



STEM for girls

research

women and STEM

Women are faring better, academically, than ever before, but...

The manufacturing sector already has

600,000

jobs it can't fill because of the shortage of STEM skills

Women represent **49%** of the workforce, but only

24% of the STEM workforce

20% of young women intend to major in a STEM field, compared to **50%** of young men¹

For every **\$1** a man in STEM makes, women earn in STEM earn **\$.086**

¹ "Facts About Women and STEM" Getting Smart. (2013)

² National Research Center for College and University Admissions (2011)



girls and STEM

Girl Scouts Research Institute discovers:

Girls like STEM!

74% of teen girls said they were “somewhat” or “very” interested in STEM subjects¹

K-12 years, on a percentage basis, more girls than boys take algebra II and precalculus/analysis, while 17 percent of each gender takes calculus.²

African American and Hispanic girls have high interest in STEM, high confidence, and a strong work ethic, but have fewer supports, less exposure, and lower academic achievement than Caucasian girls.³

¹ “Generation Stem.” Girl Scouts Research Institute. (2012)

² “The STEM dilemma.” Pittsburgh Quarterly. (2013)

³ Girl Scouts Research Institute. (2012)



girls and STEM

DISCOURAGING FACTORS

The internalization of outdated stereotypes and feelings of insufficiency

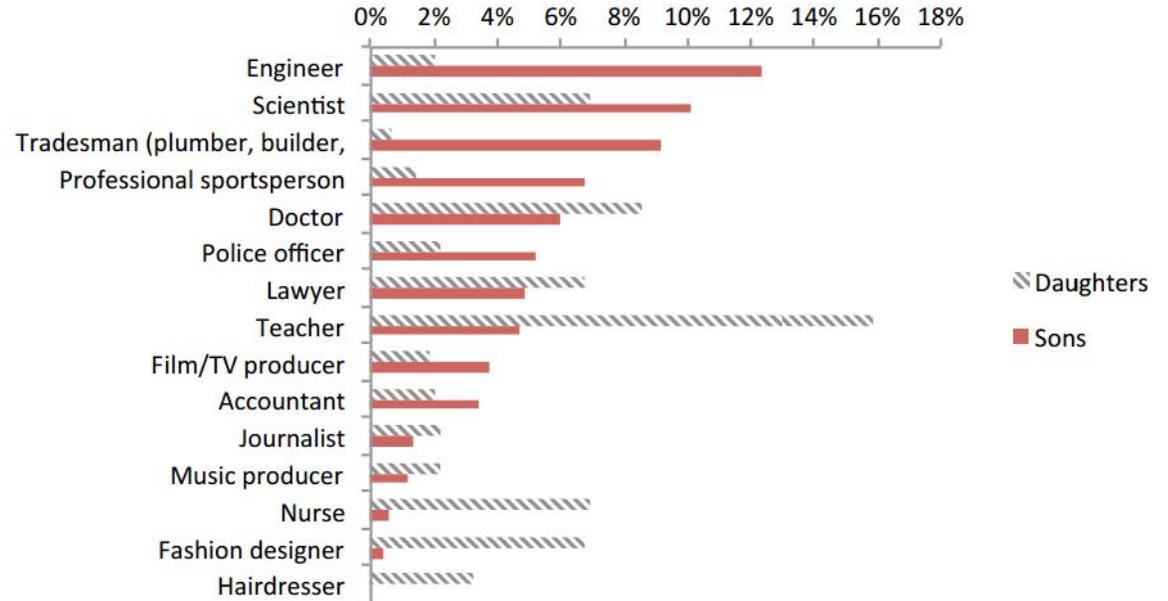
The idea that girls are not as good as boys in math or science

Girls with the same abilities are more likely to give up when it is difficult and to talk themselves out of pursuing the field

Girls are typically more interested in careers where they can help others

The workplace environment is still unfitting for women

They pay, workplace intensity, lack of opportunities to advance



Survey of what parents think their son or daughter would like to be when they grow up

changes in the curriculum

Inspire more creativity +
critical thinking

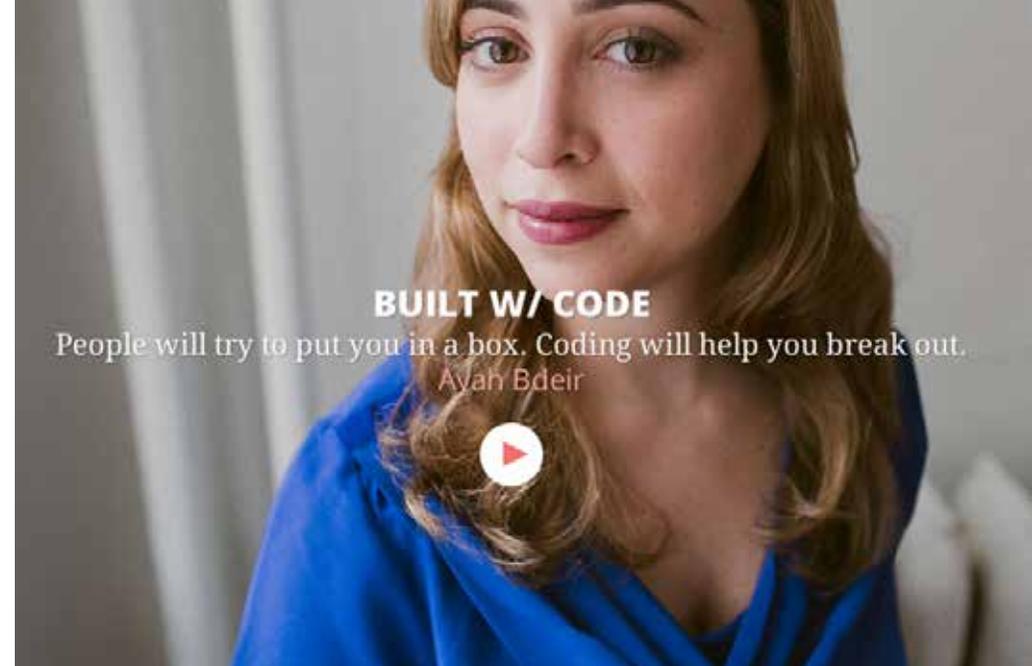
Give the opportunity to
inquire and articulate

Learn to construct and
deconstruct things

Introduce them to
women in a wide range
of STEM fields (combat
stereotypes)

Create different class
levels based on the
amount of experience

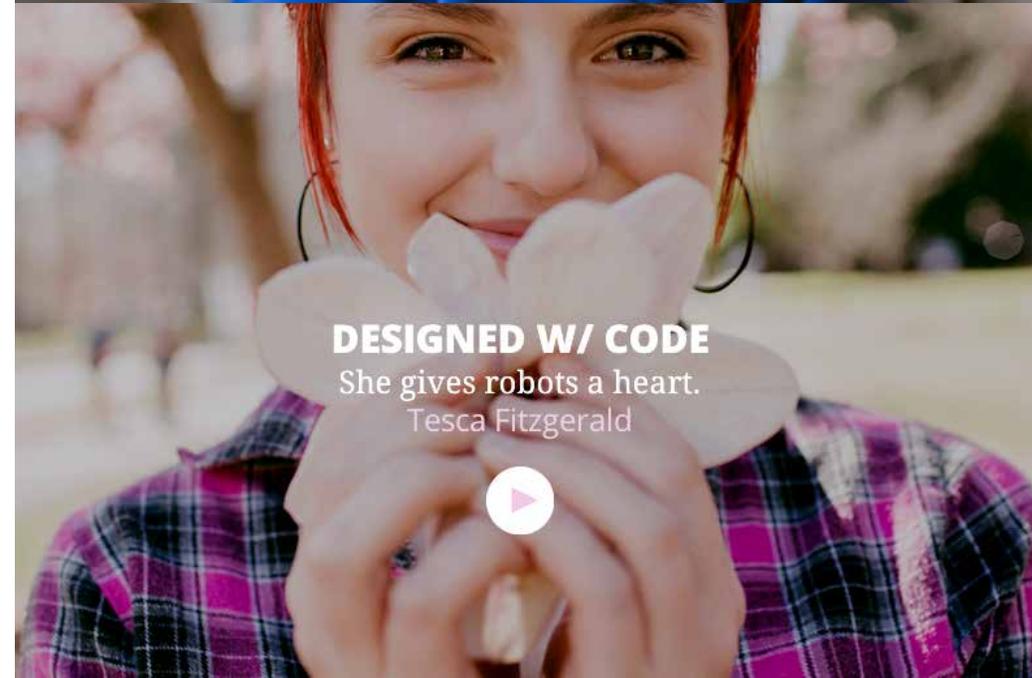
Cultivate STEM
interests at a young age
with more hands-on
workshops



BUILT W/ CODE

People will try to put you in a box. Coding will help you break out.

Ayah Bdeir



DESIGNED W/ CODE

She gives robots a heart.

Tesca Fitzgerald



children's learning methods

building motivation

Competence

they think they have the ability to do what is asked

Control

they believe they have the choice in what to do and can affect the outcome

Interest

they perceive the value in the task of learning

Relatedness

believing that doing the task/gaining knowledge will gain them social approval

Intrinsic Motivation vs. Extrinsic Motivation

Make his or her own choices, and achieve satisfaction from the act of choosing + the opportunity to do what they chose

Self-sustained motivation retains learning better

Parents guide their child's play while still giving the child a range of options

Reward-based Motivation

Carrots & Sticks

Feedback & Encouragement



children's learning methods

other methods

When students learn something well, they reduce their costs of doing it; they can use their well-absorbed knowledge or well-practice skills nearly automatically

Student must exert effort over a period of time to acquire sufficient levels of automacity

Repetition

Self-committed goals

Explorations that bring pleasure or success

Allow for persistence (un-interrupted learning)

Evaluate one's own accomplishments

Working in a Team / Solve Real World Problems



survey

HELPING ANSWER:

What girls are interested in at that age

If parents take part in what their daughters play

Clear examples of games that girls play

Who is being persuaded at point-of-purchase/download

To make Free, Freemium, or Paid

What sorts of social platforms girls use



Survey for Parents



Survey for Girls

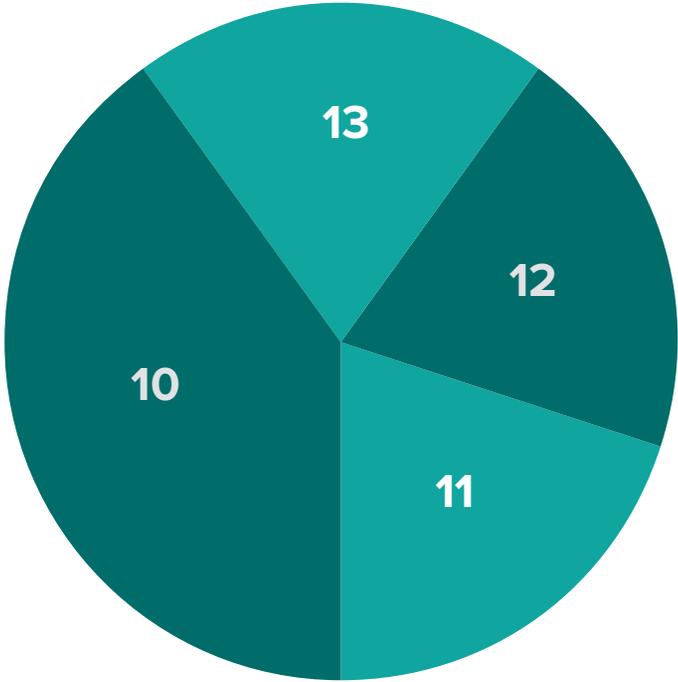
survey results

Survey Respondants



**Parents of Daughters
Ages # Years old**

10 Responses



Girls Ages # Years old

5 Responses

survey

Favorite Activities

hanging out +
socializing with friends -5
games / internet / watching videos -5
arts + crafts -5
riding horses -2
hiking -2
sleepovers -1
talking about boys -1
debate -1
choir -1
science club -1
reading -1
gymnastics -1
jogging -1
dancing -1
singing -1
eating ice cream -1
imaginary play -1

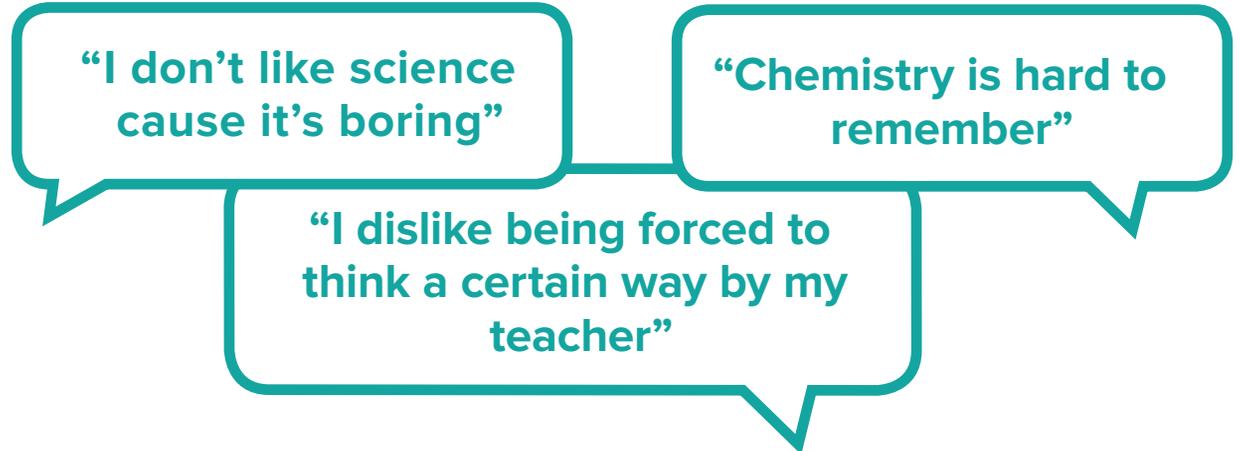
Favorite Classes

Math -7
Art -6
Science -5
Music -2
English -2
Gym -2
History -1
Foreign Language -1

Least Favorite Classes

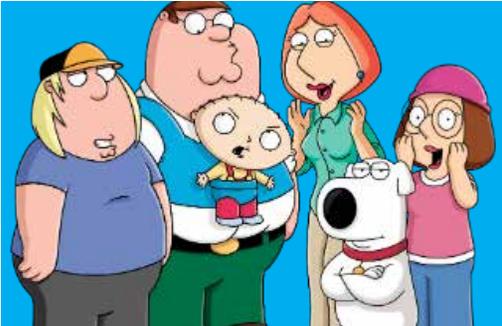
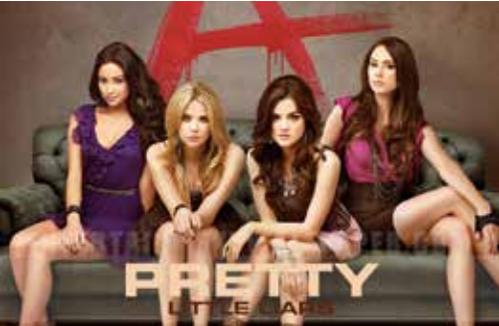
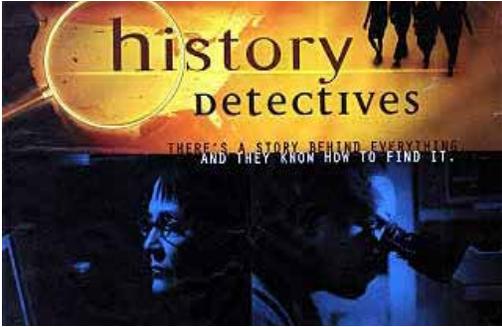
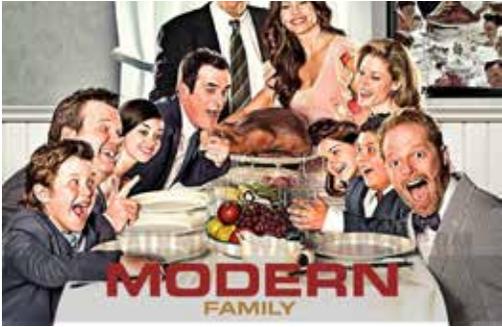
Math -3
Science -3
Gym -2
English -2
Art -1
Music -1
History -1

ADDITIONAL FEEDBACK:



survey results

TV Preferences/Influences



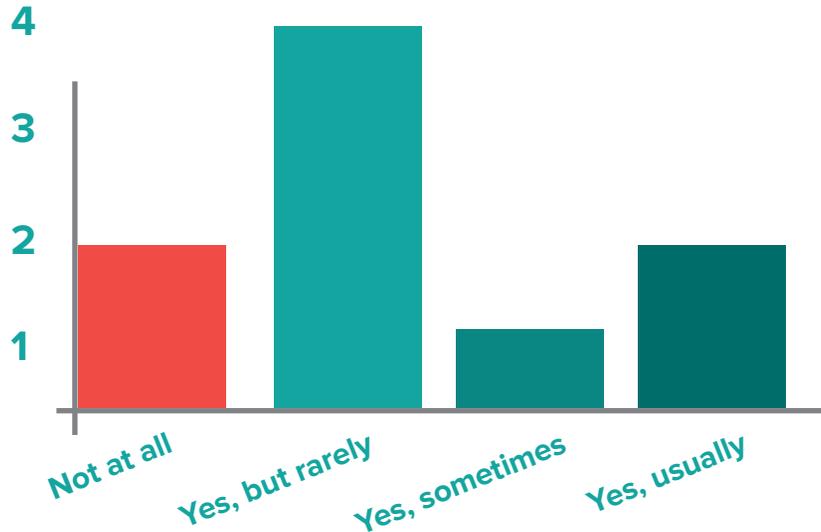
survey results

Does your daughter play games that you've suggested to her?

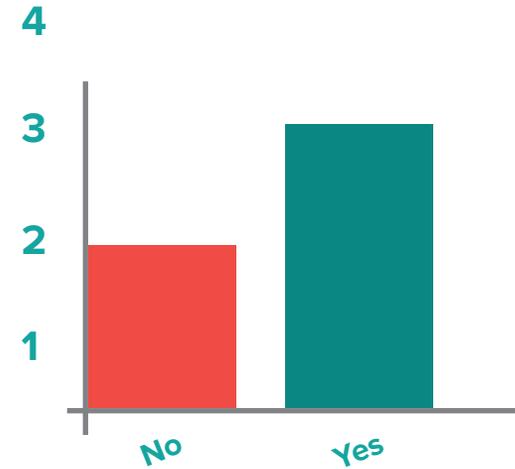
Do you play games that your parents suggest?

60% of parents said that they take part in choosing the games

78% of girls said that they play games that their parents suggested
56% of the girls who do, do it rarely



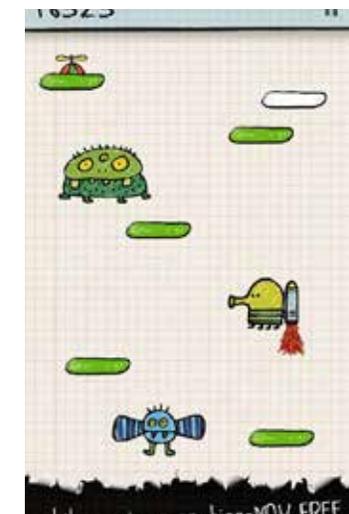
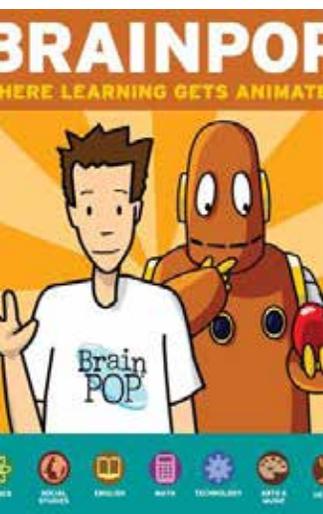
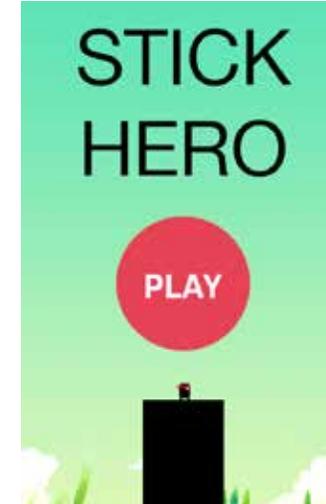
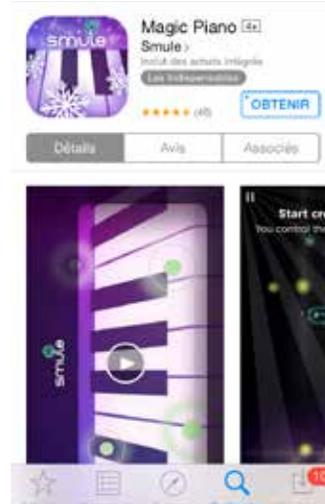
According to Parents



According to Girls

survey results

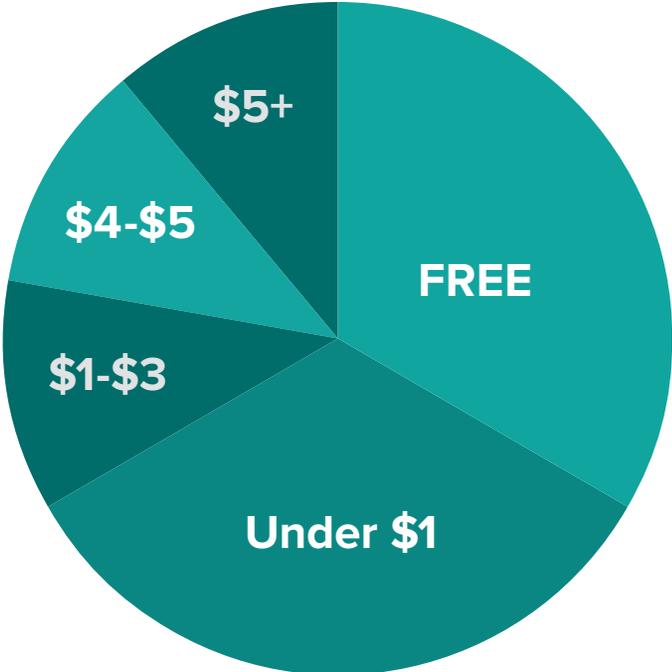
Game Apps they Play



survey results

Are the games that you usually play free or do you buy them?

3/5 of girls said that they buy games themselves



According to Parents



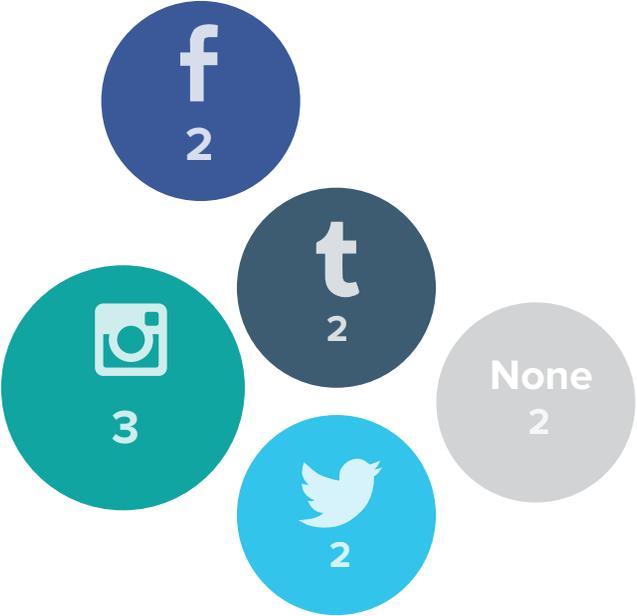
According to Girls

survey results

Social Platforms that Girls Use



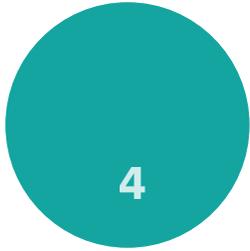
According to Parents



According to Girls

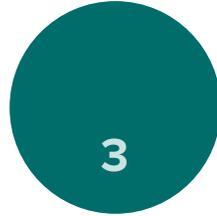
survey results

Select the subjects you'd be interested in learning in a fun way



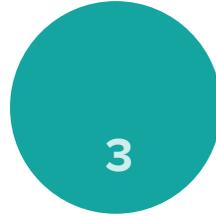
Technology

(how to build websites, games, and other computer-related things)



Astronomy

(the study of space and the universe)



Math

(the world of numbers)



Biology

(science about living things)



Physics

(study of how things move)



Chemistry

(study of structure and property of matter)



Earth Science

(study of rocks, oceans, volcanos, etc)

survey results

What would you think will make a learning game fun for you?

What do you think would the best game app that would help strengthen STEM skills?

 - girls

 - parents

**A fun game that
wouldn't get
boring after a short
amount of time**

**An app that would be better
marketed to girls and
parents so they are more
aware of them**

**Physics puzzles, dissection,
animal behavior, self-assembling
mechanisms, informatics, &
machine
language**

**Something
that makes
science fun**

**An imaginative
character or
storyline**

a cool character

**Being able
to know
what I can
improve on**

**Collaboration
with other girls;
social or team-
based**

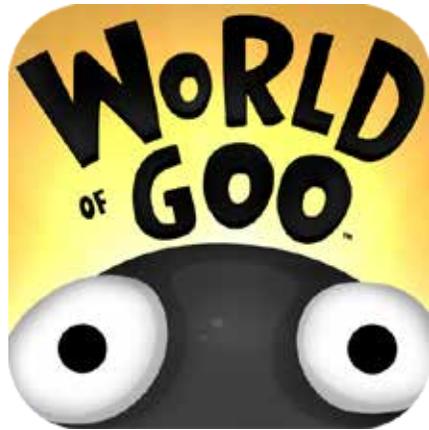
existing apps

Trivia Crack



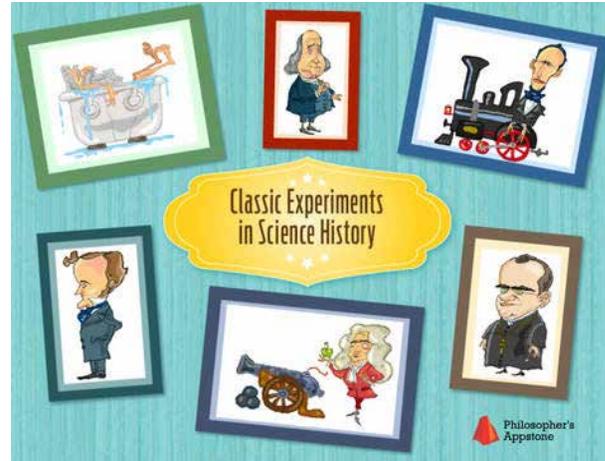
existing apps

World of Goo



existing apps

Classic Experiments in Science History



FRANKLIN'S ELECTRICITY THEORY

ELECTRICITY

It seems that in June 1752 Franklin carried out one of the most famous experiments in the history of science. In a stormy sky, tied to a silk thread, he decided to fly a kite which had a metallic structure. At the end of the thread he placed a key, which was also metallic. As he was flying the kite in the middle of the storm he realized how the key was being charged with electricity when he tried to touch it and got an electric shock. That was the evidence that storm clouds store static electricity and that a lightning is a discharge of this electricity. It was possible to transmit the electricity from the kite to the key as the wet silk thread was slightly conductive. This was however a very dangerous experiment. The German scientist Georg Wilhelm Richmann was electrocuted and died when he tried to repeat it in Saint Petersburg in 1753.



Artistic illustration of the kite experiment (Benjamin West, 1818)

He published his findings in different editions of his book *Experiments and Observations on Electricity*. He postulated the *one-fluid theory of electricity* and formulated his principles of

