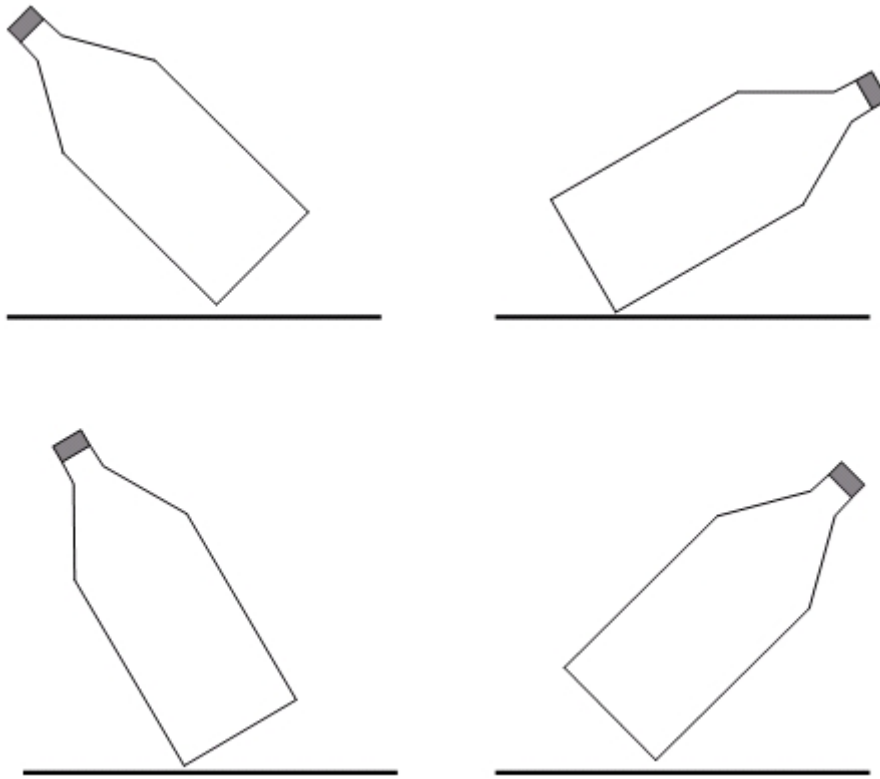


Spatial Skills

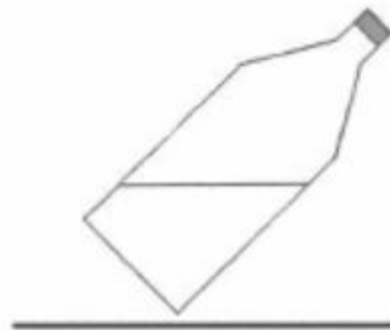
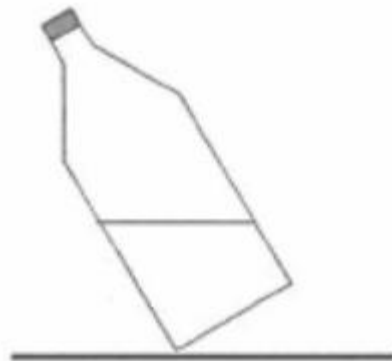
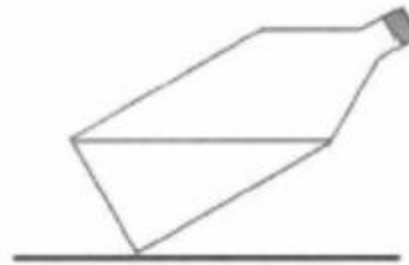
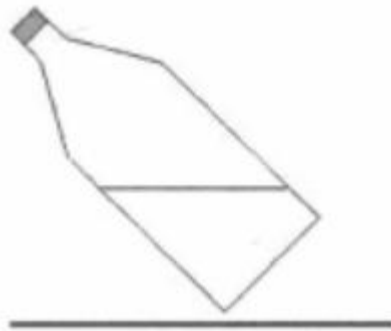
The Untapped Means to Opening STEAM Potential of Girls

Linda Swarlis, Julie Biswas, and
Hollis Wood

Water Level Test



Answers



Spatial Ability/Spatial Intelligence

Consists of many abilities:

- Visualizing
- Creating
- Manipulating
- Rotating
- Perceiving and remembering information in nonverbal/symbolic forms

Spatial Intelligence Examples

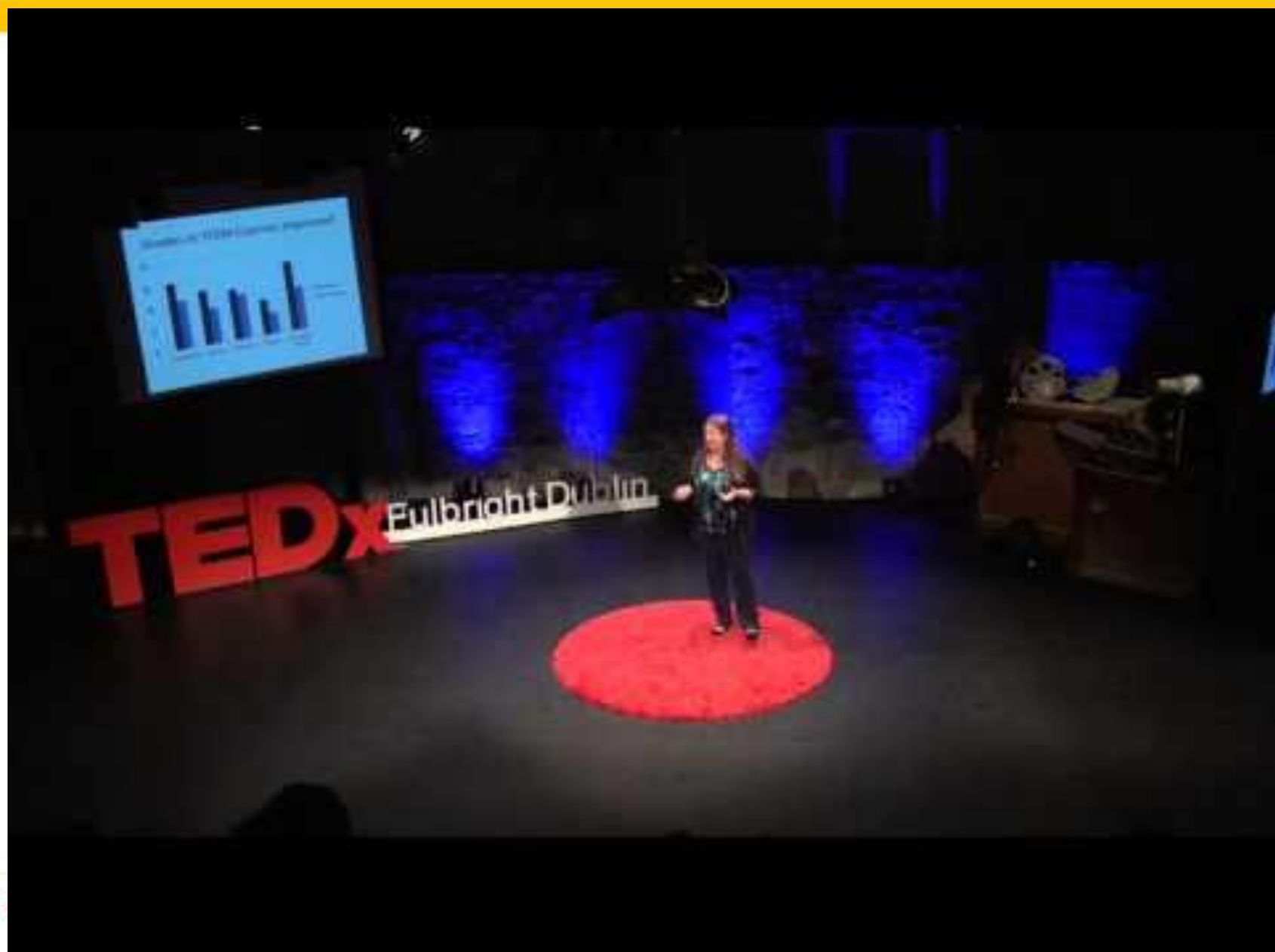
Surgery
Chemistry
Meteorology
Ultrasound

Engineering
Geology
Physics
Computer Science

Important

- Gender research results can be used to examine characteristics of groups, not to predict success or failure of individuals. Ability levels can and do overlap between the sexes.

(Halpern, 2000)



Sheryl Sorby

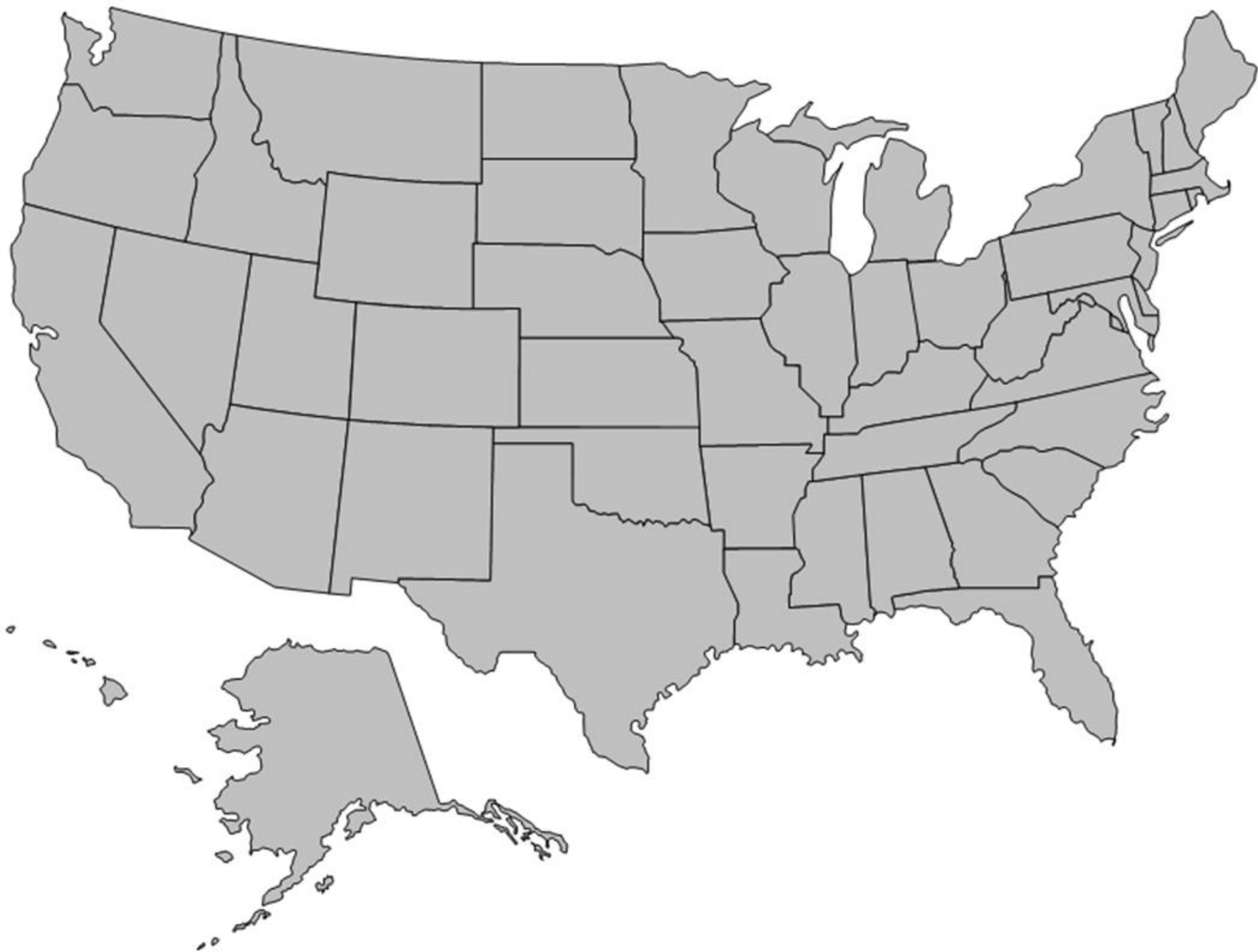
- American Association of University Women report: <http://www.aauw.org/research/why-so-few/>
- Retention of female students who opted not to enroll in the course = **48%**
- Spatial Visualization Course after failure on PSVT:R = **77% retention** female engineering students

Statistics from the U.S.

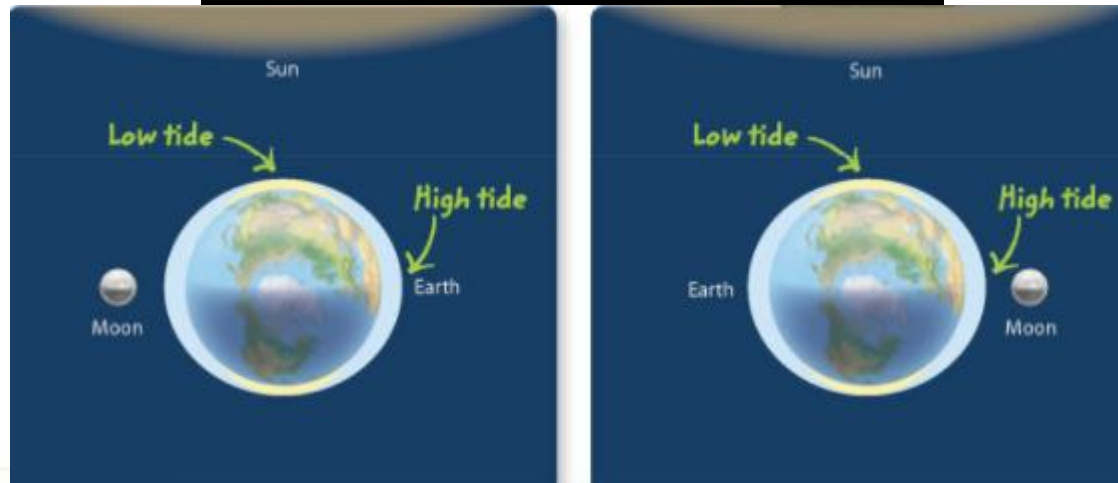
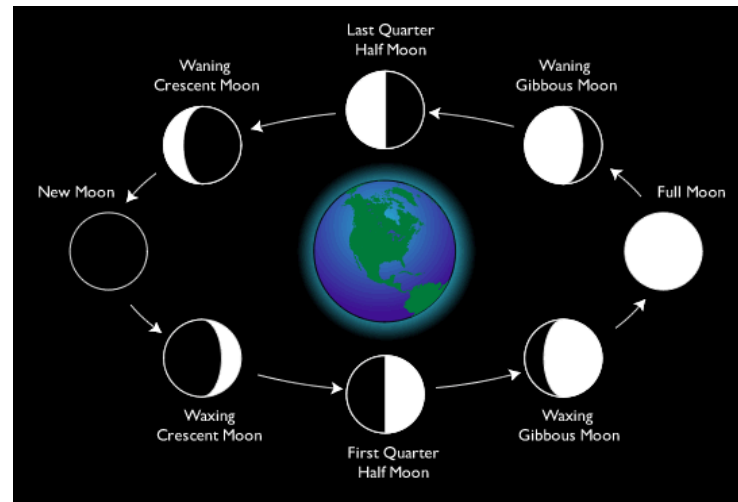
- 90% of STEM doctorate holders scored in the top quartile of spatial ability during adolescence
- Current verbal and mathematical assessments would miss **70%** of students scoring in the top **1%** of spatial ability



Where do you live?

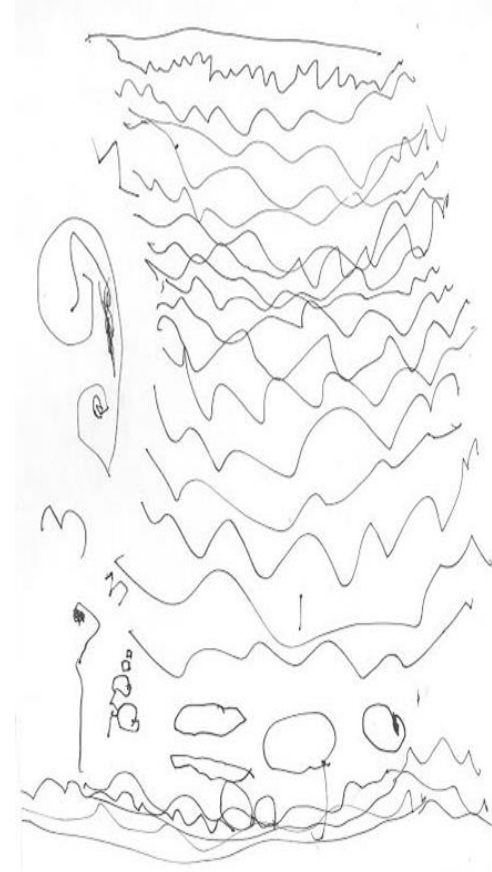


What's the Difference?





“Water Thingy”



The water barrel is where the sand field almost is.
Frankie





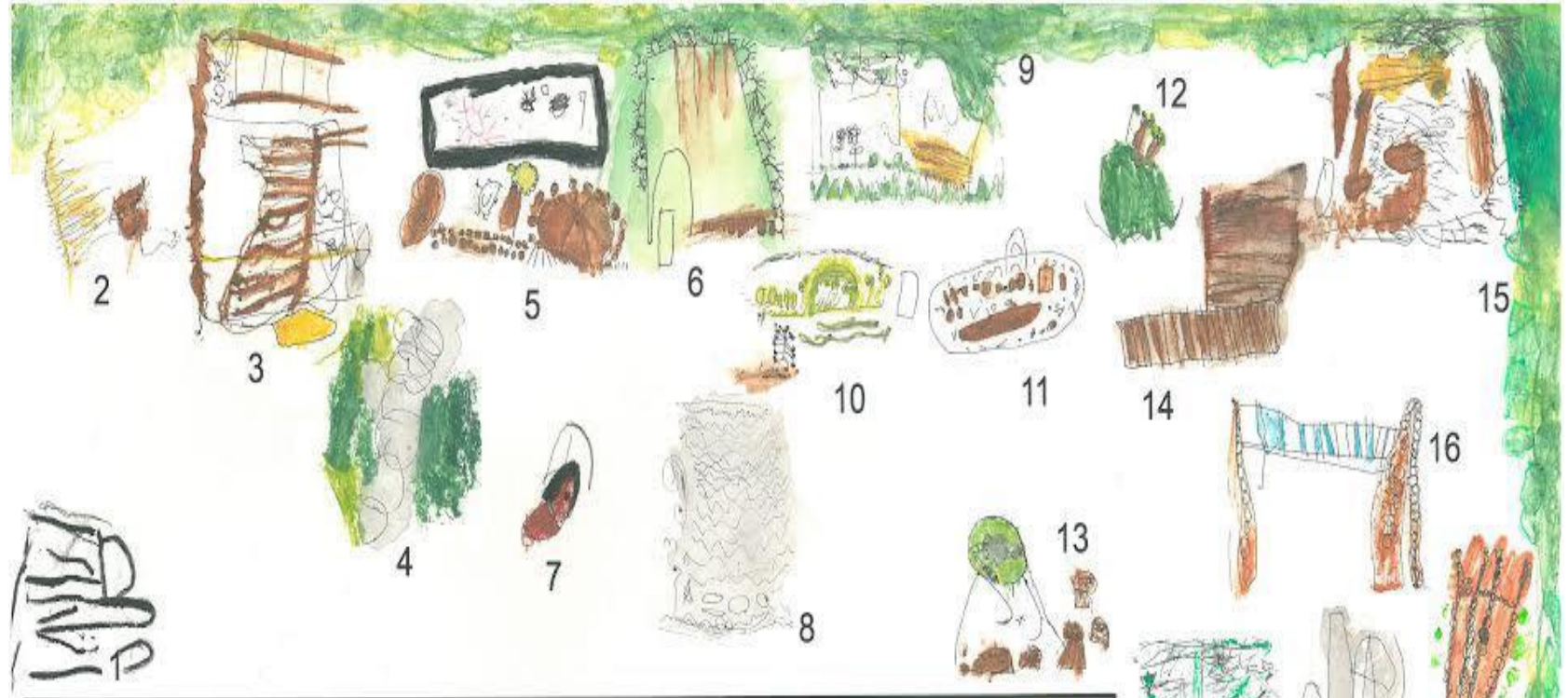
The treehouse needs to be here in the middle between the rock path I drew and the gate. Sam



We need to change the sand field to be close to the willow tunnel. Emmie

I think the Moveable Parts should be here instead. (pointing next to the monkey bars) It's near the monkey bars, not the PYC building.

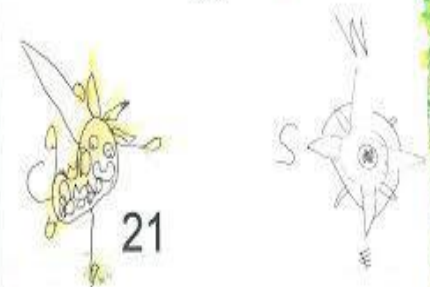
Quinn



PYC Playscape Map

Created by the 3/4 Class, 2017

- | | | |
|----------------------|-------------------|------------------------|
| 1. Gate | 8. Water Thingy | 15. Movable Parts Area |
| 2. Squirrel House | 9. Big Bush | 16. Monkey Bars |
| 3. Treehouse | 10. Willow Tunnel | 17. Porcupine Tree |
| 4. Rock Path | 11. Sand Field | 18. Bush House |
| 5. Chalkboard | 12. Mountain | 19. The Barrels |
| 6. Hidden Bush House | 13. The Garden | 20. Tire Swing |
| 7. Bird House | 14. The Bridge | 21. Giraffe |



Lower School

- Spatial language (to the right of, to the left of)
- Golly Gee Blocks Program, Legos, Puzzles, Magna Tiles, Goldiblox
- Use Google Earth to study Asia
- Google Tour Builder
- Robotics (Building Robots)

Middle School

- Drama: blocking and set design
- Math/PE: graphing “The Big Race”
- Humanities: using maps and timelines
- Science: reading and creating diagrams
- Art: One-point perspective



The Big Race

Runner A

You run three meters every two seconds and start at the starting line. The race is 25 meters long.

The Big Race

Runner B

You get a six meter head start and run twice as fast as Susan.

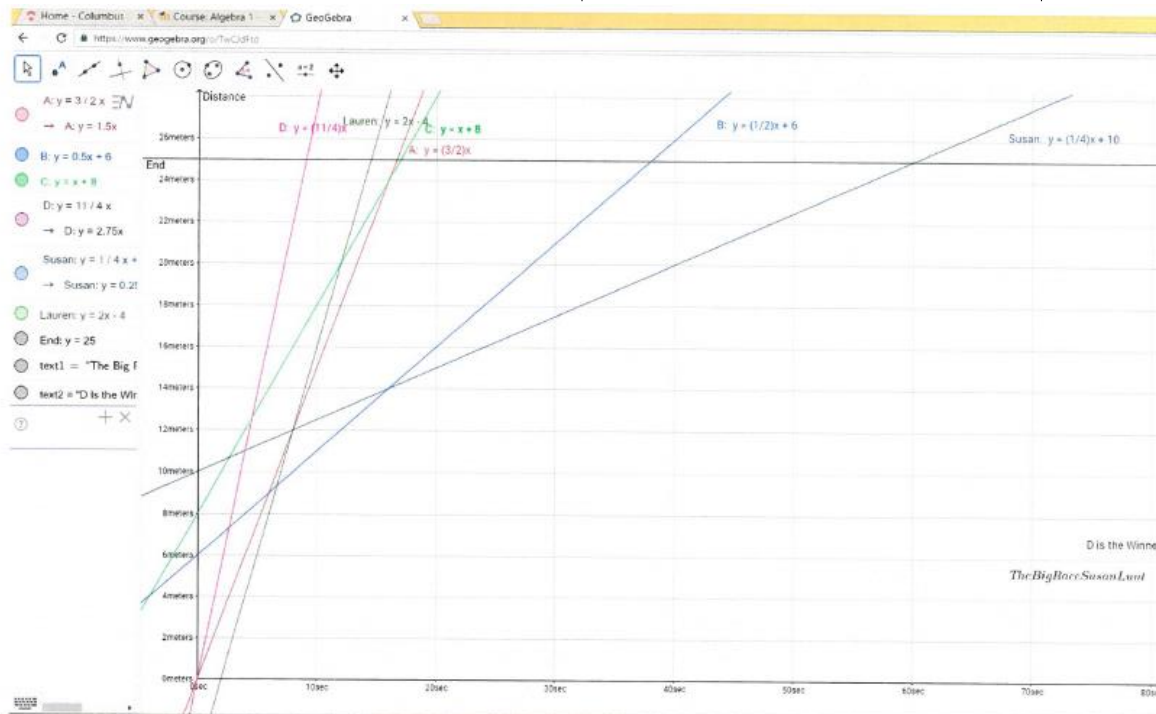
The Big Race

Runner C

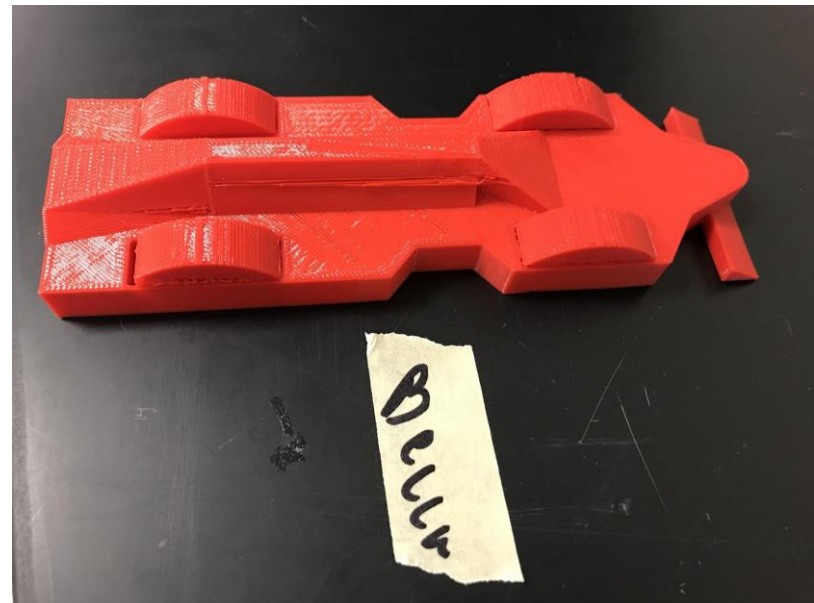
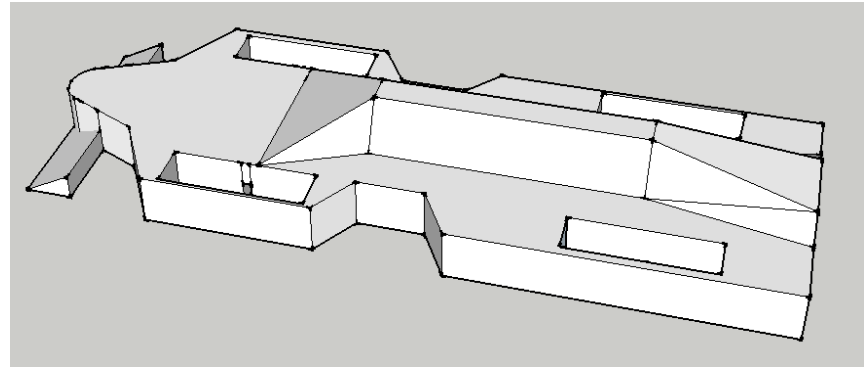
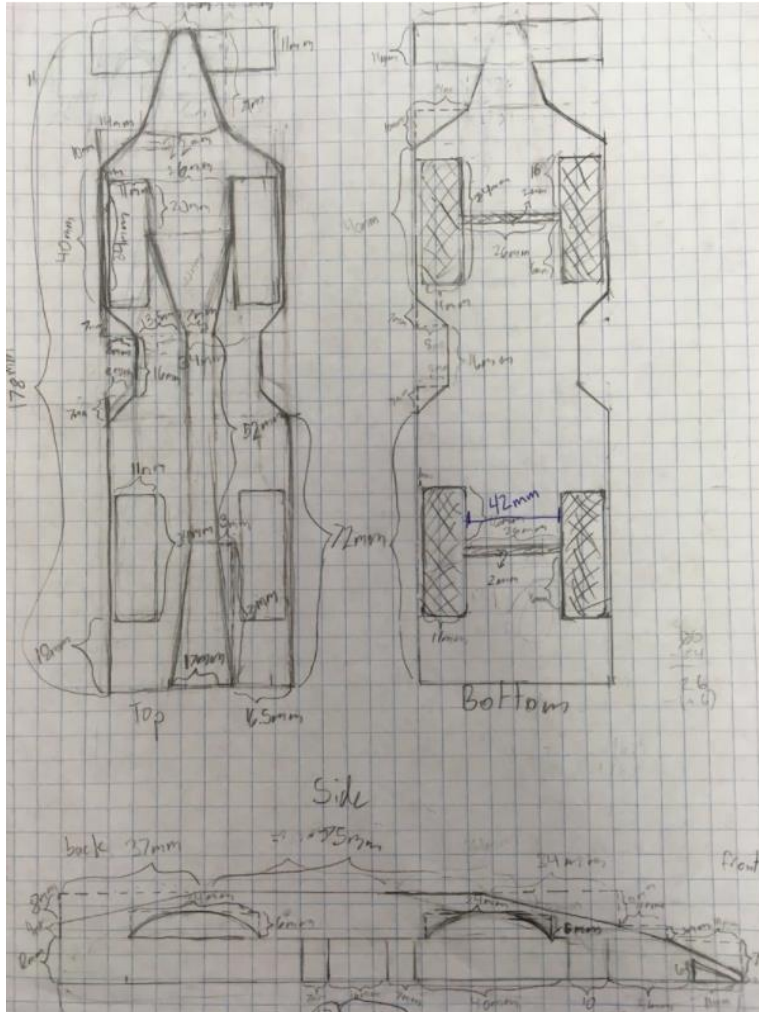
The Big Race

Runner D

Start at the starting line
pick up to Susan in four
seconds.



STEM Cars



Upper School

- Languages: directional/spatial vocabulary in maps
- History: using atlases and geographical dictionaries
- Chemistry: Molecular models
- Physics: photo contest



Block Rotations

1.

2	1
2	2
1	1



A



B



C



D

2.

3	1
2	1
1	1



A



B



C



D

3.

3	2
1	2
	1



A



B

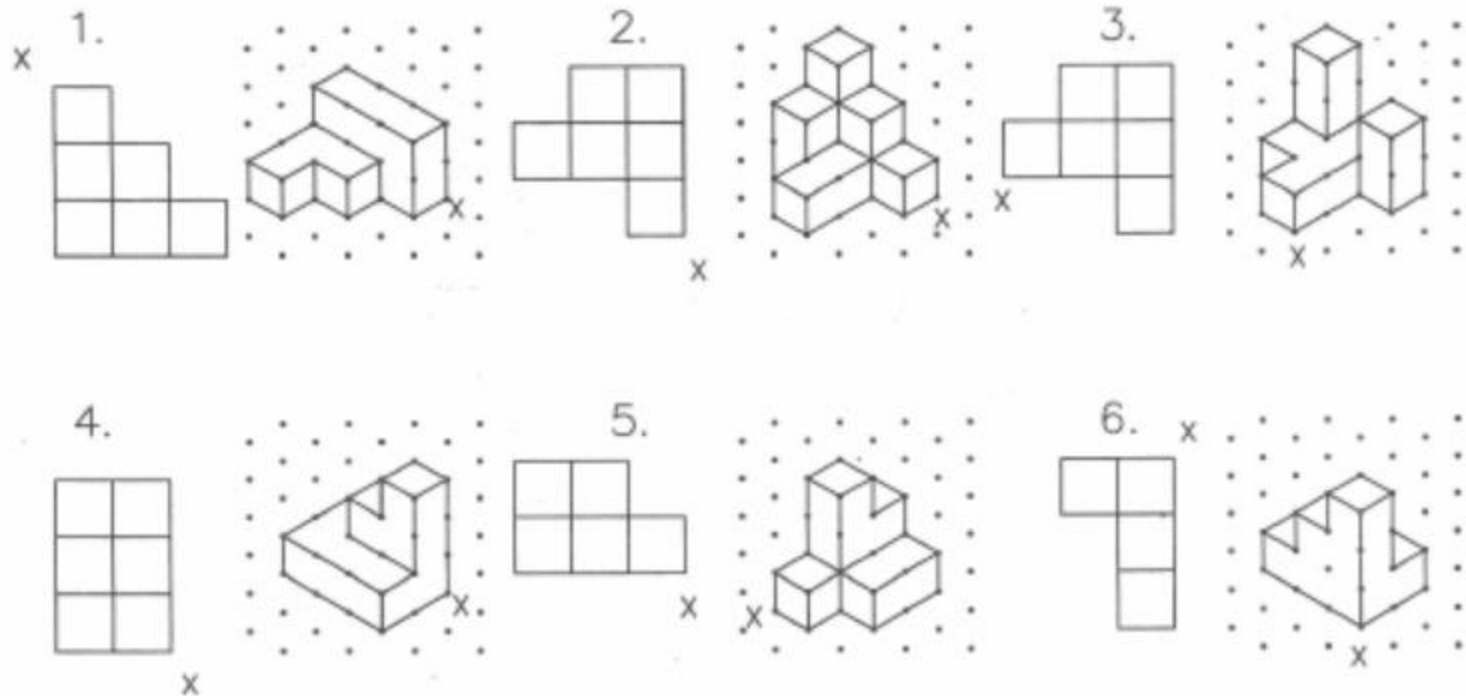


C



D

Coded Plans



What are you already doing?

- Using maps
- Directional language
- Graphing
- Games
- Model building
 - goo.gl/HxvWyg

