Genetic Disorder Research

RESET AN AEOP EFFORT aeop

Authors
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SUBJECT/GRADE LEVEL
Biology
9-12

Materials
- Laptops
- Paper
- Pencil
- Genetic Disorder Documents
- Open Tutor
- Internet
- Prezi
- Google Slides

STANDARDS

Next Generation Science Standards
- HS-LS1-1: Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins that carry out the essential functions of life through systems of specialized cells.
- HS-LS3-2: Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

English Language Arts Standards | Common Core State
- RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
- RST.6-8.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

LESSON OBJECTIVE(S)
Students present their research on the characteristics of genetic disorders including symptoms, causes, and treatments.

CAREER CONNECTION(S)
Mentor Background: Dr. Benjamin D. Nye is the Director of Learning Sciences at the University of Southern California, Institute for Creative Technologies. Ben's major research interest is to identify best-practices in advanced learning technology, particularly for frontiers such as distributed learning technologies (e.g., cloud-based, device-agnostic) and socially-situated learning (e.g., face-to-face mobile use). His research interests include modular intelligent tutoring system (ITS) designs, modeling social

learning and memes, cognitive agents, and educational tools for the developing world and low-resource/low-income contexts. He received his Ph.D. in Systems Engineering from the University of Pennsylvania in 2011. Ben currently leads projects focused on areas such as mobile adaptive learning ecosystems (Personal Assistant for Life-Long Learning), open-source and user-authorable tutoring chat dialogs (OpenTutor), a studio for career mentors to self-record their own virtual mentors (CareerFair.ai), and augmented reality experiences with the La Brea Tar Pits to understand complex concepts (Re-Living Paleontology) In his prior work as a Research Professor at the University of Memphis, Ben led work on the Shareable Knowledge Objects (SKO) framework integrating ITS services such as AutoTutor for the ONR ITS Grand Challenge, helped data mine effort a corpus of 250k human-to-human online tutoring dialogs (part of the ADL PAL initiative), collaborated on ONR's PAL3 tutoring architecture for supporting life-long learning, and is an advisor and book editor for the ARL Generalized Intelligent Framework for Tutoring (GIFT) advisory panel. Ben's research tries to remove barriers to development and adoption of ITS so that they can reach larger numbers of learners, which has traditionally been a major roadblock for these highly-effective interventions.

STEM Careers: Microbiologist and Biotechnologist, Biochemist and Biophysicist, Research Geneticist Scientist, Agricultural and Food Geneticist, Clinical Trials Consultant, Genetic Counselor, Medical Illustrator, Computational Genomics and Data Scientist, Technology Development

ENGAGEMENT

Brief Description:

Day 1

Students will have a discussion on genetic disorders and watch a video on genetic disorders. (Teacher Led) After the discussion, students will play trivia trait bingo. Students will view a short video on genetic disorders: Inherited Genetic Disorders | Genetics | Biology | FuseSchool and think/pair/share initial thoughts.

EXPLORATION

Brief Description: Students will go through Khan's Academy section on genetic disorders and complete the review. Students will choose a genetic disorder that interests them.

Procedures:

Days 2-3

1. Khan Academy Genetic Mutations
2. Choose Genetic Disorder from List or **Celebrities with chronic illnesses: Endometriosis to Lyme disease** or **Famous People with Genetic Disorders - HRF**
3. Pair and Share two interesting facts about the disorder chose
4. Start Research on Genetic Disorders
5. Complete All Genes and Traits Science Games (Answer one question for each game as review)

EXPLANATION

Brief Description: Students will create a prezi or google slide presentation. They also will create a short 2-3 minute video about their disorder. Students will utilize Open Tutor to monitor their understanding.

Procedures:

Days-3-6

1. Complete all games and Review Question for each game: Gene Mutations Science Games | Legends of Learning
2. Create Prezi or Google Slides based on research and game.

ELABORATION

Brief Description: Students will share their prezi, google slides and video

Procedures:

Days 7-8

1. Students will share their research (Prezi, Google Slides, Video)

EVALUATION

Brief Description: Students will have an opportunity to evaluate themselves on their performance and conduct a peer review. Students will also have rubric to use for their work.

Procedures:

1. Students will conduct a self-review
2. Students will conduct a peer review.
3. Complete Rubric

REFERENCES

- https://jamboard.google.com/d/1VDLXZmrLFRv5ioTolxAGS1gesqbg5ZWbz2scVkV1n9w/edit?usp=sharing
- https://docs.google.com/presentation/d/1HtprVN5Bwe2fgr_1xP4eeXH4aQybgsonBuFDvHuXDtk/edit?usp=sharing
- https://prezi.com/
- www.khanacademy.org/science/ap-biology/gene-expression-and-regulation/mutations-ap/v/an-introduction-to-genetic-mutations
- https://opentutor.info/admin/lessons/edit/?lessonId=16c03938-ddac-42d3-94f8-281a28f688ec
- https://www.legendsoflearning.com/learning-objectives/gene-mutations/

Links Page
https://docs.google.com/document/d/13OX-eglY2Y-3OufvaloXu839uJ2eBeiua8RUiwObl3M/edit?usp=sharing

Attachments
https://drive.google.com/drive/folders/1zAkL8ld5hmxXRhk5eTTv7tyEaLBITD75?usp=sharing