualitatively and quantitatively

-analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

-develop and/or use a model to generate data to support explanations, analyze systems, or solve problems.

Core Learning Activities

Core Activities

- Modified Atwood's Machine Laboratory

https://www.cerritos.edu/cmera...

- Alternate Online Virtual Force Lab

https://phet.colorado.edu/en/simulation/legacy/the-ramp

- Centripetal Force Lab

http://www.batesville.k12.in.u...

- Alternate Online Virtual Centripetal Force Lab

https://www.physicsclassroom.com/Physics-Interactives/Circular-and-Satellite-Motion/Uniform-Circular-Motion/Uniform-Circular-Motion-Interactive

Suggested Activities

- Newton's Third Law Activity
  - https://www.physicsclassroom.c...
- "Newton's Laws" Video
  - http://p2cdn4static.sharpschoo...
- Friction Laboratory
  - http://www.umsl.edu/~physics/f...

Assessments

Atwood Lab
Formative: Lab Assignment
Atwood Lab.doc
Centripetal Force Lab
Formative: Lab Assignment
Centripetal Force Lab.doc
Force Test
Summative: Written Test
~$st 1415.doc
Centripetal Force Test
Summative: Written Test
test 1415a.doc
Atwood Lab.doc

Resources

Professional & Student

Professional

- Giancoli, Douglas C.*Physics: Principles with Applications*. 5th ed. Upper Saddle River, NJ: Prentice Hall, 1998. Print. Teacher Edition.

Student

- Giancoli, Douglas C.*Physics: Principles with Applications*. 5th ed. Upper Saddle River, NJ: Prentice Hall, 1998. Print. Student Edition.
- http://www.physicsclassroom.com Basic background information on concepts in physics.
- Colorado PhET (https://phet.colorado.edu/)

Student Learning Expectation & 21st Century Skills

Information Literacy
Critical Thinking
Spoken Communication
Written Performance

Interdisciplinary Connections

Connections can be made to social studies. Teachers can look and see how history affected what scientists thought of how the planets in the universe move.

Unit Planner: Momentum and Energy
Honors Physics

Newtown High School / 2022-2023 / Grade 11 / Science / Honors Physics / Week 12 - Week 17

Last Updated: Friday, January 14, 2022 by Kim Lowell

Momentum and Energy

Canfield, Christian; Dyer, Michael; Lowell, Kim; Smith, Timothy; Torrance, Melissa

- Unit Planner
- Lesson Planner

Concept-Based Unit Development Graphic Organizer (Download)

Unit Web Template (Optional)

Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Conservation

Concepts- Momentum, Impulse, energy, collisions, law of conservation

G

Generalizations / Enduring Understandings

1. The action of forces transfer energy and momentum.

2. The law of conservation of energy governs all energy transfers.

3. The law of conservation of momentum determines the results of a collision.

4. An impulse applied to a system results in a change in momentum.

Guiding Questions

Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]

1.

What is work? (F)

How is power calculated? (F)

What is a closed system? (F)

What is the relationship between work and energy? (C)

How is energy created by a force? (C)

How is the energy stored or work done influenced by the choice of system? (C)

Based on impulse and force, should trampolines be banned? (P)

2.

What is kinetic energy? (F)

What is potential energy? (F)

In what way is energy conserved? (C)

How is energy transferred from one object to another? (C)

Based on energy conservation, is it better to sit in the front or the back of a rollercoaster? (P)

3.

What is momentum? (F)

Under what conditions is momentum conserved? (F)

How does Newton's third law relate to the law of conservation of momentum? (C)

How is momentum used to determine fault in car crashes? (C)

Is the layman definition of momentum accurate for the physics definition? (P)

4.

What is impulse? (F)

How can impulse change the momentum of an object or system? (C)

How can a baseball player improve their swing to hit more homeruns? (P)

Standard(s)

Connecticut Core Standards / Content Standards

CCSS: Literacy in History/Social Studies, Science, & Technical Subjects 6-12

CCSS: Grades 11-12

Reading: Science & Technical Subjects

3. Analyze how and why individuals, events, or ideas develop and interact over the course of a text.

RST.11-12.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

RST.11-12.7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

Writing

Text Types and Purposes

1. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.

WHST.11-12.1. Write arguments focused on discipline-specific content.

WHST.11-12.1a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.

WHST 11-12.1e. Provide a concluding statement or section that follows from or supports the argument presented.

NGSS: Science Performance Expectations (2013)

NGSS: HS Physical Sciences

HS.Forces and Interactions

Performance Expectations

HS-PS2-2. Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.

HS-PS2-3. Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.*

HS.Energy

Performance Expectations

HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.

NGSS: Science and Engineering Practices

NGSS: 9-12

Practice 1. Asking questions (for science) and defining problems (for engineering)

Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

Ask questions that can be investigated within the scope of the school laboratory, research facilities, or field (e.g., outdoor environment) with available resources and, when appropriate, frame a hypothesis based on a model or theory.

Practice 3. Planning and carrying out investigations

Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.

Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.

Select appropriate tools to collect, record, analyze, and evaluate data.

Make directional hypotheses that specify what happens to a dependent variable when an independent variable is manipulated.

Practice 4. Analyzing and interpreting data

Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible.

Consider limitations of data analysis (e.g., measurement error, sample selection) when analyzing and interpreting data.

Practice 5. Using mathematics and computational thinking

Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Use mathematical, computational, and/or algorithmic representations of phenomena or design solutions to describe and/or support claims and/or explanations

Apply techniques of algebra and functions to represent and solve scientific and engineering problems.

Apply ratios, rates, percentages, and unit conversions in the context of complicated measurement problems involving quantities with derived or compound units (such as mg/mL, kg/m3, acre-feet, etc.).

Practice 6. Constructing explanations (for science) and designing solutions (for engineering)

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

Make a quantitative and/or qualitative claim regarding the relationship between dependent and independent variables.

CT: Science Framework (2005)

CT: Grades 9-12

I. Inquiry

SCIENTIFIC INQUIRY • Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. • Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation. • Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists. SCIENTIFIC LITERACY • Scientific literacy includes the ability to read, write, discuss and present coherent ideas about science. • Scientific literacy also includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media. SCIENTIFIC NUMERACY • Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas.

D INQ1. Identify questions that can be answered through scientific investigation.

D INQ10. Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

D INQ3. Formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.

D INQ4. Design and conduct appropriate types of scientific investigations to answer different questions.

D INQ5. Identify independent and dependent variables, including those that are kept constant and those used as controls.

D INQ6. Use appropriate tools and techniques to make observations and gather data.

D INQ7. Assess the reliability of the data that was generated in the investigation.

D INQ8. Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.

D INQ.9 Articulate conclusions and explanations based on research data, and assess results based on the design of the investigation.

High School Physics

Conservation of Energy and Momentum The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects

Kinetic energy can be calculated by using the formula E = (1/2)mv2.

Changes in gravitational potential energy near Earth can be calculated by using the formula (change in potential energy) = mgh.

Momentum is calculated as the product mv.

Momentum is a separately conserved quantity different from energy.

An unbalanced force on an object produces a change in its momentum.

The principles of conservation of momentum and energy can be used to solve problems involving elastic and inelastic collisions.

Critical Content & Skills

*What students must **KNOW and be able to DO***

Students must know-

work, energy, kinetic energy, potential energy, gravitational potential energy, elastic potential energy, mechanical energy, power, momentum, impulse, elastic collision, inelastic collision, conservative, nonconservative, conservation laws, work-energy theorem

Students must be able to-

-justify the selection of a mathematical routine to solve problems.
-apply mathematical routines to quantities that describe natural phenomena.
-design a plan for collecting data to answer a particular scientific question.
-analyze data to identify patterns or relationships.
-use representations and models to analyze situations or solve problems qualitatively and quantitatively

- construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.

-analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

-develop and/or use a model to generate data to support explanations, analyze systems, or solve problems.

Core Learning Activities

Core Activities

- Work and Power Lab with Stairs
  - https://www.nhvweb.net/nhhs/sc...
- Conservation of Mechanical Energy Lab
  - http://mrsj.exofire.net/ipc/do...
- "Explosions" and the Conservation of Momentum Lab
  - https://rucsm.org/physics/labd...
- Alternate Online Virtual Conservation of Momentum Lab

https://www.physicsclassroom.com/Physics-Interactives/Momentum-and-Collisions

Suggested Activities

- Impulse and Change in Momentum Lab
  - https://academics.uccs.edu/rgi...
- Alternate Online Virtual Conservation of Mechanical Energy Lab

https://phet.colorado.edu/en/simulation/legacy/energy-skate-park

- Egg Drop Activity
  - https://stem.northeastern.edu/...

Assessments

Work and Power Stair Activity
Formative: Lab Assignment
Stair Lab
Conservation of Energy Lab
Formative: Lab Assignment
Conservation of Energy Lab.doc
Conservation of Momentum Lab
Formative: Lab Assignment
Conservation of Momentum Lab.docx
Car Crash Reconstruction
Formative: Group Project
ACCIDENT RECONSTRUCTION 201415.docx
Conservation of Energy Test
Summative: Written Test
test 1516.doc
Momentum and Impulse Test
Summative: Written Test
test 1516 make up use makeup 1819.doc

Resources

Professional & Student

Professional

- Giancoli, Douglas C.*Physics: Principles with Applications*. 5th ed. Upper Saddle River, NJ: Prentice Hall, 1998. Print. Teacher Edition.

Student

- Giancoli, Douglas C.*Physics: Principles with Applications*. 5th ed. Upper Saddle River, NJ: Prentice Hall, 1998. Print. Student Edition.
- http://www.physicsclassroom.com Basic background information on concepts in physics.
- Colorado PhET (https://phet.colorado.edu/)

Student Learning Expectation & 21st Century Skills

Information Literacy
Critical Thinking
Spoken Communication

Interdisciplinary Connections

Students can relate what they are learning about work, power, and kinetic energy to activities they are doing in physical education classes.

Written Performance	

Unit Planner: Rotational Motion
Honors Physics

Newtown High School / 2022-2023 / Grade 11 / Science / Honors Physics / Week 18 - Week 21

Last Updated: Friday, January 14, 2022 by Kim Lowell

Rotational Motion

Canfield, Christian; Dyer, Michael; Lowell, Kim; Smith, Timothy; Torrance, Melissa

- Unit Planner
- Lesson Planner

Concept-Based Unit Development Graphic Organizer (Download)

Unit Web Template (Optional)

Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Correlation

Concepts- rotational motion, torque, angular momentum, equilibrium, inertia

G

Generalizations / Enduring Understandings

1. Mathematical formulas predict rotational motion.

2. A force exerted at an angle, a distance away from the pivot point generates a torque and can change the angular momentum of the system.

3. Conservation laws govern the motion of rotating objects.

4. Objects that have no net torque are in equilibrium.

Guiding Questions

Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]

1.
What is angular displacement? (F)

What is angular velocity? (F)

What is angular acceleration? (F)

How are angular displacement, angular velocity, and angular acceleration related? (C)

What links the linear and rotational motion of an object? (C)

2.
What is torque? (F)

How are torque and angular acceleration calculated? (F)

What is angular momentum? (F)

What is moment of inertia? (F)

Why are long wrenches more effective? (C)

How do balanced forces cause rotation? (C)

How does the choice of system and rotation point affect the forces that cause a torque on an object or a system? (C)

How does a system at rotational equilibrium compare to a system in translational equilibrium? (C)

How does an external net torque change the angular momentum of a system? (C)

What factors affect the moment of inertia for a rotating object? (C)

How is the moment of inertia found for a rotating object? (C)

3.
What is conservation of angular momentum? (F)

Why is a rotating bicycle wheel more stable than a stationary one? (C)

	Why does a spinning skater accelerate when his/her arms are brought closer to the body? (C) How does conservation of energy apply to rotating objects? (C) Which conservation law is the most important? (P)

Standard(s)

Connecticut Core Standards / Content Standards

GRADUATION STANDARDS

Graduation

PROBLEM SOLVING

Standard 1: The student demonstrates use of the scientific method and applies appropriate procedures to solve and communicate an authentic problem or situation.

Identifies the problem adequately.

Develops an action plan that addresses the problem adequately.

Collects accurate and relevant information, data, or media to adequately address the problem.

Demonstrates or applies a solution to the problem based on the data collected.

Formulates a conclusion that adequately addresses the problem.

The writing generally follows the given format.

CCSS: Literacy in History/Social Studies, Science, & Technical Subjects 6-12

CCSS: Grades 11-12

Reading: Science & Technical Subjects

3. Analyze how and why individuals, events, or ideas develop and interact over the course of a text.

RST.11-12.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

RST.11-12.7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

Writing

Text Types and Purposes

1. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and

relevant and sufficient evidence.

WHST.11-12.1. Write arguments focused on discipline-specific content.

WHST.11-12.1a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.

WHST.11-12.1e. Provide a concluding statement or section that follows from or supports the argument presented.

NGSS: Science Performance Expectations (2013)

NGSS: HS Physical Sciences

HS.Energy

Performance Expectations

HS-PS3-3. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.*

NGSS: Science and Engineering Practices

NGSS: 9-12

Practice 1. Asking questions (for science) and defining problems (for engineering)

Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

Ask questions to determine relationships, including quantitative relationships, between independent and dependent variables.

Practice 3. Planning and carrying out investigations

Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.

Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.

Select appropriate tools to collect, record, analyze, and evaluate data.

Make directional hypotheses that specify what happens to a dependent variable when an independent variable is manipulated.

Practice 4. Analyzing and interpreting data

Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible.

Consider limitations of data analysis (e.g., measurement error, sample selection) when analyzing and interpreting data.

Practice 5. Using mathematics and computational thinking

Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Create and/or revise a computational model or simulation of a phenomenon, designed device, process, or system.

Use mathematical, computational, and/or algorithmic representations of phenomena or design solutions to describe

and/or support claims and/or explanations.

Apply techniques of algebra and functions to represent and solve scientific and engineering problems.

Apply ratios, rates, percentages, and unit conversions in the context of complicated measurement problems involving quantities with derived or compound units (such as mg/mL, kg/m3, acre-feet, etc.).

Practice 6. Constructing explanations (for science) and designing solutions (for engineering)

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

Make a quantitative and/or qualitative claim regarding the relationship between dependent and independent variables.

Apply scientific ideas, principles, and/or evidence to provide an explanation of phenomena and solve design problems, taking into account possible unanticipated effects.

Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.

Practice 8. Obtaining, evaluating, and communicating information

Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs.

Gather, read, and evaluate scientific and/or technical information from multiple authoritative sources, assessing the evidence and usefulness of each source.

Communicate scientific and/or technical information or ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (i.e., orally, graphically, textually, mathematically).

CT: Science Framework (2005)

CT: Grades 9-12

I. Inquiry

SCIENTIFIC INQUIRY • Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. • Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation. • Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists. SCIENTIFIC LITERACY • Scientific literacy includes the ability to read, write, discuss and present coherent ideas about science. • Scientific literacy also includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media. SCIENTIFIC NUMERACY • Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas.

D INQ1. Identify questions that can be answered through scientific investigation.

D INQ10. Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

D INQ3. Formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.

D INQ4. Design and conduct appropriate types of scientific investigations to answer different questions.

D INQ5. Identify independent and dependent variables, including those that are kept constant and those used as controls.

D INQ6. Use appropriate tools and techniques to make observations and gather data.

D INQ7. Assess the reliability of the data that was generated in the investigation.

D INQ8. Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.

D INQ.9 Articulate conclusions and explanations based on research data, and assess results based on the design of the investigation.

High School Physics

Motion and Forces Newton's laws predict the motion of most objects

When forces are balanced, no acceleration occurs; thus an object continues to move at a constant speed or stays at rest.

Critical Content & Skills

*What students must **KNOW and be able to DO***

Students must know-

torque, static equilibrium, lever arm, angular displacement, angular speed, angular acceleration, tangential velocity, angular momentum, rotational kinetic energy, rotational inertia, torque, rotational equilibrium, conservation of angular momentum

Students must be able to-

-justify the selection of a mathematical routine to solve problems.
-apply mathematical routines to quantities that describe natural phenomena.
-design a plan for collecting data to answer a particular scientific question.
-analyze data to identify patterns or relationships.
-use representations and models to analyze situations or solve problems qualitatively and quantitatively

-analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

-develop and/or use a model to generate data to support explanations, analyze systems, or solve problems.

Core Learning Activities

Core Activities

- Torque Lab
  - http://www.phy.olemiss.edu/lab...
- Alternative online level lab

https://phet.colorado.edu/en/simulation/balancing-act

- Mobile Project
  - http://msquacksphysics.weebly....

Suggested Activities

- Conservation of Rotational Energy lab
  - https://physics.mercer.edu/lab...

Assessments

Torque Lab

Resources

Professional & Student

Formative: Lab Assignment phet torque lab.docx **Mobile Project** **Formative: Group Project** mobile 1819.doc Mobile Project Rubric update 2.15.pdf **Rotational Motion Test** **Summative: Written Test** test 1617 make up.doc	Professional • Giancoli, Douglas C.*Physics: Principles with Applications*. 5th ed. Upper Saddle River, NJ: Prentice Hall, 1998. Print. Teacher Edition. Student • Giancoli, Douglas C.*Physics: Principles with Applications*. 5th ed. Upper Saddle River, NJ: Prentice Hall, 1998. Print. Student Edition. • http://www.physicsclassroom.com Basic background information on concepts in physics. • Colorado PhET (https://phet.colorado.edu/)
Student Learning Expectation & 21st Century Skills Information Literacy Critical Thinking Spoken Communication Written Performance	Interdisciplinary Connections Students can see how mobiles use science as well as artistic principles in their designs.

Unit Planner: Electric and Magnetic Phenomena
Honors Physics

Newtown High School / 2022-2023 / Grade 11 / Science / Honors Physics / Week 22 - Week 30

Last Updated: Friday, January 14, 2022 by Kim Lowell

Electric and Magnetic Phenomena

Canfield, Christian; Dyer, Michael; Lowell, Kim; Smith, Timothy; Torrance, Melissa

- Unit Planner
- Lesson Planner

Concept-Based Unit Development Graphic Organizer (Download)

Unit Web Template (Optional)

Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Connections

Concepts- charge, Coulomb's Law, electric field, magnetic field, DC circuits, induction, force, alternating current

G

Generalizations / Enduring Understandings

1. Objects with charge create an electric field.

2. The force between charges are governed by Coulomb's Law.

3. Conservation laws govern how a DC circuit behaves.

4. Moving electric charges produce magnetic fields and moving magnets induce electric fields.

Guiding Questions

Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]

1.
What are the differences between conductors and insulators? (F)

How are objects charge by conduction and induction? (F)

What is an electric field? (F)

What are electric field lines? (F)

How do electrical charges behave in an electric field? (C)

Why does a balloon stick on the ceiling, if rubber is an insulator? (C)

2.

What is the relationship between electric forces, charges, and distance? (F)

What is an inverse square law? (F)

How are electrostatic and gravitational forces alike? (C)

How are electrostatic and gravitational forces different? (C)

3.
What is voltage, current, and resistance? (F)

What is Ohm's law? (F)

What are series and parallel circuits? (F)

What is the difference between AC and DC? (F)

What conditions affect the voltage, the current, and the resistance in a circuit? (C)

How does changing shape alter the value of something? (C)

Why are Christmas lights wired in series but house lights wired in parallel? (C)

4.

	What is the right hand rule? (F) How are currents generated by magnetic fields? (C) How are charges affected by magnetic fields? (C) Would life be different if electric fields and magnetic fields did not induce one another? (P)

Standard(s)

Connecticut Core Standards / Content Standards

CCSS: Literacy in History/Social Studies, Science, & Technical Subjects 6-12

CCSS: Grades 11-12

Reading: Science & Technical Subjects

3. Analyze how and why individuals, events, or ideas develop and interact over the course of a text.

RST.11-12.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

RST.11-12.7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

Writing

Text Types and Purposes

1. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.

WHST.11-12.1. Write arguments focused on discipline-specific content.

WHST.11-12.1a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.

WHST.11-12.1e. Provide a concluding statement or section that follows from or supports the argument presented.

NGSS: Science Performance Expectations (2013)

NGSS: HS Physical Sciences

HS.Forces and Interactions

Performance Expectations

HS-PS2-4. Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.

HS-PS2-5. Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.

NGSS: Science and Engineering Practices

NGSS: 9-12

Practice 1. Asking questions (for science) and defining problems (for engineering)

Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

Ask questions to determine relationships, including quantitative relationships, between independent and dependent variables.

Practice 3. Planning and carrying out investigations

Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.

Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.

Select appropriate tools to collect, record, analyze, and evaluate data

Make directional hypotheses that specify what happens to a dependent variable when an independent variable is manipulated.

Practice 4. Analyzing and interpreting data

Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible.

Consider limitations of data analysis (e.g., measurement error, sample selection) when analyzing and interpreting data.

Analyze data to identify design features or characteristics of the components of a proposed process or system to optimize it relative to criteria for success.

Practice 5. Using mathematics and computational thinking

Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Use mathematical, computational, and/or algorithmic representations of phenomena or design solutions to describe and/or support claims and/or explanations.

Apply techniques of algebra and functions to represent and solve scientific and engineering problems.

Apply ratios, rates, percentages, and unit conversions in the context of complicated measurement problems involving quantities with derived or compound units (such as mg/mL, kg/m3, acre-feet, etc.).

Practice 6. Constructing explanations (for science) and designing solutions (for engineering)

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

Make a quantitative and/or qualitative claim regarding the relationship between dependent and independent variables.

CT: Science Framework (2005)

CT: Grades 9-12

I. Inquiry

SCIENTIFIC INQUIRY • Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. • Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation. • Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists. SCIENTIFIC LITERACY • Scientific literacy includes the ability to read, write, discuss and present coherent ideas about science. • Scientific literacy also

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D INQ10. Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

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D INQ4. Design and conduct appropriate types of scientific investigations to answer different questions.

D INQ5. Identify independent and dependent variables, including those that are kept constant and those used as controls.

D INQ6. Use appropriate tools and techniques to make observations and gather data.

D INQ7. Assess the reliability of the data that was generated in the investigation.

D INQ8. Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.

D INQ.9 Articulate conclusions and explanations based on research data, and assess results based on the design of the investigation.

High School Physics

Electric and Magnetic Phenomena Electric and magnetic phenomena are related and have many practical applications.

The voltage or current in simple direct current (DC) electric circuits constructed from batteries, wires, resistors, and capacitors can be predicted using Ohm's law.

Any resistive element in a DC circuit dissipates energy, which heats the resistor.

The power in any resistive circuit element can be calculated by using the formula Power = 12R.

Charged particles are sources of electric fields and are subject to the forces of the electric fields from other charges.

Magnetic materials and electric currents (moving electric charges) are sources of magnetic fields and are subject to forces arising from the magnetic fields of other sources.

Changing magnetic fields produce electric fields, thereby inducing currents in nearby conductors.

Critical Content & Skills

*What students must **KNOW and be able to DO***

Students must know:

electric charge, Coulomb's Law, conductors, insulators, conduction, induction, electric field, electrostatic force, electrostatic potential, potential difference, capacitance, equipotential surfaces, electron volt, voltage, current, resistance, circuit, Ohm's Law, electromotive force, magnetic field, induced current, electromagnetic induction , magnetic flux, electric motor, electric generator, transformer, Lenz's Law, Faraday's Law

Students must be able to-

-justify the selection of a mathematical routine to solve problems.
-apply mathematical routines to quantities that describe natural phenomena.
-design a plan for collecting data to answer a particular scientific question.
-analyze data to identify patterns or relationships

-use representations and models to analyze situations or solve problems qualitatively and quantitatively

-analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

-develop and/or use a model to generate data to support explanations, analyze systems, or solve problems

Core Learning Activities

Core Activities

- Electrostatic Lab
  - https://manoa.hawaii.edu/explo...
- Ohm's Law Lab
  - https://www.phy.olemiss.edu/la...
- Alternative Online Ohm's Law Lab
  - https://phet.colorado.edu/en/simulation/legacy/ohms-law

Suggested Activities

- Balloon Lab
  - http://www.physicsinmotion.net...
- Play-Doh Lab
  - https://aapt.scitation.org/doi...
- Alternative Online Play-Doh Lab

http://www.pulsedpower.net/Applets/Electronics/resistance2/resistance.html

- Circuit Lab
  - https://www.phy.olemiss.edu/la...
- Alternative Online Circuit Lab

https://phet.colorado.edu/en/simulation/circuit-construction-kit-dc-virtual-lab

- Drawing Magnetic Field Lines
  - https://s3.wp.wsu.edu/uploads/...
- Magnetic Fields of Coil Lab
  - http://physics.ham.miamioh.edu...
- Making a Motor
  - https://www.spsnational.org/th...

Assessments

Electrostatic Lab
Formative: Lab Assignment


Electrostatic Lab

Ohm's Law Lab
Formative: Lab Assignment

Resources

Professional & Student

Professional

- Giancoli, Douglas C. *Physics: Principles with Applications*. 5th ed. Upper Saddle River, NJ:

Ohm's Law Lab **Building a Motor** **Formative: Group Project** Instructions for building a motor.doc **Electrostatic Test** **Summative: Written Test** test 1516 make up.doc **Current Electricity Test** **Summative: Written Test** test 1415.doc **Electricity and Magnetism Test** **Summative: Written Test** test 1516.doc	Prentice Hall, 1998. Print. Teacher Edition. Student • Giancoli, Douglas C.*Physics: Principles with Applications*. 5th ed. Upper Saddle River, NJ: Prentice Hall, 1998. Print. Student Edition. • http://www.physicsclassroom.com Basic background information on concepts in physics. • Colorado PhET (https://phet.colorado.edu/)
Student Learning Expectation & 21st Century Skills Information Literacy Critical Thinking Spoken Communication Written Performance	Interdisciplinary Connections

Unit Planner: Waves
Honors Physics

Monday, January 9, 2023, 10:09AM

Newtown High School / 2022-2023 / Grade 11 / Science / Honors Physics / Week 31 - Week 38

Last Updated: Friday, January 14, 2022 by Kim Lowell

Waves

Canfield, Christian; Dyer, Michael; Lowell, Kim; Smith, Timothy; Torrance, Melissa

- Unit Planner
- Lesson Planner

Concept-Based Unit Development Graphic Organizer (Download)

Unit Web Template (Optional)

Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Behavior

Concepts- waves, light, sound, energy, interference, mathematical formulas, medium boundaries

G

Generalizations / Enduring Understandings

1. Waves transfer energy and momentum without matter.

2. Mathematical formulas predict the qualities of sound.

3. Medium boundaries manipulate waves.

4. Light and sound travel as waves.

5. Waves can exhibit constructive or destructive interference.

Guiding Questions

Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]

1.
What is the difference between transverse and longitudinal waves? (F)

What is the relationship between wave speed, wavelength, and frequency? (F)

How does a restoring force differ from a "regular" force? (F)

What affects the period of a pendulum? (F)

How does the presence of restoring forces predict and lead to harmonic motion? (C)

What is the Doppler Effect? (F)

How does the motion of an adult and a child on a swing differ? (C)

Why does a police siren sound different when it is moving toward you than when it is moving away from you? (C)

2.
What is a node? (F)

What is an antinode? (F)

Why do different guitar strings have different pitches? (C)

Why does a flute have a higher pitch than a trumpet? (C)

3.
What is the law of reflection? (F)

How does Snell's Law predict how light will bend as it travels from one medium to another? (F)

Why are optical fibers preferred over electrical cables to send information? (F)

What are the practical applications of reflection and refraction? (C)

Does an object become invisible? (C)

Which lens, diverging or converging, is more useful? (P)

4.

What type of wave is sound? (F)

What type of wave is light? (F)

How are sound and light waves similar? (C)

How are sound and light waves different? (C)

Many movies sometimes do not accurately depict science principles. What mistakes are made about sound and light waves in movies? (P)

5.

What happens when two waves meet? (F)

What is a standing wave? (F)

How can auditoriums be designed to minimize areas of destructive interference? (C)

Standard(s)

Connecticut Core Standards / Content Standards

GRADUATION STANDARDS

Graduation

PROBLEM SOLVING

Standard 1: The student demonstrates use of the scientific method and applies appropriate procedures to solve and communicate an authentic problem or situation.

Identifies the problem adequately.

Develops an action plan that addresses the problem adequately.

Collects accurate and relevant information, data, or media to adequately address the problem.

Demonstrates or applies a solution to the problem based on the data collected.

Formulates a conclusion that adequately addresses the problem.

The writing generally follows the given format.

CCSS: Literacy in History/Social Studies, Science, & Technical Subjects 6-12

CCSS: Grades 11-12

Reading: Science & Technical Subjects

3. Analyze how and why individuals, events, or ideas develop and interact over the course of a text.

RST.11-12.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

RST.11-12.7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

Writing

Text Types and Purposes

1. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.

WHST.11-12.1. Write arguments focused on discipline-specific content.

WHST.11-12.1a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.

WHST.11-12.1e. Provide a concluding statement or section that follows from or supports the argument presented.

NGSS: Science Performance Expectations (2013)

NGSS: HS Physical Sciences

HS.Waves and Electromagnetic Radiation

Performance Expectations

HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

HS-PS4-4. Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.

HS-PS4-5. Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.*

NGSS: Science and Engineering Practices

NGSS: 9-12

Practice 1. Asking questions (for science) and defining problems (for engineering)

Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

Define a design problem that involves the development of a process or system with interacting components and criteria and constraints that may include social, technical, and/or environmental considerations.

Practice 2. Developing and using models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

Develop and/or use multiple types of models to provide mechanistic accounts and/or predict phenomena, and move flexibly between model types based on merits and limitations.

Develop a complex model that allows for manipulation and testing of a proposed process or system.

Develop and/or use a model (including mathematical and computational) to generate data to support explanations, predict phenomena, analyze systems, and/or solve problems.

Practice 3. Planning and carrying out investigations

Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.

Plan an investigation or test a design individually and collaboratively to produce data to serve as the basis for evidence as part of building and revising models, supporting explanations for phenomena, or testing solutions to problems. Consider possible confounding variables or effects and evaluate the investigation's design to ensure variables are controlled.

Select appropriate tools to collect, record, analyze, and evaluate data.

Practice 4. Analyzing and interpreting data

Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible.

Consider limitations of data analysis (e.g., measurement error, sample selection) when analyzing and interpreting data.

Compare and contrast various types of data sets (e.g., self-generated, archival) to examine consistency of measurements and observations.

Practice 5. Using mathematics and computational thinking

Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Use mathematical, computational, and/or algorithmic representations of phenomena or design solutions to describe and/or support claims and/or explanations.

Apply techniques of algebra and functions to represent and solve scientific and engineering problems.

Apply ratios, rates, percentages, and unit conversions in the context of complicated measurement problems involving quantities with derived or compound units (such as mg/mL, kg/m3, acre-feet, etc.).

Practice 6. Constructing explanations (for science) and designing solutions (for engineering)

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.

CT: Science Framework (2005)

CT: Grades 9-12

I. Inquiry

SCIENTIFIC INQUIRY • Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. • Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation. • Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists. SCIENTIFIC LITERACY • Scientific literacy includes the ability to read, write, discuss and present coherent ideas about science. • Scientific literacy also

includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media. SCIENTIFIC NUMERACY • Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas.

D INQ10. Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

D INQ6. Use appropriate tools and techniques to make observations and gather data.

D INQ7. Assess the reliability of the data that was generated in the investigation.

D INQ8. Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.

D INQ.9 Articulate conclusions and explanations based on research data, and assess results based on the design of the investigation.

High School Physics

Waves Waves have characteristic properties that do not depend on the type of wave

Waves carry energy from one place to another.

Transverse and longitudinal waves exist in mechanical media, such as springs and ropes, and in the earth as seismic waves.

Wavelength, frequency, and wave speed are related.

Sound is a longitudinal wave whose speed depends on the properties of the medium in which it propagates.

Radio waves, light, and X-rays are different wavelength bands in the spectrum of electromagnetic waves whose speed in a vacuum is approximately 3 x 108m/s, and less when passing through other media.

Waves have characteristic behaviors such as interference, diffraction, refraction and polarization.

Beats and the Doppler Effect result from the characteristic behavior of waves.

Critical Content & Skills

*What students must **KNOW and be able to DO***

Students must know-

simple harmonic motion, spring constant, amplitude, cycle, frequency, period, equilibrium position, longitudinal wave, transverse wave, resonance, superposition, interference, Doppler Effect, wavelength, wave velocity, reflection, refraction, Snell's Law, critical angle, total internal reflection, virtual image, focal point, focal length, refraction, electromagnetic spectrum

Students must be able to-

-justify the selection of a mathematical routine to solve problems.
-apply mathematical routines to quantities that describe natural phenomena.
-design a plan for collecting data to answer a particular scientific question.
-analyze data to identify patterns or relationships.
-use representations and models to analyze situations or solve problems qualitatively and quantitatively

-analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

-develop and/or use a model to generate data to support explanations, analyze systems, or solve problems.

Core Learning Activities

Core Activities

- Speed of Sound Lab
  - https://www.mines.edu/teacherp...
- Optical Bench Lab
  - https://www.homesciencetools.c...
- Alternative Online Optical Bench Labs

https://www.physicsclassroom.com/Physics-Interactives/Refraction-and-Lenses/Optics-Bench

Suggested Activities

- Light Box Reflection/Refraction Activity
  - http://www.umsl.edu/~physics/f...
- Alternative Light Box Lab

  https://www.physicsclassroom.com/Physics-Interactives/Refraction-and-Lenses/Refraction
- Refraction of Light/ Snell's Law
  - https://groups.physics.northwe...
- Alternative Online Refraction Lab
  - https://phet.colorado.edu/en/s...

Assessments

Speed of Sound Lab
Formative: Lab Assignment
data for speed of sound lab.docx
Musical Instrument Project
Formative: Group Project
musical instrument project.docx
Snell's Law Lab
Formative: Lab Assignment
Snell's Law Lab.docx
Optical Bench Lab
Formative: Lab Assignment
Optical Bench Lab
Waves and Sound Test
Summative: Written Test
test 1516.doc
Light Test
Summative: Written Test
test 1516.doc

Resources

Professional & Student

Professional

- Giancoli, Douglas C.*Physics: Principles with Applications*. 5th ed. Upper Saddle River, NJ: Prentice Hall, 1998. Print. Teacher Edition.

Student

- Giancoli, Douglas C.*Physics: Principles with Applications.* 5th ed. Upper Saddle River, NJ: Prentice Hall, 1998. Print. Student Edition.
- http://www.physicsclassroom.com Basic background information on concepts in physics.
- Colorado PhET (https://phet.colorado.edu/)

Student Learning Expectation & 21st Century Skills

Information Literacy
Critical Thinking
Spoken Communication
Written Performance

Interdisciplinary Connections

Students can connect what they are learning about sound to the musical instruments that they play in band.

i-Ready Data Report:
Winter Results

Report to the BOE
February 22, 2023
Kara DiBartolo
Director of Teaching and Learning

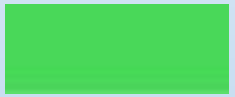
Agenda

- ❑ Assessment Overview
- ❑ Winter Results for Math and ELA
- ❑ Typical Growth vs. Stretch Growth
- ❑ Winter Growth Results for Math and ELA
- ❑ District and School Based - Next Steps
- ❑ Summary/Questions

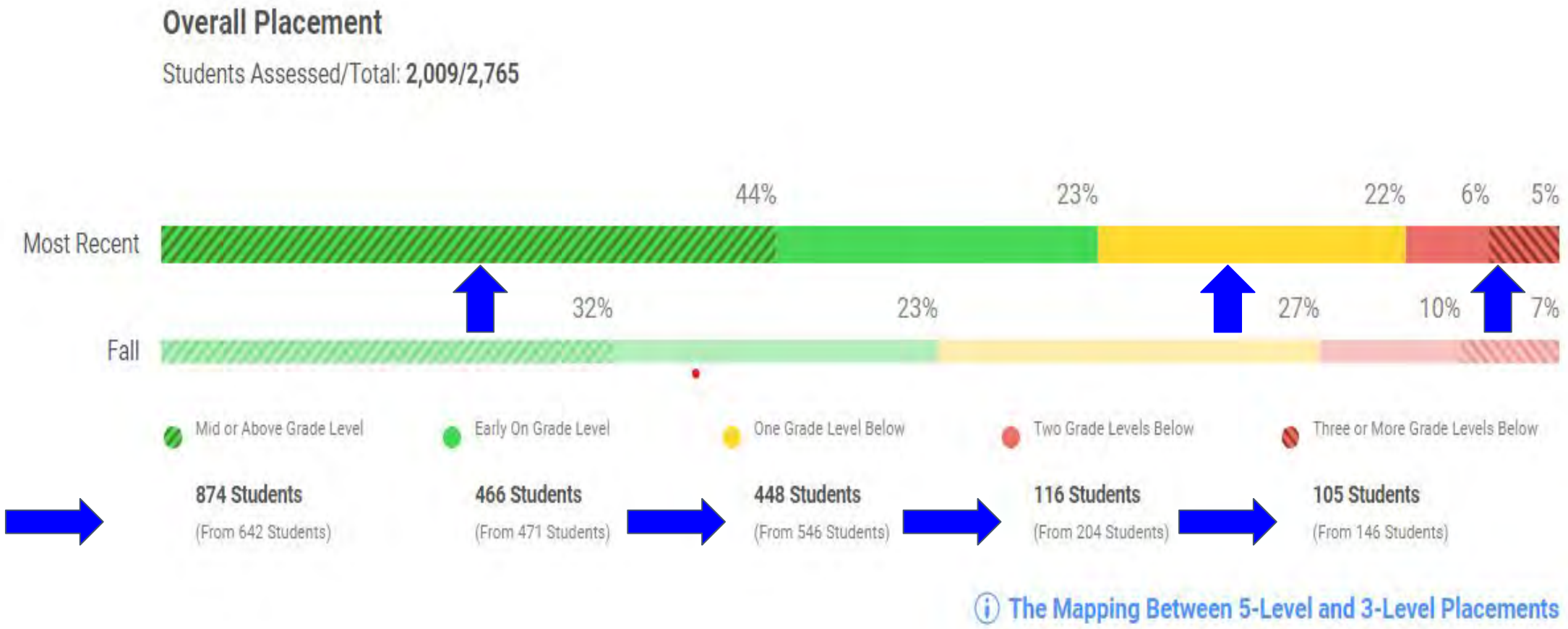
i-Ready Assessment Overview

- Administered three time a year in grades 2-8.
- Both ELA and Math.
- Detailed reports, include overall results as well as results for 4 domains in math and 6 domains in ELA.
- Students results are color coded and reported out based on whether they have met the expectations of the grade level standards in ELA and math.
- Internal, district-wide assessment.

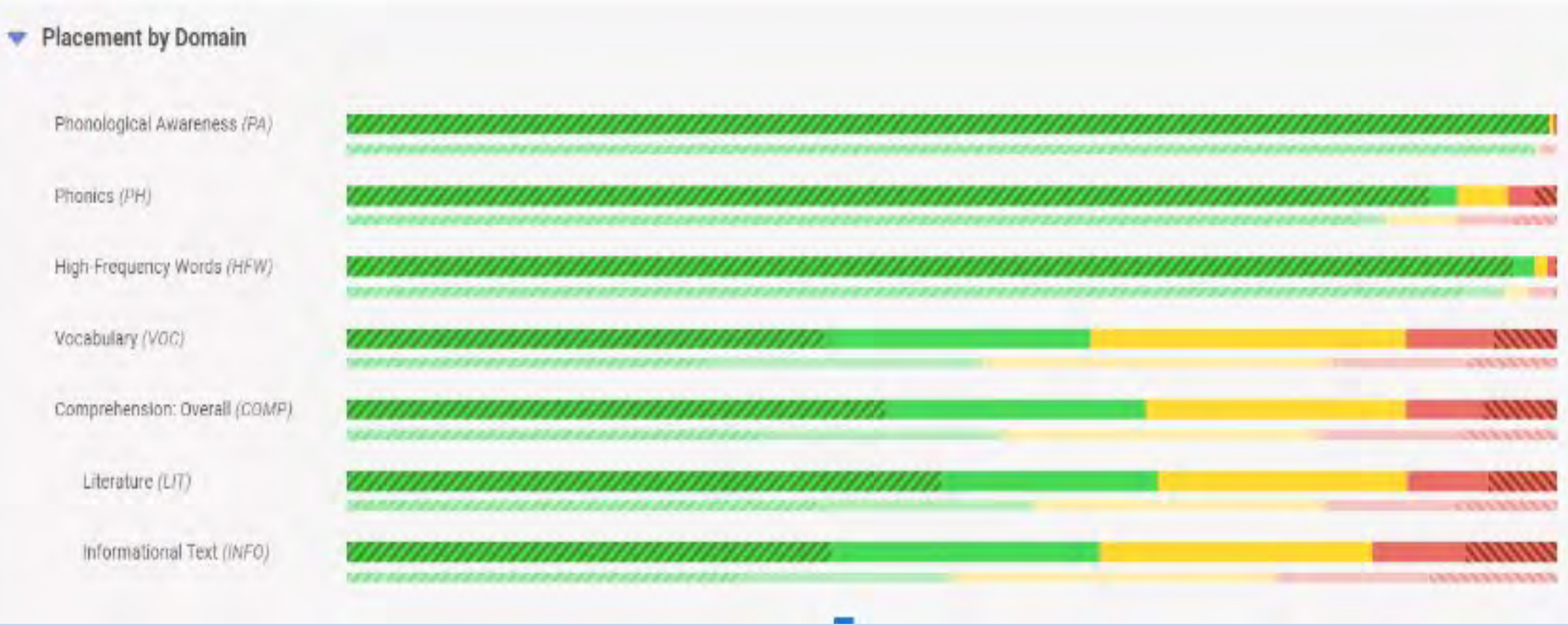
5 Level Placement Reports

-  Mid or above grade level performance
-  Early grade level performance
- One grade level below
-  Two grade levels below
-  Three or more grade levels below

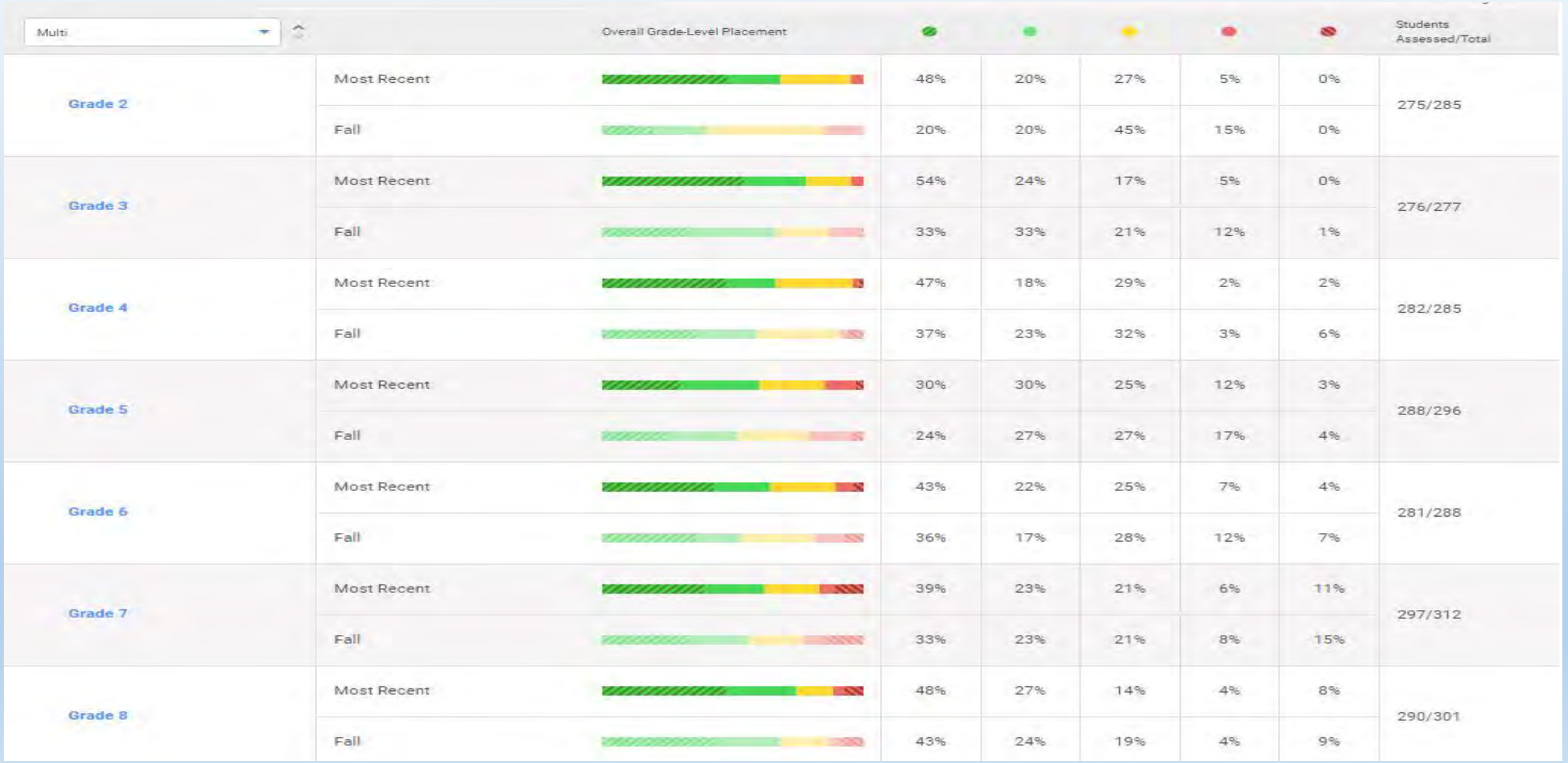
Reading Placement with Fall Comparisons



Reading Placement by Domain: Fall to Winter

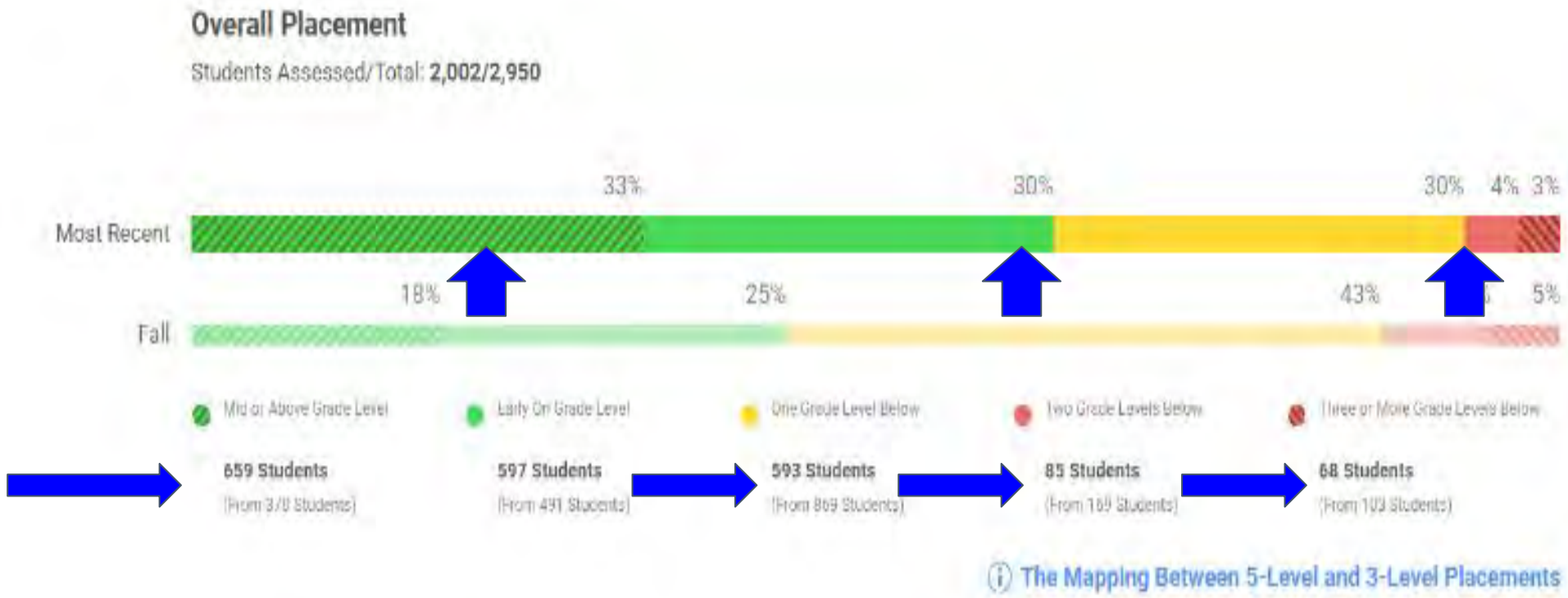


Reading Placement by Grade: Fall to Winter

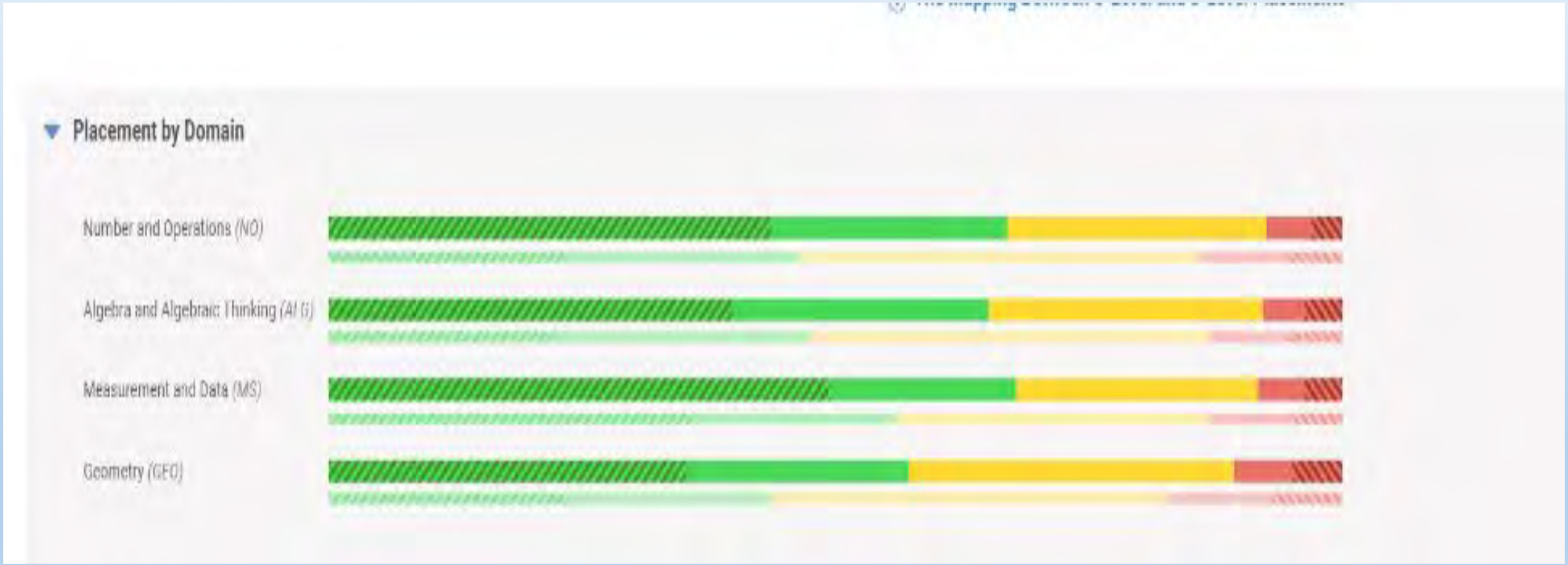


Multi		Overall Grade-Level Placement						Students Assessed/Total
Grade 2	Most Recent		48%	20%	27%	5%	0%	275/285
	Fall		20%	20%	45%	15%	0%	
Grade 3	Most Recent		54%	24%	17%	5%	0%	276/277
	Fall		33%	33%	21%	12%	1%	
Grade 4	Most Recent		47%	18%	29%	2%	2%	282/285
	Fall		37%	23%	32%	3%	6%	
Grade 5	Most Recent		30%	30%	25%	12%	3%	288/296
	Fall		24%	27%	27%	17%	4%	
Grade 6	Most Recent		43%	22%	25%	7%	4%	281/288
	Fall		36%	17%	28%	12%	7%	
Grade 7	Most Recent		39%	23%	21%	6%	11%	297/312
	Fall		33%	23%	21%	8%	15%	
Grade 8	Most Recent		48%	27%	14%	4%	8%	290/301
	Fall		43%	24%	19%	4%	9%	

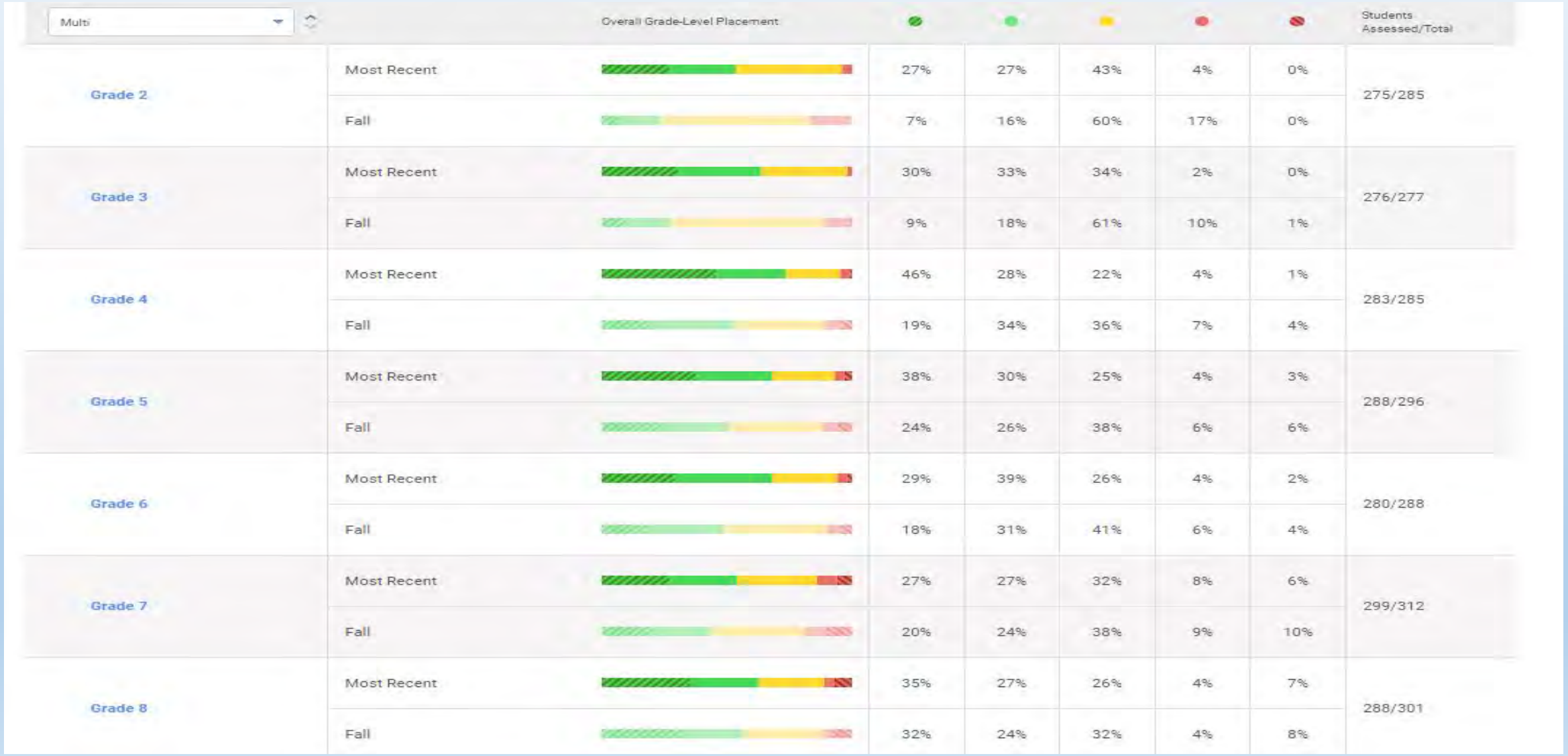
Math Overall Placement: Fall to Winter



Math Placement by Domain - Fall to Winter



Math Placement by Grade: Fall to Winter



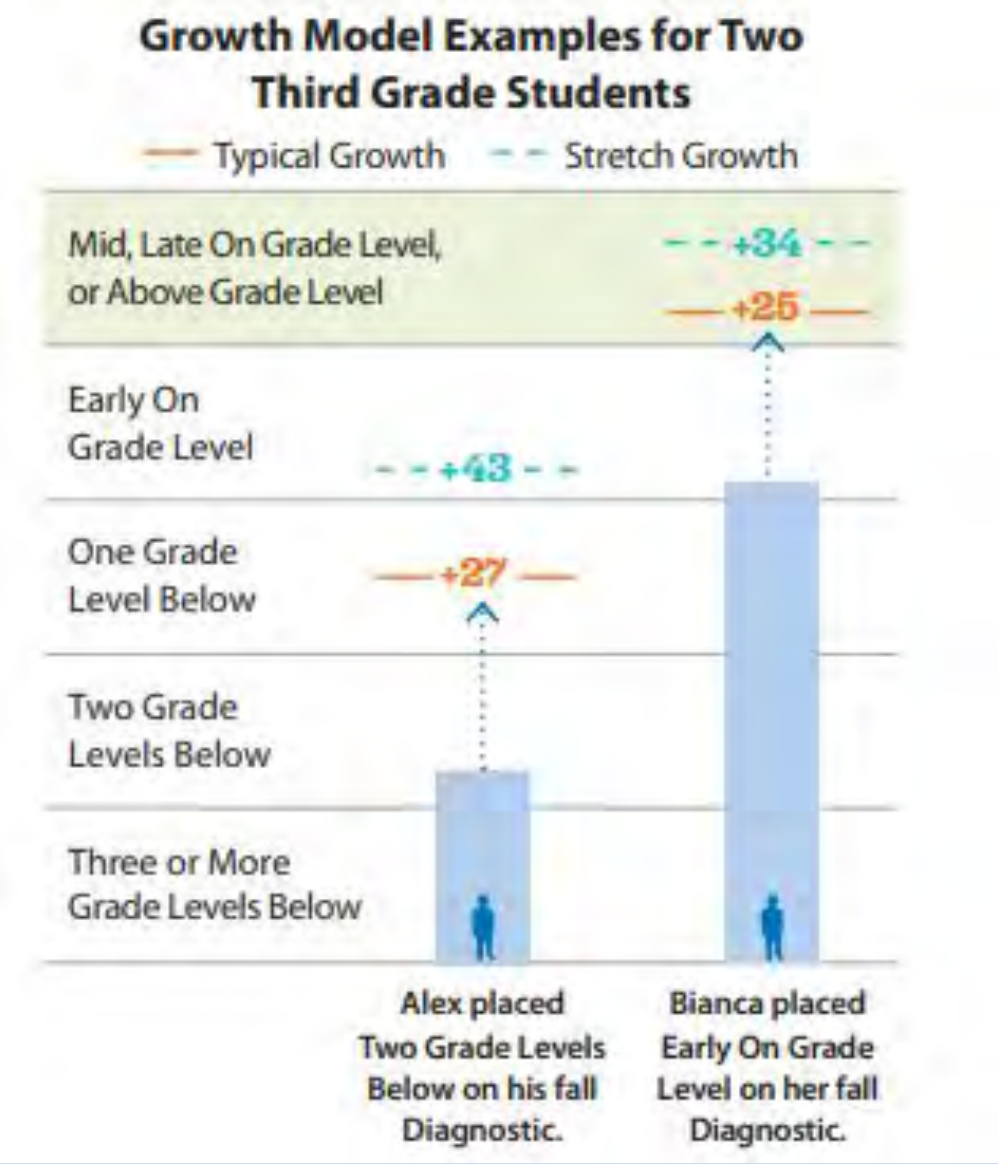
Multi		Overall Grade-Level Placement						Students Assessed/Total
Grade 2	Most Recent		27%	27%	43%	4%	0%	275/285
	Fall		7%	16%	60%	17%	0%	
Grade 3	Most Recent		30%	33%	34%	2%	0%	276/277
	Fall		9%	18%	61%	10%	1%	
Grade 4	Most Recent		46%	28%	22%	4%	1%	283/285
	Fall		19%	34%	36%	7%	4%	
Grade 5	Most Recent		38%	30%	25%	4%	3%	288/296
	Fall		24%	26%	38%	6%	6%	
Grade 6	Most Recent		29%	39%	26%	4%	2%	280/288
	Fall		18%	31%	41%	6%	4%	
Grade 7	Most Recent		27%	27%	32%	8%	6%	299/312
	Fall		20%	24%	38%	9%	10%	
Grade 8	Most Recent		35%	27%	26%	4%	7%	288/301
	Fall		32%	24%	32%	4%	8%	

Typical Growth vs. Stretch Growth

- Typical Growth – The average growth a student will make in one year in a given grade level/initial placement level.

- Stretch Growth – Growth a student is capable of achieving with additional support/enrichment. Students who are below grade level will now be on path to proficiency and students who are already on grade level will be on a path toward advance proficiency.

Focus on Growth – Sample Report



Reading Growth by Grade

Showing 7 of 9

Multi	Annual Typical Growth		Annual Stretch Growth®		% Students with Improved Placement	Students Assessed/Total
	Progress (Median)	% Met	Progress (Median)	% Met		
Grade 2	96%	47%	66%	25%	71%	276/285
Grade 3	106%	53%	62%	25%	58%	276/277
Grade 4	61%	37%	35%	16%	41%	282/285
Grade 5	60%	40%	30%	16%	37%	289/296
Grade 6	100%	52%	42%	23%	44%	281/288
Grade 7	67%	43%	21%	18%	39%	299/312
Grade 8	67%	47%	18%	20%	34%	291/301

Math Growth by Grade

Multi	Annual Typical Growth		Annual Stretch Growth®		% Students with Improved Placement	Students Assessed/Total
	Progress (Median)	% Met	Progress (Median)	% Met		
Grade 2	65%	25%	44%	6%	55%	276/285
Grade 3	65%	20%	49%	3%	59%	276/277
Grade 4	68%	32%	47%	11%	57%	284/285
Grade 5	64%	33%	40%	9%	42%	289/296
Grade 6	85%	40%	44%	12%	45%	280/288
Grade 7	67%	40%	35%	11%	37%	304/312
Grade 8	50%	37%	21%	8%	27%	291/301

Types of Intervention and Support

- **Elementary Schools Intervention & Support:** Before school program, small group instruction in Math and Reading, Tier 2 and 3 intervention by specialists, i-Ready personalized instruction, Lexia Core 5.
- **Support & Intervention at Reed:** Small group instruction in Math and Reading, Tier 2 and 3 intervention by specialists, i-Ready personalized instruction, Lexia PowerUp, IXL Math.
- **Support & Intervention at the MS:** Whole group instruction on common skill areas in Math and Reading, Tier 2 and 3 intervention by specialists, i-Ready personalized instruction, Lexia PowerUp, IXL Math and Reading.

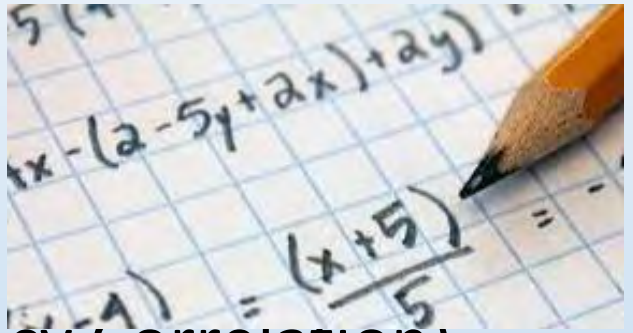
Presentation Summary

In Reading…

- ★ 44% of students on or above (SBAC Proficiency Correlation).
- ★ 23% early grade level - Likely on-track to reach mid/late grade level.
- ★ 22% one grade level below.
- ★ 11% two or more below.
- ★ Vocabulary and Comprehension are reading domains in greatest need of improvement.
- ★ In both Reading and Math, all grades have shown growth since the fall assessment (approx. 4 months of instruction).

Presentation Summary

In Math…



- ★ 33% of students at or above grade level (SBAC Proficiency Correlation).
- ★ 30% of students are early grade level - Likely to reach mid/late grade-level.
- ★ 30% one grade level below.
- ★ 7 % of students two or more below.
- ★ Geometry and Algebra and Algebra Thinking are a math domains in greatest need of improvement.
- ★ In both Reading and Math, all grades have shown growth since the fall assessment (approx. 4 months of instruction).

Action Steps

- ❑ Implementing new reading programming in grades K through 4
- ❑ Exploring changes in reading instruction in grades 5 through 8
- ❑ Supporting implementation of Bridges and Into Math
- ❑ At NMS, engaging students in the goal-setting process to help them take ownership of their own learning
- ❑ Continuing to use data to inform multi-tiered systems of supports (MTSS) for students in need of targeted instruction
- ❑ Monitoring interventions to ensure fidelity of implementation and adequate progress
- ❑ Analyzing instructional practices for improvement through consistent use of learning walks
- ❑ Planning professional development related to student learning trends

Questions ???