

Teaching Science thru Gamification:

Resource Manual of
Education Games linked by the
National Institutes of Health



Health Sciences Library

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Education Games linked by the National Institutes of Health

2017

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Additional copies can be downloaded from:

LSU Health Shreveport, Health Sciences Library, [healthelinks.org](http://www.healthelinks.org), Teacher Education Portal,
Teaching Science thru Gamification
<http://www.healthelinks.org/teachingsciencethrugamification.html>

This project has been supported in part or in full by Federal funds through the National Library of Medicine of the National Institutes of Health under award number UG54LM012345 with the University of North Texas Health Science Center. The content is the responsibility of the authors and does not necessarily represent the official views of the NIH.

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Preface

Gamification falls within Game-Based Learning (GBL) as a form of teaching that can reach multiple types of learners, including visual and strategic. GBL is often cited in the literature as computer-based, digital, as or similar to video games; however, educational games are more often considered to be either computer-based or non-computer-based, such as board or card games. The concept of gamification varies. The predominant definition of gamification is applying the mechanics of games such as points and rewards and levels to activities that have nothing to do with playing a game. The broader definition of gamification is turning a non-game into a game or creating a game for an activity.

The goal of this manual is to bring awareness to Caddo Parish public school teachers and librarians of reliable game-based online health and science information resources for educational use available through National Library of Medicine (NLM) databases and to promote the incorporation of game-based online and health science information resource in teaching.

As Louisiana's educational standards change, teachers need materials for STEM and STEAM education in the different methods in which students learn. Game-Based Learning, educational games, and gamification all focus on teaching towards multiple learning methods and often incorporate art within the teaching of science, technology, engineering, and math. This manual and its related website will promote the existing 'game' resources available from the National Library of Medicine, promoting incorporation of gamification/game-based learning as a teaching method for science, technology, art, engineering, and math within elementary and secondary schools.

The manual will reside on the LSU Health Shreveport [healthelinks.org](http://www.healthelinks.org) website under the Teacher Education Portal <http://www.healthelinks.org/teachingsciencethrugamification.html>

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Medical Information:

It is not the intention of LSU Health Shreveport or National Library of Medicine (NLM) to provide specific medical advice, but rather to provide users with information to better understand their health and their diagnosed disorders. Specific medical advice will not be provided, and LSU Health Shreveport and NLM urge you to consult with a qualified physician for diagnosis and for answers to your personal questions.

External Links:

This resource provides links to other Internet sites for the convenience of World Wide Web users. LSU Health Shreveport and NLM are not responsible for the availability or content of these external sites, nor does LSU Health Shreveport or NLM endorse, warrant or guarantee the products, services or information described or offered at these other Internet sites. It is the responsibility of the user to examine the copyright and licensing restrictions of linked pages and to secure all necessary permission. Users must assess the privacy policies of external sites.

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How to use this manual

Look at the table of contents and go to the relevant section. Type in the web address (http:...) to go to the resource indicated in the guide.

To learn more about gamification**Books:**

The following books have been added to the Professional Library at Caddo Parish Schools from this Federal funded project. Book summaries have been provided by the publishers.

Game It Up! Using Gamification to Incentivize Your Library

Folmar, David. Lanham: Rowman & Littlefield, 2015.

Using game thinking and game mechanics in non-game settings to promote engagement and learning is a new trend in both business and education sectors. This book explains how to use game design techniques to involve patrons and motivate staff in the library. It will walk the reader through gamifying the library experience by incorporating game thinking into bibliographic instruction, staff training, the online catalog, and more. This A–Z guidebook covers a range of ways to use gamification in the library. Readers will learn the ins and outs of gamification techniques through projects, such as: badge hunts for staff orientation; a “face of the library” game for patron services; badges for programs; augmented reality and a catalog Easter egg hunt; interactive fiction for information literacy education; and top-down video games for library orientation.

Gamification: A Practical Guide for Librarians

McMunn-Tetangco, Elizabeth. Lanham, Maryland: Rowman & Littlefield Publishers, 2017.

How can libraries use gamification and game elements to improve instruction and outreach, or to encourage the use of particular areas and services? In this guide, readers will learn about how to structure game activities in order to reach their patrons. Chapters devoted to topics such as personalization, goal setting, working with partners, games in instruction, and assessment illustrate some of the many ways games can have an impact in libraries. This practical book includes email templates, real-life examples, and scenarios. This book will help librarians develop, implement, and evaluate game-style library projects.

Let the Games Begin!: Engaging Students with Field-Tested Interactive Information Literacy Instruction

McDevitt, Theresa R. New York: Neal-Schuman Publishers, 2011.

This book presents sixty field-tested games that teach information literacy skills using fun, interactive activities at a variety of skill and knowledge levels. It includes games that involve individual and group work and that use clickers, white boards, and chalk boards. Details for each game are provided, including: objectives; information literacy standards addressed; audience (size, educational level); time required; materials and equipment, including prize suggestions; area setup; preparation; game instructions and processes. With this step-by-step creative guide, instructors will be able to confidently create information literacy instruction sessions that will engage students in learning that is both highly educational and highly enjoyable.

Libraries Got Game: Aligned Learning through Modern Board Games

Mayer, Brian and Christopher Harris. Chicago: ALA Editions, 2010.

This book explains how designer board games, which are different from games produced strictly for the educational market, can become curricular staples for students of all ages. To equip librarians to initiate a board game project, the authors provide direct links between board games and curriculum, suggestions for building a core collection across grade levels, and strategies for program development and implementation. From promoting the idea to teachers and administrators to aligning specific games to state and national education standards, this book will help librarians build a strong collection that speaks to enhanced learning, social development, and fun.

Organizations:**American Library Association. Games and Gaming Round Table (GameRT).**

<http://www.ala.org/gamert/>

The Games and Gaming Round Table (GameRT) of the American Library Association provides a venue for librarians interested in the use of games and gaming in libraries of all types. GameRT was formed in 2011, replacing and extending the pre-existing Gaming Member Interest Group. As a round table, GameRT is built around a shared passion for games and the use of gaming within libraries. With members from all types of libraries, GameRT encompasses a wide variety of viewpoints, situations, and user types. For more information about GameRT, you can join us on [ALA Connect](#) at <http://connect.ala.org/gamert> (even if you aren't an ALA member). ALA Connect is a centralized space where ALA groups can work online. Each group in ALA Connect has discussions, online documents (like wiki pages), a file repository, polls, a calendar, a chat room, and an image gallery (think logos, pictures, etc.). To find out more about ALA Connect and how to create an account as a non-member or a member of ALA, go to <http://connect.ala.org/about>.

Some Select Articles:

Bruder, Patricia. Game On: Gamification in the Classroom. *Education Digest*. 2015 Mar;80(1):56-60.

Frederick, Kathy. Play Along: Gaming in Education. *School Library Monthly*. 2014 Nov; 31(2):24-6.

Kingsley, Tara L.; Grabner-Hagen, Melissa M. Gamification: Questing to Integrate Content Knowledge, Literacy, and 21st-Century Learning. *Journal of Adolescent & Adult Literacy*. 2015 Jul-Aug;59(1):51-61.

Trinter, Christine P.; Brighton, Catherine M.; Moon, Tonya R. Designing Differentiated Mathematics Games: "Discarding" the One-Size-Fits-All Approach to Educational Game Play. *Gifted Child Today*. 2015 Apr;38(2):88-94.

Elementary School

Environmental Science

Climate Kids – National Ocean and Atmospheric Administration

<http://climatekids.nasa.gov/>

Kids Environment Kids Health Games Page – National Institute of Environmental Health Sciences

<https://kids.niehs.nih.gov/games/>

Matching Fun Facts Game – U.S. Environmental Protection Agency

https://www3.epa.gov/safewater/kids/flash/flash_matching.html

Life Science

To Tell the Tooth

<http://www.mouthhealthykids.org/en/games-and-quizzes/to-tell-the-tooth>

For K-3

Disaster Master

<https://www.ready.gov/kids/games/data/dm-english/>

This would be good for 3-5 grade band.

Middle School

Health

Disaster Master

<https://www.ready.gov/kids/games/data/dm-english/>

Pest Private Eye – University of Nebraska - Lincoln, Institute of Agriculture and Natural Resources

<http://pested.unl.edu/pestpi>

General Science

Disaster Master

<https://www.ready.gov/kids/games/data/dm-english/>

Food Detectives: Fight BAC

<http://www.fooddetectives.com/>

Food Safety Mobile Game

<https://www.fsis.usda.gov/Oa/foodsafetymobile/mobilegame.swf?redirecthttp=true>

Lung Attack – Pima County, Department of Environmental Quality

<http://web1.pima.gov/deg/lungattack/lungplay.htm>

ToxMystery

<https://toxmystery.nlm.nih.gov/>

Also available in Spanish

High School

Anatomy and Physiology

Disease Detective – Public Broadcasting Services

<http://www.pbs.org/wgbh/nova/body/disease-detective.html>

Electrocardiogram Game

<http://www.nobelprize.org/educational/medicine/ecg/>

Immune System Defender

<http://www.nobelprize.org/educational/medicine/immunity/>

National Institutes of Health Lobe-oratorium

<https://education.ninds.nih.gov/Lobeoratorium/index.html>

Biology

Dog Breeding

http://pbskids.org/dragonflytv/games/game_dogbreeding.html

Gene Expression: The Basics

<https://phet.colorado.edu/en/simulation/gene-expression-basics>

Gene Machine - The Lac Operon

<https://phet.colorado.edu/en/simulation/gene-machine-lac-operon>

Lung Attack – Pima County, Department of Environmental Quality

<http://web1.pima.gov/deq/lungattack/lungplay.htm>

Microscope Imaging Station – Activities

<https://www.exploratorium.edu/imaging-station/activities.php>

Optical Tweezers and Applications

<https://phet.colorado.edu/en/simulation/optical-tweezers>

Stretching DNA

<https://phet.colorado.edu/en/simulation/stretching-dna>

Test Your Science IQ!: Cells

<https://publications.nigms.nih.gov/classroom/quiz/rules.html>

Test Your Science IQ!: Proteins

https://publications.nigms.nih.gov/classroom/protein_quiz/quiz1.html

Biology and Anatomy

Are You My Blood Type? (Blood Type Game)

<http://www.redcrossblood.org/donating-blood/donor-zone/games/blood-type>

Blood Typing Game

<http://www.nobelprize.org/educational/medicine/bloodtypinggame/index.html>

Chemistry

Molecular Motors

<https://phet.colorado.edu/en/simulation/molecular-motors>

Health Class

2016 National Drug and Alcohol IQ Challenge

<https://teens.drugabuse.gov/quiz/national-drug-alcohol-facts-week/take-iq-challenge/2016>

Test Your Knowledge

<https://teens.drugabuse.gov/activities/test-your-knowledge>