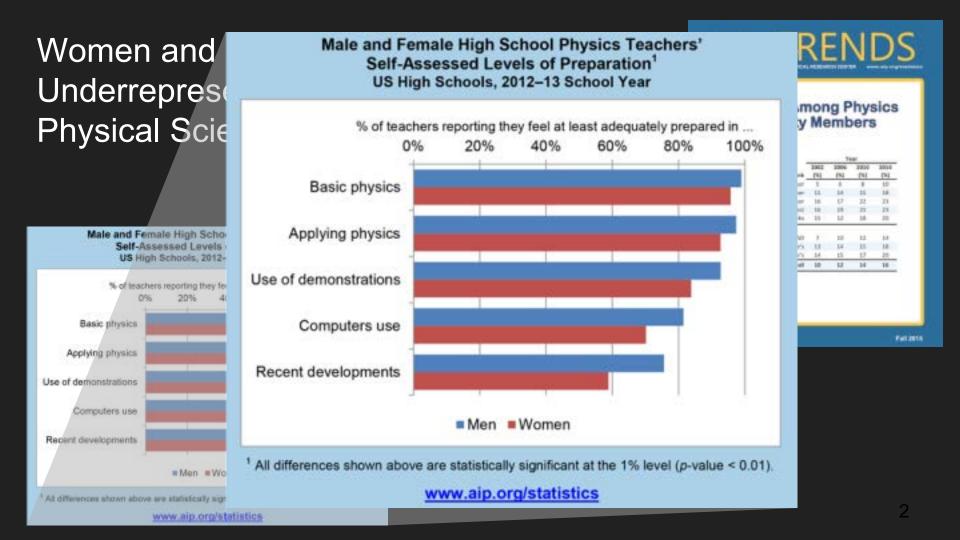


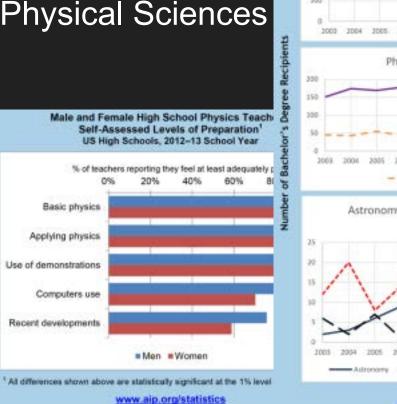
Planning for the Future: Revising the Past

Victoria DiTomasso CUNY Macaulay Honors College at Hunter College Samantha Spytek, Virginia Polytechnic Institute

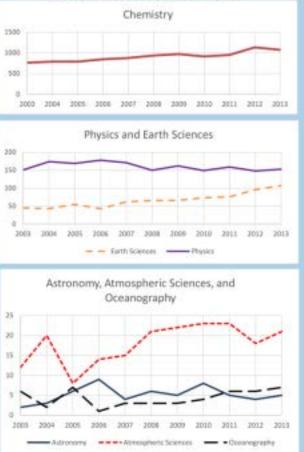
Mentor: Dr. Greg Good



Women and Minor Underrepresented Physical Sciences



Trends in Bachelor's Degrees Earned by African Americans in Physical Science Fields, 2003-2013

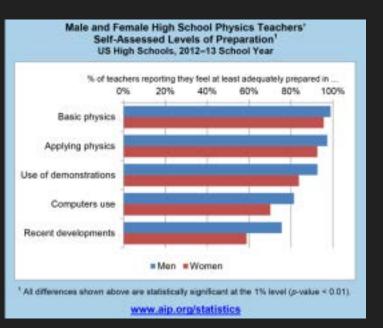




Follow as GAPEIndetes

Fail 2018

Women and Minorities are Underrepresented in the Physical Sciences



AIP American Institute of Physics PHYSICS READED AND A STATISTICAL RESEARCH CENTER WAVE also or given all or

Women Among Physics Faculty Members

10		Ye	ar	
Rank	2002 (%)	2006 (%)	2010 (%)	2014 (%)
Full Professor	5	6	8	10
Associate Professor	11 16	14 17	15 22	18 23
Assistant Professor				
instructor/Adjunct	16	19	21	23
Other Ranks	15	12	18	20
Highest Degree Offered				
PhD	7	10	12	14
Master's	13	14	15	18
Bachelor's	14	15	17	20
Overall	10	12	14	16



18

Follow us @AIPStatistics

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Produce teaching guides

Lesson plans Worksheets PowerPoints Readings

> African Americans Native Americans Disabled Americans

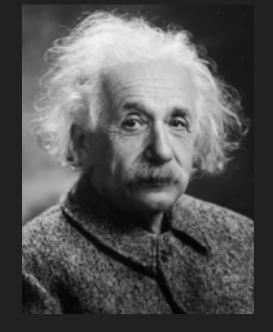
about the history of women and minorities

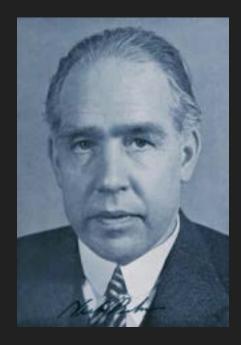
in the physical sciences

Physics Astronomy Earth Science Chemistry

Provide students with a diverse set of role models







Isaac Newton

Albert Einstein

Niels Bohr

Provide students with a diverse set of role models



Solvay Conference in Brussels, 1927

Provide students with a diverse set of role models









Katherine Johnson

Lise Meitner

Chien-Shiung Wu

Herman Branson

Photos from the AIP Emilio Segre Visual Archives

Raise awareness of ongoing diversity issues in the physical sciences

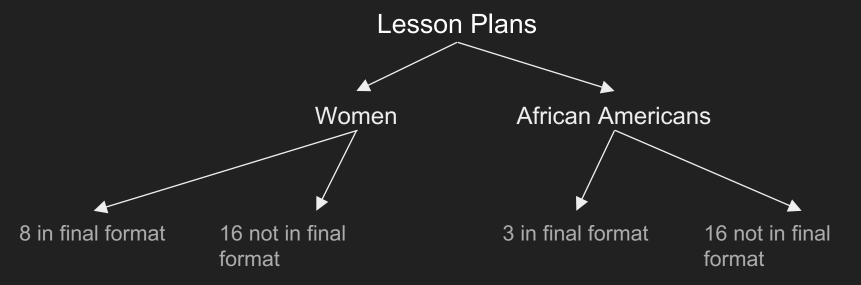




Building on Three Years of Work

Previously:

Teaching Guides on Women and African Americans in Physics, Astronomy and Related Disciplines



Complete Standardization of Lesson Plan Format

The 5 E's

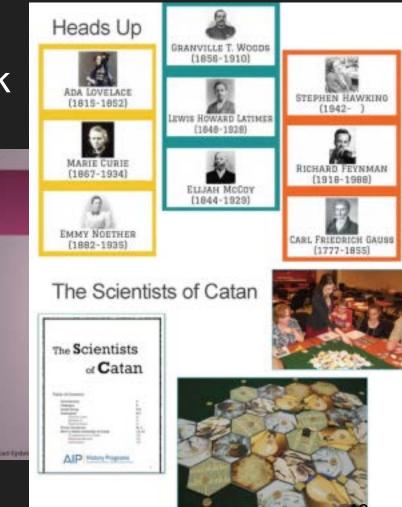


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Building on Four Years of Work

More than just lesson plans

- Slideshows
- Annotated bibliographies
- Timelines
- Informational handouts
- Guides to online, AIP, archival resources
- Lists of oral histories and video interviews
- Historiographies
- Puzzles and games



Supplemental Materials

What we included

Discussion questions/answers

PowerPoints

Worksheets

Informational handouts

Readings





terry in the pro- American of





Branson and Stovall: Bios and Backgrounds

Pairman Brainant

- Herman Beartan with been in 1914 in Virginia.
- He received his 3.5. Inner Veginia Scale Callege in 2008 and his V0.0. in physics from the University of Caldennel in 2009.
- Marcan Jained the fact by at Haward University, or HECU (Microircelly Book College and University) in Washington, D.C., in 1941



Physicist: Novingo Besicist, na. 1960), Irrege country the AIP Forths Segar (House America), Physics Teles Collection

- After Na time at Callback, Reasons reformed to Howard University. Previo Televic Callbacks where he remained until LBMI when he want on to serve so the president of Control Socie University in Witherface, Ohio.
- In 1937), he became president of Lincole University until his rytimement in \$985.
- Throughter, Nr Bill, Immersen was technologien about the need for equal apportunities for African
 Americans in the calences, basing telepart least the Stational Association for Island Opportunity in
 relighter (Scicension in 1988 and massing the Pensident Schwid Nieo about the disporting in
 Fernancing
 for Nighter relocation.

Tarvis Stocal



(86-Wank park) profiles internal latural 2 fermi

 Tarvis Soval ecolosis ha 8.5. from Monthours College and his Rh.D. in physics from the University of Memoroto in the only 1980s.

 In 1964, Stovall import to Paris with the family to work or a transactin aminant at the fools insertial Supplement. He assimitually leasance an arrivalisity professor at the University doe for the.

- He spart sevenil years in Nigetia as a physics professor at the University of Achieveness uning to Paris.
- In 1966, he was working at the lathoratoire de l'Acceleratour Lindoire d'Orsey (Linder Accelerator)

Laboratory in Orsey) when the permet is response to Shaman's 1985 intensiew in which the discussed African Americans in physics.

Programming the Contor for History of Physics at Aim



12

Revising Previously Existing Lesson Plans

African American Physicists in the 1960s



Herman Branson



Tannie Stovall

Revising Previously Existing Lesson Plans

African American Physicists in the 1960s



Branson and Stoval: Blos and Backgrounds.

Section Disease

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- He expenses his high later physics there for \$200 and the 198.1) Augit-price from the University of Caldword & 2020.
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American glycelists at the time he was interviewes?

win a graculate student? Ensie heat Broman's words as well as your own Recordering of charge in American Fattory for African Interinants.

Discussion Questions

African Americans Physicists in the 1960s

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3. What is Brainson's openiar on whether Rhiston Americana is physics should pursue server apportunities in instudy or academia?

4. Owinall, what is Rearaps's presignment of the status of Africa's Americana in sheet?

Propagate if the Transfer has before a primarily on and



Discussion Questions Answers African American Physicists in the 1960s

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- 8. You had the same of shines hearings is playing draged sizes through an a probability student? Since here iterated is worth to work as your time introducing a st change in teratione Automotive for Athlings Investigant.
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- Designing, territory many that the distancements and provide and provide and percenture where it convertes physics. No. Internet, Kan a problem period on the forum. We Harder Not the scientific conventing it particularly littled and collineal. So and by you it, the sharing In Altice American physicine is improving and that will exists any formula and reminented registers, the choice of America America are in physics an integrined party further.
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Revised Lesson Plans

Follow the Drinking Gourd - Before



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Instruction plantations

Barlig tours!

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- 1. Give dialerts lages of the "Carried the Rand" National
- Net share to the tole like the life (speed, one the likent that when they go not the factory).

Artholy Two: Autonomical meaning of the song "Follow the Tololog Search"

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- 3. One statems signed of the fundamit "Follow the Dentity Dial of King Interpretation"
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- Alterwards, how studieds, practice writing a congitited would interface equilibrium one class its another that we physical transfer had be segme writing? In shell implicity.
- Studiets can stop imagine what it would have sale like to travel the indiaground hall pay with market fulntum.

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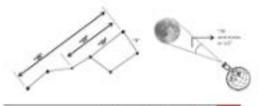
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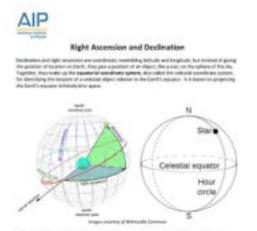




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Revised Lesson Plans

Follow the Drinking Gourd - After



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Rotating Sky Explorer Activity

Student Instructions

1. In your groups, go to the University of Nebraska-Lincoln Rotating Sky

Explorer at http://astro.unl.edu/naap/motion2/animations/ce_hc.html.

- In the Star Controls section, select "Big Dipper" in the Star Patterns dropdown menu.
- 3. In the Star Controls section, click "Add a Star Randomly."
- 4. Click on the star that was added.
- 5. In the "Celestial Sphere View", set right ascension = 2.5 h and declination to
- 89.2^o. This star is Polaris, the North Star.
- 6. In the Appearance Settings section, select "show labels".
- 7. Click "Start Animation."
- 8. Play with the different options in the simulation.
- 9. Think about how the sky looks from different locations and how the sky

changes over time.

Many Thanks to

Dr. Greg Good

Samantha Spytek, Stephen Neal, Lance Burch

The Niels Bohr Library and Archive staff

Dr. Brad Conrad, Courtney Lemon

The Society of Physics Students

The American Institute of Physics



Planning for the Future: Educating the Present

Samantha Spytek Virginia Polytechnic Institute and State University, Honors College Victoria DiTomasso, CUNY Macaulay Honors College

Mentor: Dr. Greg Good



We Have Standards Here

Common Core Standards

Reading: Literature

Reading: Informational Text

Speaking and Listening

Language

History/Social Studies

Science & Technical Subjects

Subject Writing

Speaking & Listening					
CCSS, ELA-BELLEWARD AND ADDRESS		A	rige or contaborative		
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	partners on grades 9-30				_
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CCSS.ELA-UTERACY.SL-9-10.2	Integrate multiple source	es of informatio	n presented in diverse		
	media or formats (e.g., v	visually, quantita	tively, orally evaluating	ies as they are used in a	
	the credibility and accur	acy of each sour	08.	at as they are used in a al, social, or economic	
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STREET, BUILDING, LOUIS 1003	concisely, and logically s				
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	style are appropriate to			pital text.	_
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	partners on grades 11-1				
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	make informed decision				
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	and the case a could be			text (e.g., how	a format for
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	addressed, and the orga			or solve a problem.	
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05510/000000000000000000000000000000000	City specific tested with	teres to repper	analysis or primary and		on) or solve
	secondary sources, attending to such features as the date and			priate;	
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CCSS.ELA-UTERACY.BH.9-10.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.		ion appropriate;			
				demonstrating	tive print and
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0035.11/	A-LITERACY.WHST.9-	Gather relevant	t information from multiple	authoritative print and	the specific sto the text
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	CCSS.ELA-LITERA	CY.WHST.11-	Draw evidence from infor	national texts to support.	analysis,
	CCSS.ELA-LITERA 12.9	CY.WHST.11-	Draw evidence from infor- reflection, and research.	national texts to support.	analysis,

We Have Standards Here

Next Generation Science Standards

Dimension One: Practices	 Asking Questions and Defining Problems Planning and Carrying Out Investigations (Extension) Analyzing and Interpreting data (Extension) Obtaining, Evaluating and Communicating Information
Dimension Two: Crosscutting Concepts	 Patterns Cause and effect Systems and system models Stability and change
Dimension Three: Disciplinary Core Ideas	PS2.A: Forces and Motion PS2.C: Stability and Instability in Physical Systems ESS2.A: Earth Materials and Systems ESS2.C: The Roles of Water in Earth's Surface Processes ETS2.A: Interdependence of Science, Engineering, and Technology

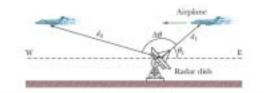


- Women Astronomers, Mathematicians and Physicists of History
 Aglaonike
 - · Hertha Marks Ayrton
 - 1854 1923
 - #<u>19thcentury</u>
 - #British
 - #physicist
 - Mileva Einstein-maric
 - 1875 1948
 - · #19thcentury
 - #Serbian #Swiss
 - #physicist
 - · Margaret Eliza Maltby
 - 1860 1944
 - #19thcentury
 - #<u>American</u>
 - #physicist
 - Mary Somerville
 - 1780 1872
 - #19thcentury
 - #British
 - #physicist and polymath

Scientifi Learn by

85 You are kidnapped by political-science majors (who are upset because you told them political science is not a real science). Although blindfolded, you can tell the speed of their car (by the whine of the engine), the time of travel (by mentally counting off seconds), and the direction of travel (by turns along the rectangular street system). From these clues, you know that you are taken along the following course: 50 km/h for 2.0 min, turn 90° to the right, 20 km/h for 4.0 min, turn 90° to the right, 20 km/h for 60 s, turn 90° to the left, 50 km/h for 60 s, turn 90° to the right, 20 km/h for 2.0 min, turn 90° to the left, 50 km/h for 30 s. At that point, (a) how far are you from your starting point, and (b) in what direction relative to your initial direction of travel are you?

> 86 In Fig. 4-49, a radar station detects an airplane approaching directly from the east. At first observation, the airplane is at distance $d_z = 360$ m from the station and at angle $\theta_c = 40^\circ$ above the horizon. The airplane is tracked through an angular change $\Delta \theta = 123^\circ$ in the vertical east–west plane; its distance is then $d_z = 790$ m. Find the (a) magnitude and (b) direction of the airplane's displacement during this period.

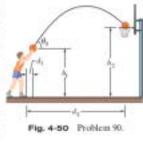


(4.0i + 2.0j) m/s¹. When the particle's x coordinate is 29 m, what are its (a) y coordinate and (b) speed?

LIEGE

90 At what initial speed must the basketball player in Fig. 4-50 throw the ball, at angle $\theta_0 = 55^\circ$ above the horizontal, to make the ford shot? The horizontal distances are $d_1 = 1.0$ ft and $d_2 = 14$ ft, and the heights are $h_1 = 7.0$ ft and $h_2 = 10$ ft.

During volcanic eruptions, chunks of solid rock can be blasted out of the volcano: these projectiles are



called volumic bombs. Figure 4-51 shows a cross section of Mt. Fuji, in Japan. (a) At what initial speed would a bomb have to be ejected, at angle $\theta_i = 35^\circ$ to the horizontal, from the vent at A in order to fall at the loot of the volumo at B, at vertical distance h =3.30 km and horizontal distance d = 9.40 km² Ignore, for the moment, the effects of air on the bomb's travel. (b) What would be the time of flight? (c) Would the effect of the air increase or decrease your answer in (a)?

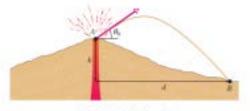


Fig. 4-51 Problem 91.

Halliday, David, Robert Resnick and Jearl Walker. 2010. *Fundamentals of Physics* (Ninth Edition). Wiley (p. 84)

Scientific Writing Learn by Explaining

SD TREASTOCK

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A sudden blast depresses each ear equally and succossively in the direction of the wind, but in constquence of the elasticity of the stalks and the force of the impulse, each car not only rises again as soon as the pressure is removed, but bands back nearly as much in the contrary direction, and then continues to oscillato backward and forward in equal times, like a pendulum to a less and less extent, till the resistance of the air puts a stop to the motion. These vibrations are the same for every individual car of corn. Yet as their oscillations do not all commence at the same time, but successively, the cars will have a variety of positions at any one instant. Some of the advancing cars will meet others in their returning vibrations, and as the times of oscillation are equal for all, they will be crowded together at regular intervals. Between these there will occur equal spaces, where the ears will be few, in consequence of being bent in opposite directions; and at other equal intervals they will be in their natural upright positions. So that over the whole field there will be a regular series of condensations and rarefactions among the cars of corn, separated by equal intervals where they will be in their natural state of density. In consequence of these changes the field will be marked by an alternation of bright and dark bands. Thus the successive waves which fly over the corn with the speed of the wind, are totally distinct from, and entirely

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Scientific Writing Learn by Explaining



Caroline. That it is, certainly, for I am almost stannod by the noise. But what is a sonorous body, Mrs. R. ? for all bodies are capable of producing some kind of sound by the motion they communicate to the air.

Mrs. B. Those bodies are called sonorous, which produce clear, distinct, regular, and durable sounds, such as a bell, a drum, munical strings, wind instruments, &c. They owe this property to their clasticity ; for an clastick body, after having been struck, not only returns to its former situation, but having acquired momentum by its velocity, like the pendulum, it springs out on the opposite side. If I draw the string A B, which is made fast at both ends, to C, it will not only return to its original position, but proceed onwards to D.

This is its first vibration, at the end of which it will retain sufficient velocity to bring it to E, and back again to F, which constitutes its second vibration; the third vibration will carry it only to G and H, and so on till the resistance of the air destroys its motion.

The vibration of a sonorous body gives a tremulous motion to the air around it, very similar to the motion communicated to smooth water when a stone is thrown into it. This first produces "a small circular wave around the spot in which the stone falls; the wave spreads, and gradually communicates its motion to the adjacent waters, producing similar waves to a considerable extent. The same kind of waves is produced in the air by the

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SIMPLE WRITER

WRITE LIKE UP GOER FIVE AND THING EXPLAINER

PUT WORDS HERE

I am writing to show you how to use this right/wrong word box. You write words that you think will work, and if they do they look like all of the ones you've seen so far, and if they don't they look like this: indicator.

YOU USED SOME LESS SIMPLE WORDS

indicator

https://xkcd.com/simplewriter/

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We have all of this content... Now what?

Nation + Holey Program + Marcan for Tachers & Business					
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Scholenhip at the Center		In this leason other, eludents will reach two contracting assessments of the status of African Americans in proyect in the 1965x. They will also leasn about the features context of the out rights reservent and here it impacted the physics community was an increase in demand of physicals.			
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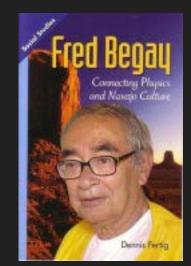
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With a New Website Comes New Content











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our coordinators **Brad Conrad** and **Courtney Lemon**









It Takes a Village

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Questions?