

# Developing STEM Activities for the Museum of London

Colin Buckley, Sean Fraser, Tessa Garbely, & Karina Naras



**WPI**



# STEM at the Museum of London

Incorporating STEM allows the museum to

- Teach fusion skills
- Use the collection in non-traditional ways
- Appeal to a wider audience



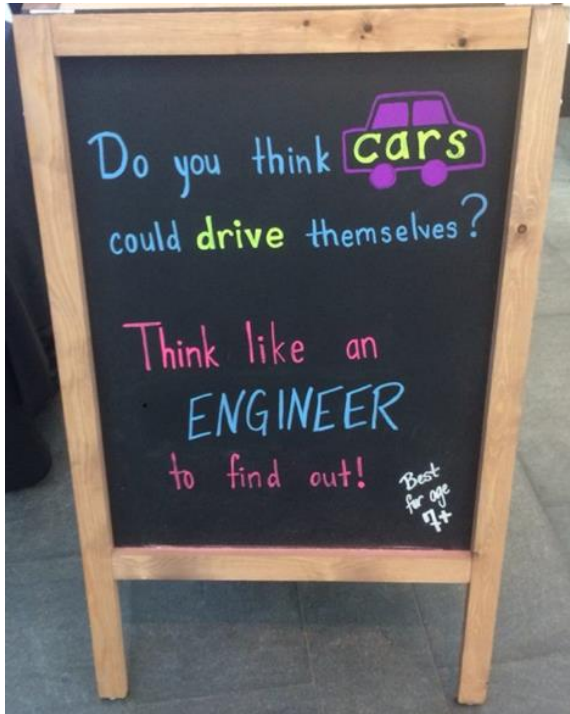
We developed and delivered two STEM-based activities for the half-term, then reviewed participant feedback and our own observations in order to make recommendations for future STEM activities.



# Observation of Museum Programs

- Reviewed relevant literature
- Interviewed Museum of London's Senior Family Learning Manager
- Observed sessions at museums





## DeTECHtives

**Simple machines** are tools with few moving parts that make work easier. People have been using these machines for thousands of years.

Can you find these 6 simple machines hidden throughout the museum?

You will be hunting for:

Lever	Wheel & Axle	Screw
Ramp	Pulley	Wedge

**Challenge:** There are a lot of wheels and axles in the galleries. See how many you can find!

### Wedge (London Before London)

A **wedge** is used to separate, lift, or tighten an object.

Can you find an object prehistoric people might have used to split wood?



Circle examples of wedges at home:

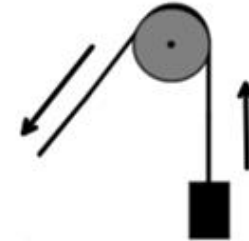
Knife	Toothbrush	Soap
Nail	Doorstop	Chair

# DeTECHtives



### Pulley (Roman London)

A **pulley** is a wheel that a rope, cord, or belt moves around.



Find the pulley on the ship model.

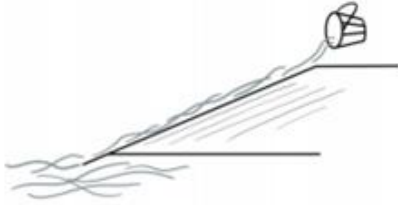
What do you think the Romans lifted with the pulley?

### Challenge:

Can you find the hidden pulley in the grain mill?

Pulleys have been in use since Roman times. There is an old-fashioned lift in the People's City gallery. A complex set of pulleys called a bolt and tackle system is used to raise and lower the lift.

## Ramp (Roman London)



A **ramp** is a surface that is angled or sloped, which connects a lower level to an upper level. Another name for a ramp is an **inclined plane**!

Find the drainage ramps leading out of the Roman bath house.

Do you see any modern examples of ramps around?

Yes ☐ No ☐

What would have happened if the Romans tried to get rid of unwanted water on flat ground? Discuss with your grown up.

Circle the examples of ramps below:

Inclined Plane    Slide    Axe  
Pencil    Stairs    Computer

# DeTECHtives



## Lever (Great Fire of London)

A **lever** is a board or pole that rests on a central stand called a **fulcrum**.



Can you think of any examples of levers at home or at the playground? Draw them below.



Find the fire engine.

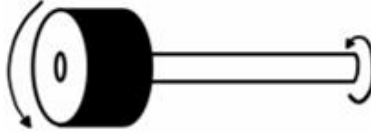
How many people did it take to use the fire engine? (Circle one.)

12    4    5    1

Why do you think they used this fire engine? Why not just use buckets? Discuss with your grown up.

## Wheel & Axle (Victorian Walk)

An **axle** is a rod that goes in or through the **wheel** to move it, and keeps the wheel in place as it turns.



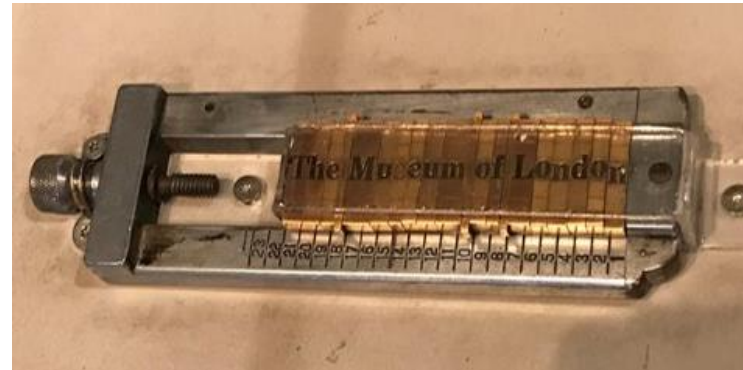
Find one of the food carts in the Victorian Walk and draw it below.

Who used this cart?

What would it be like pulling or pushing the cart without any wheels? Discuss with your grown up.

If you did the challenge at the beginning of the scavenger hunt, how many wheels did you see today?

# DeTECHtives



## Screw (World City)

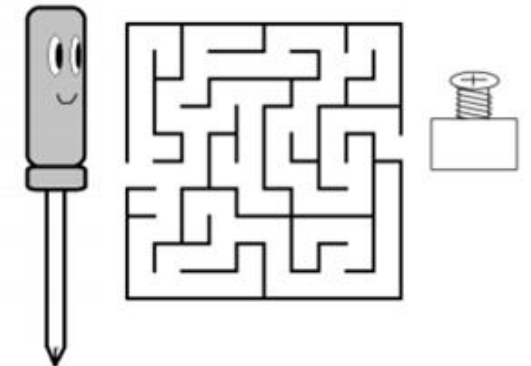
A **screw** is a ramp wrapped or twisted around a **cylinder**.



Screws are used everywhere today.

How many screws can you count on the digital switching card in the World City gallery? (Hint: It's in the same display case as the old telephones.)

Help Phillip the Screwdriver find the loose screw!

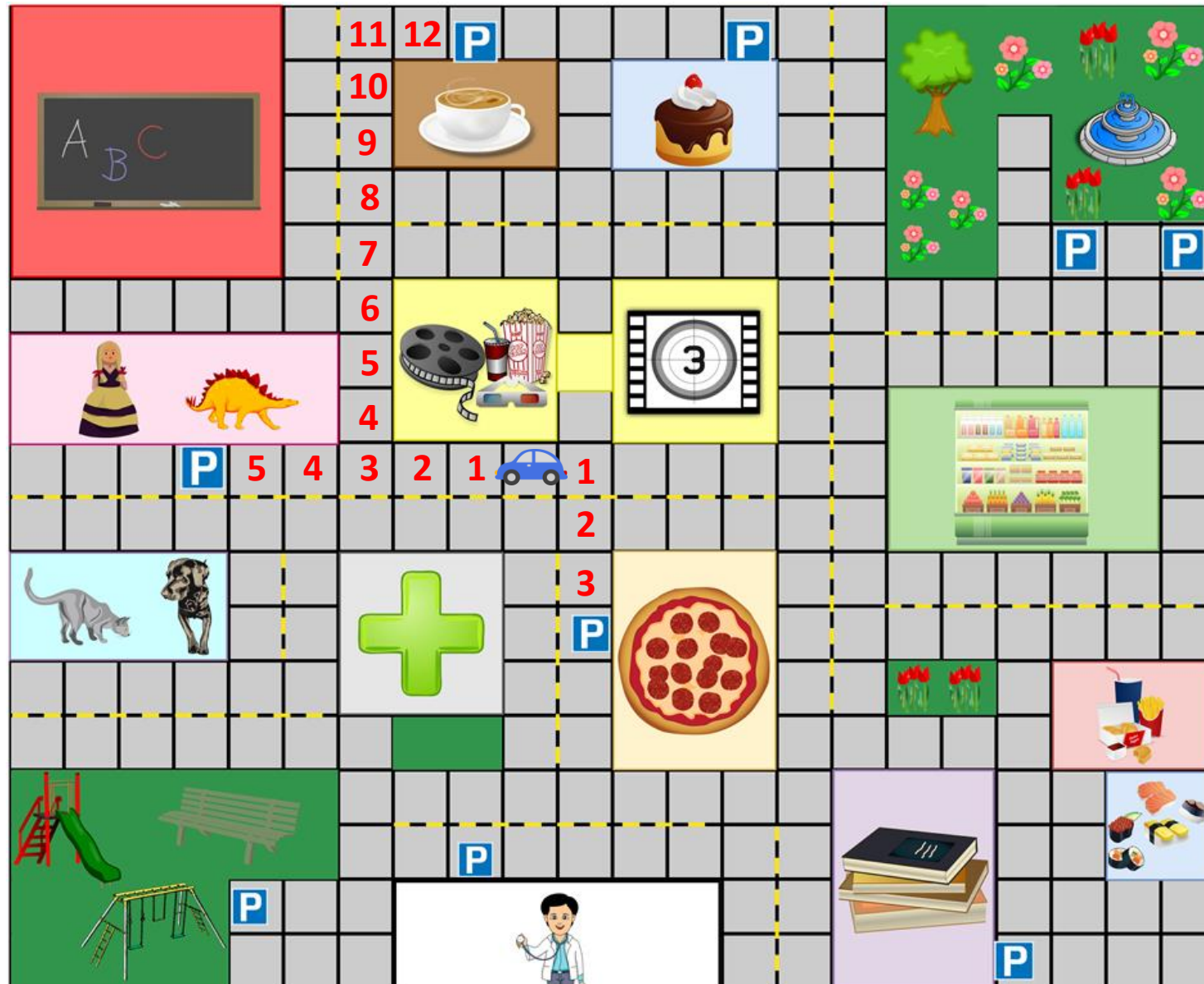


Congratulations! Come back to the table to get your sticker!

### Engineer Word Bank

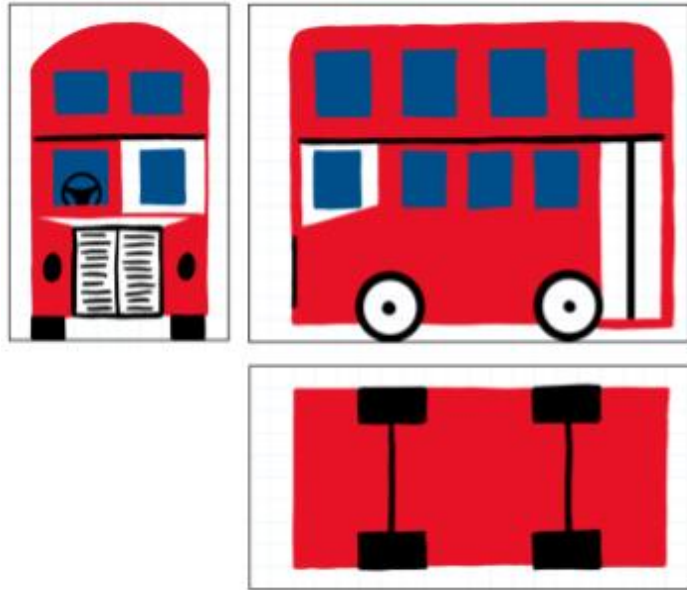
Simple machines   Wedge   Pulley  
Ramp   Inclined plane   Lever  
Fulcrum   Axle   Wheel   Screw   Cylinder

# Think Like an Engineer

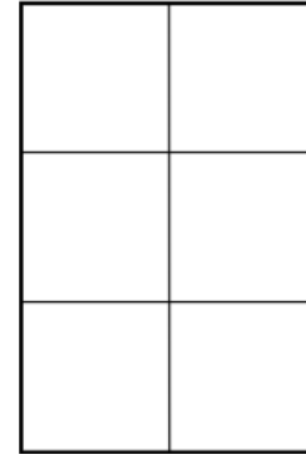


# Think Like an Engineer

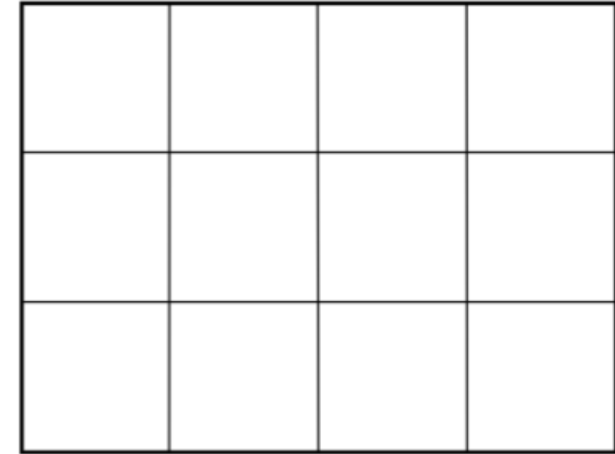
## Draw a Car from the Future



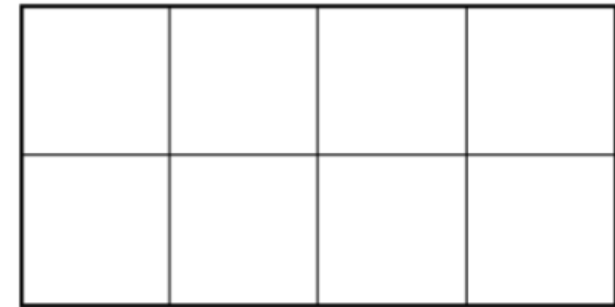
When engineers design cars, they first draw it out from several different points of view: from the front, the bottom, and the side. To the left is an example of how they might draw a bus. In the boxes below create your own car from the future. What do you think cars will look like in the future? Will they drive themselves? Will they look like they do today?



Front



Side



Bottom

# Feedback

"Child was 4, so it was a bit much"

"The leader was great communicating with the children"

"Great fun! Thank you for giving quite a grown up exhibition some more colour for small people!"

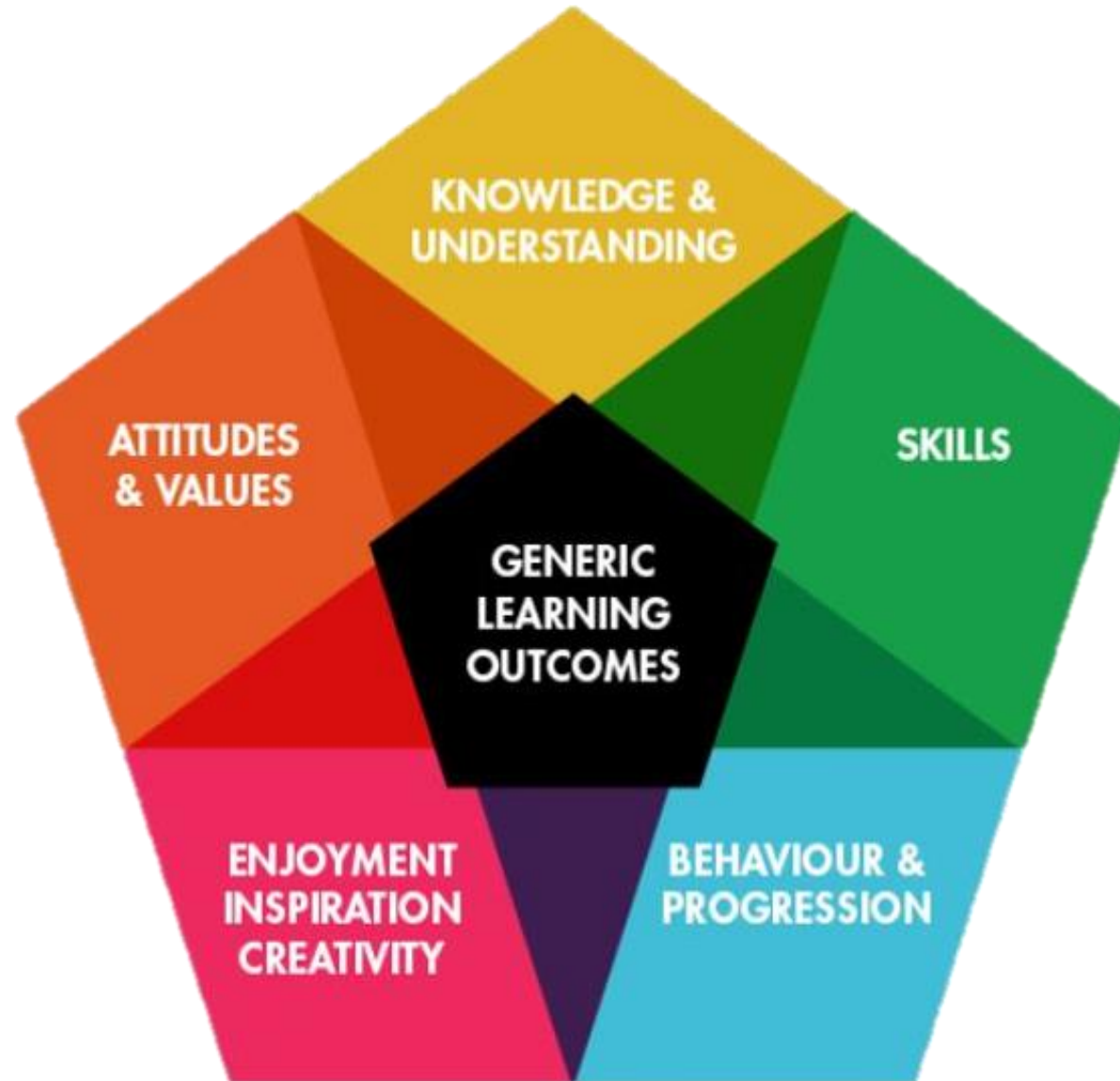
"A little bit too complex for a 5-year-old but he did try"

"Explain a bit about perspective"

"Very friendly and engaging hosts!"

"More STEM for kids please!"

# Evidence of Generic Learning Outcomes

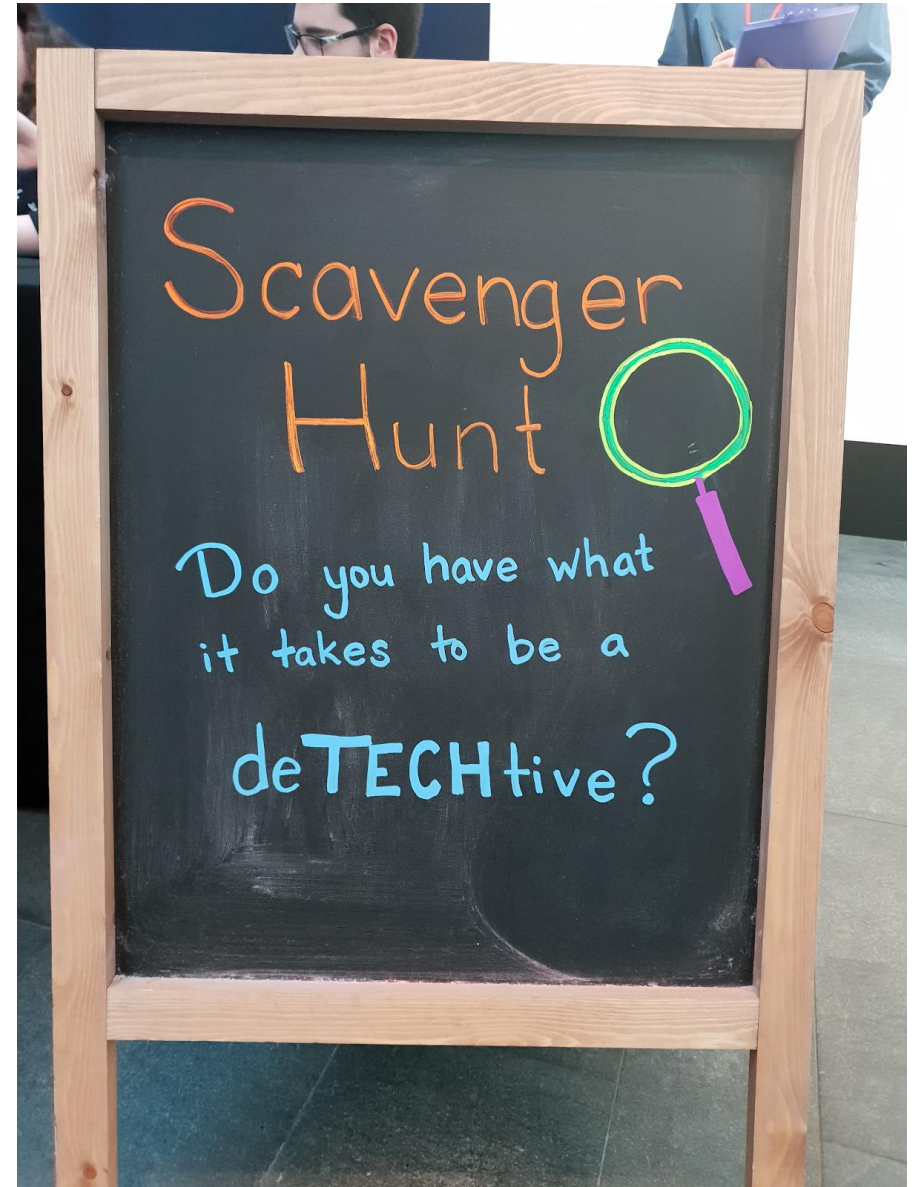


# Observation of Generic Learning Outcomes

Activity Observation Template	Date & Time
Knowledge and Understanding <input type="checkbox"/> Learning facts or information <input type="checkbox"/> Making sense of something <input type="checkbox"/> Making links and relationships	Enjoyment, Inspiration, and Creativity <input type="checkbox"/> Having fun <input type="checkbox"/> Creativity <input type="checkbox"/> Exploration and experimentation
Skills <input type="checkbox"/> Knowing how to do something <input type="checkbox"/> Being able to do new things <input type="checkbox"/> Communication skills	Action, Behavior, and Progression <input type="checkbox"/> Change in behavior <input type="checkbox"/> Progression towards further learning <input type="checkbox"/> Reported or observed actions
Attitudes and Values <input type="checkbox"/> Feelings and Perceptions <input type="checkbox"/> Increased motivation <input type="checkbox"/> Positive and negative attitudes in relation to an experience	Notes

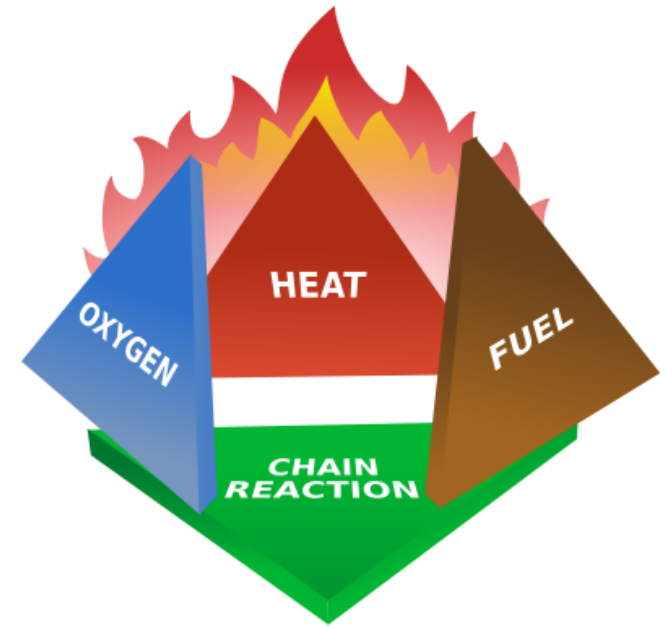
# Main Takeaways

- Bright colors, clear signage
- Charismatic attitude
- Variation for different ages
- Efficient use of time
- Relatable topic



# Future Activity Suggestions

- Fire Pyramid Craft
- Here to There: Transportation through History
- Augmented Reality Activity Trails
- Real World Robots
- Ada Lovelace Performance
- Shop Like a Roman
- Automation for Safety





# We would like to thank...

Olivia Murphy, for her never-ending support;

Sandra Hedblad, for her time answering our questions about museum programs;

Frazer Swift, for sharing his view of the Museum of London's mission;

The Learning team, for welcoming us into their space and helping us use the printers;

The Host team, for directing families to our activity stations;

Cynthia Adobea-Aidoo, David Laird, Phil Hatfield, and Amy Walker-Smith, for welcoming us to their institutions;

and Professors Joel J. Brattin & Zoe Reidinger, for their feedback and guidance throughout this project.

# MUSEUM OF LONDON



# Image Sources

- Culture Mile Logo
  - <https://www.culturemile.london/>
- Tower Bridge Logo
  - <http://popoutproducts.com/example/souvenir-piece-for-tower-bridge-london/>
- Museum of London Docklands logo
  - <http://www.citykidsmagazine.co.uk/2017/05/26/museum-london-docklands-family-activities/>
- Science Museum logo
  - [https://www.underconsideration.com/brandnew/archives/new\\_logo\\_and\\_identity\\_for\\_science\\_museum\\_by\\_north.php](https://www.underconsideration.com/brandnew/archives/new_logo_and_identity_for_science_museum_by_north.php)
- Child standing in front of Museum of London
  - <https://www.boorooandtiggertoo.com/days-out-museum-of-london-victorian-walk/>
- Fire tetrahedron
  - [https://commons.wikimedia.org/wiki/File:Fire\\_tetrahedron.svg](https://commons.wikimedia.org/wiki/File:Fire_tetrahedron.svg)
- CNC lathe
  - [http://www.americanmachinetools.com/images/cnc\\_lathe\\_sharp\\_1740nc.jpg](http://www.americanmachinetools.com/images/cnc_lathe_sharp_1740nc.jpg)