



CLASSROOMS THAT CARE

STEM / SEL MINI UNITS

Learning disabilities, motor skill issues, and bullying are just a few of the daily challenges that many of our NF Heroes face while in school. Neurofibromatosis, better known as “NF,” is a genetic disorder that affects 1 in every 3,000 births across all populations. NF causes tumors to grow on nerves throughout the body, and can lead to deafness, blindness, disfigurement, bone abnormalities, learning disabilities, disabling pain, and cancer. There is no cure for NF... yet.

Classrooms that Care is a learning program that teaches students about neurofibromatosis (NF) through educational activities and programming designed to fit into school curriculum standards.

The STEM unit was created by school administrators, teachers, counselors, and NF parents. This program allows participating schools to raise awareness about NF while building empathy for those facing health challenges, empowering students to celebrate diversity and understand the importance of collaboration, especially in science.

The NF Collective is a group of organizations dedicated to improving the lives of neurofibromatosis (NF) patients and their families by providing accurate and reliable information about NF resources and caregivers. The first national NF organization was started in 1978. Since that time, a number of organizations have been created to address various needs within the NF community. Each group has specific focus areas but all share the goal of curing NF and enriching the lives of those impacted by this disorder. Recognizing a critical need for NF families to find reliable NF care, the member organizations of the NF Collective joined forces to provide a single, reliable, updated resource of NF providers.

NF COLLECTIVE
nfcollective.org



DAY 1 OBJECTIVE

Neurofibromatosis (NF) occurs in 1 in 3,000 births due to a variation that occurs in an individual's genetic composition. Students will be able to comprehend how variations in genes can have different end results and how they affect the daily lives of each patient.

APPROXIMATE TIME: 40 MIN

HOOK

- [This is NF Video](#) (7-12)
- [Classrooms that Care NF Info](#) (K-6)

RESOURCES

- [NF Experience](#) - a series of interactive exercises to be done in the classroom, by grade, block, period, or at an assembly
- [Activities](#) or [Remote Activities](#)
- [Instructional Video](#)
- [Tools for Collaborative Engagement](#)

PRESENTATION OF CONTENT

Genes are like patterns and codes, one variance in the pattern or code can lead to a variety of end results. Similar to computer coding and order of operations, one small change can render a different end product.

"Patterns are key factors in understanding mathematical concepts. The ability to create, recognize, and extend patterns is essential for making generalizations, seeing relationships, and understanding the order and logic of mathematics. Functions evolve from the investigation of patterns."

-Marilyn Burns, American mathematics educator

In NF1 patients, the variance can be found on chromosome 17. People with NF2 and schwannomatosis (which are diseases that, like NF1, aren't well known) have a variance on chromosome 22. The slightest change can alter the makeup of DNA in a big way, like changing the pigment in certain areas of one's skin, causing learning disabilities, or even causing scoliosis.

ACTIVITY

- NF Experience - a series of interactive exercises that can be done in the classroom and organized by grade, classroom, period, or as a school assembly.
- Station Rotation - Each station demonstrates how different variations in genes can lead to different results/NF manifestations

CONCLUSION

- Reflect on your experience today: What key takeaway did you get from each exercise and/or station?
- In your own words, explain the comparison between gene variation and variations in coding or order of operations.

DAY 2 OBJECTIVE

Importance of Collaboration.
Neurofibromatosis (NF) causes tumors to grow on nerves throughout the body. Tumors, no matter how you look at them, are bad. That is why the NF research initiatives are done with a consortium of scientists, because we know the quickest way to a cure is through teamwork and collaboration! Using the four C's, students will be able to demonstrate that problems can be solved faster and more efficiently through collaboration.

APPROXIMATE TIME: 40 MIN

HOOK

- [What is Synodos?](#)
- [Researchers and Patients Discuss Synodos](#)

RESOURCES

- [The Four C's](#)
- [Teach Hub: Collaborative Classroom Games](#)
- [Teach Thought: 10 Team-Building Games That Promote Critical Learning](#)

PRESENTATION OF CONTENT

Our body systems work together to help us perform everyday functions like breathing, running, and eating. A car's system works with gas to make it go. Members of the NF Collective work together with their scientists, researchers, and patients to ensure the quickest path to a cure.

ACTIVITY

Students learn the importance of teamwork and collaboration. Choose one or more, if time allows.

Worst Case Scenario

Fabricate a scenario in which students need to work together and solve problems to succeed, like being stranded on a deserted island or getting lost at sea. Ask them to work together to create a solution that ensures everyone arrives safely. You might ask them to come up with a list of 10 must-have items that would help them most or create a passage to safety. Encourage them to vote. Everyone in the group must agree to the final solution.

Line Up!

Work together as a team to arrange yourselves in a line based on a quality you have that is not obviously apparent. Examples of the ways you can arrange yourselves can include: alphabetically by middle name, chronologically according to birth date, or by house number. This icebreaker starts unstructured and ends with order as all participants work together to discover the facts they need and arrange themselves.

“Line Up!” works best in a large open space where participants can move around freely. This is an icebreaker that is ideal for very large groups because the leadership required scales appropriately with the number of players. Smaller groups can still use this icebreaker, but the game is not as difficult with under 10 participants. Line Up is an engaging activity that can help group facilitators pinpoint natural leaders that emerge as the game is played, although every participant is an important part of the game.

Materials

To play the “Line Up!” icebreaker, you will need:

- A large open space for participants to move around
- A list of qualities for the players to use as a basis for their line up

How To Play

1. Call the group to order. Explain the rules of the game and explain the quality that they will use to arrange their lineup. For example, line up in the order of your birthdays, with January 1 being the furthest to the left and December 31 being the furthest to the right.
2. Do not help the group or give them hints as to how to organize themselves. Participants may use any objects available in the room to help them if they request them.
3. When the group believes that the lineup is correct, they will start at one end and call off their birthdays. Down the line, every participant will name off their date. The game is won if the line is correct.
4. If the line is incorrect, give the players another quality to use for the lineup and allow them to try again.

Tips and Notes

The tricky part of this game is getting a group of people who don’t know each other to establish leadership. If no one steps forward to make leadership decisions, it will be very difficult for the players to line up. If too many people step forward with opposing leadership strategies, it will be difficult to find cohesion as each leader struggles to get buy-in from the rest of the group.

“Line Up!” works particularly well with groups of people who don’t know each other. In a group that is more familiar with one another, it won’t take long for them to decide the leaders because they will have had previous experience with each other’s leadership skills.

CONCLUSION

Evaluate how your team executed the exercise and give examples on ways to improve your team’s collaboration. In your own words, explain the importance of collaboration when it comes to solving a problem, whether it be NF research or any research.

DAY 3 OBJECTIVE

Project Introduction:
Neurofibromatosis (NF) is an under-recognized disease. Students will create a PSA for one of the below topics of choice to educate and raise awareness of NF and the Children's Tumor Foundation in their community by demonstrating the importance of collaboration and education.

APPROXIMATE TIME: 40 MIN

HOOK

- [Meet Brianna Worden, Former NF Ambassador](#)

RESOURCES

- [Children's Tumor Foundation \(ctf.org\)](http://ctf.org)
- [Neurofibromatosis Fact Sheets & Brochures](#)
- [Neurofibromatosis Information from the NIH](#)
- [The Four C's](#)

PRESENTATION OF CONTENT

Presentation of Rubric: [PSA Task Sheet and Project Rubric](#) or [Public Service Announcement Rubric](#)

ACTIVITY

Work in groups, state a claim, and support with evidence. Together each team will pick one of the following statements or questions and create a PSA. Collaborate together with a brain drain, thought web, or other brainstorm technique. Use the Four C's to help guide your project.

- What is NF?
- Why is it so important to fund collaborative research?
- How can NF Research help other types of research?
- Describe the importance of innovation to improve quality of life
- Why does learning about a rare disease like NF matter?
- Genetics, variance, and inclusion

Who is your audience?

- PSA to NF Community
- PSA to Public

Be creative: You can make a PowerPoint/Google Slides presentation, poster board, video, skit, or another teacher- approved medium.

CONCLUSION

Evaluate your team's collaboration performance. Write down two (positive) things your team could do to collaborate better tomorrow.

DAY 4 OBJECTIVE

Working Day: Students will continue to collaborate with their team to demonstrate the importance of their chosen statement by creating a PSA using various approved media.

APPROXIMATE TIME: 40 MIN

HOOK

- Make NF Visible

RESOURCES

- The NF Collective (nfcollective.org)
- Children's Tumor Foundation (ctf.org)
- Neurofibromatosis Fact Sheets & Brochures
- Neurofibromatosis Information from the NIH
- The Four C's
- Flipgrid (Video Discussion Experience)

ACTIVITY

Project continuation. Working Day - State a claim and support with evidence. Students continue to work in groups using the four C's to create their PSA

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CONCLUSION

Reflection: What are the next steps your team needs to take in order to complete your PSA. List each action step and who is responsible for each.

DAY 5 OBJECTIVE

Show What You Know!
Students should demonstrate what they have learned through each presentation.

- What is NF?
- How is collaboration contributing to education and awareness of NF?
- How is collaboration contributing to the solutions to find a cure for NF?

APPROXIMATE TIME: 40 MIN

HOOK

- [Ian Desmond, Using His Platform](#)

RESOURCES

- [Student Presentation Evaluation Form](#)

PRESENTATION OF CONTENT

Students are to present their projects in a carousel formation.

ACTIVITY

Each student should complete the evaluation form during each team's presentation.

Listener's Task:

- Design a question for each team's presentation.
- Identify a "glow and a grow" for each team's presentation.

CONCLUSION

- Compare each presentation from the notes in your evaluation forms. Which team's presentation had the deepest impact on you and why?
- Share how you can apply the knowledge you have learned to continue to support patients and families living with neurofibromatosis.