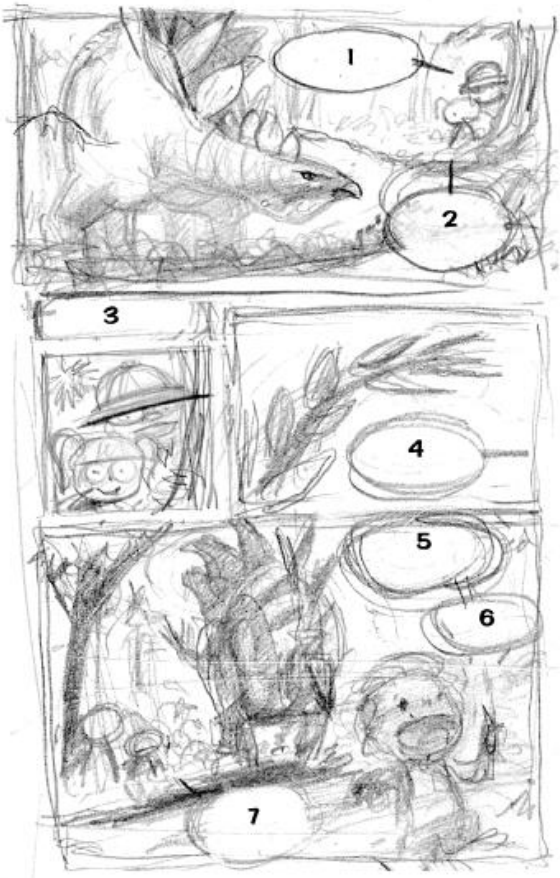
SUPER WHO? SUPER YOU!

WEEK TWO

DAY FIVE: QUICK ON THE DRAW!

A great resource for kids and teachers for this section is: *So, You Want to Be a Comic Book Artist?: The Ultimate Guide on How to Break ...* By Philip Amara



Think of the comics you enjoy. What is it you enjoy about them? Getting started with comics is just about finding something to draw with and something to draw on.

Challenge students into telling a story in three to six panels. As they grow more comfortable with these single page strips they can start moving on to longer stories.

One way to start is by trying to depict something that happened to you today in your own life. At home, at school, on the bus. Just keep it short. Jot down a few ideas, a few lines. Don't get caught up thinking there are any right or wrong ways to making a comic because there aren't. Simply tell a story, draw it in pictures, and place it in a sequence.

Because much of the comic book story can be told through the characters' expressions and body language, your characters' conversations can be brief and to the point. Since you don't need a lot of it, the dialogue should be interesting, tell you something about the characters, and move the plot forward. You can use sound effects (also called onomatopoeia) to help tell your story and what's happening too.

Think about how to use your characters to best tell the story. Using one of your completed scripts or story prompts, draw a rough, quick sketch to correspond with each panel in your script. Don't take too long about it. When you're done, you will have a set of thumbnails outlining your comic sequence. Focus on drawing

characters and setting first, and position your balloons or captions later, so they won't cover too much art.

Did you know that professional comic artists draw about one to four pages a week on average? It's important for them to take their time and do it right!

YOUR TURN!

We're going to ease one of the toughest parts of the writing process: finding ideas and getting started. Give all of the students **the same story prompt** (whether it's a statement or a picture) and pass out the comic book page panel templates. Students have to show the story through pictures—and at the end we're going to see how all are very different, even when based on the same exact story.

As a writer it's always best to ignore anyone who tells you, "That's a weird Idea."

Sample Prompts:

EX. "ONE EVENING AS BARRY IS ABOUT TO LEAVE THE LAB, A LIGHTNING BOLT SHOOTS IN THROUGH THE WINDOW AND HITS A CABINET OF CHEMICALS, THE VERY SAME CABINET THAT BARRY IS WALKING PAST. THE RESULTANT BLAST IMBUES BARRY WITH_____."

Some other fun ideas for prompts to start a comic strip.

- ☐ Difficulties Superheroes Would Face in the Real World
  - Ex. A superhero's costume is stuck at the dry cleaner's and he/she needs to 'save the day.'
  - Trying to do 'everyday things'
- ☐ The Insomni-Yak, a furry, horned psychologist who counsels sleep-deprived daytime or nighttime animals
- ☐ A talking gorilla named Sky-Ape who flies around in a jet pack
- ☐ 'Superhero tryouts were getting harder and harder'
- ☐ What happens when a superhero's superpowers go 'on the fritz'
- ☐ A pigeon suddenly got superpowers. What would it do with them?
- ☐ A day in the life of a nanny for baby superheroes and/or villains.
- ☐ Two aliens disguise themselves as dogs to live among humans.

- [ ] A superhero's power is to instantly become really really old.
- [ ] She looked at the beautiful painting hung on the wall. 'It looks so real.' *sigh* 'I wish I could get inside and live there forever!' 'Whoop! A museum guard peeped into the hall. 'I'm gonna lock up. Anyone there?' The empty hallway echoed. He smiled.

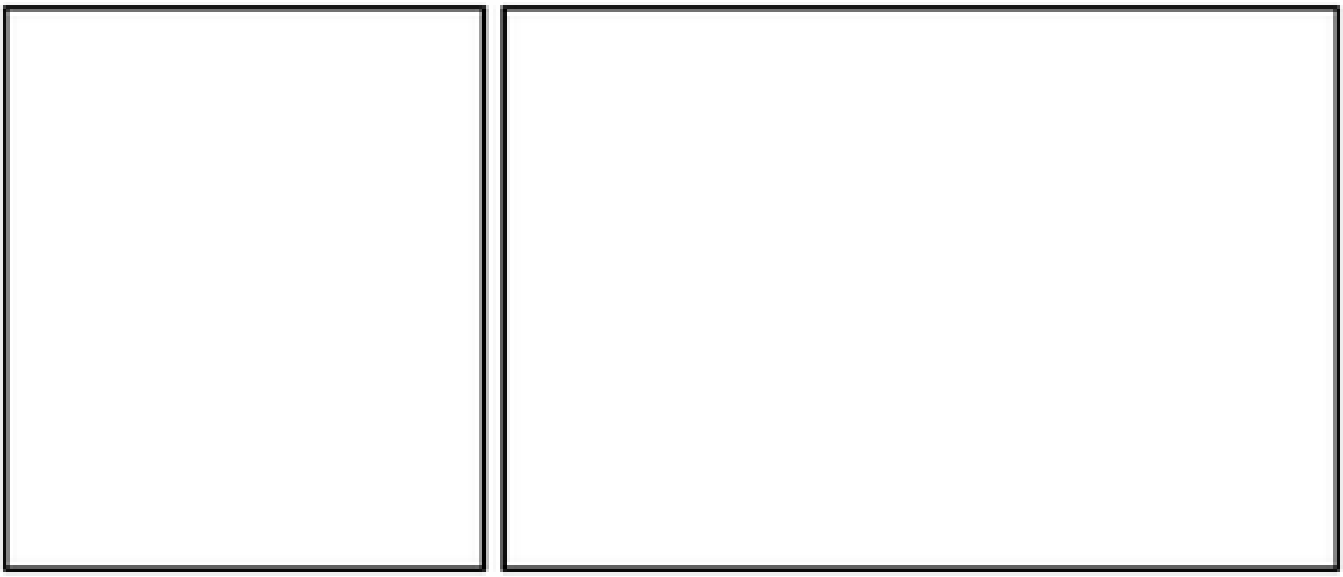
Extension: Invite students to record their stories as their own radio programs/audiobooks

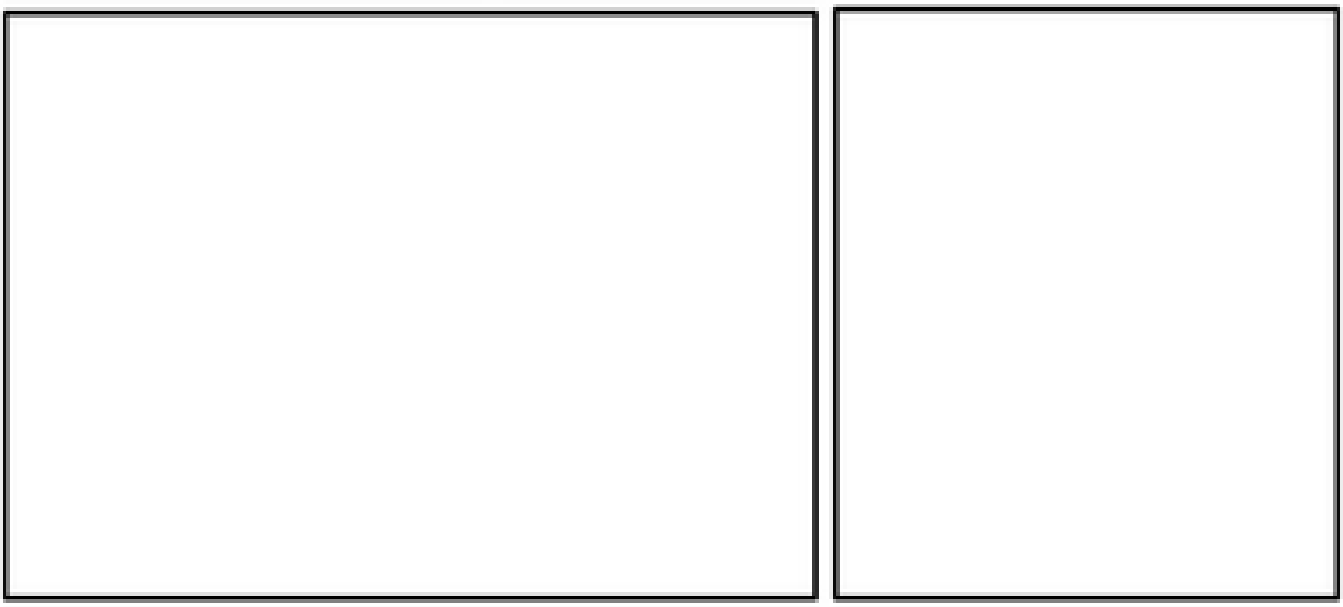
Listening to great stories and reading aloud go hand in hand, so after your students have become familiar with the professional audio recordings from the past, have students answer the question "What happened next?" and add more to the story of what happened to Barry from the laboratory.

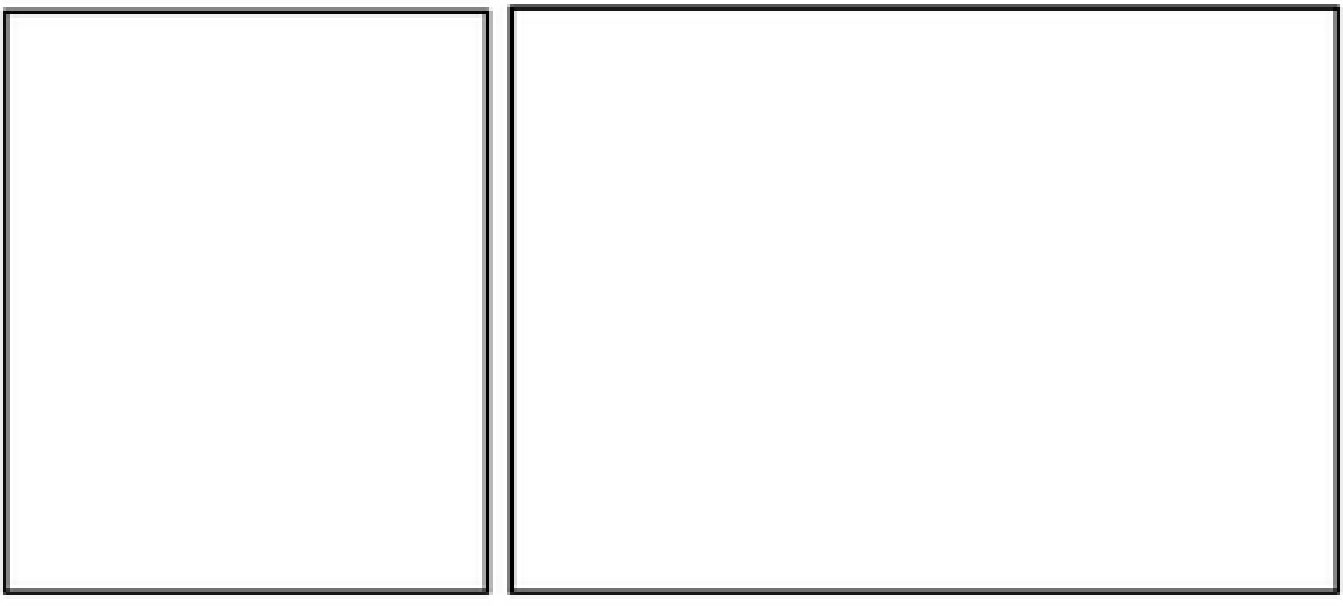
Then, challenge them to make their own audio versions of their expanded version of the story using an iPod or smartphone as a simple recording device, or alternatively a program such as iMovie to capture a full-blown filmed version of the tale. Students love hearing themselves and they can judge whether or not they were reading fluently.

Tip: Making your own audiobooks helps to close the circle of fluency and comprehension, developing students' understanding that stories are both an art form and a means of communication.

Title & Author







Name That Thing!-Comic Books vs. Graphic Novels

Who do you agree with?

"They may seem similar, but calling something a graphic novel isn't just a fancy way of saying "comic book." There's a very clear difference between the two. Graphic novels are much longer and tend to be much more complex. While a comic book will tell a story over many issues, graphic novels more often have their storylines wrapped up in only one or two books."-- Debra Kelly

"A visual medium that employs a single to sequential images (text is entirely optional) to tell a story or express an idea is a comic. Therefore, graphic novels are comics. The term "graphic novel" is not an ancient one. It was coined by Will Eisner of all people, as a sort of trojan horse term to lend comics more credibility among snobbish literary types." – CplEthane

And, according to the Merriam-Webster Dictionary: *noun* a work of fiction or nonfiction that tells a story using comic strips and that is published as a book

So, what do students think? Is it a graphic novel? Is it a comic? Is it both? Does it matter?

Day Five K-8 Standard Alignment

K

SL.K.5. Add drawings or other visual displays to descriptions [and stories] to provide additional detail.

RL.K.7. With prompting and support, describe the relationship between illustrations and the story in which they appear (e.g., what moment in a story an illustration depicts).

These standards will be met and reinforced as students write and draw their six panel comics in response to the Barry in the Laboratory writing prompt. Students have to show the story through pictures—and at the end we're going to have a class gallery and discussion looking at how see how all of our drawings are very different, even when based on the same exact story. We'll look at what the illustrations add to the story and how they relate to the text and if they add any new details or ideas that the text didn't share.

1

SL.1.5. Add drawings to descriptions [and stories] when appropriate to clarify ideas, thoughts, and feelings as well as plot points, events, etc.

RI.1.6. Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.

These standards will be met and reinforced as students write and draw their six panel comics in response to the Barry in the Laboratory writing prompt. Students have to show the story through pictures—and at

the end we're going to have a class gallery and discussion looking at how see how all of our drawings are very different, even when based on the same exact story. We'll look at what the illustrations add to the story and how they relate to the text and if they add any new details or ideas that the text didn't share.

2

SL.2.5. b) Add drawings to stories to clarify events, plot points, characters, ideas, thoughts, and feelings.

RI.2.7. Explain how specific images contribute to and clarify a text.

These standards will be met and reinforced as students write and draw their six panel comics in response to the Barry in the Laboratory writing prompt. Students have to show the story through pictures—and at the end we're going to have a class gallery and discussion looking at how see how all of our drawings are very different, even when based on the same exact story. We'll look at what the illustrations add to the story and how they relate to the text and if they add any new details or ideas that the text didn't share.

3

SL.3.5. Add visual displays and drawings [to stories] when appropriate to emphasize or enhance certain facts or details.

RL.3.7. Explain how specific aspects of a text's illustrations contribute to what is conveyed by the words in a story (e.g., create mood, emphasize aspects of a character or setting).

These standards will be met and reinforced as students write and draw their six panel comics in response to the Barry in the Laboratory writing prompt. Students have to show the story through pictures—and at the end we're going to have a class gallery and discussion looking at how see how all of our drawings are very different, even when based on the same exact story. We'll look at what the illustrations add to the story and how they relate to the text and if they add any new details or ideas that the text didn't share.

4

SL.4.5. Add drawings and visual displays to presentations and stories when appropriate to enhance the development of main ideas or themes.

RI.4.7. Interpret information presented visually (e.g., in drawings) and explain how the information contributes to an understanding of the text in which it appears.

These standards will be met and reinforced as students write and draw their six panel comics in response to the Barry in the Laboratory writing prompt. Students have to show the story through pictures—and at the end we're going to have a class gallery and discussion looking at how see how all of our drawings are very different, even when based on the same exact story. We'll look at what the illustrations add to the story and how they relate to the text and if they add any new details or ideas that the text didn't share and help us understand the text better than we would have otherwise.

5

SL.5.5. Include multimedia components (e.g., graphics) and visual displays (e.g., drawings) in presentations and stories when appropriate to enhance the development of plot, characters, main ideas or themes.

RL.5.7. Analyze how visual and multimedia elements contribute to the meaning, tone, or beauty of a text (e.g., graphic novel, comics, comic books)

These standards will be met and reinforced as students write and draw their six panel comics in response to the Barry in the Laboratory writing prompt. Students have to show the story through pictures—and at the end we're going to have a class gallery and discussion looking at how see how all of our drawings are very different, even when based on the same exact story. We'll look at what the illustrations add to the story and how they relate to the text and if they add any new details or ideas that the text didn't share and help us understand the text better than we would have otherwise. We'll discuss whether students like having the illustrations with a story and why or why not.

6

SL.6.5. Include multimedia components (e.g., graphics, images) and visual displays (e.g., drawings) in presentations and stories to clarify information, e.g., plot, characters, events, main ideas, or themes.

RI.6.3. Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text.

These standards will be met and reinforced as students write and draw their six panel comics in response to the Barry in the Laboratory writing prompt. Students have to show the story through pictures—and at the end we're going to have a class gallery and discussion looking at how see how all of our drawings are very different, even when based on the same exact story. Characters may be drawn differently, the location may look very different, different colors may have been used, students may have chosen to start at a different plot point than others, and we'll discuss why they made the choices they did.

We'll look at what the illustrations add to the story and how they relate to the text and if they add any new details or ideas that the text didn't share and help us understand the text better than we would have otherwise.

7

SL.7.5. Include multimedia components (e.g., graphics, images) and visual displays (e.g., drawings) in presentations and stories to clarify and emphasize salient points.

RI.7.7. Compare and contrast a text to a multimedia version (e.g., graphic novel or comic) of the text, analyzing each medium's portrayal of the subject.

These standards will be met and reinforced as students write and draw their six panel comics in response to the Barry in the Laboratory writing prompt. Students have to show the story through pictures—and at the end we're going to have a class gallery and discussion looking at how see how all of our drawings are very different, even when based on the same exact story. Characters may be drawn differently, the location may look very different, different colors may have been used, students may have chosen to start at a different plot point than others, and we'll discuss why they made the choices they did.

We'll look at what the illustrations add to the story and how they relate to the text and if they add any new details or ideas that the text didn't share and help us understand the text better than we would have otherwise.

8

SL.8.5 Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations and stories.

SL.8.5.a Integrate multimedia components (e.g., graphics, images) and visual displays (e.g., drawings) into presentations and stories to clarify information and/or add interest.

These standards will be met and reinforced as students write and draw their six panel comics in response to the Barry in the Laboratory writing prompt. Students have to show the story through pictures—and at the end we're going to have a class gallery and discussion looking at how see how all of our drawings are very different, even when based on the same exact story. Characters may be drawn differently, the location may look very different, different colors may have been used, students may have chosen to start at a different plot point than others, and we'll discuss why they made the choices they did.

We'll look at what the illustrations add to the story and how they relate to the text and if they add any new details or ideas that the text didn't share and help us understand the text better than we would have otherwise.

DAY SIX: 'GOLDEN' BOYS

Imagine if drawing and writing comics were your job! Do you think it would be easy to constantly come up with new adventures and challenging stories and characters? How about being the one who had to draw them and bring all those stories and characters 'to life?'

Newspaper comic strips were so popular that it gave a man named MC (Max) Gaines and idea. Well, what would happen if you took a newspaper comic strip and folded it, stapled it in the middle? You'd have a thing called a comic book. And he went out and experimented with it, sold it at a couple of newsstands in New York City to test the market.

He began doing some premium comic book publishing as well. And before you know it, such comic book titles as Funnies on Parade and Famous Funnies started to take root in America, and the comic book industry was born.

Over on the other part of town, there was Martin Goodman, another Jewish publisher who had been active in pulps who got into the comic book business in late 1939, calling his comic book line Timely Comics. Not too many years later, they would become known more by the name of the first comic book he published, a little ditty called Marvel Comics.

Martin Goodman was a businessman and he was very happy to be publishing comics, and the money they brought in, but comics didn't interest him that much (The one thing he was interested in were the covers. He would look at the cover and say, no, no, that masthead should be red, not blue. And that was his big contribution.) So he pretty much left the comics to an 'annoying teenager' named Stan Lee all the time. Which was a marvelous thing for comic books, as Stan Lee went on to become a legend (and he still makes cameos in Marvel movies today at 89.) The comic-book creator who, working with the invaluable help of incredibly talented others like Jack Kirby, came up with the likes of Spider-Man, the Fantastic Four and the X-Men.

JACK KIRBY

Jack Kirby stands among the most famous and influential comic book artists and writers of all time. The first big splash he made on the scene was with Joe Simon back in March of 1941. Together they gave us *Captain America Comics #1*, which introduced the world to Steve Rogers, super-solider. The success of the series established Simon and Kirby as serious players in the burgeoning field of comic book creation.

They would go on in the 40s and 50s to produce quality stories across genres spanning science fiction, horror, romance and crime. They gave us the Sandman, the Fly, Lancelot Strong, Fighting American and Stuntman, to name a few.

In the Silver Age, Kirby teamed up with Stan Lee to help create seminal titles like the original X-Men, the Incredible Hulk, the Invincible Iron Man, Thor, Black Panther, the Inhumans, and the family upon which Marvel was built: the Fantastic Four. Kirby also worked with Stan Lee early on in developing Spider-Man, even though penciling work would eventually go to Steve Ditko.

Almost all the main characters in *Avengers* — including Thor, the Hulk, superspy Nick Fury, and the movie's primary villain, the trickster-god Loki — were introduced between 1961 and 1964, in comics written and drawn by Lee and Kirby. During that same period — a generative streak basically unparalleled in American comics' history before or since — they also introduced the X-Men and the Fantastic Four.

Officially, Lee wrote the books and Kirby drew them. Officially, Stan supplied the realism — his heroes had flaws, they argued among themselves, they were prone to colds and bouts of self-loathing, and sometimes they'd forget to pay the rent and face eviction from their futuristic high-rise HQs, which were in New York, not a made-up metropolis — while Kirby supplied the propulsion, filling the pages with visions of eternity and calamity, along with action sequences that basically invented the visual grammar of modern superhero comics.

Different stories came together different ways, but essentially they were co-storytellers. What truly matters, of course, is that the Fantastic Four et al. thrived, nourished by Kirby's pacing and Lee's dialogue, Kirby's characters and Lee's characterization. And the work they did together during those first few years transformed the American comic-book industry and laid the groundwork for the billion-dollar trademark empire Marvel would eventually become.

Jack Kirby created Marvel "comics" (small "c", the pictures and stories) but Stan Lee created Marvel "Comics". Lee created the connected universe and global empire.

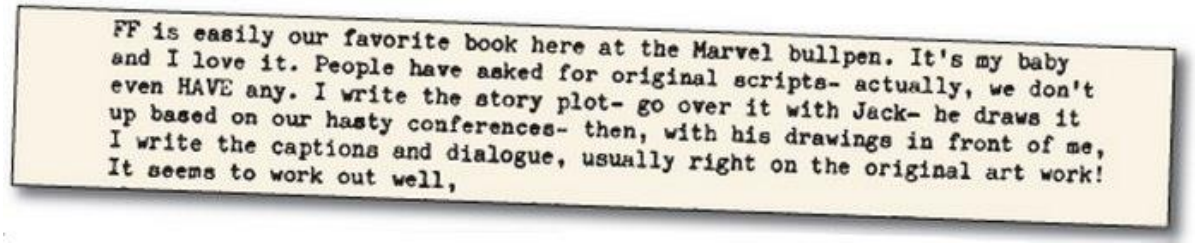
Marvel Comics popularized the idea that a superhero's weakness needn't be a specific item or action, but rather, it could be an ordinary human flaw. For instance, Bruce Banner's propensity toward anger is his weakness. Spider-Man's flaws are those of most adolescents. He's short-sighted, prone to unnecessary risks, cocky…we all know the list. What makes some of Stan Lee (and his co-creators') best creations so much fun—and so interesting—is that these flaws are familiar to all of us, even when beings who aren't even human possess them. Thor doesn't need his weakness to be wrapped up in him losing possession of his hammer Mjolnir, although that story has been put forward. His biggest weakness, such as it is, is his love for his brother Loki, which often renders Thor incapable of seeing Loki's devious actions for what they are until it's too late.

CONTROVERSY?!

The early Fantastic Four said "written by Stan Lee, drawn by Jack Kirby." Nice and simple. In "Origins of Marvel Comics" and other interviews, Stan Lee indicates that he came up with the ideas and Jack Kirby

drew them. But according to some comic book historians there are several big problems here:

- Both before and after the early 1960s, Stan Lee was not known for producing great new ideas. Jack Kirby, on the other hand, was always producing big ideas, such as Captain America (co-created with Joe Simon) and the Fourth World series for DC (entirely on his own, immediately after leaving Marvel).
- Stan Lee was just too busy to write everything, and would often just deliver the faintest outline for a script. In this letter from 1965 (printed in the book "The Stan Lee Universe") he outlines what became known as "the Marvel method:


FF is easily our favorite book here at the Marvel bullpen. It's my baby and I love it. People have asked for original scripts- actually, we don't even HAVE any. I write the story plot- go over it with Jack- he draws it up based on our hasty conferences- then, with his drawings in front of me, I write the captions and dialogue, usually right on the original art work! It seems to work out well,

[The process: Jack (or whoever) had the ideas, Stan would approve or change them and add his own ideas, and Kirby did the rest. But Stan was in overall control and Stan would write the finished dialog in his easy to read style, and that is why he called himself the writer.]

- Stan would often would just give a general suggestion and Jack (or another artist) would do the rest, delivering the pages for dialog to be added. For example, Stan said something like "this month have the Fantastic Four fight God" and Jack then created the Galactus saga, perhaps the greatest comic story ever. Famously, when Stan first saw the Silver Surfer he asked "who's this guy?"
  "Very often," Lee has said, "I didn't know what … [Kirby] was going to give me. I'd get some pages of artwork, and I wrote the copy and turned it into whatever story I wanted it to be ... It was like doing a crossword puzzle. I would try to figure out what the illustrations meant and then I would put in the dialog and captions." (Source)
  Kirby would even add blue pencil notes for dialog. Stan would then add the actual dialog (which often contradicted what Jack wanted, but Jack seldom had time to read the finished comic).
- In 1968, the magazine "Castle of Frankenstein" #12 published a Stan Lee interview where he said "Some artists, such as Jack Kirby, need no plot at all. I mean I'll just say to Jack, 'Let's let the next villain be Dr. Doom'… **or I may not even say that. He may tell me.** And then he goes home and does it. He's so good at plots, I'm sure he's a thousand times better than I. He just about makes up the plots for these stories. All I do is a little editing… I may tell him that he's gone too far in one direction or another. Of course, **occasionally I'll give him a plot,** but we're practically both the writers on the things." (emphasis added) In interviews such as that it seems that when Stan says "writing" he means adding the dialog to the finished art, but when Jack Kirby says "writing" he means deciding what happens from panel to panel, and adding notes in the margins as needed.
- The surviving artwork often includes written notes from Jack telling Stan what is going on

- This example (from the Kirby Museum) is from issue 61:

- In later years, Kirby stated plainly that he created it all.
- Stan openly admits to having a notoriously bad memory, so how he remembers it may not be as others remember it.
- Stan has a powerful motive for claiming credit: copyright law means that if Kirby created it then he (or his estate) would now be due hundreds of millions of dollars in royalties. But Stan is always the consummate company man, so as long as he claims credit (and takes his million dollar a year salary) Marvel is legally safe.
- Kirby ignored most of what Stan wrote. This is from John Romita Sr: *"I heard them plotting in other instances! [laughter] Jack would say, 'Stanley, I think I've got an idea. How 'bout this?' Stan would say, 'That's not bad, Jack, but I'd rather see it this way.' Jack would absolutely forget what Stan said, and Stan would forget what Jack said. [laughter] I would bet my house that Jack never*

read the books after Stan wrote them; that's why he could claim with a straight face that Stan never wrote anything except what Jack put in the notes. He was kidding himself; he never read them.

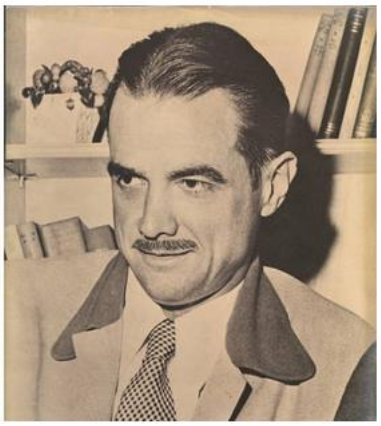
Jack Kirby was only paid as an artist, but he felt he should be paid more because he also contributed story ideas. He believed he had been promised payment and it never came, so he finally left Marvel. Years later, in the 1980s, Jack was fighting to get his original art back from Marvel, and the two sides became polarized.

Some fans felt that clearly Stan did everything. Others felt that he had taken credit for Kirby's work. Still others felt that their contribution was equal, as one historian says, "Stan Lee provided the roads, the land, the buyers and the paint, but Jack Kirby built the house." The battle rages to this day. **So who is right? Who do students think deserves the most credit? Or do they think they both deserve the same amount?**

FINDING INSPIRATION

Artists and writers find inspiration for their creations in a variety of things around them, from any everyday item to the exceptional. People, places, things, even other works of art have inspired some of the greatest artists throughout history to create some very memorable pieces – comic book artists and writers are no exception. Have you ever wondered what inspired comic book artists to create some of your favorite superheroes and villains? While some of them came directly from the minds of the creators (such as The Blob and Apocalypse) or from the Greek and Norse mythology (such as Hercules and Thor) there are still a few of them that aren't so obvious to figure out.

Most of the greatest comic book superheroes and villains have been inspired by living, breathing people. Here are some of the real life inspirations behind comic book characters.



The Joker was inspired by a playing card and a silent movie star (Conrad Veidt in *The Man Who Laughs.)* Iron Man is basically Howard Hughes. If crotchety hermit billionaires had trading cards, Howard Hughes would be the Babe Ruth. Though handsome, rich and bona-fide brilliant, Hughes struggled in his personal life. Since that kind of flawed hero figure is really

Marvel's bag, Hughes was a natural fit when coming up with the personality for playboy whiz Tony Stark. both inherited their fortune from their fathers, both were inventors and playboys. They even named Tony's father Howard.

"Hughes was one of the most colorful men of the time. He was an inventor, an adventurer, a ladies' man, and a nutcase." – Stan Lee

"He is rich, handsome, known as a glamorous playboy, constantly in the company of beautiful, adoring women . . . Anthony Stark is both a sophisticate and a scientist! A millionaire bachelor, as much at home in the laboratory as in high society!" – Stan Lee about Tony StarkI

INSPIRATION FOR A SUPER GUY

Superman was inspired by a whole combination of things! Using biblical figures such as Moses and Samson and fictional heroes such as Hercules, Doc Savage, and Buck Rogers, his creators tweaked their creation into one of the most iconic characters ever. As avid movie buffs, Siegel and Shuster made Superman look like famous movie star Douglas Fairbanks (minus the pencil-thin mustache). His alter ego, Clark Kent (using the first names of actors Clark Gable and Kent Taylor) was modeled after another actor, Harold Lloyd. Lloyd had made a career of melding a deceptively meek look with strength and athleticism. Recently, comic book historians have speculated that Superman's loss of his parents and isolation from home originated from Siegel's own home life. His parents were Lithuanian immigrants, and Siegel's father died in 1932, just six months before Superman made his first appearance.

If you had to create a superhero or super villain what would you use as inspiration?

SUPER THIRST!

Being a superhero is thirsty work! Especially making sure the forces good and the forces of evil don't mix. Drinks are generally one boring, homogenous color. That doesn't sound like something worthy of a superhero. I mean, their costumes are snazzy combinations of color, why can't their liquid refreshment be too? Meet the pousse-café, a.k.a. a layered drink, a.k.a. a stacked drink. It's an eye-catching effect because it looks like it defies the laws of physics, just like a superhero.

On the contrary, it's actually the laws of physics that makes it possible. The secret sauce that makes these layered drinks work is specific gravity, or what's more commonly known as "relative density." It refers to the mass of a unit of volume (e.g. one fluid ounce) of one substance, compared to the mass of the same unit of volume (again, one fluid ounce) of another substance. So, for example, say you have one fluid ounce of water and one fluid ounce of gold. They both occupy the same amount of space, right, since a fluid ounce is a measurement of volume or how much space they take up? But the gold is much heavier, therefore it has a greater relative density (specific gravity). If you put the two substances together in a bottle, **what would happen**?, the gold would sink and the water would float.

The same principles are at work in our superhero's stacked drink. Say water is our reference substance (which it usually is in science). Sugar is heavier than water, and so when it is dissolved in a fluid it increases the relative density of it. The sweeter something is, the denser it will be and thus more likely to sink.

AREN'T "WEIGHT" AND "MASS" THE SAME?

A: Not really.

An object has mass (say 100 kg). This makes it heavy enough to show a weight of "100 kg". An object's weight is how hard gravity is pulling on it. We think the weight is the same everywhere ... because we all live on the surface of the planet Earth!

But in outer space it would not push on the scales at all (ahem, there's no gravity to pull on it.) The scales would show 0 kg ... but the mass is still 100 kg! An object's mass doesn't change (unless you remove some!), but its weight (or how hard gravity is pulling on it) can change.

So why do people say weight instead of mass?

People often use "weight" to mean "mass", and vice versa. Because gravity is pretty much the same everywhere on Earth, we don't notice a difference. But remember they do not mean the same thing, and they can have different measurements depending on where they're being measured.

Experimental: Give students two unidentified liquids to layer and test. Have them measure them out accurately to equal volumes, measure their weights and/or estimated mass (ex. Using a digital scale), as well as temperature, and determine which they think is the densest and the least dense. Then they'll have to make a logical prediction of what they think will happen and record it on their data sheet. Then they'll test it by layering the liquids and recording their results on their data sheet. Was their hypothesis correct? How do they know? Did everyone get the same results? What might have led to any differences if there were any?If done carefully enough, the colors should stay relatively separate from each other. What do you think will happen if you stir up the liquids in the glass?

Tip: The sample super drinks in the pictures were made with a layer of sweetened cranberry juice and then a layer of colorful sports drink (ex. Gatorade). If you make different drink choices, choose ones with different amounts of sugar content. The greater the difference in the sugar content, the better this will work (and the better your drinks will stay layered!)

When making some super layered drinks there are a few simple rules to follow:

- You want to use a narrow glass to maximize the thickness of each layer without using a ton of the liquid.
- The order in which you pour is the most important aspect. You want to start with the liquid that has the greatest specific gravity, and decrease as you ascend. That way they liquids won't try to pass through each other, which will mostly likely just end in blending. Terrible blending! Start with the sweetest liquid, and go up from there until you have the least-sweet liquid at the top.
- Pouring technique is critically important. This definitely takes a steady hand. If you pour too fast, the top layer will plunge down into the one under it, which will cause mixing. That ain't pretty, and prettiness is what this drink is all about (prettiness and science). You'll want to pour your liquid over the back of a regular spoon, too. Just position the spoon *right* above the last layer, and pour as slowly as humanly possible, or maybe it's as slow as *super*humanly possible.
- The idea is to pour the lighter layer very slowly along the stem of a spoon. The other end of the spoon is placed just above the lower layer and the liquid is then poured very carefully from a beaker or jug. Capillary forces will then hold a small amount of the liquid on the spoon and let it run down. If there's too much liquid, it will form drops and drop of the spoon and cause the layers to mix.
- If the drinks are cold, the layers will keep apart longer.

HELPFUL TOOL: a digital scale is an excellent way to show how you may have the same volume of a liquid, but the mass/weight/density can be different.

DRINKING IT

There are two schools of thought here. One says you just knock it back, and let all those flavors hit you in rapid succession like the Flash running by. The other says that you should sip a layered drink through a straw, one layer at a time, so you can enjoy each as you go. Which is best ultimately depends on what recipe you went with and your personal preference.

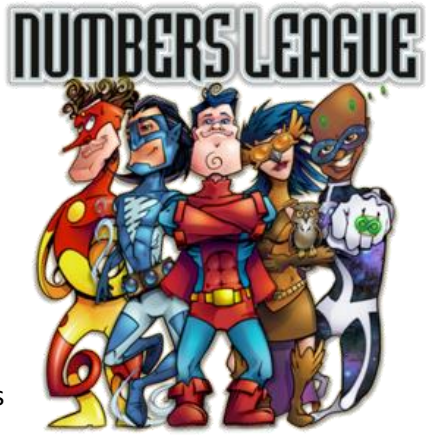
EXTENSION: NUMBERS LEAGUE!--ADVENTURES IN ADDIPLICATION

Villains lurk in the streets of Infinity City. Our only hope is the Numbers League. (Players must) assemble a team of superheroes and use the sum of their incredible powers and ingenious devices (using addition, subtraction, and multiplication) to capture as many villains as they can, by matching combinations of numbers to each villain's Kryptonite-like digit that renders them powerless, and save the day.

In Numbers League, clever use of basic math skills is key. The more you play the sharper these skills will become until no villain is safe from your numerical onslaught.

GOOD FOR LEARNING!

Playing the game, younger kids practice basic arithmetic and mental math. Older kids can play a more challenging game including negative numbers and multiplication, depending on which level is chosen (1-5). Once kids understand the game, Numbers League is so much fun that kids revel in practicing math to rid the city of its villain problem. As a result, they're learning an even bigger math lesson: that using numbers can solve real-life problems (even though in this game the "real life" problems involve masked superheroes and silly bad guys).



NOTE: The Numbers League Card Game also comes in an excellent app representation. This Numbers League version allows for playing against the computer, against human opponents, or a combination thereof. It also has a very large range of game settings and levels. There is no sidekick in this version, but otherwise the gameplay is very similar to the card game.

SUPER THIRST!

MYSTERY LIQUID ONE

DESCRIPTION: ex. What color is it?

VOLUME	ESTIMATED MASS/WEIGHT	PREDICTION (WHAT DO YOU THINK WILL HAPPEN?)	RESULT (WHAT HAPPENED?)

MYSTERY LIQUID TWO

DESCRIPTION: ex. What color is it?

VOLUME	ESTIMATED MASS/WEIGHT	PREDICTION (WHAT DO YOU THINK WILL HAPPEN?)	RESULT (WHAT HAPPENED?)

MYSTERY LIQUID THREE

DESCRIPTION: ex. What color is it?

VOLUME	ESTIMATED MASS/WEIGHT	PREDICTION (WHAT DO YOU THINK WILL HAPPEN?)	RESULT (WHAT HAPPENED?)

Day Six K-8 Standard Alignment

K

- K.6.01 e. Explain the consequences of an individual's decisions and actions.
- K.6.01 b. Know that individuals choose jobs that impact their lives, families and communities.

These standards will be met and reinforced as we study and discuss the lives and impact of those like Stan Lee & Jack Kirby.

- 7.9.2 Observe, discuss, and compare characteristics of various liquids.
- 7.9.1 Describe an object by its observable properties.

These standards will be met and reinforced as we go through the Super Thirst experiment activity.

1

- 1.5.01. c. Identify contributions of diverse historical figures that have influenced their community, state, nation, and/or the world.
- 1.5.02 Understand the place of historical events in the context of past, present, and future.

These standards will be met and reinforced as we study and discuss the lives and impact of those like Stan Lee & Jack Kirby.

- 7.9.2 Compare liquids, e.g., according to their color, ability to flow, solubility in water, whether they sink or float, whether they mix, and use.
- 7.9.3 Predict the changes that may occur when different materials are put together and/or mixed.

These standards will be met and reinforced as we go through the Super Thirst experiment activity

2

- 2.5.02 Understand the place of historical events in the context of past, present, and future.
- 2.6.01 Recognize the impact of individual and group decisions on citizens and communities.

These standards will be met and reinforced as we study and discuss the lives and impact of those like Stan Lee & Jack Kirby.

7.9.1 Use tools to observe the physical properties of objects.

7.Inq.1 Use senses and simple tools to make observations.

These standards will be met and reinforced as we go through the Super Thirst experiment activity

3

- 3.6.01 Recognize the impact of individual and group decisions on citizens and communities.
- 3.5.01 Identify major people, events, and issues in United States and world history.

These standards will be met and reinforced as we study and discuss the lives and impact of those like Stan Lee & Jack Kirby.

- 7.9.1 Use physical properties to compare and contrast substances.
- 7.9.4 Classify combinations of materials according to whether they have retained or lost their individual properties.
- 3.MD.2. a) Measure and estimate liquid volumes and masses of objects using standard units, e.g., grams (g), kilograms (kg), and liters (l)

These standards will be met and reinforced as we go through the Super Thirst experiment activity

4

- 4.6.01 Recognize the impact of individual and group decisions on citizens and communities.
- 4.6.01a. Identify leadership qualities of leaders of the past.

These standards will be met and reinforced as we study and discuss the lives and impact of those like Stan Lee & Jack Kirby.

- 7.9.1 Use appropriate tools to measure and compare the physical properties of various liquids.
- 7.9.2 Determine the mass and volume of a substance or object using proper units of measurement.

These standards will be met and reinforced as we go through the Super Thirst experiment activity

5

- 5.6.01a Recognize the impact of individual and group decisions on citizens and communities.

- 5.6.01c. Identify and describe factors that either contribute to cooperation or cause disputes within and among groups and actions.

These standards will be met and reinforced as we study and discuss the lives and impact of those like Stan Lee & Jack Kirby.

- 7.Inq.1 Explore different scientific phenomena by asking questions, making logical predictions, planning investigations, and recording data.
- 7.Inq.4 Analyze and communicate findings from multiple investigations of similar phenomena to reach a conclusion.

These standards will be met and reinforced as we go through the Super Thirst experiment activity.

6

- 6.6.01 Understand the impact of individual and group decisions on citizens and communities.
- 6.6.02 a. Identify and describe ways family, groups, and community influence the individual's daily life and personal choices

These standards will be met and reinforced as we study and discuss the lives and impact of those like Stan Lee & Jack Kirby.

- 7.Inq.3 Use evidence from a dataset to determine cause and effect relationships that explain a phenomenon.
- 7.Inq.4 Draw a conclusion that establishes a cause and effect relationship supported by evidence.

These standards will be met and reinforced as we go through the Super Thirst experiment activity.

7

- 7.6.02 Understand how individuals and groups can effect change and have an impact at local, regional, and global levels.
- 7.6.01 Understand the impact of individual and group decisions on citizens and communities.

These standards will be met and reinforced as we study and discuss the lives and impact of those like Stan Lee & Jack Kirby.

- 7.Inq.3 Use evidence from a dataset to determine cause and effect relationships that explain a phenomenon.

- 7.Inq.4 Draw a conclusion that establishes a cause and effect relationship supported by evidence.

These standards will be met and reinforced as we go through the Super Thirst experiment activity.

8

- 8.6.02 Understand how individuals and groups can effect change and have an impact at local, regional, and global levels.
- 8.6.01 Recognize the impact of individual and group decisions on citizens and communities.

These standards will be met and reinforced as we study and discuss the lives and impact of those like Stan Lee & Jack Kirby.

- 7.9.7 Apply an equation to determine the density of an object or liquid based on its mass and volume. ["Density" = "Mass"/"Volume", in other words density has units of mass divided by volume.]
- 7.9.3 Measure or calculate the mass, volume, [and temperature] of a given substance.

These standards will be met and reinforced as we go through the Super Thirst experiment activity.

Days Seven & Eight: She has her mother's . . .super powers?

The doorbell rings. Emma's dad calls out, "Emma, answer the door! I'm making dinner and my hands are full!"

Emma puts down her book, and heads to the door. As she opens it slowly, a burst of mostly familiar faces rush through the door. Aunts, uncles, and cousins she hasn't seen in years greet her enthusiastically.

Aunt Rita pulls Emma into a hug and says, "Well, look at you! You've grown! And you've got such beautiful red, curly hair! It runs in the family, you know. You look just like my grandmother!"

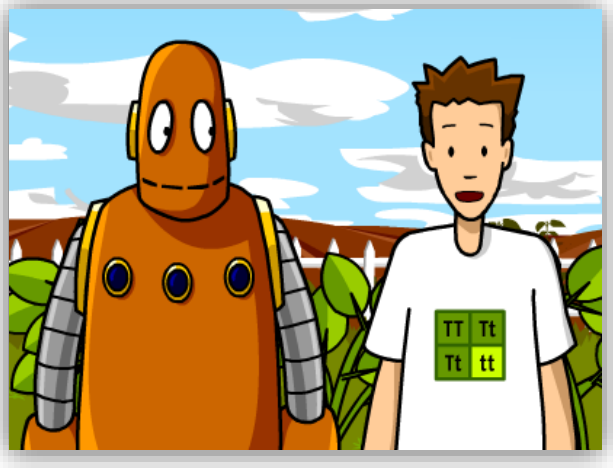
Uncle Michael adds, "And, look, she's getting so tall! Just like her dad. Only 10 years old, and you look like a basketball player already!"

Emma's dad emerges from the kitchen to greet the guests. As he helps everyone get settled, Emma wonders, "Aunt Rita's grandmother? It runs in the family? What are they talking about?"

They're talking about heredity! And genes (say: **jeenz**), that's what they're talking about. These aren't the blue pants that hang in your closet! Genes play an important role in determining physical traits — how we look —and lots of other stuff about us. They carry information that makes you who you are and what you look like: curly or straight hair, long or short legs, even how you might smile or laugh. Many of these things are passed from one generation to the next (that's what heredity means—the passing down of physical traits) in a family by genes. Why does one kid have green eyes while another kid's eyes are brown? It's all in the genes!

What is a gene?

Note: If you have paid access to BrainPop the animated Genetics video has an excellent introduction to the basics of genes and recessive and dominant traits. There is also an excellent free video 'Heredity' on BrainPop that discusses heredity, traits, & Punnett squares.



Each cell in the human body contains about 25,000 to 35,000 genes. Genes carry the information that determines your traits (say: **trates**), which are features or characteristics that are passed on to you — or inherited — from your parents.

For example, if both of your parents have green eyes, you might inherit the trait for green eyes from them. Or if your mom has freckles, you might have freckles too because you inherited the trait for freckles. Genes aren't just found in humans — all animals and plants have genes, too.

Where are these important genes? Well, they are so small you can't see them. Genes are found on tiny spaghetti-like structures called chromosomes (say: KRO-moh-somes). And chromosomes are found inside cells. Your body is made of billions of cells. Cells are the very small units that make up all living things. A cell is so tiny that you can only see it using a very strong microscope.

Chromosomes come in matching sets of two (or pairs) and there are hundreds — sometimes thousands — of genes in just one chromosome. The chromosomes and genes are made of DNA, which is short for deoxyribonucleic (say: dee-ox-see-ri-bo-nyoo-CLAY-ik) acid.

Most cells have one nucleus (say: NOO-clee-us). The nucleus is a small egg-shaped structure inside the cell which acts like the brain of the cell. It tells every part of the cell what to do. But, how does the nucleus know so much? It contains our chromosomes and genes. As tiny as it is, the nucleus has more information in it than the biggest dictionary you've ever seen.

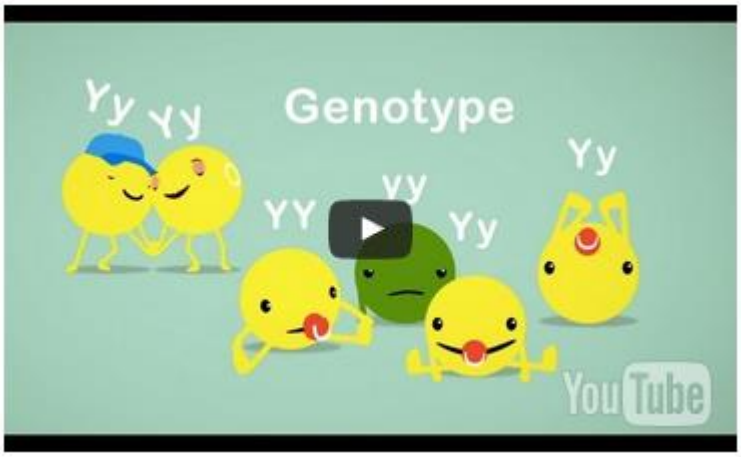
In humans, a cell nucleus contains 46 individual chromosomes or 23 pairs of chromosomes (chromosomes come in pairs, remember? 23 x 2 = 46). Half of these chromosomes come from one parent and half come from the other parent.

DID YOU KNOW?

Under the microscope, we can see that chromosomes come in different lengths and striping patterns. When they are lined up by size and similar striping pattern, the first twenty two of the pairs these are called autosomes; the final pair of chromosomes are called sex chromosomes, X and Y. The sex chromosomes determine whether you're a boy or a girl: females have two X chromosomes while males have one X and one Y.

But not every living thing has 46 chromosomes inside of its cells. For instance, a fruit fly cell only has four chromosomes!

HOW DO GENES WORK?



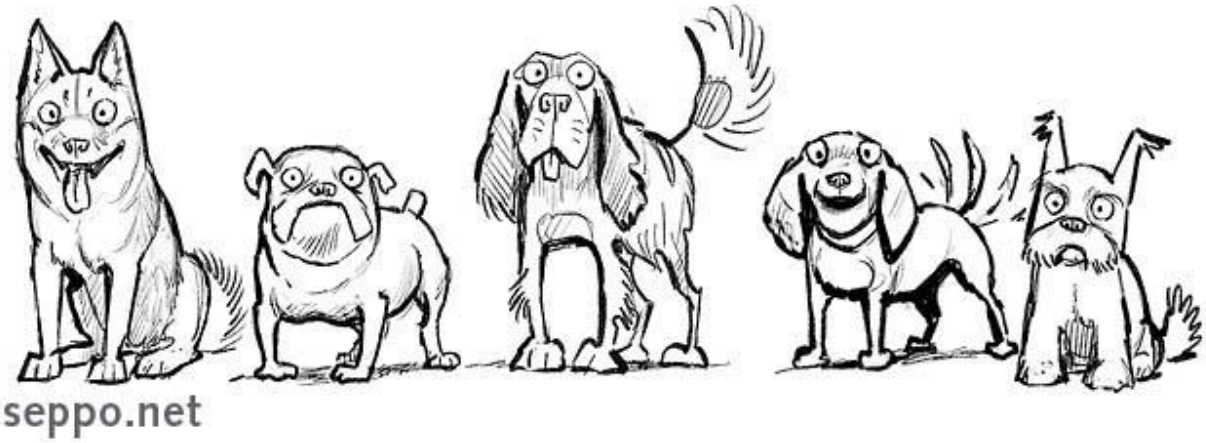
Each father and mother pass down traits to their children, who inherit combinations of their dominant or recessive alleles. But how do we know so much about genetics today? In this excellent (and cute) TEDed short film [How Mendel's pea plants helped us understand genetics] Hortensia Jiménez Díaz explains how studying pea plants revealed why you may have blue eyes.

Each gene has a special job to do. The DNA in a gene spells out specific instructions—much like in a cookbook recipe — for making proteins (say: PRO-teens) in the cell. Proteins are the building blocks for everything in your body. Bones and teeth, hair and earlobes, muscles and blood, are all made up of proteins. Those proteins help our bodies grow, work properly, and stay

healthy. Scientists today estimate that each gene in the body may make as many as 10 different proteins. That's more than 300,000 proteins!

Like chromosomes, genes also come in pairs. Each of your parents has two copies of each of their genes, and each parent passes along just one copy to make up the genes you have. Genes that are passed on to you determine many of your traits, such as your hair color and skin color. And they keep that trait alive as they're passed down.

Maybe Emma's mother has one gene for brown hair and one for red hair, and she passed the red hair gene on to Emma. If her father has two genes for red hair, that could explain her red hair. Emma ended up with two genes for red hair, one from each of her parents.



You also can see genes at work if you think about all the many different breeds of dogs. As they reproduce they continue their species. And they all have the genes that make them dogs instead of cats, fish, or people. But those same genes that make a dog a dog also make different dog traits. So even within the same species (dog or 'Canis familiaris' if you want to use some scientific Latin) there can be differences. Some breeds are small and others are big. Some have long fur and others have short fur. Dalmatians have genes for white fur and black spots, and toy poodles have genes that make them small with curly fur.

Behavior can be controlled by genes, too. Border collies were bred to herd sheep, so even if they have never seen a sheep in their life, they will display herding behaviors - like running around your house collecting all your pillows. You get the idea!

So, basically, DNA is the material that genes are made of and this material is passed on from generation to generation. But not everyone has the exact same combination of DNA, even if we're from the same family. Genetic differences exist in all of us and that diversity, or those differences, is what makes us unique as individuals. Phenotypes are the physical characteristics that we develop from our genotype (our genetic makeup) and both the environment and our genotype interact to make us what we are. (An individual's **phenotype** consists of the traits we can observe. These can include features of appearance, behavior, metabolism, or anything else we can detect.) Genetic diversity creates cultural differences that make our world unique.

So, what if your parents had super powers? Could you inherit Hulk's crazy green skin and hot temper or Captain Marvel's brilliant mind and bright blue eyes? Genes can affect our superheroes too!

HELLO, MOTHER! HELLO, FATHER!...

OBJECTIVES: Students will use superhero traits and genetic crosses to help better understand genotypes, phenotypes, Punnett squares, and what possible outcomes are when two parent organisms have offspring.

MATERIALS:

- ☐ Internet access to reference & research sites, ex.
  - The Superhero Dictionary
  - Superhero Database
  - Marvel's Character Database
  - Marvel Universe Wiki (Encyclopedia of the 9000+ characters, places, and things that inhabit the Marvel Universe—look under each character's attributes & powers)
  - DC Comics Character Database
  - DC Comics Wikia (Publicly edited)Database
- ☐ And/or reference books. There are many books available, ex. *DC Comics Ultimate Character Guide*, *Marvel Encyclopedia*, *The DC Comics Encyclopedia*, *Meet The Marvel Super Heroes*, and more such as trading cards for superheroes (male and female),
- ☐ Drawing materials (paper, colored pencils, crayons, markers, and/or watercolors).
- ☐ Coins (pennies are fine).

Go through a sample demonstration of each of the following steps as a group to ensure students understand what they are to do and how.

1. Students use the Internet to locate Marvel/DC Comic sites, books, and other resources that give backgrounds and physical characteristics of the super- heroes. **(Examples would include Wolverine, Black Widow, Captain Marvel, Cyclops, and Elektra to name a few).**

2) Students must search for a **male** and **female** superhero and develop a list of physical traits and powers that these super-heroes have in common and that can be identified by physically looking at the characters (ex: Eye color)and also those unique to that individual, example: Superman flight. Develop a list of [5-10] minimum observable physical traits (phenotype) that your character has and determine what would be dominant and recessive trait for each of them, ex: hair color, eye color, invisibility, strength, speed, height, intelligence, flight, etc.

3) Create a genotype for each characteristic of each superhero and then put the genotype and phenotype (what it looks like or what traits we see) in the family genotype/phenotype chart, like the example below.

	FEMALE		**MALE**	
Name of Character	SAMPLE GIRL!		SAMPLE GUY!	
Trait	**Phenotype**	**Genotype**	**Phenotype**	**Genotype**
Hair Color	Purple	PP	Orange	oo
Strength	Super Strength	Ss *(s=recessive weakness)*	Super Strength	Ss *(s=recessive weakness)*
Flight	Has ability to Fly	FF	Unable to Fly	ff
Speed	Super Speed	Ee *(e = recessive normal speed)*	Normal Speed	ee
Wings	Doesn't have wings	ww	Has large wings	Ww *(w=recessive gene for no wings)*

As you develop your list of physical traits, assign different letters of the alphabet for each trait. (Older students should know these are called alleles (which represent the different forms of the gene/the letters)). Include a key for these traits in your paper, like the notes in the chart above, or in the sample chart below.

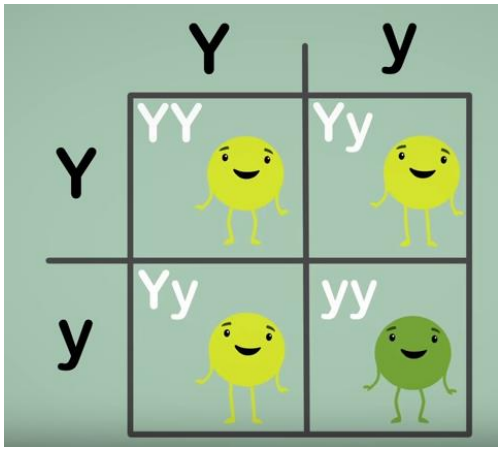
Superhero Trait Chart—Example		
1)Hair	**H=** red hair	**h=** blonde hair
2) Eye color	**B- Blue**	**b- Green**
3) Super human strength	**S- Strength**	**ss- Normal Strength**

For dominant traits use all capital letters. Choose lower case letters for recessive traits for your super character (ex. You might decide that while Storm has white hair (W-dominant), her recessive trait might be for purple hair (w-recessive). Or that while Black widow has Red hair (R = dominant red hair), perhaps she has a recessive gene for blonde hair (r = recessive blonde)

[Hair color] Examples: R=red hair (dominant), r= blonde hair (recessive).

Phenotype (what appears physically)/Genotype (what you get genetically) Examples: RR = (hair will be) red, Rr = (hair will be) red, rr = (hair will be) blonde

4) **[Older students]** Neatly draw a Punnett Square grid framework--essentially the beginning of tick-tack-toe--on your paper for each of your traits. You will be crossing your male and female characters, so use his and her genotypes as the parents in your crosses. Below each Punnett square, list the possible phenotype and genotype probabilities for your characters' offspring. Remember, the uppercase (dominant) trait ALWAYS overpowers his lowercase (recessive) friend. So the only way a recessive trait shows up is if you have two lowercase letters, like our green pea in the picture.

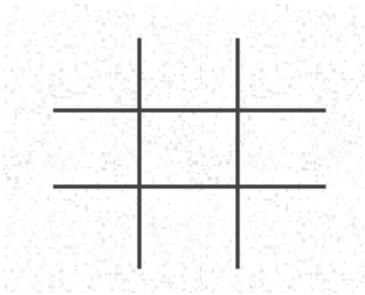


Phenotype Probability: 75 % will have Red hair, 25% White hair

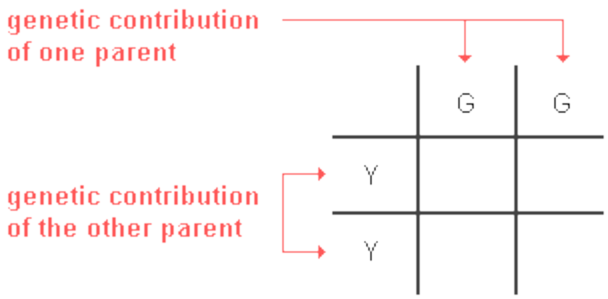
Genotype Probability: 25% RR, 50% Rr, 25% rr

A Quick Review on Punnett Squares

A **Punnett square** is used to predict the chances of an offspring to have its parent's traits. Setting up and using a Punnett square is quite simple (and rather fun) once you understand how it works. You begin by drawing a grid of perpendicular lines, like you're playing tick-tack-toe:

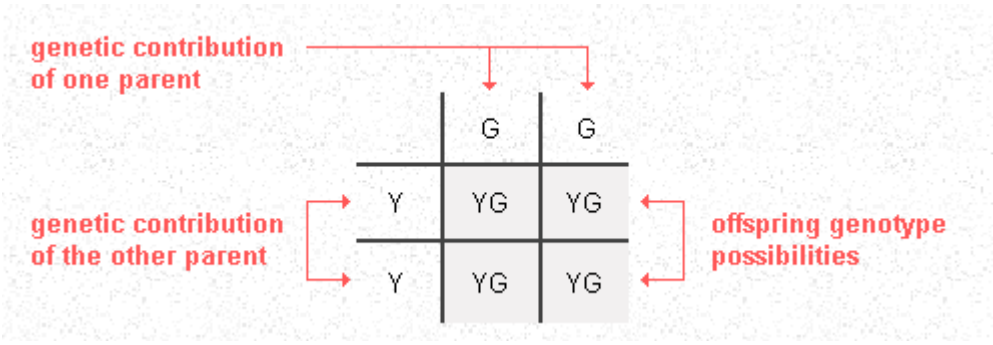


Next, you put the genotype of one parent across the top and that of the other parent down the left side. For example, if super parent genotypes for eye color were YY (yellow-dominant) and GG (green-recessive) respectively, the setup would be:

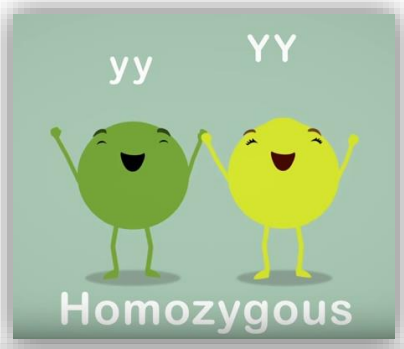


Note that only one letter goes in each box for the parents. It does not matter which parent is on the side or the top of the Punnett square.

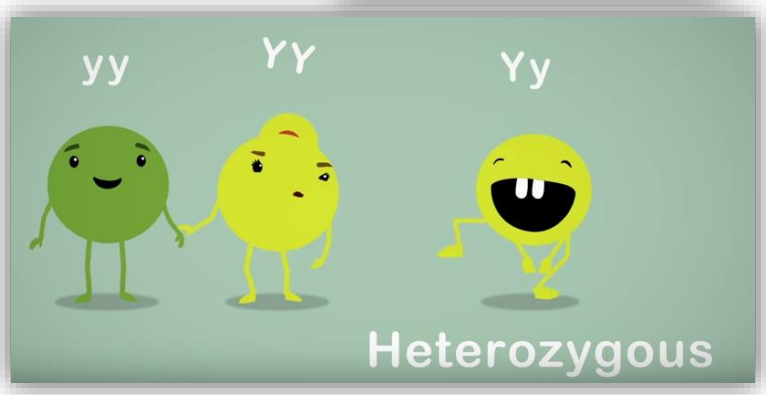
Next, all you have to do is fill in the boxes by copying the row and column-head letters across or down into the empty squares. This gives us the predicted frequency of all of the potential genotypes among the offspring each time reproduction occurs.



In this example, 100% of the offspring will likely be heterozygous (YG) or, in other words, have mixed genes for their trait. (Homozygous is what it is called when an organism has two copies of the same allele/gene/letter) But, since the Y (yellow) allele is dominant over the G (green) allele for eye colors, 100% of the YG offspring will have yellow eyes (their phenotype, or appearance.)



In another example (shown below), if **both** of the parent superheroes have heterozygous/mixed (YG) genotypes, there will be 25% YY, 50% YG, and 25% GG offspring on average. These percentages are determined based on the fact that each of the 4 offspring boxes in a Punnett square is 25% (1 out of 4). As to phenotypes (what they look like physically), 75% will be Y and only 25% will be G. These will be the odds every time a new offspring is conceived by parents who both have YG genotypes.



5) **[Younger students can start here, if you wish]** Have students cross their own female and male characters. *Or have two groups get together and choose a male character and a female character—one from each group.*

Flip one coin (twice) to determine the sex of the baby character. Heads=X, Tails=Y and Female=XX, Male=XY And write down the result.

Then, have someone [from each group if you are combining groups] toss a coin (use a penny) to simulate a genetic cross: If the coin turns up head-head, the capital letter for the trait will dominate. If the coins turn up head-tail, the trait for the capital letter will still dominate. If the coin turns up tail-tail, the lower case letter trait will be the physical trait. This represents the recessive trait.

Ex. **HH** (the trait is dominant—so what we physically see is the dominant trait, **Ht** (the trait is mixed but still dominant—so what we physically see is the dominant trait) **tt** (the trait is recessive—so what we physically see is the *recessive* trait)

Tossing coins for as many different traits that they have listed, they generate a new list of physical features. Have them keep track of their coin flips and the results by creating a/using a data table.

Genetic Cross -- Example				
Trait	**Male Genotype**	**Female Genotype**	**Offspring 1Genotype**	**Offspring 1Phenotype**
Hair	h h	H h	hh	Blonde

6) The fun and challenge comes when students have to draw a new baby superhero based upon the new set of traits. The baby/new superhero has to be drawn and colored – ***no exceptions***! They can do this on paper or electronically, using drawing software or online drawing tools. The artwork created by the students can then be displayed in the room or shared on interactive whiteboard or projector.

Are Punnett Squares Just Academic Games?

Why is it important for you to know about Punnett squares? The answer is that they can be used as predictive tools when considering having children. It is likely that every one of us is a carrier for a large number of recessive alleles. Some of these alleles can cause life-threatening defects if they are inherited from both parents.

Let us assume, for instance, that both you and your mate are carriers for a particularly unpleasant genetically inherited disease such as cystic fibrosis. Of course, you are worried about whether your children will be healthy and normal. As carriers, you and your mate are both heterozygous (Aa). This disease only afflicts those who are homozygous recessive (aa). The Punnett square makes it clear that at each birth, there will be a 25% chance of you having a normal homozygous (AA) child, a 50% chance of a healthy heterozygous (Aa) carrier child like you and your mate, and a 25% chance of a homozygous recessive (aa) child who probably will eventually die from this condition.

If one parent is a carrier and the other has a recessive disorder, their children will have the following odds of inheriting it:

50% chance of being a healthy carrier

50% chance having the recessive disorder

Punnett squares are standard tools used by genetic counselors. Theoretically, the likelihood of inheriting many traits, including useful ones, can be predicted using them. It is also possible to construct squares for more than one trait at a time. Note: Some traits are not inherited with the simple mathematical probability suggested here.

7) Students make up new names for these super-heroes and these drawings can then be used with other drawings for even more genetic crosses to create a large and crazy superhero family tree! Does a granddaughter look like her super-grandmother? Are any children born without powers? See what happens!

8) Students will be required to present their superheroes to the class.

Option: Have a contest for the wildest looking superhero/ine.

MOTHER'S NAME: _____ FATHER'S NAME: _____

CONGRATULATIONS! THE BABY IS A: (CIRCLE YOUR RESULT)

MALE (XY) FEMALE (XX)

GENETIC CROSS				
TRAIT	FATHER'S GENOTYPE	MOTHER'S GENOTYPE	OFFSPRING/BABY'S GENOTYPE	OFFSPRING PHENOTYPE WHAT TRAIT WILL IT HAVE/SHOW?

Genetic Cross -- Example				
Trait	Male Genotype	Female Genotype	Offspring 1Genotype	Offspring 1Phenotype
Hair	h h	H h	hh	Blonde

Days Seven & Eight K-8 Standard Alignment

K

- 7.4.2 Observe that offspring resemble their parents.
- 7.4.2 Match pictures of a juvenile to the adult parent animal (including humans).

These standards will be met and reinforced as students learn about how genes work and traits are passed from parents to offspring and then participate in the 'Hello, Mother! Hello, Father!' superhero genetics activity, create new 'super offspring' and draw them. Students will have a chance as a group to look at the gallery and try to determine what superhero parents were involved in the creation of each new 'super offspring' by seeing what they have in common and looking for similarities.

1

- 7.4.2 Describe ways in which animals' (including humans) offspring closely resemble their parents.
- 7.4.2 Match pictures of parents and related offspring and identify common characteristics.

These standards will be met and reinforced as students learn about how genes work and traits are passed from parents to offspring and then participate in the 'Hello, Mother! Hello, Father!' superhero genetics activity, create new 'super offspring' and draw them. Students will have a chance as a group to look at the gallery and try to determine what superhero parents were involved in the creation of each new 'super offspring' by seeing what they have in common and looking for similarities.

2

- 7.4.2 Realize that parents pass along physical characteristics to their offspring.
- 7.4.3 Look for similarities in pictures of members from the same human [or 'superhuman'] family.

These standards will be met and reinforced as students learn about how genes work and traits are passed from parents to offspring and then participate in the 'Hello, Mother! Hello, Father!' superhero genetics activity, create new 'super offspring' and draw them. Students will have a chance as a group to look at the gallery and try to determine what superhero parents were involved in the creation of each new 'super offspring' by seeing what they have in common and looking for similarities.

3

- 7.4.2 Recognize common human characteristics that are transmitted from parents to offspring.
- 7.4.4 Draw conclusions about the similarities and differences between parents and their offspring.

These standards will be met and reinforced as students learn about how genes work and traits are passed from parents to offspring and then participate in the 'Hello, Mother! Hello, Father!' superhero genetics activity, create new 'super offspring' and draw them. Students will have a chance as a group to look at the gallery and try to determine what superhero parents were involved in the creation of each new 'super offspring' by seeing what they have in common and looking for similarities.

4

- 7.4.1 Recognize the relationship between reproduction and the continuation of a species.
- 7.4.1 Draw conclusions about the relationship between reproduction and the survival of a species.

These standards will be met and reinforced as students learn about how genes work and traits are passed from parents to offspring. We will discuss how genetics and reproduction help continue the human and other species (ex. Dogs) before students participate in the 'Hello, Mother! Hello, Father!' superhero genetics activity, create new 'super offspring' and draw them.

5

- 7.4.1 Recognize that information is passed from parent to offspring during reproduction.
- 7.4.2 Distinguish between inherited traits and those that can be attributed to the environment.

These standards will be met and reinforced as students learn about how genes work and traits are passed from parents to offspring and then participate in the 'Hello, Mother! Hello, Father!' superhero genetics activity, create new 'super offspring' and draw them.

6

- 7.Inq.3 Interpret and translate data in a table, graph, or diagram.
- 7.Inq.4 Draw a conclusion that establishes a cause and effect relationship supported by evidence.

These standards will be met and reinforced as students learn about how genes work and traits are passed from parents to offspring and then participate in the 'Hello, Mother! Hello, Father!' superhero genetics activity, create new 'super offspring' and draw them based on the data they've recorded using Punnett squares and their data table sheets.

7

- 7.4.4 Predict the probable appearance of offspring based on the genetic characteristics of the parents.
- 7.4.5 Explain the differences between dominant and recessive traits.
- 7.4.6 Use a Punnett square to predict the genotypes of offspring.
- 7.4.7 Draw a phenotypically accurate picture of an individual whose traits are modeled by the role of a die or flip of a coin.

These standards will be met and reinforced as students learn about how genes work, what dominant and recessive traits are, what phenotypes and genotypes are, and how traits are passed from parents to offspring, and which ones are visually expressed. Students will then participate in the 'Hello, Mother! Hello, Father!' superhero genetics activity, create new 'super offspring' and draw them based on the data they've recorded using Punnett squares, the flip of a coin, and their data table sheets.

8

- 0.4.2 Describe the relationships among genes, chromosomes, proteins, and hereditary traits.

- 6.4.2 Describe the relationship between phenotype and genotype.

These standards will be met and reinforced as students learn about how genes work, what dominant and recessive traits are, what phenotypes and genotypes are, and how traits are passed from parents to offspring, and which ones are visually expressed. Students will then participate in the 'Hello, Mother! Hello, Father!' superhero genetics activity, create new 'super offspring' and draw them based on the data they've recorded using Punnett squares, the flip of a coin, and their data table sheets.

Samples of Possible Week Two Academic Vocabulary Words to Reinforce

K

- Observe
- Parts
- Temperature
- Thermometer
- Tools
- Water
- Drawing
- Story

1

- Illustrate
- Sequence
- Predict
- History
- Values
- Mixed
- Past
- Present

2

- Offspring
- Parent
- Similarities
- Differences
- Organism
- Observation

3

- Heredity
- Cause
- Effect
- Mixture
- Economy

4

- Mass
- Reproduction
- Relationship
- Drawing conclusions
- Supply and demand

5

- Main Idea
- Visual Image
- Variable
- Solution
- Gravity

6

- Cause and effect
- Imagery
- Random
- Percent
- Variable

7

- Punnett Square
- Dominant trait
- Recessive Trait
- Gene
- Genetic characteristic
- Genotype
- Phenotype

8

- Density
- Heterogeneous
- Homogeneous
- Family
- Species
- Variation

Sample Week Two Supply List

Day Five

- ☐ Print-outs of Templates
- ☐ Art materials (ex. Crayons, etc.)
- ☐ Pencils

Day Six

- ☐ Associated PowerPoint 'Golden Boys'
- ☐ Fruit juices and sports drinks with a variety of sugar contents
- ☐ Digital Scale
- ☐ Clear Cups [narrow] for layering
- ☐ Small cups, ex. Dixie size for measuring liquids
- ☐ Thermometers
- ☐ Plastic spoons
- ☐ Print-outs of 'Super Thirst' worksheet
- ☐ Pencils
- ☐ Straws
- ☐ Optional: Numbers League Game

Days Seven and Eight

- ☐ Access to internet and videos
- ☐ Reference books
- ☐ Printouts of 'Hello, Mother! Hello, Father!' Worksheet
- ☐ Drawing materials (paper, colored pencils, crayons, markers, and/or watercolors).
- ☐ Coins (pennies are fine)