DESIGN & TECHNOLOGY

YEARS 8-10
RESILIENT FLAME

NATIONAL SPORTS MUSEUM

Bank of Melbourne
Education Program Partner

BEFORE THE VISIT

OLYMPIC TORCHES – WHAT AND WHY?

After a class discussion, answer the following questions

You could also view the videos on the following links:

- London Olympic games - Olympic torch relay video montage:
  https://www.youtube.com/watch?v=RKlcaDwQilY
- History of the Olympic Torch relay (pre London Games) – watch either the first 2.15 min or 3.25 mins (last section is a promo for the London torch relay and not as relevant)
  https://www.youtube.com/watch?v=pcjfrfa2ubE

1. What is the purpose of Olympic Torch re lays? (Why are they run? What is the torch relay for?)

2. Why is the torch lit in Greece?

3. Why do you think the torch travels through many countries and regions?

4. Why is it important for the torch to continue operating in all conditions and never go out?

INVESTIGATING TORCHES

Research into past Olympic torch relay locations - In small groups

1. Find 4 examples of Olympic torch relay locations – each one needs to be in a different setting. See if you can find the most extreme locations *Your examples can be either written, or shown through photos or a video clip*

For each example, answer the following questions:

a. Which Olympic game was this torch relay section for?
b. Where was the example located?
c. Under what weather or environmental conditions did the flame need to operate?
d. How many were needed?

In 2-3 minutes, present this information to the rest of the class – making sure that you use photos or videos to show each torch location.

Remember that a torch not only needs a flame that works, but it also needs to be held comfortably by many people, has to operate for a certain length of time, and needs to be symbolic and look attractive.

WHAT MAKES A GOOD TORCH?

In your groups, come up with a list of requirements that an Olympic organising committee might develop to give to a torch designer. Your list of requirements needs to cover:

- The conditions under which the flame should operate
- How people interact with (ergonomics, safety, useability, etc.) and control the torch
- Durability and reliability
- Aesthetic design (how it looks)
- Connection to Olympic movement

These requirements would become the **constraints** and **considerations** of an Olympic torch **design brief**

- *For example: The torch needs to continue operating when winds blow to 100 km per hour*
- ✎
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2. Choose your 'top 4' requirements (the most important) and write them on post-it notes. Work with the other groups to compile a class list of requirements – under the headings given.

3. Highlight the requirements on your sheet that are **functional** – that relate to how the product works or does its job.

LIGHT AND STRONG

MATERIALS TECHNOLOGY FOCUS

Investigating materials

1. What are the main requirements or criteria for the materials used in Olympic torches?

- ✎ .....
- .....
- .....
- .....

2. Research 2 different Olympic torch designs

a. Draw or download photo/diagram of each design
b. List the materials that were used for each design
c. Explain the qualities of the materials – what would make them a good choice for a torch?
d. Decide whether these materials are a good choice or not, and give your reasons.

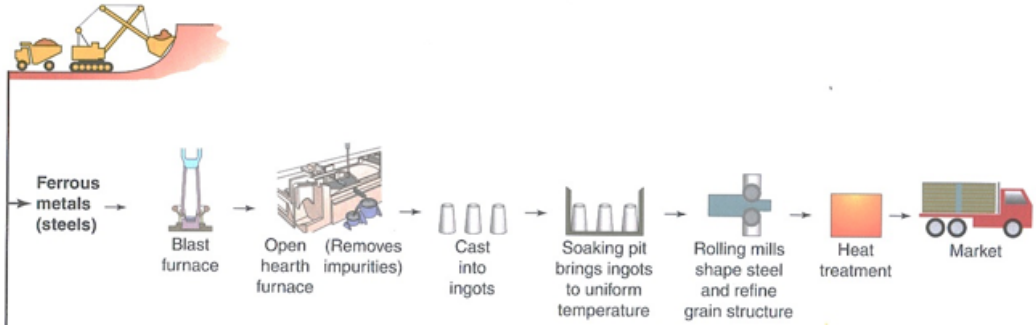
Torch 1 Olympic Games: ..... ✎	List materials used in the torch: ✎ .... What are the characteristics and properties of those materials? ✎ .... Is this a good choice? Why/Why not ✎ .....
Torch 2 Olympic Games:	List materials used in the torch: ✎ .... What are the characteristics and properties of those materials? ✎ .... Is this a good choice? Why/Why not? ✎ ....

LIGHT AND STRONG - MATERIALS TECHNOLOGY FOCUS

3. What are the impacts of using different materials?

a. Choose 3 different different types of materials that are used in torch construction and find out how they are sourced (where do they come from, how are they mined, processed, etc.)? Draw a diagram/flow chart to show that process.

For example:



From: VCE Product Design and Technology Units 1-4, Livett, J. and O'Leary, J. 2011: p.194

Material	**Description of how it is sourced and processed**
✎	

b. List some environmental impacts of sourcing and processing these materials

Material	**Environmental impacts**
✎	

c. Are some materials more environmentally sustainable than others?

✎ .....

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KEEPING THE FLAME ALIGHT - ENGINEERING SYSTEMS FOCUS

Research into the flame mechanisms/methods used

Using the internet, find examples of 2 different Olympic flame mechanisms

a. Either copy or draw a diagram of what the mechanism looks like, and annotate its main functional features
b. In 2-3 sentences, explain how it works

Flame mechanism example 1

Explain how it works

Flame mechanism example 2

KEEPING THE FLAME ALIGHT - ENGINEERING SYSTEMS FOCUS

Explain how it works

List some of the different fuels that have been used for the Olympic torch flames:

Considering both methods, what do you think are their advantages and disadvantages?

Describe the workings of all Olympic torches in the following engineering terms

Input	Process	Control	Output

Flames underwater

In the Sydney Olympic torch relay, the flame was carried underwater! Find out and explain how the designers made this happen.

Share your information – presentation

Prepare a 3 minute presentation that explains, in detail, how **one of your flame mechanisms works.** Your presentation needs to include at least 4 slides (not including the first title slide) and you must use a range of visual images to describe and explain the torch flame.

In your presentation, describe to following:

- Positioning of the components of the system (use diagrams)
- Method of control - how the torch is ignited
- The advantages and disadvantages of the system
- Length of burn
- Type of fuel

Include any other information that you think is interesting

DURING THE VISIT

OLYMPIC TORCHES – IN REAL LIFE

Visit the Olympic torch display wall in the **Faster, Higher, Stronger (Olympic) Gallery** and answer the following questions: *Choose 2 torches – one from the early years, and one that was used recently (if you did Worksheet 3, choose different torches to the ones you investigated). Draw each design and annotate/comment on what you can tell about the materials and flame mechanism used in each (if the information isn't there, have a guess). If you have access to a camera or phone, take a photo of each torch design.*

Torch 1
Olympic Games: ..... Year: .....

Torch 2
Olympic Games: ..... Year: .....

What materials are used in the torch?

What materials are used in the torch?

What flame mechanism is used in the torch?

What flame mechanism is used in the torch?

Comment about the choice of either the materials or flame mechanism (good/bad?):

Comment about the choice of either the materials or flame mechanism (good/bad?):

Think about the following criteria or requirements for the torch and judge whether the 2 torches meet these requirements *(as much as you can tell/guess from looking)*. Rate each torch from 1-5 for each criterion *(5 = excellent)*

Criteria/requirements	**Torch 1**	**Torch 2**
Do you think the torch would be light and easy to carry?		
How durable are the materials and design (are they tough to withstand knocks and weather)?		
Do the materials looks appealing?		
Do the shapes and decorations look good? Interesting visual design features?		
How well do you think the flame would last in harsh weather conditions, i.e. wind and rain?		

AFTER THE VISIT

OLYMPIC TORCHES – WRITING THE BRIEF:

Imagine you are on the Olympic organising committee, and the next Olympic Games are being held in the major city that is closest to your school.

1. **Write a design brief for your games' Olympic torch design, explaining the factors that need to be considered in the design. You need to cover the following aspects:**

- Who will be carrying the torch
- How far they need to carry it
- The weather conditions the torch needs to be carried through
- Particular requirements for the flame mechanism
- Requirements for choosing materials
- Aspects that will make the torch comfortable to carry
- Visual aspects that relate it to Olympics, and to the country/state/city where the games will be held

Complete the following design brief:

The ✎ ..... (your sport) team committee are calling for innovative designs for the next international sporting event. The team clothes/competition uniform needs to be /will be...

✎ .....

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What are the 4 most important requirements of this brief? (Constraints and considerations)

A. ✎ .....

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B. .....

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C. .....

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D. .....

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OLYMPIC TORCHES – WRITING THE BRIEF:

2. If you were going to design and make areal Olympic torch for this brief, what specific information would you need to find out before you started designing?

Research Area ✎ .....

Details ✎ .....

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Research Area ✎ .....

Details ✎ .....

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Research Area ✎ .....

Details ✎ .....

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YOUR TORCH DESIGN

Draw a design for an Olympic torch – using line and colour.
(You may want to brainstorm a few sketched ideas first)
You can show a side and either a front view or top view. Identify the materials that the torch will be made from, and how the flame operates.

*On your drawing, you need to **write comments** pointing out:*

- *the materials you have chosen*
- *the main measurements*
- *where the torch will be held*
- *where the flame will be and how it will work*
- *the visual features that make the torch appealing and connect it with the Olympics and games city*
- *any other interesting design features or innovations (new ideas)*

Explain what is good about your design

How well does your design fulfil the requirements written in the 4 dot points below your design brief?

TORCH PROTOTYPE

Working drawing
A design team would need to make a prototype of their Olympic torch to show the organising committee.

If your original drawing isn't very detailed or accurate, you may need to develop a working drawing. Using an orthogonal drawing method (front, side and top view), draw your design in detail, including indications of materials and dimensions.

Making
Now make your full-sized prototype or model, using whatever materials will help you to show what the end design would look like. You can use:

- Cardboard - plain, mini corrugated
- Foamboard
- Thin sheet plastic (e.g. polypropolene)
- Recycled materials
- Coloured and metallic paint
- Hot glue gun, glue stick, etc
- Corflute
- Paper
- Tape
- Foil
- Paints and markers for details

WHAT DID YOU LEARN?

Student self evaluation (A3)

1. List one thing that you already knew about Olympic torches.

2. List 3 new things you learnt about Olympic torches and how they are used?

3. How well did your torch design satisfy the different requirements of the brief ? *(be specific)*

4. What did you learn about how designers work when they are commissioned to do a job? Compare that with the way they work when developing their own product ideas.

5. How could you improve your torch design or model?

6. What aspect of this unit did you enjoy most?

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