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| **Video Topics in This Chart** | | | |
| [Graphing Motion](http://earlhaig.ca/departments/science/physicsreview.php#graphing) | [Mathematical Operations](http://earlhaig.ca/departments/science/physicsreview.php#math) | [Acceleration Equations (Kinematics)](http://earlhaig.ca/departments/science/physicsreview.php#accel) | [Vectors](http://earlhaig.ca/departments/science/physicsreview.php#vectors) |
| [Relative Velocity](http://earlhaig.ca/departments/science/physicsreview.php#relative) | [Free Body Diagrams](http://earlhaig.ca/departments/science/physicsreview.php#FBD) | [Newton's Laws](http://earlhaig.ca/departments/science/physicsreview.php#Newton) | [Pulley Systems](http://earlhaig.ca/departments/science/physicsreview.php#pulley) |
| [Centripetal (Circular) Motion](http://earlhaig.ca/departments/science/physicsreview.php#centripetal) | [Projectile Motion](http://earlhaig.ca/departments/science/physicsreview.php#projectile) | [Collisions using Momentum and Energy](http://earlhaig.ca/departments/science/physicsreview.php#collisions) | [Energy, Power & Efficiency](http://earlhaig.ca/departments/science/physicsreview.php#energy) |
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| [Videos of Class Activities](http://earlhaig.ca/departments/science/physicsreview.php#activities) | [Science Fairs](http://earlhaig.ca/departments/science/physicsreview.php#fairs) | [Download this chart](http://earlhaig.ca/.chart.pdf) |  |
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| **Description** | **Video Link** | **Number** | **Grade** |
| (What you will learn) |
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| **Graphing Motion** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Position-Time (d-t) Graphs*** |  |  |  |
| An introduction and how to calculate the slope (velocity) on d-t graph | [Position Time Graphs Part 1 Intro](https://www.youtube.com/watch?v=-1ztosop_aY&list=PLA479634BE2390113&index=1) | Gr-1 | 11 |
| How to describe the motion shown on a d-t graph | [Position Time Graphs Part 2](https://www.youtube.com/watch?v=0bys19z6Pow&list=PLA479634BE2390113&index=2) | Gr-2 | 11 |
| How to find the slope of a curved d-t graph (object is accelerating) | [Position Time Graphs Part 3](https://www.youtube.com/watch?v=GkQX-IS1Ffo&list=PLA479634BE2390113&index=3) | Gr-3 | 11 |
| ***Velocity-Time (v-t) Graphs*** |  |  |  |
| Finding the slope (acceleration) and describing motion on a v-t graph | [Velocity Time Graphs Part 1](https://www.youtube.com/watch?v=Buv32VWWrOo&list=PLA479634BE2390113&index=4) | Gr-4 | 11 |
| More samples of slope and describing motion on a v-t graph | [Velocity Time Graphs Part 2](https://www.youtube.com/watch?v=pRHxU1_Rjaw&list=PLA479634BE2390113&index=5) | Gr-5 | 11 |
| Finding the area (distance and displacement) under a v-t graph | [Velocity Time Graphs Part 3](https://www.youtube.com/watch?v=DxJMDJSorMQ&list=PLA479634BE2390113&index=6) | Gr-6 | 11 |
| More samples for area and how to find speed and velocity from a v-t graph | [Velocity Time Graphs Part 4](https://www.youtube.com/watch?v=Ka9xWAmWBow&list=PLA479634BE2390113&index=7) | Gr-7 | 11 |
| ***Acceleration-Time (a-t) Graphs*** |  |  |  |
| How to find the area on an a-t graph | [Acceleration Time Graphs Area](https://www.youtube.com/watch?v=AbvucnBfkzw&list=PLA479634BE2390113&index=8) | Gr-8 | 11 |
| ***Summary of Graphing*** |  |  |  |
| A summary of graphing | [Graphing Summary](https://www.youtube.com/watch?v=ezn2FGBfUDE&list=PLA479634BE2390113&index=9) | Gr-9 | 11 |
| ***Using One Graph to Draw the Others*** |  |  |  |
| Drawing velocity and acceleration time graphs from a distance time graph | [Distance to Velocity Time Graph](https://www.youtube.com/watch?v=EZXLkAYjmR0&list=PLA479634BE2390113&index=10) | Gr-10 | 11 |
| Drawing a distance time graph from a velocity time graph | [Velocity to Distance Time Graph](https://www.youtube.com/watch?v=vPhwP-w5tUU&list=PLA479634BE2390113&index=11) | Gr-11 | 11 |
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| **Mathematical Operations** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| A simple way to change units like kg to mg | [Converting Units](http://www.youtube.com/watch?v=2yAF9DELM-E) | Conv-1 | 11&12 |
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| **Acceleration Equations (Kinematics)** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Questions with objects moving forward and backward*** |  |  |  |
| How to use formulae to calculate displacement, initial velocity, final velocity, acceleration and time. Sometimes called the "Big Five" | [Acceleration Equations Part 1 Kinematics](https://www.youtube.com/watch?v=hD0ineZXpcw&list=PL4B64FB6A8FE2DC5D&index=1) | Kin-1 | 11&12 |
| Another sample of using the 5 acceleration formulae | [Acceleration Equations Part 2 Kinematics](https://www.youtube.com/watch?v=9Yvljd1IsVo&list=PL4B64FB6A8FE2DC5D&index=2) | Kin-2 | 11&12 |
| Sample problem that is very common on tests. An object speeds up and later slows down. | [Sample Train Type Kinematics Problem](https://www.youtube.com/watch?v=GsQ6bAEmJ4o&index=7&list=PL4B64FB6A8FE2DC5D) | Kin-3 | 11&12 |
| Complex problem with a car and truck | [Acceleration Equations Part 4 Kinematics](https://www.youtube.com/watch?v=n_Od92zo2DA&list=PL4B64FB6A8FE2DC5D&index=4) | Kin-4 | 11&12 |
| Complex problem with 2 objects moving | [Acceleration Equations 1 Object Catching up to Another](https://www.youtube.com/watch?v=Fw83cXoWTkI&list=PL4B64FB6A8FE2DC5D&index=9) | Kin-5 | 11&12 |
| Sample problem where Superman races to catch up to a bullet | [Tricky Sample Problem Can Superman Catch a Bullet](https://www.youtube.com/watch?v=oyWwtojE2Go&list=PL4B64FB6A8FE2DC5D&index=6) | Kin-6 | 11&12 |
| ***Questions with objects thrown up or falling down*** |  |  |  |
| How to use these formulae to calculate objects thrown up and down. | [Acceleration Equations Part 3 Kinematics](https://www.youtube.com/watch?v=jHNiypVd1hQ&list=PL4B64FB6A8FE2DC5D&index=3) | Kin-7 | 11&12 |
| Sample problem with one ball dropping and a second one thrown down 1 s later. | [Sample Kinematics Problem 2 Balls Thrown Down](https://www.youtube.com/watch?v=YWzL4Bcgr1E&list=PL4B64FB6A8FE2DC5D&index=5) | Kin-8 | 11&12 |
| Sample problem where Superman has to catch a falling student | [Tricky Gravity Problem With Superman Saving a Falling Student](https://www.youtube.com/watch?v=tGJxMyr_-wk&index=8&list=PL4B64FB6A8FE2DC5D) | Kin-9 | 11&12 |
| This is a very tricky sample problem with 2 arrows shot up. | [Complex Sample Problem 2 Arrows Shot Up](https://www.youtube.com/watch?v=b8oxxXwEc7U&index=10&list=PL4B64FB6A8FE2DC5D) | Kin-10 | 11&12 |
| ***Problems with objects moving in a curve or circle*** |  |  |  |
| Using the kinematics equations for objects that are not just moving in a straight line. | [Kinematics Equations in 2D: Car Changes Direction Using Vectors](https://www.youtube.com/watch?v=CQp9vSkDeyY&index=11&list=PL4B64FB6A8FE2DC5D) | Kin-11 | 11&12 |
| This sample problem uses kinematics equations to solve for the acceleration and displacement on a Ferris wheel. | [Tricky Sample 2D Kinematics Ferris Wheel Find Displacement Problem](https://www.youtube.com/watch?v=VbEQt3tcaKA&list=PL4B64FB6A8FE2DC5D&index=12) | Kin-12 | 11&12 |
| Using the kinematics equations for objects that are turning corners | [Kinematics Equations in 2D Using Vectors (Complex)](https://www.youtube.com/watch?v=AwLmcrnBe5E&index=13&list=PL4B64FB6A8FE2DC5D) | Kin-13 | 11&12 |
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| **Vectors** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Introduction to Vectors*** |  |  |  |
| How to put bearings on vectors so it will be easier to add them up. | [Putting Bearings on Vectors](https://www.youtube.com/watch?v=ZS8tmo9BcOM&list=PL6CB840B23288724C&index=1) | Vect-1 | 11&12 |
| Vectors can be added up graphically using a ruler and protractor. Later you should learn to do this algebraicly. | [Vector Addition (Graphically)](https://www.youtube.com/watch?v=OpNd6nGN-pY&list=PL6CB840B23288724C&index=2) | Vect-2 | 11 |
| If you put bearings on the vectors, you need to remove them when you finish adding them | [Removing Bearings From Vectors](https://www.youtube.com/watch?v=2Ghzp59iflo&list=PL6CB840B23288724C&index=3) | Vect-3 | 11&12 |
| Vector Components |  |  |  |
| Vectors sometimes need to be broken into components to add them up or solve questions. This is how to do this | [Vector Components Part 1](https://www.youtube.com/watch?v=rGFaVoz2Jig&list=PL6CB840B23288724C&index=4) | Vect-4 | 11&12 |
| Another example of breaking a vector into components but this time you need to use a sign convention to indicate the direction of each piece. | [Vector Components Part 2](https://www.youtube.com/watch?v=ViDo-n2Ekmo&list=PL6CB840B23288724C&index=5) | Vect-5 | 11&12 |
| Now that you broke a vector into components, this is how to put the pieces back together to find the vector. | [Vector Components Part 3](https://www.youtube.com/watch?v=StmUsYTvMH4&list=PL6CB840B23288724C&index=6) | Vect-6 | 11&12 |
| Components are needed to solve problems. This is an example of how to use them. | [Vector Components Easy Airplane Taking Off Sample Problem](https://www.youtube.com/watch?v=cTeYXzzhDsw&index=7&list=PL6CB840B23288724C) | Vect-7 | n |
| ***Adding/Subtracting Vectors with Components (Algebraic Method)*** |  |  |  |
| The best way to add/subtract vectors. This is better than using the graphical method sown earlier. | [Algebraic Addition of Vectors](https://www.youtube.com/watch?v=I8n-VgbcA6s&index=8&list=PL6CB840B23288724C) | Vect-8 | 12 |
| Vector subtraction is very easy if you turn subtraction into addition. Here's how. | [Vector Subtraction](https://www.youtube.com/watch?v=IOf0ThmMZ6o&index=9&list=PL6CB840B23288724C) | Vect-9 | 11&12 |
| This is an example of using vector addition and subtraction. | [Vector Acceleration](https://www.youtube.com/watch?v=aU_DLx4SmKc&list=PL6CB840B23288724C&index=10) | Vect-10 | 11&12 |
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| **Relative Velocity** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Simple Right Angles Problems*** |  |  |  |
| Simple right angle river problems. How to find the resultant velocity, time of trip and how far downstream. | [Relative Velocity Part 1 Kinematics](https://www.youtube.com/watch?v=prhUQGgX8oU&list=PLB49A5A6FEDDBE853&index=1) | RelV-1 | 11&12 |
| Simple right angle river problems. How to find which way to swim to go directly across and the time of the trip | [Relative Velocity Part 2 Kinematics](https://www.youtube.com/watch?v=ke-T-eYa1mU&list=PLB49A5A6FEDDBE853&index=2) | RelV-2 | 11&12 |
| ***More Complex Problems*** |  |  |  |
| Finding the resultant velocity of an airplane when the wind is at an angle | [Relative Velocity Part 3 Kinematics](https://www.youtube.com/watch?v=t9DmmoTjt8U&list=PLB49A5A6FEDDBE853&index=3) | RelV-3 | 12 |
| Finding the airspeed and heading of an airplane to compensate for the wind | [Relative Velocity Part 4 Kinematics](https://www.youtube.com/watch?v=SA_7FJQLJrw&list=PLB49A5A6FEDDBE853&index=4) | RelV-4 | 12 |
| Finding the heading of an airplane and the resultant velocity. This is about as hard as it gets. | [Relative Velocity Part 5 Kinematics](https://www.youtube.com/watch?v=CoQUBi-0KyQ&list=PLB49A5A6FEDDBE853&index=5) | RelV-5 | 12 |
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| **Free Body Diagrams** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| If you get good at these you can solve just about any Newton's law problems | |  |  |
| Introduction to Free Body Diagrams | [Vector Free Body Diagrams Part 1](https://www.youtube.com/watch?v=BuPfDI7TyL0&list=PL004831B0BC331E9B&index=1) | FBD-1 | 11&12 |
| How to find the x-equation for your Free Body Diagram | [Vector Free Body Diagrams Part 2](https://www.youtube.com/watch?v=cqKTxv8KeQA&list=PL004831B0BC331E9B&index=2) | FBD-2 | 11&12 |
| How to find the y-equation if a force is applied down on an object in your Free Body Diagram | [Vector Free Body Diagrams Part 2B](https://www.youtube.com/watch?v=XfJ0dG3E5sk&list=PL004831B0BC331E9B&index=3) | FBD-2B | 11&12 |
| Fn is not %$#! equal to Fg! Why does everyone forget this?? | [Vector Free Body Diagrams Part 2C](https://www.youtube.com/watch?v=wINRmgN2i68&list=PL004831B0BC331E9B&index=4) | FBD-2C | 11&12 |
| Objects being pulled with a force at an angle | [Vector Free Body Diagrams Part 3](https://www.youtube.com/watch?v=IrY-FlJ0c7Y&list=PL004831B0BC331E9B&index=5) | FBD-3 | 11&12 |
| Objects being pulled with a force at an angle | [Vector Free Body Diagrams Part 4](https://www.youtube.com/watch?v=1rjwV8KkeDs&list=PL004831B0BC331E9B&index=6) | FBD-4 | 11&12 |
| Force at an angle Find acceleration | [Vector Free Body Diagrams Part 5a](https://www.youtube.com/watch?v=R1VW7LLJVVg&list=PL004831B0BC331E9B&index=7) | FBD-5 | 11&12 |
| Force at an angle Find the angle | [Vector Free Body Diagrams Part 5](https://www.youtube.com/watch?v=ftVw6eAY7rk&list=PL004831B0BC331E9B&index=8) | FBD-6 | 11&12 |
| Find the force to accel an elevator up and down | [Vector Free Body Diagrams Part 6 Elevators](https://www.youtube.com/watch?v=glq8IML2CMA&list=PL004831B0BC331E9B&index=9) | FBD-7 | 11&12 |
| Looking at FBDs for a car doing different things | [Vector Free Body Diagrams Car Story](https://www.youtube.com/watch?v=h7Vz-spxnjc&index=10&list=PL004831B0BC331E9B) | FBD-8 | 11&12 |
| Looking at FBDs for an elevator doing different things | [Vector Free Body Diagrams Elevator Story](https://www.youtube.com/watch?v=is2O86Sghjk&list=PL004831B0BC331E9B&index=11) | FBD-9 | 11&12 |
| Looking at FBDs for a skydiver as they descends | [Vector Free Body Diagrams Skydiver Story](https://www.youtube.com/watch?v=g7NOPa94-1w&list=PL004831B0BC331E9B&index=12) | FBD-10 | 11&12 |
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| **Newton's Laws** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Newton's First and Second Law*** |  |  |  |
| Introduction: An overview of 1st and 2nd Law | [Newton's Laws Introduction Part 1](https://www.youtube.com/watch?v=FdEsSeNOw_8&list=PLF99F64695C0DA474&index=1) | Newt-1 | 11&12 |
| How the first law works | [Newton's Laws Part 2 The First Law](https://www.youtube.com/watch?v=5yGiJW9lx_k&list=PLF99F64695C0DA474&index=2) | Newt-2 | 11&12 |
| How the second law works | [Newton's Laws Part 3 The Second Law](https://www.youtube.com/watch?v=C0u20x7SYjE&list=PLF99F64695C0DA474&index=3) | Newt-3 | 11&12 |
| Examples for the first law: Airplane and boat | [Newton's Laws Part 4 Examples](https://www.youtube.com/watch?v=MWgg58ql1c0&list=PLF99F64695C0DA474&index=4) | Newt-4 | 11&12 |
| Example that shows the difference between the first and second law: Pushing a fridge | [Newton's Laws Part 5 More Examples](https://www.youtube.com/watch?v=l886CLPBGWs&list=PLF99F64695C0DA474&index=5) | Newt-5 | 11&12 |
| Diagram of car at rest and accelerating (You should watch the Free Body Diagrams videos first) | [Newton's Laws Part 6 Free Body Diagrams](https://www.youtube.com/watch?v=jHCsMXpYGAc&list=PLF99F64695C0DA474&index=6) | Newt-6 | 11&12 |
| More Free Body Diagrams: Car slowing and rock being pulled up | [Newton's Laws Part 7 More Free Body Diag](https://www.youtube.com/watch?v=eniPc9gUMy0&list=PLF99F64695C0DA474&index=7) | Newt-7 | 11&12 |
| More Free Body Diagram: Bullet falling | [Newton's Laws Part 8 Free Body Diag Falling](https://www.youtube.com/watch?v=8AcjOJAb8qA&list=PLF99F64695C0DA474&index=8) | Newt-8 | 11&12 |
| Summary of the first and second law | [Newton's Laws Part 9 Summary](https://www.youtube.com/watch?v=y42NSY3REAM&list=PLF99F64695C0DA474&index=9) | Newt-9 | 11&12 |
| ***Newton's Third Law*** |  |  |  |
| Explanation and examples of this law | [Newton's Third Law Explained](https://www.youtube.com/watch?v=OB-jKdzopGw&list=PL4jewF29p-5pi1e_d9fDU9wuI2qPgn4TF&index=1) | Newt-10 | 11&12 |
| A look at all the action reaction forces on a boat | [Newton's Third Law Great Review Problem](https://www.youtube.com/watch?v=nBPVDQI_2Sk&list=PL4jewF29p-5pi1e_d9fDU9wuI2qPgn4TF&index=4) | Newt-10B | 11&12 |
| How friction helps a person pull a box | [Newton's Third Law with Friction and FBD](https://www.youtube.com/watch?v=ZUgaxS-qdVE&index=5&list=PL4jewF29p-5pi1e_d9fDU9wuI2qPgn4TF) | Newt-10C | 11&12 |
| ***Sample Problems for Newton's Laws*** |  |  |  |
| A sample problem with a car being pulled. Friction is used and the problem is modified in the second half of the video. | [Newton's Laws Simple Car Sample Problem to Get You Started](https://www.youtube.com/watch?v=mt2FyB9cYVE&index=11&list=PLF99F64695C0DA474) | Newt-11 | 11&12 |
| A bullet is shot through a block in this sample problem. | [Newton's Second Law and Forces Bullet and Block Sample Problem](https://www.youtube.com/watch?v=9zy2Q7-tS5w&index=12&list=PLF99F64695C0DA474) | Newt-12 | 11&12 |
| Typical Newton's 2nd law problem with a helicopter lifting up a car. | [Newton's Laws Find Tension in the Cable for a Helicopter](https://www.youtube.com/watch?v=TWl83kdyLLI&index=13&list=PLF99F64695C0DA474) | Newt-13 | 12 |
| This sample problem covers most cases of what happens in an elevator. | [Newton's Laws Simple Elevator Problem](https://www.youtube.com/watch?v=wM8zcO6NH8c&list=PLF99F64695C0DA474&index=14) | Newt-14 | 11&12 |
| This sample problem has an elevator moving up and down with a person standing on a scale | [Newton's Laws Complex Elevator Problem](https://www.youtube.com/watch?v=zwftfjAiNfo&list=PLF99F64695C0DA474&index=15) | Newt-15 | 11&12 |
| Finding the action-reaction force between objects | [Newton's Laws Action Reaction Boxes Being Pushed Problem](https://www.youtube.com/watch?v=oJAdNCRNtQg&index=16&list=PLF99F64695C0DA474) | Newt-16 | 12 |
| Finding the action-reaction force between objects | [Newton's Law Action Reaction Boxes Being Pulled Problem](https://www.youtube.com/watch?v=B9TvDVxR6PM&index=17&list=PLF99F64695C0DA474) | Newt-17 | 12 |
| This sample problem includes friction and a force at an angle. | [Newton's Laws Find Tension Between Boxes with Friction Sample Problem](https://www.youtube.com/watch?v=U5vfHrQmNNw&index=18&list=PLF99F64695C0DA474) | Newt-18 | 12 |
| This sample problem is a more tricky version of boxes being pulled and includes cute penguins | [Newton's Laws Find Tension Problem With a Penguins](https://www.youtube.com/watch?v=oZ43M5qgOas&index=19&list=PLF99F64695C0DA474) | Newt-19 | 12 |
| This is 1 of 2 tricky sample problems using stacked blocks, friction and free body diagrams | [Newton's Laws Sample Problem Stacked Boxes Part 1](https://www.youtube.com/watch?v=R2wH4NDeSZQ&list=PLF99F64695C0DA474&index=20) | Newt-20 | 12 |
| This is 2of 2 tricky sample problems using stacked blocks, friction and free body diagrams | [Newton's Second Law Sample Problem Stacked Boxes Part 2](https://www.youtube.com/watch?v=kYIKKSgthYc&list=PLF99F64695C0DA474&index=21) | Newt-21 | 12 |
| Sometimes you can't use x and y-equations to solve a problem. This sample shows how to do this by adding the vectors which are at different angles. | [Newton's Laws Sample Problem Using Vector Forces](https://www.youtube.com/watch?v=fl1PC201zS0&list=PLF99F64695C0DA474&index=22) | Newt-22 | 12 |
| ***Objects sliding down a hill or ramp*** |  |  |  |
| Basically things sliding down hills or ramps | [Acceleration Down Ramps w/Friction Part 1](https://www.youtube.com/watch?v=BjguCgHI2Xs&list=PL432E2093A5BCF9CC&index=1) | Ramp-1 | 12 |
| More complex problem of sliding down a hill or ramp | [Acceleration Down Ramps w/Friction Part 2](https://www.youtube.com/watch?v=4U5E7puURFc&list=PL432E2093A5BCF9CC&index=2) | Ramp-2 | 12 |
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| **Pulley Systems** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Simple Pulleys*** |  |  |  |
| How to find the acceleration and tension in a rope for two objects hanging on a pulley: New HD Version: | [Pulley Systems Part 1 Dynamics](https://www.youtube.com/watch?v=i2bGTC27OJU&list=PL079636FFF6749E2B&index=1) | Pull-1 | 12 |
| How to find the acceleration and tension in a rope for a pulley with one object on a level surface: New HD Version: | [Pulley Systems Part 2 Dynamics](https://www.youtube.com/watch?v=3YLc9_-ZXT0&list=PL079636FFF6749E2B&index=2) | Pull-2 | 12 |
| How to find the acceleration and tension in a rope for a pulley with one object on a hill or ramp at an angle: New HD Version: | [Pulley Systems Part 3 Dynamics](https://www.youtube.com/watch?v=QKeFvEma-Ys&list=PL079636FFF6749E2B&index=3) | Pull-3 | 12 |
| Alternate version of Two objects hanging on a pulley | [Simple Pulley Problem Part 1](https://www.youtube.com/watch?v=YRBtd63_u7Q&list=PL079636FFF6749E2B&index=4) | Pull-4 | 12 |
| Alternate version: Pulley with one object on a level surface | [Pulley Problem w/Friction Part 2](https://www.youtube.com/watch?v=ql6g1Zp8dew&list=PL079636FFF6749E2B&index=5) | Pull-5 | 12 |
| Alternate version: Pulley with one object on a hill or ramp at an angle | [Pulley on a Ramp Problem (Simple)](https://www.youtube.com/watch?v=O_wnVIogLh0&list=PL079636FFF6749E2B&index=6) | Pull-6 | 12 |
| More advanced look at this problem | [Pulley on a Ramp Problem (Advanced)](https://www.youtube.com/watch?v=r06IldRtx_s&index=7&list=PL079636FFF6749E2B) | Pull-7 |  |
| Complex Multiple Pulley Systems |  |  |  |
| This sample problem has multiple pulleys and is more tricky than most. | [Complex Multiple Pulley Problem With Friction](https://www.youtube.com/watch?v=u3Q8G5SwDSo&index=8&list=PL079636FFF6749E2B) | Pull-8 | n |
| This sample problem is more complex than most with 2 different sloped sides. | [Complex Pulley Problem With 2 Angles](https://www.youtube.com/watch?v=FCbtNWoIU-4&index=9&list=PL079636FFF6749E2B) | Pull-9 | n |
|  |  |  |  |
| **Centripetal (Circular) Motion** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| A car driving around a corner | [Centripetal Force Part 1 Acceleration Dynamics](https://www.youtube.com/watch?v=CK3tB7v09ms&list=PL70E3E272BE88BC3C&index=1) | Fc-1 | 12 |
| Overview of objects moving in a vertical circle | [Centripetal Force Part 2 Acceleration Dynamics](https://www.youtube.com/watch?v=dN8eTFSfaEg&list=PL70E3E272BE88BC3C&index=2) | Fc-2 | 12 |
| Tension in a rope for an object moving in a vertical circle (also see part 6) | [Centripetal Force Part 3 Acceleration Dynamics](https://www.youtube.com/watch?v=GsVM9errtZo&list=PL70E3E272BE88BC3C&index=3) | Fc-3 | 12 |
| Car driving around an inclined ramp | [Centripetal Force Part 4 Acceleration Dynamics](https://www.youtube.com/watch?v=8dlAoMr4OXI&list=PL70E3E272BE88BC3C&index=4) | Fc-4 | 12 |
| Pendulum being swung in a horizontal circle | [Centripetal Force Part 5 Acceleration Dynamics](https://www.youtube.com/watch?v=FR4oZGoSJ2Y&list=PL70E3E272BE88BC3C&index=5) | Fc-5 | 12 |
| Analyzing a pendulum at a point other than the top and bottom | [Centripetal Force Part 6 Pendulum](https://www.youtube.com/watch?v=_wCtJWJ0ubE&list=PL70E3E272BE88BC3C&index=6) | Fc-6 | 12 |
| Some free body diagrams to help you understand circular motion | [Centripetal Force Part 7 Samples](https://www.youtube.com/watch?v=GWn5LNMDb2k&list=PL70E3E272BE88BC3C&index=7) | Fc-7 | 12 |
| Sample problem using free body diagrams to calculate the minimum period to keep an object stable. | [Sample Problem with a Ferris Wheel](https://youtu.be/3li1mC9bT3Q) | Fc-8 | 12 |
| Very common problem where you calculate the height for a coaster to go around a loop. | [Sample Problem With a Roller Coaster](https://youtu.be/fUG_b0LPb0U) | Fc-9 | 12 |
| Must see film. Sure it's old but the second half has amazing circular motion demos. | [Frames of Reference Film](https://www.youtube.com/watch?v=ImM9cg6vk1w&list=PL70E3E272BE88BC3C&index=8) | Fc-10 | 12 |
|  |  |  |  |
| **Projectile Motion** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Lessons*** |  |  |  |
| If you throw something horizontally, where will it land? | [Projectile Motion Horizontal Shot Part 1](https://www.youtube.com/watch?v=XDIvbf9jVLU&list=PL3452E66E5829ACE9&index=1) | Proj-1 | 12 |
| If you throw something at an angle, where will it land? | [Projectile Motion Angle Shot Part 2](https://www.youtube.com/watch?v=tUUU8ZnlqMU&list=PL3452E66E5829ACE9&index=2) | Proj-2 | 12 |
| Finding the impact (final) velocity when a projectile lands on the ground. | [Projectile Motion Find Final Velocity Part 3](https://www.youtube.com/watch?v=eSO9uS2gU8M&list=PL3452E66E5829ACE9&index=3) | Proj-3 | 12 |
| A complex problem where you are looking for the angle | [Projectile Motion Find The Angle Part 4](https://www.youtube.com/watch?v=xb8hWwD7j-M&list=PL3452E66E5829ACE9&index=4) | Proj-4 | 12 |
| Simple method to solve a projectile problem, but it only works if the object lands at the same level as it was shot at. | [Projectile Motion Part 5 Level Launch](https://www.youtube.com/watch?v=e-sOAGxJ9pQ&list=PL3452E66E5829ACE9&index=5) | Proj-5 | 12 |
| How to calculate the maximum height of a projectile | [Projectile Motion Part 6 Maximum Height](https://www.youtube.com/watch?v=OWSUSPv2tf0&list=PL3452E66E5829ACE9&index=6) | Proj-6 | 12 |
| ***Sample Problems*** |  |  |  |
| This problem is about an airplane dropping an object. | [Projectile Motion Airplane Dropping Object Sample Problem](https://www.youtube.com/watch?v=a_pRjPmfPlU&index=7&list=PL3452E66E5829ACE9) | Proj-7 | n |
| Bart Simpson tries to jump a gorge and the tricky part is finding the velocity | [Projectile Motion Find Velocity Difficult Sample Problem](https://www.youtube.com/watch?v=dzW-GwJT_aI&index=8&list=PL3452E66E5829ACE9) | Proj-8 | n |
| How to calculate the angle to shoot a projectile. | [Projectile Motion Tricky Find the Angle Problem](https://www.youtube.com/watch?v=32PiZDW40VI&list=PL3452E66E5829ACE9&index=9) | Proj-9 | n |
|  |  |  |  |
| **Collisions Using Momentum and Energy** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Momentum*** |  |  |  |
| Objects crash into each other in a straight line |  |  |  |
| A collision where 2 objects join or stick together | [Momentum Part 1](https://www.youtube.com/watch?v=e7M0pB7GTXk&list=PL9E8B2964185E8F1D&index=1) | Col-1 | 12 |
| A collision where the 2 objects bounce off each other and an explosion | [Momentum Part 2](https://www.youtube.com/watch?v=Hlx_L0kKMUg&list=PL9E8B2964185E8F1D&index=2) | Col-2 | 12 |
| Objects crash into each other at an angle |  |  |  |
| A 2D collision with 1 ball bumping into another and bouncing off at an angle | [Momentum 2D collision Part 3](https://www.youtube.com/watch?v=esf81_K-uT8&list=PL9E8B2964185E8F1D&index=3) | Col-3 | 12 |
| A 2D explosion where the parts fly off at angles | [Momentum 2D explosion Part 4](https://www.youtube.com/watch?v=JedYrFlv_ck&list=PL9E8B2964185E8F1D&index=4) | Col-4 | 12 |
| ***Energy*** |  |  |  |
| Elastic & Inelastic collisions are compared | [Elastic & Inelastic Collisions Introduced](https://www.youtube.com/watch?v=h-hlCRX-Iwc&list=PL4jewF29p-5rSxK27MWE4Z9vQwXoeLWxy&index=1) | Col-5 | 12 |
|  |  |  |  |
| **Energy, Power & Efficiency** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Work, Kinetic and Gravitational Energy*** |  |  |  |
| An introduction of how work is changed into kinetic energy: car being pushed | [Kinetic Energy and Work, Conservation Part 1](https://www.youtube.com/watch?v=zQ_9Atyekh8&list=PLE5FAF872F37546C8&index=1) | NRG-1 | 11&12 |
| Work changed to kinetic energy and the work to stop the object: Ball hits your head | [Kinetic Energy and Work Part 2](https://www.youtube.com/watch?v=-0aizPk3a8Y&list=PLE5FAF872F37546C8&index=2) | NRG-2 | 11&12 |
| Doing work to make something go faster and how to calculate how fast it will be moving: Pushing a bed that's already moving | [Kinetic Energy and Work Part 3](https://www.youtube.com/watch?v=y18j7Ke-6tk&list=PLE5FAF872F37546C8&index=3) | NRG-3 | 11&12 |
| Converting from gravitational energy to kinetic energy | [Roller Coaster Problem Conservation of Energy](https://www.youtube.com/watch?v=W7f_t00boqY&list=PLE5FAF872F37546C8&index=4) | NRG-4 | 11&12 |
| An example of gravitational energy to kinetic energy | [Conservation of Energy Slide Problem](https://www.youtube.com/watch?v=cmjkdA1WdXE&list=PLE5FAF872F37546C8&index=5) | NRG-5 | 11&12 |
| Elastic (Spring) Energy |  |  |  |
| Elastic energy stored in a spring is converted to kinetic energy | [Elastic Energy in Springs Part 1](https://www.youtube.com/watch?v=SIqn0xjzJXY&list=PLE5FAF872F37546C8&index=6) | NRG-6 | 12 |
| Elastic energy stored in a spring is converted to kinetic energy in the vertical direction | [Elastic Energy in Springs Part 2](https://www.youtube.com/watch?v=bXq4VEPwC6A&list=PLE5FAF872F37546C8&index=7) | NRG-7 | 12 |
| Another method to solve an elastic energy stored in a spring converted to kinetic energy in the vertical direction | [Elastic Spring and Gravitational Energy Part 3](https://www.youtube.com/watch?v=7zbmf-sxPVc&list=PLE5FAF872F37546C8&index=8) | NRG-8 | 12 |
| Power and Energy |  |  |  |
| Calculate the power of a Tesla Automobile | [Power Kinetic Energy Introduction](https://youtu.be/oJYsjsQy3xI) | POW-1 | 11 |
| Efficiency and Energy |  |  |  |
| Calculate the efficiency of running up the stairs and how to use calories in food | [Efficiency with Gravitational Energy](https://www.youtube.com/watch?v=wTWIW4ox9z4&list=PL4jewF29p-5q2OCgH1nPjxHzi01JuBubB) | EFF-1 | 11 |
| Calculate the efficiency of a roller coaster | [Efficiency with Gravitational & Kinetic Energy](https://www.youtube.com/watch?v=Jy1XdMx4VfE&index=2&list=PL4jewF29p-5q2OCgH1nPjxHzi01JuBubB) | EFF-2 | 11 |
| Calculate the energy used by a car given its power in horse power | [Efficiency with Power Calculation](https://www.youtube.com/watch?v=ZIcOmNMVJyk&index=3&list=PL4jewF29p-5q2OCgH1nPjxHzi01JuBubB) | EFF-3 | 11 |
|  |  |  |  |
| **Newton's Universal Law of Gravity** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| Introduction of the formula Fg=Gmm/d^2 | [Newton's Universal Law of Gravity Calculations](https://www.youtube.com/watch?v=92ByqtVtru8&list=PL4jewF29p-5obtjTjTW_KnFHnJMbvGkkH&index=1) | Grav-1 | 11&12 |
| Using Newton's law of gravity with ratios | [Newton's Universal Law of Gravity Using Ratios](https://www.youtube.com/watch?v=DXzvsODjo-U&index=2&list=PL4jewF29p-5obtjTjTW_KnFHnJMbvGkkH) | Grav-2 | 11&12 |
|  |  |  |  |
| **Planetary Mechanics** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Kepler and Newton*** |  |  |  |
| Simple explanation of Kepler's 3 Laws | [Kepler's 3 Laws of Planetary Motion: Introduction](https://www.youtube.com/watch?v=92ROKc-BwDc&list=PL50D9B93B3A7B30A2&index=1) | PMech-1 | 12 |
| Calculating the altitude of a satellite using Kepler's Third Law | [Kepler's 3rd Law](https://www.youtube.com/watch?v=DJfu9R-4new&list=PL50D9B93B3A7B30A2&index=2) | PMech-2 | 12 |
| Using equations for gravity and centripetal force to solve problems for satellites and planets | [Gravity and Centripetal Force](https://www.youtube.com/watch?v=_S0o8yAVcsA&list=PL50D9B93B3A7B30A2&index=3) | PMech-3 | 12 |
| ***Using Energy equations for objects put in orbit*** |  |  |  |
| Work to launch a satellite to an altitude, the Kinetic energy required and the velocity (not in orbit) Eg=-Gmm/R | [Gravitational Orbital Energy Part 1 Planetary Mechanics](https://www.youtube.com/watch?v=jKWltfG-VjU&list=PL58F689B9528DEBC4&index=1) | PMech-4 | 12 |
| Binding energy and escape velocity to put a satellite in orbit | [Gravitational Orbital Energy Part 2 Planetary Mechanics](https://www.youtube.com/watch?v=_Ms9A9fM0ew&list=PL58F689B9528DEBC4&index=2) | PMech-5 | 12 |
| Work to launch a satellite into orbit and the velocity required | [Gravitational Orbital Energy Part 3 Planetary Mechanics](https://www.youtube.com/watch?v=9rEPjhFAOZM&list=PL58F689B9528DEBC4&index=3) | PMech-6 | 12 |
| Kinetic energy once a satellite is in orbit and the velocity of it in orbit | [Gravitational Orbital Energy Part 4 Planetary Mechanics](https://www.youtube.com/watch?v=vsLoRxVfT4Q&list=PL58F689B9528DEBC4&index=4) | PMech-7 | 12 |
|  |  |  |  |
| **Electricity** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Formulas and simple calculations*** |  |  |  |
| An introduction to the most common formulas | [Electricity Calculations Intro Part 1](http://www.youtube.com/watch?v=dIItCs8oQd0&list=PL4jewF29p-5oBhnxIDVFaR_hCQ91WIPgB&index=1) | Elec-1 | 11 |
| How to use the formula Q=Ne | [Charge and Current Q=Ne Part 2](http://www.youtube.com/watch?v=77V0PDdg2iY&list=PL4jewF29p-5oBhnxIDVFaR_hCQ91WIPgB&index=2) | Elec-2 | 11 |
| How to use the formula V=E/Q | [Voltage V= E/Q Part 3](http://www.youtube.com/watch?v=Ju65Dp1qLgQ&list=PL4jewF29p-5oBhnxIDVFaR_hCQ91WIPgB&index=3) | Elec-3 | 11 |
| How to use the formula I=Q/t | [Current I = Q/t Part 4](http://www.youtube.com/watch?v=PrUZMH5pR9I&list=PL4jewF29p-5oBhnxIDVFaR_hCQ91WIPgB&index=4) | Elec-4 | 11 |
| How to use the formula R=V/I | [Resistance R =V/I Part 5](http://www.youtube.com/watch?v=dwk-5XYw9To&list=PL4jewF29p-5oBhnxIDVFaR_hCQ91WIPgB&index=5) | Elec-5 | 11 |
| How length, area, and the material effects resistance | [Resistance Introduction Part 6](http://www.youtube.com/watch?v=MWHkrZ7WZpA&list=PL4jewF29p-5oBhnxIDVFaR_hCQ91WIPgB&index=6) | Elec-6 | 11 |
| How to use the formula R= resistivity\*L/A | [Resistance Formula Part 7](http://www.youtube.com/watch?v=w25s8XGhBYg&list=PL4jewF29p-5oBhnxIDVFaR_hCQ91WIPgB&index=7) | Elec-7 | 11 |
| How to use the 3 Power formulas | [Power Part 8](http://www.youtube.com/watch?v=j6pE5PcsI1I&list=PL4jewF29p-5oBhnxIDVFaR_hCQ91WIPgB&index=8) | Elec-8 | 11 |
| Using the rate of energy to calculate the cost of electricity | [Calculating the Cost of Electricity](http://www.youtube.com/watch?v=YRfljbFyVig&list=PL4jewF29p-5oBhnxIDVFaR_hCQ91WIPgB&index=9) | Elec-9 | 11 |
| ***Electric Circuits*** |  |  |  |
| Drawing circuits and the 4 parts | [How to Draw Simple Electric Circuits](http://www.youtube.com/watch?v=52JoONLGl2s&list=PLC4040A595E894C97&index=1) | Elec-10 | 11 |
| Putting in Volt and Ammeters in a circuit | [Drawing Electric Circuits with Meters](http://www.youtube.com/watch?v=cPOZvJCpziM&list=PLC4040A595E894C97&index=2) | Elec-11 | 11 |
| How to calculate current in an electric circuit | [Current Electricity Diagram Circuits Part 1](http://www.youtube.com/watch?v=iKKQJbCsqPg&list=PLC4040A595E894C97&index=3) | Elec-12 | 11 |
| How to calculate voltage in an electric circuit | [Voltage in Circuits Part 2](http://www.youtube.com/watch?v=1u96-KOcbkY&list=PLC4040A595E894C97&index=4) | Elec-13 | 11 |
| How to calculate resistance in an electric circuit | [Resistance in Electric Circuits Part 3](http://www.youtube.com/watch?v=KrDup4V3SPE&list=PLC4040A595E894C97&index=5) | Elec-14 | 11 |
| Simple example of solving a circuit | [Series and Parallel Circuits Part 4](http://www.youtube.com/watch?v=qP7Ro6abxuw&list=PLC4040A595E894C97&index=6) | Elec-15 | 11 |
| More complex example of solving a circuit | [Series and Parallel Circuits Part 5](http://www.youtube.com/watch?v=UMNtgVgz-_I&list=PLC4040A595E894C97&index=7) | Elec-16 | 11 |
|  |  |  |  |
| **Electromagnetism** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Left and Right Hand Rules*** |  |  |  |
| How to find the magnetic field around a wire | [Left or Right Hand Rules for Conductors](http://www.youtube.com/watch?v=nWg3B3LAVI0&list=PLB87904A1CB8BCB75&index=1) | EM-1 | 11 |
| How to find the North end of an electromagnet | [Left or Right Hand Rules for Coils](https://www.youtube.com/watch?v=ZxykEG29iHs&list=PLB87904A1CB8BCB75&index=2) | EM-2 | 11 |
| How to find the direction of the motor force | [Motor Principle Left or Right Hand Rule](http://www.youtube.com/watch?v=h38h-6crIoQ&list=PLB87904A1CB8BCB75&index=3) | EM-3 | 11 |
| ***Generators and Transformers*** |  |  |  |
| How to find the direction electricity will flow | [Electric Generator and Lenz's Law Part 1](http://www.youtube.com/watch?v=8FXPmYGIOs4&list=PLB87904A1CB8BCB75&index=4) | EM-4 | 11 |
| How to find the direction electricity will flow | [Electric Generator and Lenz's Law Part 2](http://www.youtube.com/watch?v=Zr52QqoTmJM&list=PLB87904A1CB8BCB75&index=5) | EM-5 | 11 |
| How to do simple transformer calculations | [Electric Transformers](http://www.youtube.com/watch?v=XSuP3-Krdik&list=PLB87904A1CB8BCB75&index=6) | EM-6 | 11 |
|  |  |  |  |
| **Waves (Light and Sound)** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Properties of all types of waves*** |  |  |  |
| Introduction to cycle period and frequency | [Introduction to the types of waves and vibrations](http://www.youtube.com/watch?v=sTaVQGgY6aY&list=PLE8E8F5894A33BDBB&index=1) | Wave-1 | 11&12 |
| Basic vocabulary for transverse waves | [Waves Introduction](http://www.youtube.com/watch?v=CwuRLuyjJpQ&list=PLE8E8F5894A33BDBB&index=2) | Wave-2 | 11&12 |
| How to calculate stuff using V=f\*Lambda | [Universal Wave Equation](http://www.youtube.com/watch?v=s08cT_KihwE&list=PLE8E8F5894A33BDBB&index=3) | Wave-3 | 11&12 |
| Sample calculation using V=f\*Lambda | [Universal Wave Equation Sample Problem](http://www.youtube.com/watch?v=s59k26H7nBM&list=PLE8E8F5894A33BDBB&index=4) | Wave-4 | 11&12 |
| Resonance and Natural Frequency | [Mechanical Resonance In Waves](http://www.youtube.com/watch?v=hSjmOsey0UA&list=PLE8E8F5894A33BDBB&index=5) | Wave-5 | 11&12 |
| About fundamental frequency and harmonics | [Waves and Harmonics In Physics](http://www.youtube.com/watch?v=RwyHs7P8OhM&list=PLE8E8F5894A33BDBB&index=6) | Wave-6 | 11&12 |
| Description of the three types of waves: Transverse, torsional and longitudinal | [Types of Waves in Physics, Transverse, Longitudinal and Torsional](http://www.youtube.com/watch?v=GQ6xE_UhD48&list=PLE8E8F5894A33BDBB&index=7) | Wave-7 | 11&12 |
| Waves reflecting from fixed and open ends | [Reflection of Waves](http://www.youtube.com/watch?v=0mZk2vW5rWU&list=PLE8E8F5894A33BDBB&index=8) | Wave-8 | 11&12 |
| How to add up waves and draw the result. This is called superposition | [Adding Waves in Physics Crests, Troughs](http://www.youtube.com/watch?v=lFuPAE9GYeM&list=PLE8E8F5894A33BDBB&index=9) | Wave-9 | 11&12 |
| Basic definition of standing waves | [Standing Waves](http://www.youtube.com/watch?v=J_Oto3mUIuk&list=PLE8E8F5894A33BDBB&index=10) | Wave-10 | 11&12 |
| ***Sound Waves*** |  |  |  |
| How to describe sound waves qualities: loudness, pitch and quality | [Properties of Sound Waves Loudness, Pitch, Quality](http://www.youtube.com/watch?v=mevjV5pcITc&list=PLE8E8F5894A33BDBB&index=11) | Wave-11 | 11&12 |
| How to calculate the speed of sound in air using the formula V=331 + 0.59Te | [Calculating the Speed of Sound in Air](http://www.youtube.com/watch?v=2ANChjjb1J0&list=PLE8E8F5894A33BDBB&index=12) | Wave-12 | 11&12 |
| What is Beat frequency and how to use the beat frequency formula | [Calculating Beat Frequency](http://www.youtube.com/watch?v=gHOC58L-53Q&list=PLE8E8F5894A33BDBB&index=13) | Wave-13 | 11&12 |
| What is the Doppler Effect and how does it work | [The Doppler Effect Explained](http://www.youtube.com/watch?v=O-Uhiz0Tilk&list=PLE8E8F5894A33BDBB&index=14) | Wave-14 | 11&12 |
| Solving problems for sound in air columns | [Air Columns and Waves](http://www.youtube.com/watch?v=0koYLAVZGUo&list=PLE8E8F5894A33BDBB&index=15) | Wave-15 | 11&12 |
| Partial reflection and partial transmission of waves as a wave moves from one material to another | [Waves Transmission Partial Reflection](http://www.youtube.com/watch?v=sciz9CFUaLU&list=PLE8E8F5894A33BDBB&index=16) | Wave-16 | 12 |
| ***Waves in 2 Dimensions (Interference)*** |  |  |  |
| 2 Point source interference of waves | [Waves 2D Interference Part 1](http://www.youtube.com/watch?v=ztq7gWRC1d8&list=PLE8E8F5894A33BDBB&index=17) | Wave-17 | 12 |
| 2 Point source interference of waves continued | [Waves 2D Interference Part 2](http://www.youtube.com/watch?v=_VnFXnaOKfE&list=PLE8E8F5894A33BDBB&index=18) | Wave-18 | 12 |
| 2 Point source interference of waves continued | [Waves 2D Interference Part 3](http://www.youtube.com/watch?v=eKIo6bFko4k&list=PLE8E8F5894A33BDBB&index=19) | Wave-19 | 12 |
| 2 Point source interference using Young's double slit formula | [Young's Double Slit Interference Waves in 2D Part 4](http://www.youtube.com/watch?v=vFzbHNNPtPE&list=PLE8E8F5894A33BDBB&index=20) | Wave-20 | 12 |
| 2 Point source interference using single slit formula | [Young's Single Slit Interference Waves in 2D Part 5](http://www.youtube.com/watch?v=yb5vKMH0vys&list=PLE8E8F5894A33BDBB) | Wave-21 | 12 |
|  |  |  |  |
| **Optics** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| ***Refraction of light*** |  |  |  |
| An introduction to what refraction is and the names of the parts on a diagram are | [Refraction of Light Intro and Sample Problem](https://www.youtube.com/watch?v=Gek2ttedf0Y&index=1&list=PL4jewF29p-5oxyibJlu6fTJNQm-mZ97sx) | Opt-1 | 10 |
| How total internal reflection works | [Refraction and Total Internal Reflection](https://www.youtube.com/watch?v=dqCEMUot_lY&index=2&list=PL4jewF29p-5oxyibJlu6fTJNQm-mZ97sx) | Opt-2 | 10 |
| How to calculate the critical angle as light refracts | [Refraction Total Internal Reflection Sample](https://www.youtube.com/watch?v=8nobdWaWP-s&index=3&list=PL4jewF29p-5oxyibJlu6fTJNQm-mZ97sx) | Opt-3 | 10 |
| ***Curved Mirrors*** |  |  |  |
| How to draw a ray diagram for a concave mirror | [Drawing Concave Mirror Ray Diagrams](https://www.youtube.com/watch?v=tcgT4PcVXNo&list=PL4jewF29p-5od7-cGSowZ8Mqr6b-qz2Ot&index=1) | Opt-4 | 10 |
| Finding a virtual image using a ray diagram for curved mirrors | [Drawing Concave Mirror Ray Diagrams for Virtual Images](https://www.youtube.com/watch?v=tRUcH2giP5A&index=2&list=PL4jewF29p-5od7-cGSowZ8Mqr6b-qz2Ot) | Opt-5 | 10 |
| When to use (+) and (-) in calculations | [Curved Mirror Calculations Sign Convention](https://www.youtube.com/watch?v=I8KoDHzdA88&list=PL4jewF29p-5od7-cGSowZ8Mqr6b-qz2Ot&index=3) | Opt-6 | 10 |
| Sample calculation | [Curved Mirror Calculations Sample Problem](https://www.youtube.com/watch?v=NXecYmcZlhk&list=PL4jewF29p-5od7-cGSowZ8Mqr6b-qz2Ot&index=4) | Opt-7 | 10 |
| ***Lenses*** |  |  |  |
| Explanation of the types of lenses and images | [Introduction to Lenses Concave and Convex](https://www.youtube.com/watch?v=SqIGBjEB07c&index=1&list=PL4jewF29p-5pbOm6WRfBgzfcxW9z34xJq) | Opt-8 | 10 |
| How to describe an image | [Lenses Image Characteristics Concave Convex](https://www.youtube.com/watch?v=x6toACsDITI&list=PL4jewF29p-5pbOm6WRfBgzfcxW9z34xJq&index=2) | Opt-9 | 10 |
| How to find an image for a convex lens using a ray diagram | [Ray Diagrams for a Convex Lens](https://www.youtube.com/watch?v=dV5lVcLfn_M&list=PL4jewF29p-5pbOm6WRfBgzfcxW9z34xJq&index=3) | Opt-10 | 10 |
| This video shows all the possible images that a convex lens can produce | [More Ray Diagrams for Convex Lenses](https://www.youtube.com/watch?v=p7QF93bWfQ0&index=4&list=PL4jewF29p-5pbOm6WRfBgzfcxW9z34xJq) | Opt-11 | 10 |
| How to find an image for a concave lens using a ray diagram | [Concave Lens Ray Diagrams](https://www.youtube.com/watch?v=fJ0EKiSwFHc&index=5&list=PL4jewF29p-5pbOm6WRfBgzfcxW9z34xJq) | Opt-12 | 10 |
| When to use (+) and (-) in calculations for lenses | [Lens Formula Sign Convention](https://www.youtube.com/watch?v=KoZZ0xmdSQU&index=6&list=PL4jewF29p-5pbOm6WRfBgzfcxW9z34xJq) | Opt-13 | 10 |
| Sample problem using the 2 lens formulas | [Lens Formula Sample Calculations](https://www.youtube.com/watch?v=9yTgeKZnYYU&index=7&list=PL4jewF29p-5pbOm6WRfBgzfcxW9z34xJq) | Opt-14 | 10 |
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| **Graphing using Excel** | **Screen shot video lessons NOT our tutorial lessons** | | |
| Splitting a graph into sections and adding trend lines | [Hot to Draw Trend Lines in Excel](https://www.youtube.com/watch?v=rBme0yo45Bo&list=PLD4DA35DBA94B127D&index=1) | GrEx-1 | 11 & 12 |
| How to program Excel to calculate velocity, acceleration and kinetic energy for graphing | [How to Calculate Velocity, Acceleration and Kinetic Energy in Excel for Graphing](https://www.youtube.com/watch?v=67IsHRmcmfE&list=PLD4DA35DBA94B127D&index=2) | GrEx-2 | 11 & 12 |
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| **Really Awesome Fun Videos** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| A few of the things that drive physics teachers nuts. Watch this so you know the what you need to remember so you don't lose marks. | [Physics Pledge](https://www.youtube.com/watch?v=rbqBpu_pcdw&index=1&list=PLFEDB368B89DB0B36) |  |  |
| It seems so long ago that we hit 1 million views. Thanks for your support | [1 Million Views Thank You Video](https://www.youtube.com/watch?v=0772QW5KoaE&list=PLFEDB368B89DB0B36&index=2) |  |  |
| Our most entertaining video, you need to see the original Big Bang Theory, Eye of the Tiger video to appreciate this one. | [The Big Bang Theory Tribute Video](https://www.youtube.com/watch?v=2mww_pcENEw&index=3&list=PLFEDB368B89DB0B36) |  |  |
| Okay, we went a little overboard on this one when we hosted the teacher talent show at our school | [Newton's Laws: Teacher Talent Show Part 1](https://www.youtube.com/watch?v=GnlUAkxyc_U&index=4&list=PLFEDB368B89DB0B36) |  |  |
| Perhaps we also went a little overboard on this one | [Newton's Laws: Teacher Talent Show Part 2](https://www.youtube.com/watch?v=eUCc2OF7GbE&index=5&list=PLFEDB368B89DB0B36) |  |  |
| Can you believe that 100,000 views seemed like a big deal at one time | [100,000 Views Thank You Video](https://www.youtube.com/watch?v=98wToAhH9qY&list=PLFEDB368B89DB0B36&index=6) |  |  |
| We won an Excellence in Education award and this is the video produced by the TDSB for the ceremony. | [TDSB Promo Video](https://www.youtube.com/watch?v=s1nq2OtqvB4&index=7&list=PLFEDB368B89DB0B36) |  |  |
| Okay, so we think we're funny. | [Behind the Scenes at KRAM](https://www.youtube.com/watch?v=JMqzyF4ppYk&list=PLFEDB368B89DB0B36&index=8) |  |  |
| This is where it all started | [Physics Lessons Introduction Video](https://www.youtube.com/watch?v=hb8mAuaqiZY&list=PLFEDB368B89DB0B36&index=9) |  |  |
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| **Videos of Class Activities** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| Every year we hold our pasta bridge building contest. It's a lot of fun so take a look | [Bridge Building Contest Dec 2012](https://www.youtube.com/watch?v=nhJltvKQqNw&index=1&list=PL5C2721EA08E9CB06) |  |  |
| More destruction of pasta bridges | [Bridge Building Contest June 2012](https://www.youtube.com/watch?v=8qiyz7dBg4A&list=PL5C2721EA08E9CB06&index=2) |  |  |
| Student made pasta bridges being destroyed | [Bridge Building Contest 2010](https://www.youtube.com/watch?v=GjWT50bPNp8&index=3&list=PL5C2721EA08E9CB06) |  |  |
| More bridges being destroyed | [Bridge Building Contest 2009](https://www.youtube.com/watch?v=TkQnS8NFDm4&index=4&list=PL5C2721EA08E9CB06) |  |  |
| Our senior physics students build catapults and compete to hit a target | [Catapult Contest 2012](https://www.youtube.com/watch?v=YC6th3h79yk&list=PL5C2721EA08E9CB06&index=5) |  |  |
| More senior students shooting at a target | [Catapult Contest 2011](https://www.youtube.com/watch?v=cDdf8zj6Y_k&index=6&list=PL5C2721EA08E9CB06) |  |  |
| Students make speakers from simple materials | [Speaker Building Lab Activity Part 1](https://www.youtube.com/watch?v=T9vOpznPRS0&index=7&list=PL5C2721EA08E9CB06) |  |  |
| Testing the finished speakers | [Speaker building Lab Activity Part 2](https://www.youtube.com/watch?v=OQy8yaw_auE&index=8&list=PL5C2721EA08E9CB06) |  |  |
| Our grade 11 physics students build and test carts run by the gravity on a falling can | [Gravity Cart Contest](https://www.youtube.com/watch?v=-XZAr6y5wrs&index=9&list=PL5C2721EA08E9CB06) |  |  |
| One of our more fun labs where students solve a secret vector code and then search the school in a race to complete the top secret map | [Vector Search Lab](https://www.youtube.com/watch?v=jOV63gnBf8k&index=10&list=PL5C2721EA08E9CB06) |  |  |
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| **Science Fairs** | [**Back to Topic List**](http://earlhaig.ca/departments/science/physicsreview.php#list) |  |  |
| Earl Haig's Science Fair 2012 | [Grade 9 and 10 Junior Science Fair](https://www.youtube.com/watch?v=25btDOHIUpw&index=13&list=PL5C2721EA08E9CB06) |  |  |
| Earl Haig's Biology 12 Science Fair 2012 | [Grade 12 Biology Science Fair 2012](https://www.youtube.com/watch?v=8Tt200k1djo&index=12&list=PL5C2721EA08E9CB06) |  |  |
| Earl Haig's Biology 12 Science Fair 2011 | [Grade 12 Biology Science Fair](https://www.youtube.com/watch?v=ByzGRaVUGJs&list=PL5C2721EA08E9CB06&index=13) |  |  |
| Earl Haig's 9 and 10 Science Fair 2011 | [Grade 9 and 10 Science Fair](https://www.youtube.com/watch?v=RL87pJvnTTw&list=PL5C2721EA08E9CB06&index=14) |  |  |