

Knowle Locks Winter Works

Activity Pack



Knowle Locks, on the Grand Union Canal in Solihull, is a rural stretch of canal consisting of five **wide** locks.

Recently, maintenance work was carried out at lock number 49 at Knowle. The lock gates needed to be replaced so this section of the canal had to be closed and the lock drained of water.

It was a huge project that cost over £170,000 and took almost two years of planning.



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1. Winter Works

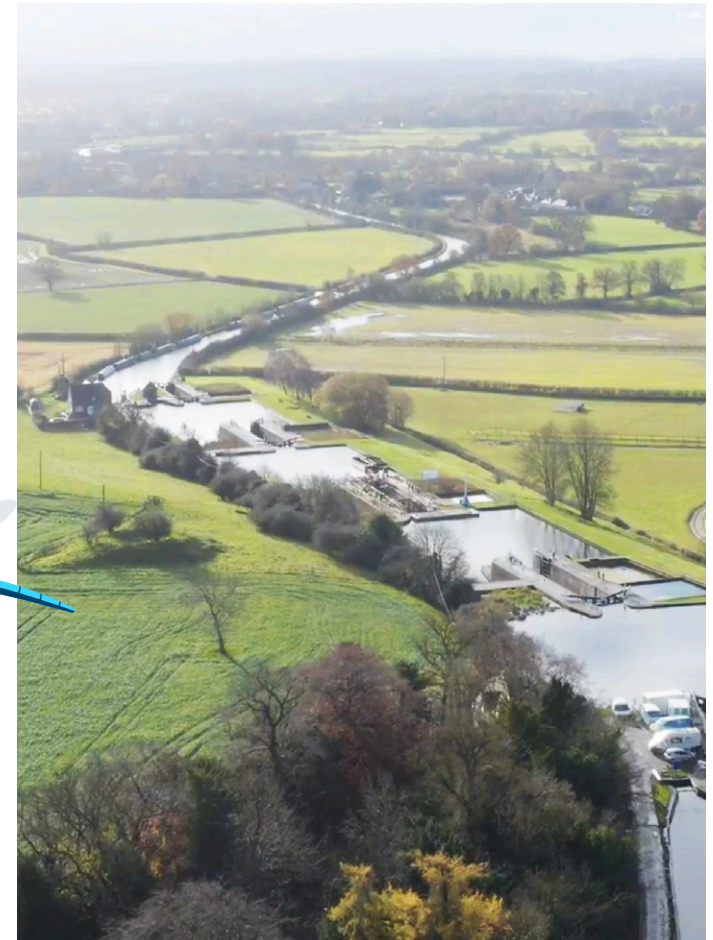
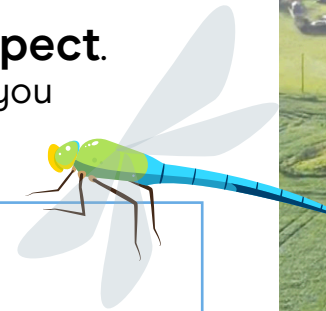
At the Canal & River Trust, we usually plan to do major maintenance work in the winter. Think of at least one **advantage** and one **disadvantage** of doing this work in the winter time:

Advantage

Disadvantage

It is essential to carry out maintenance work with **care** and **respect**. What do you think this means? List at least three elements that you would need to consider:

- 1.
- 2.
- 3.



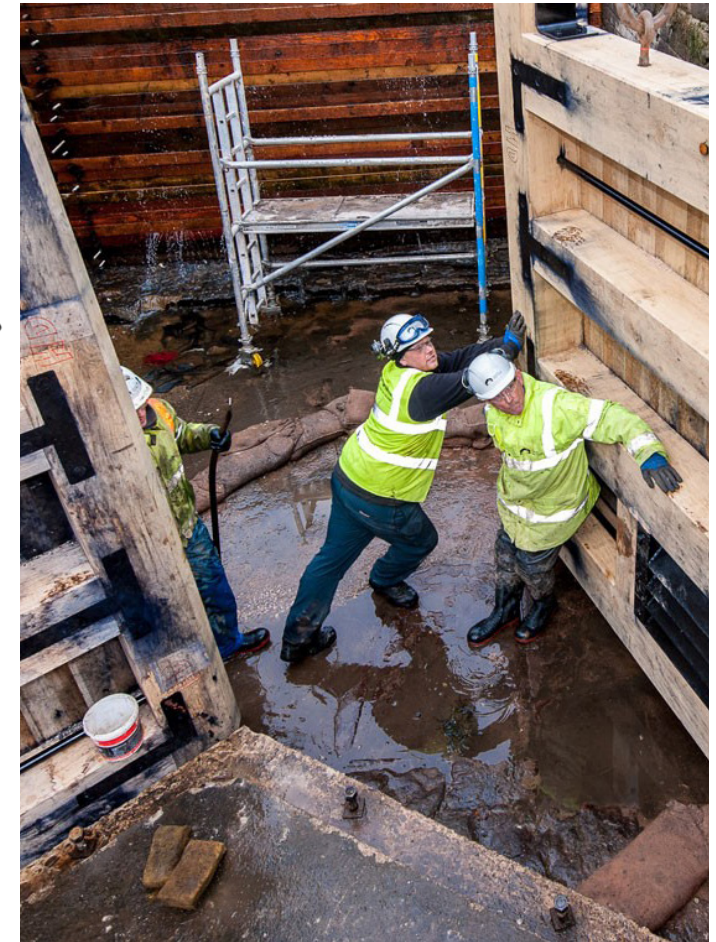
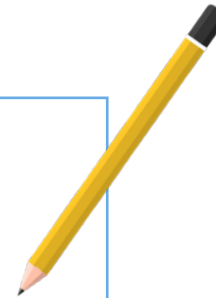
2. Lock Gates

An average lock gate lasts for about 25 years. When canal lock gates were first built there was no standard plan. They were constructed using a variety of techniques and designed to suit the local landscape.

When the Canal & River Trust build new lock gates, each one has to be measured and built to exact specifications. It takes skilled carpenters two to four weeks to build a pair of lock gates in the Canal & River Trust workshops. They are made from heavy oak and steel brackets to strengthen the joints.

Problem Solving

How could the gates be transported to the location and manouvered into position? Think about what we know about the **Knowle Locks** site.



3. Project Tasks

To complete a large engineering project like the gate replacements at Knowle, there are many elements to consider.

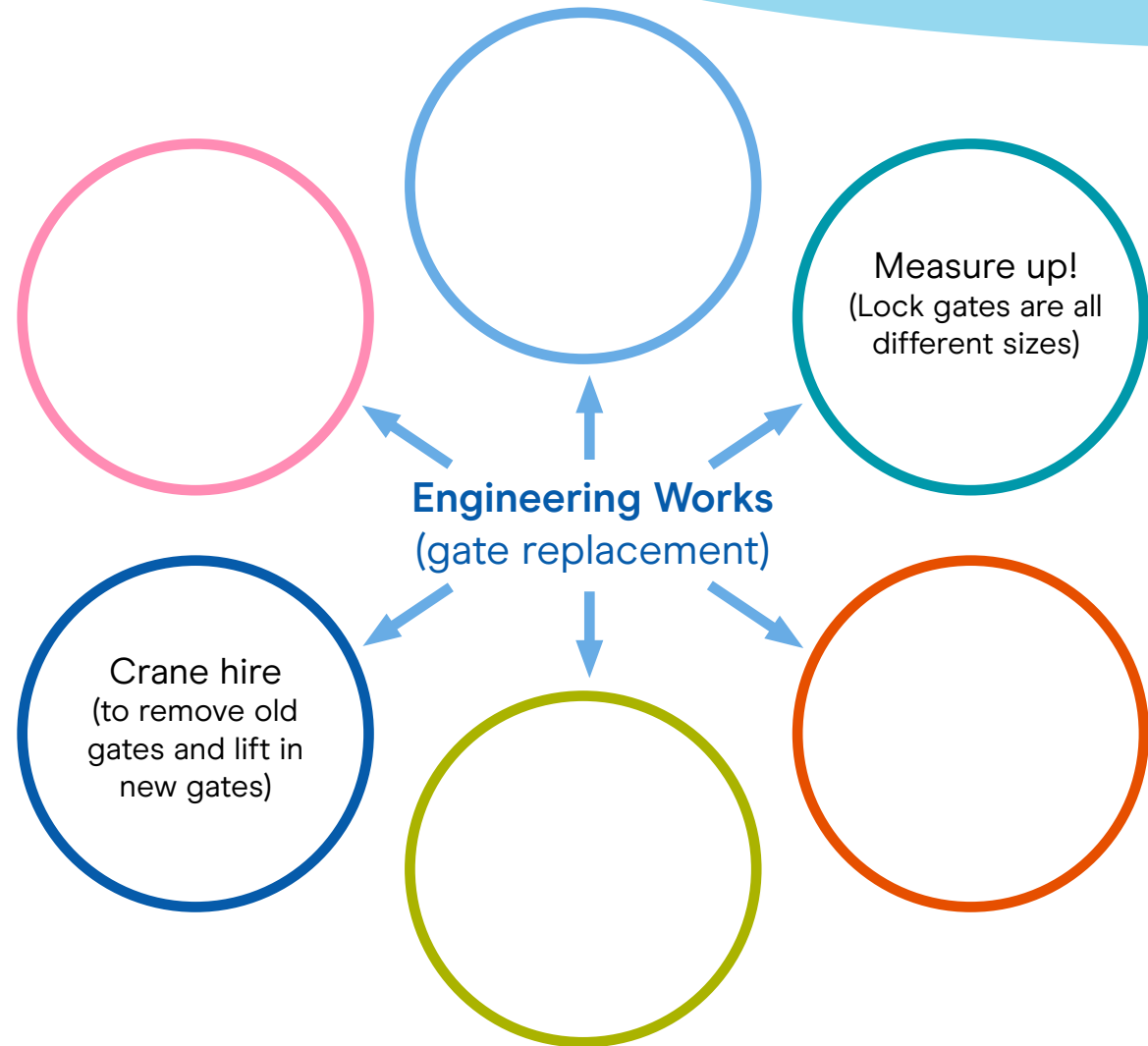
Careful planning is extremely important, and this can start two years in advance!

The first job is to inspect the problem. The Canal & River Trust often use divers to assess the gates and mechanisms to see what repairs are required.

Once the problem has been identified a schedule needs to be made to plan the works.

What tasks would we need to plan for?

Think of four more...



4a. Project Planning – Tasks

Put each of the tasks below into the correct order on the **project planning timeline** (pg 6).

Fish rescues
carried out.

Locks
inspected &
engineers plan
out tasks.

Lock gates
are measured
& start to be
made.

New gates
fitted & lock
repairs made.

External
contractors
booked.

Final safety
checks & canal
reopened.

Gates collected
& floating plant
prepared.

Site set up
including fencing
& security.

Old gates
removed.

Cofferdams
& stop planks
put in place.

Work is
inspected &
cofferdams
removed.

Lock & pound
dewatered.

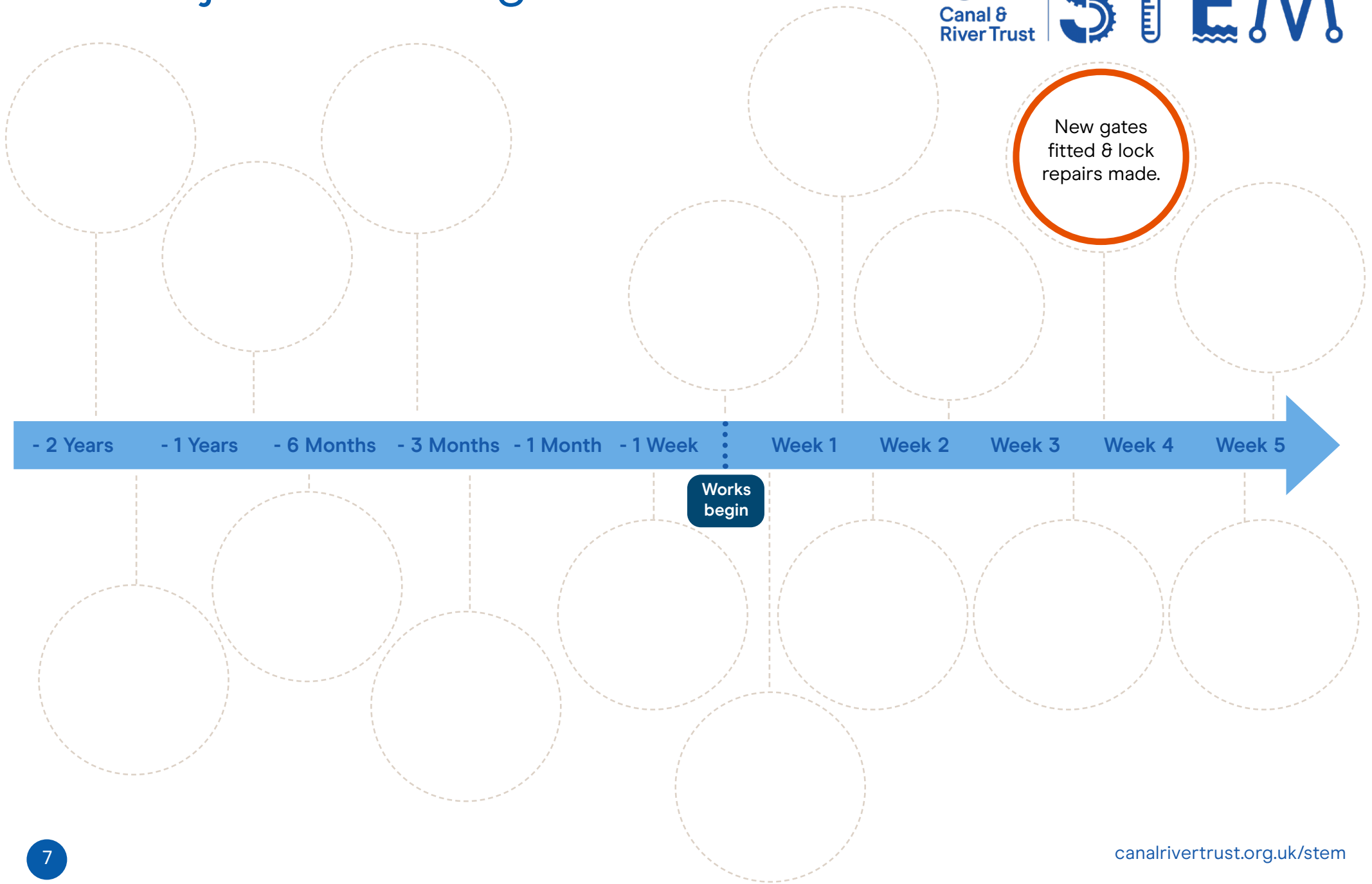
Site visits to
understand
logistical issues
& material
requirements.

Conduct risk
assessments for
health & safety.

Crane arrives
on site.

Heritage &
environment
experts
consulted.

4b. Project Planning – Timeline



5a. Job Profile Cards



Job Profile: **Ecologist**

Key words: **protect, wildlife and biodiversity.**

I conduct wildlife and plant assessments around the waterways. I provide advice on soil, land use, biodiversity strategies and environment protection.



Job Profile: **Craft Operative**

Key words: **skilled, craft and teamwork.**

I work within a team of skilled craftspeople on-site, around our canals and rivers. We conduct maintenance and repair work like masonry and carpentry on heritage structures.



Job Profile: **Construction Manager**

Key words: **organise, manage and safety.**

I coordinate and supervise the construction and maintenance works. I make sure that the operations are done safely, on-time and within budget.



Job Profile: **Engineer**

Key words: **design, technical and specialist.**

I design and manage the maintenance, repair and renewal of our heritage assets like bridges and locks. I provide guidance and technical advice to teams and contractors.



Job Profile: **Heritage Advisor**

Key words: **protect conservation and history.**

I ensure that any work that the Canal & River Trust do on the waterways conserves and maintains the integrity and authenticity of the historical assets.



Job Profile: **Mobilisation Supervisor**

Key words: **solutions, technical and safety.**

I coordinate and supervise the delivery and movement of machinery, equipment and supplies around the project sites. I make sure the work can get underway smoothly.



5b. Project Objectives



Project Objectives

- Minimum impact on the environment.
- Craftwork is of the highest standard.
- The site is secure and equipment is kept safe.
- Health and safety is ensured.
- The project is completed within the budget.
- The hired machinery arrives on time.
- The crane can access the lock area.
- The canal is closed for the shortest time possible.
- The cofferdams work efficiently.
- The new gates fit perfectly.
- Historical structures are protected.
- Traditional materials and craft skills are used.
- Daily safety checks are carried out.
- Hired equipment is returned to suppliers.
- Risk assessments are completed.
- Wildlife is rescued from the lock.
- Invasive species are monitored.
- The final structures are safety inspected.

There are many different job roles involved in a project like the Knowle winter works. Each member of the Canal & River Trust team has their own specialisms and areas of expertise.

Choose one of the roles from the job profile cards (page 8), then look at the list of project objectives on the left.

In your chosen job role, what would be your **top three objectives** for the winter works project - list your three choices in order of priority.

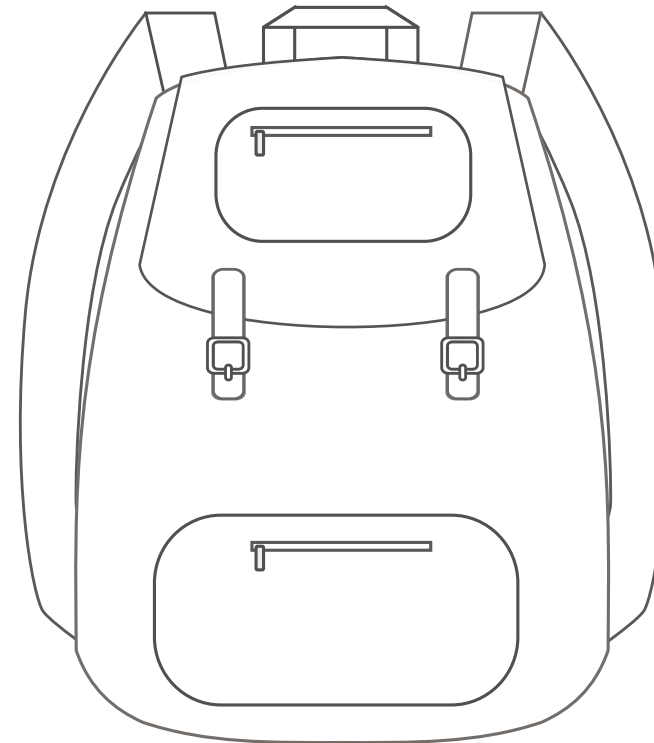
Job Role:	
Priority 1:	
Priority 2:	
Priority 3:	

6. Career Backpack

During an engineering project like the Knowle winter works, team members will often work at the project site on a daily basis. Others might just make visits to carry out assessments and checks.

In order to carry out their job role effectively, each member of the team will need a range of equipment or tools.

- Choose one of the roles from the job profile cards (page 8).
- Now fill the backpack by drawing all the equipment and tools that would be needed to carry out the chosen job role.
- Label up your items and describe what each would be used for.

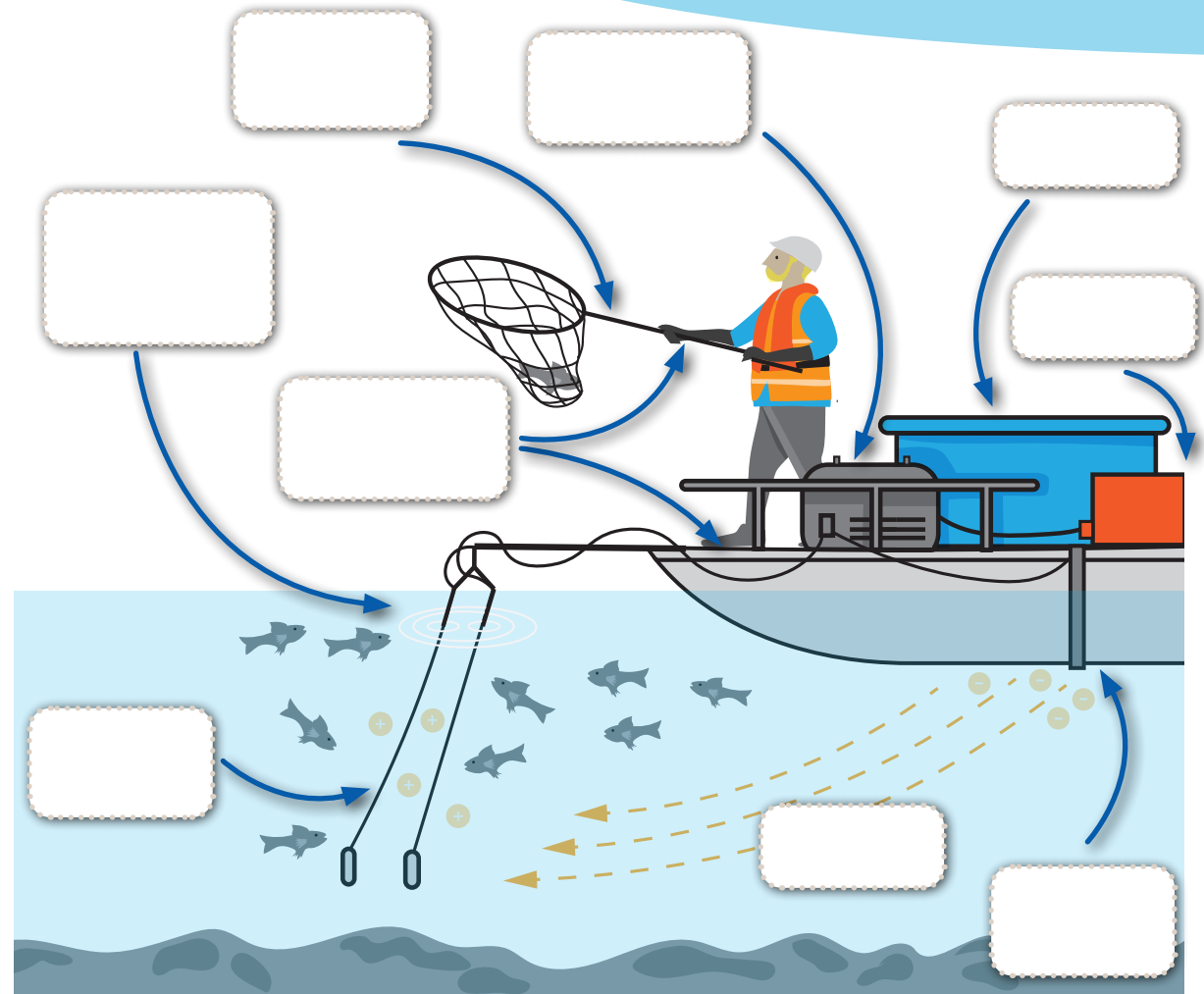


7. Fish Rescues

Before we ‘dewater’ the lock, it is important to rescue the fish and wildlife from the area. We use a process called **electrofishing** to rescue fish and eels as quickly and as safely as possible. The process involves using a low electrical current to temporarily immobilise the fish. They are then scooped up, transferred to large containers filled with fresh water, and moved to safety. We also use this as an opportunity to monitor fish health and species populations.

Use the text items below to complete the nine labels on the electrofishing diagram:

- Cathode (negative electrode)
- Anode (positive electrode)
- Electric current
- Keep well
- Rubber boots and gloves
- Insulated fishing netpole
- Fish attracted to the positive electrode
- Control box modifies current
- Generator



8a. Cofferdams

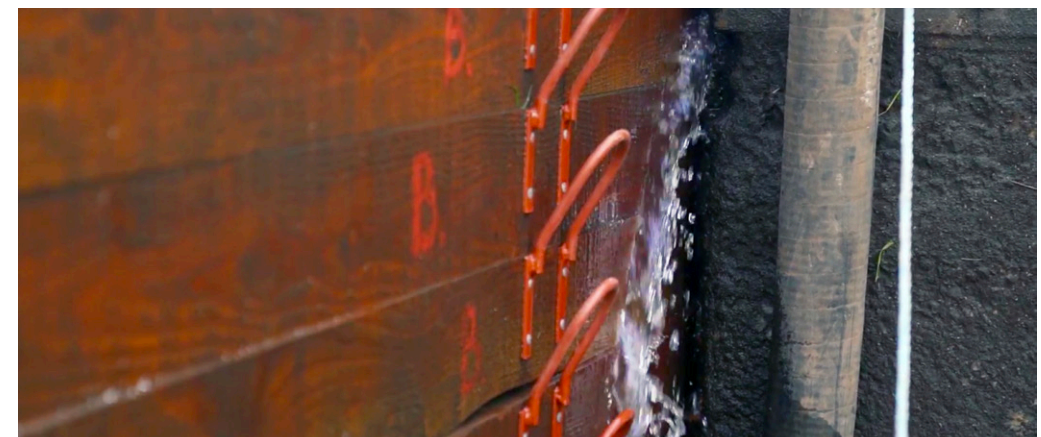
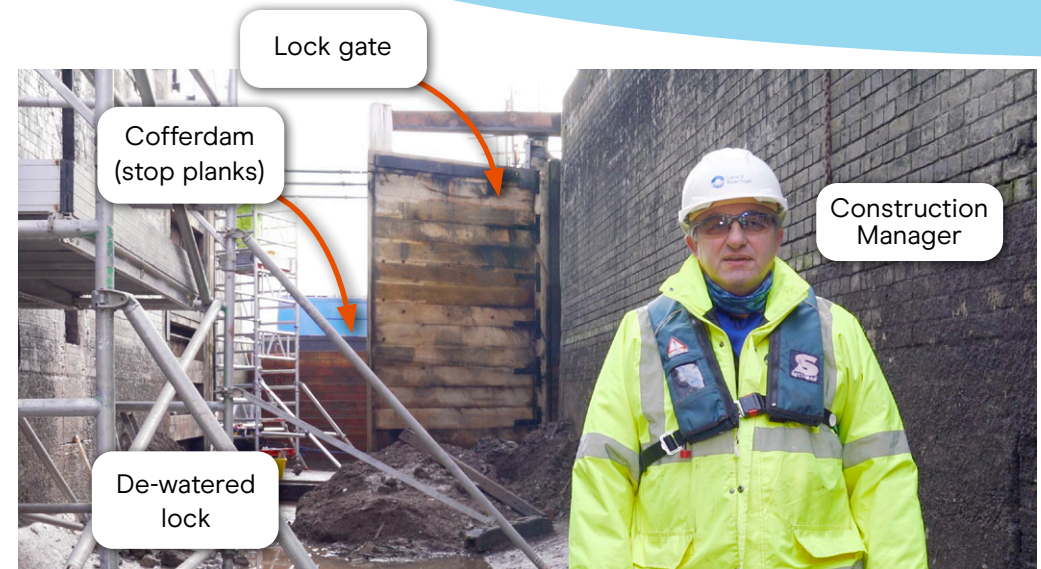
A **cofferdam** is a temporary structure that is built to hold back the water and create a dry working area. The Canal & River Trust often use 'stop planks' to create a cofferdam when working on a lock.

[Find out more from Mark Hines, Construction Manager](#)

Stop planks are large lengths of timber that slot into **grooves** on opposite sides of the canal walls. The planks stack on top of each other to form a barricade. The water inside the lock can then be pumped out.

On their own, the stop planks are not very efficient at keeping the water out. To help to seal off the water ash (from fires) is sprinkled into the 'wet side' of the cofferdam. As the water seeps through the gaps in between the planks, the ash is pulled through too, filling up any gaps and creating a better seal.

Hydraulic pumps still need to be kept running in order to remove extra water because the cofferdam is not 100% efficient.



8b. Cofferdams: Stop Plank Design

Traditionally, stop planks are rectangular pieces of timber that are stacked vertically on top of each other to hold back the water.

They have metal handles so that two people can manually insert the planks without the use of machinery.

Stop planks can withstand huge amounts of pressure but are not 100% efficient at sealing out the water.



- How can the design of a stop plank be **improved**?
- Draw and label your design in the space provided.
- What **design features** could it have?
- Describe the **advantages** and **disadvantages** of the materials you choose.
- Why not make a **prototype** of your design to demonstrate your ideas?

Existing design



Stop planks are **bespoke** pieces of timber. They are often stored at the side of the lock, ready for use.

