U.S. National Library of Medicine
National Network of Libraries of Medicine

NNLM *All of Us*

Genetics for Children and Teens

nnlm.gov/all-of-us

All of Us RESEARCH PROGRAM | The Future of Health Begins With You

Activate!

Program Summary

This program will share information about genetics, the study of genes, heredity, and genetic variation, into age-appropriate programming for youth. The focus of these programs will be engaging and interactive activities that also provide youth with educational information about genetics and their health. The program will utilize National Library of Medicine resources, like GeneEd, and other reputable resources to provide foundational information that will contribute to the overall health literacy and health information skills of children and teens.

National Library of Medicine Resources

GeneEd - Genetics Education, and Discovery, https://geneed.nlm.nih.gov/, is a safe and useful resource for students and teachers to learn genetics. Note that in March 2019 the website will be retired and selected GeneEd content will be transferred to **Genetics Home Reference**, https://ghr.nlm.nih.gov/.

Harry Potter's World: Renaissance, Science, Magic, and Medicine, https://www.nlm.nih.gov/exhibition/harrypottersworld/index.htm/, is an online exhibition that contains lesson plans, historical information related to themes of Harry Potter, online activities, and galleries. The exhibit also contains a section on the Genetics Traits of Harry Potter, https://www.nlm.nih.gov/exhibition/harrypottersworld/education/lessonplan1.html, that gives students an understanding of genetic inheritance.

Genetics Home Reference, https://ghr.nlm.nih.gov/, is a website for the public which contains information about genetic conditions and the genes or chromosomes associated with those conditions. The section titled "Help Me Understand Genetics" is a great source for introductory and easy-to-understand information about genetics. The website also has classroom resources that can be used in a teaching environment.

Outside Resources

The Gene Scene, https://www.amnh.org/explore/ology/genetics, is a science website for kids from the American Museum of Natural History. This website features games, hands-on activity ideas, videos, and stories to teach children more about genetics.

Teach Genetics, https://teach.genetics.utah.edu/, Here you'll find a wealth of resources and information aimed at helping educators bring genetics, bioscience and health alive in the classroom. A companion to the popular Learn.Genetics website, https://learn.genetics.utah.edu/, Teach.Genetics offers additional tools and resources to support your curriculum, all free of charge.

National Human Genome Research Institute, https://www.genome.gov/, is a website that features an Education Page which has some great resources, program ideas, and engaging ways to teach students about genetics and genomics. The page also features information about careers in genetics, the Human Genome Project, and DNA Day.

Collaborate!

Possible Partnerships

This program could take on many community partnerships and extension activities. Some examples include:

- Using program ideas in outreach to schools, recreational centers, and other youth focused events. You can tie in the student's current lessons
- Incorporate health and science ideas into your summer reading plans. The Collaborative Summer Library Program, https://www.cslpreads.org/, has information about current and future themes and program ideas.
- Celebrate with National DNA Day, https://www.genome.gov/10506367/national-dna-day/, at your library with a series of events. The National Human Genome Research Institute has some fun program ideas and you can add your own library's events to the website and connect with others celebrating the day.
- Include themes and ideas about genetics and health into STEM programs for children and teens at your library. Use it as an opportunity to building health literacy that will provide them with information and empower their health decisions in the future.

For help connecting with potential partners in your community, contact your NNLM Regional Medical Library, https://nnlm.gov/regions.

Educate!

Relevant NNLM Trainings

Information about NNLM Trainings, https://nnlm.gov/training, and full course descriptions can be found online. Many of the courses are offered throughout the year online; however, feel free to reach out to your local NNLM representative to discuss the possibility of in-person training for your library. NNLM course offerings include:

- Activate, Collaborate, and Educate: Health Outreach and Programming in Your Community
- NLM's Online Playgrounds: K-12 Science and Health Resources
- ABCs of DNA: Unraveling the Mystery of Genetics Information for Consumers
- Genealogy to Genetics: Library Programming to Explore Your Roots

Program Plan
DNA Sequence Wristbands

Resources

- Beads
- String or Pipe Cleaners
- Scissors
- Examples of different DNA codes

Audiences

- Adaptable to various ages

Planning

This program was inspired by the Wear a Chimp on your Wrist activity plan from the Gene Scene website, https://www.amnh.org/explore/ology/genetics/wear-a-chimp-on-your-wrist2, and the activity plan Sequence Bracelets,https://www.yourgenome.org/activities/sequence-bracelets, from Your Genome website . The website provides a breakdown that walks you through the lesson. Prepare materials as needed. This is also a quick and easy extension activity that can be done at the end of a story time or other related program about genetics.

Marketing

Highlight the program in the library's program newsletter and/or website

Implementation

Steps take from the program lesson plan

- Start the program by giving an overview of DNA and base pairs. This may be a good activity to do after an program discussing genetics or as part of DNA day.
- Choose one DNA code from the chart on the What You'll Need page. Follow that pattern as you make your bracelet.
- Cut two pieces of string, each about 12 inches long. (Remember, your bracelet will contain two strands, just like real DNA.)
- Tie at least one knot about two inches from one end of each string. You may need to tie more than one knot so that the beads don't slip off.
- Thread a bead onto String 1. Then thread the bead for the matching base onto String 2. For example, if you use a "C" on String 1, then you must put a "G" on String 2. Keep threading beads until your bracelet is long enough to slip your hand through. (You do not have to use all the letters in the DNA code.)

- Tie a knot around the last bead of each string. Then tie the ends of the strings together to complete your bracelet.

- If parents are present, provide them with additional information about NLM that can be used as on on going resources. Let youth participating know about age-appropriate resources that can be used to look up additional information in the future.

Evaluation and Reporting

For evaluation of this program if you receive NNLM funding -- The NNLM National Evaluation Office, https://nnlm.gov/neo/members/evalmaterials, has a list of evaluation methods that should be used when completed this project. For any questions, please feel free to contact NNLM MAR Coordinator. Library staff involved in the project will fill out the All of Us Partner Staff Questionnaire as well as any additional follow-up surveys for staff.

Program Plan
National DNA Day Event

Resources

Supplies will vary based on planned activities. Some suggested supplies include:

- Tablets - for NLM resource tutorials and interaction

Audiences

- Adaptable to various age groups

Planning

Look to resources like the National Human Genome Research Institute, https://www.genome.gov/10506367/national-dna-day/, for planning ideas, request a starter kit, or list your libraries activities with their website. Ideas for activities can also be found on GeneEd, https://geneed.nlm.nih.gov/, Science Buddies, https://www.sciencebuddies.org/, and Harry Potter's World NLM Exhibit, https://www.nlm.nih.gov/exhibition/harrypottersworld/. National DNA Day is held on April 25th and celebrates the day in 1953 the discovery and understanding of DNA and the scientific advances that understand has made possible.

Marketing

Highlight the program in the library's program newsletter and/or website.

Implementation

- Schedule events throughout the day in celebration of National DNA Day. Incorporate activities for youth in the event which can also include guest speakers, interactive activities, presentations, and demonstrations on genetic health information resources.

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Example Budget

Summary budget is presented as an example. You can edit and modify budget to fit the needs of your library, your individual library program plan, and prices of your library's approved vendors for materials.

Item	Price	Quantity	Total
Tablets or iPads	$350.00	8	$2,800.00
Table mounts for tablets and iPads	$80.00	8	$640.00
Pipecleaners or string	$40.00	1	$40.00
Pony Beads	$40.00	1	$40.00
Activity Supplies for a National DNA Day or other similar event	$400.00	1	$400.00
NNLM All of Us - Your Family, Your History, Your Health Activity Books - entire books or pages printed out	$250.00	1	$250.00
Marketing and Promotion, printing and copying	$150.00	1	$150.00
Staff Time - to plan and conduct program (per hour)	$30.00	80	$2,400.00
Total			**$6,720.00**

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