A PREDATOR IN THE PIPES

HEY! IT'S MILES FROM THE GEOSQUAD, AND I'M GLAD YOU'RE HERE! I KNOW YOU'VE BEEN LOOKING AT THE ***UTILITIES EXPLORATION POSTER***, SO YOU MAY HAVE SPOTTED SOMETHING THAT'S SENT THE WHOLE VILLAGE INTO A PANIC! IF NOT -- LOOK IN (D,5). THERE'S ***A CREATURE*** IN THE DRAINS! NOT ONLY THAT, THIS MYSTERIOUS TERROR HAS JUST GRABBED A WORKER AND PULLED HIM INTO AN UNDERGROUND PIPE. NOW IT'S A RACE AGAINST TIME TO FIND AND CAPTURE THE ANIMAL, AND RESCUE THE TRAPPED TECHNICIAN!

TASK 1:

CREATURE RESEARCH

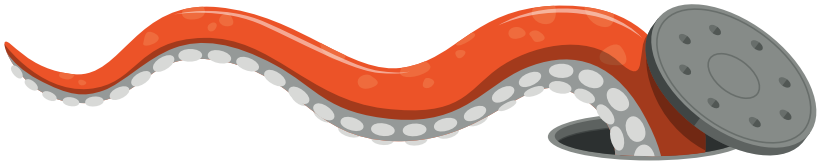
(SCIENCE LINKS - LIVING THINGS AND THEIR HABITATS / LITERACY LINKS - RETRIEVE, RECORD AND PRESENT INFORMATION FROM NON-FICTION)

Eye-witness reports suggest that the hapless worker was whisked away by a large, dextrous limb, covered in powerful suckers. Some have used the word 'tentacle', although it's important to remember that there is a difference between 'arms' and 'tentacles'. The word tentacle, when referring to animals like squids, means a limb that only has suckers on a pad at the end, and is used predominately for grabbing food. An octopus, therefore, doesn't actually have tentacles. It has eight arms - each one used to grab food and move along!

With all this in mind, you need to figure out what you might be dealing with in those pipes. Make a table and collect data on squids, octopuses and jelly fish. Collate your data under the following headings:

ANIMAL	LARGEST SPECIES	MAXIMUM SIZE	DIET	HABITAT	NUMBER OF LIMBS
Octopus					
Squid					
Jelly Fish					

Once you have all the data you need, see what additional interesting information you can find. For example, did you know that octopuses have beaks, like birds! It's the only hard part of their body, which is why they can squeeze through impossibly tight spaces. The more you find out, the better prepared your search team will be!



TASK 2:

SOUND IT OUT

(SCIENCE LINKS - LIVING THINGS AND THEIR HABITATS)

Although you know the creature and the worker are somewhere underground, it's not possible to go digging up roads and buildings to check the pipes below! Fortunately, surveyors and engineers who work on utilities all year round have some useful tech to help them 'see' below-ground without doing any digging at all. Have a look at grid reference (G,2) in the Utilities Exploration Poster - can you see the surveyor pushing along a device that looks like a yellow lawnmower? That's a GPR (Ground Penetrating Radar) scanner! It sends soundwaves through solid surfaces and measures echoes to create a picture of what's going on underground; great for checking pipes for damage, figuring out the layout of utilities in preparation for building work, or in our case, trying to find a runaway cephalopod and its helpless hostage!

Using sound to 'see' where light doesn't reach is known as echolocation, or sonar. Scientists got the idea for sonar machines from animals; many creatures in the animal kingdom use echolocation to help them move around and hunt. Carry on your research from Task 1 by identifying at least three different animals that use sonar. Write a fact file for each one, including diagrams, physical descriptions, habitat information, and an explanation of how they use echolocation to help them move and hunt. This will help you expand your understanding of sonar, how it fits into the job of surveying, and how it might help your team to locate the animal lurking below the surface of the street!

TASK 3:

STAY COLOUR COORDINATED

(GEOGRAPHY OBJECTIVES - HUMAN GEOGRAPHY)

There are two dig sites on the Utilities Exploration Poster. Both have uncovered a collection of criss-crossed utility pipes. Before you send your team underground after the creature, you'll need to let them know exactly what's in each of the pipes that they might encounter. Fortunately, they've been colour coded to let workers know what they contain:

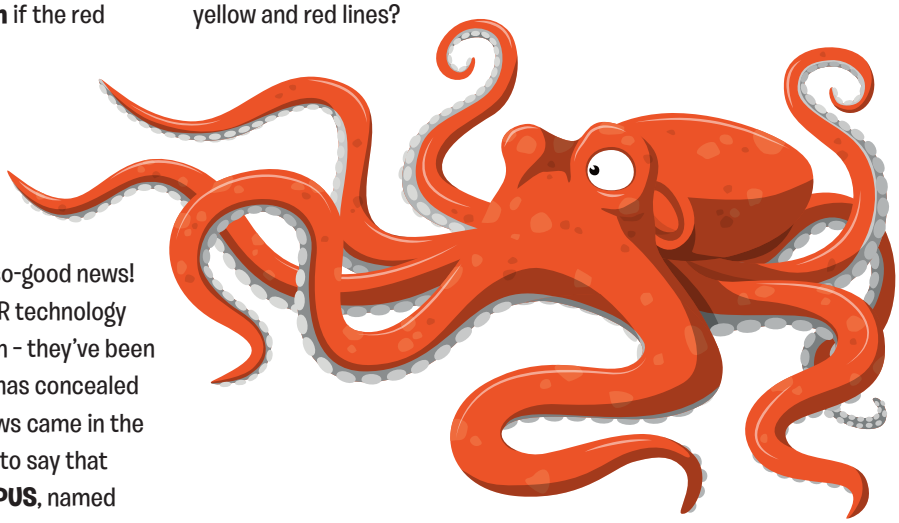
- Electric power lines, conduit and cables.
- Telecommunication, alarm or signal lines.
- Gas, oil, steam, petroleum, or other flammable material.
- Sewage and drain lines.
- Drinking water.
- Reclaimed water, irrigation, and slurry lines.
- Temporary survey markings.
- Proposed excavation limits or route.

For this task, create a quick-look safety handout sheet for your team, linking the colour of each pipe to what it contains. For each utility type, identify the hazard that your team might encounter if the pipe is broken (e.g. there would be a danger of **electrocution** if the red electric line is broken). You could also add in any possible combination hazards - for example - what would happen if the red and blue pipes were broken, and their contents came into contact? What about the yellow and red lines?

TASK 4:

BAIT YOUR TRAP

(SCIENCE LINKS - LIVING THINGS AND THEIR HABITATS)



So, you've received some good news, and some... not-so-good news! The good news is that - thanks to your guidance on GPR technology and the utility safety advice you provided to your team - they've been able to locate the section of pipe where the creature has concealed itself and the terrified technician. The not-so-good news came in the shape of a phone call from a local aquarium, who rang to say that they've... err... misplaced... their **GIANT PACIFIC OCTOPUS**, named Long-Arm Larry. The giant Pacific octopus is the biggest octopus species known to man; the largest example on record had an arm span of 32ft - almost the length of a bus! But you probably knew that from your research in Task 1! In fact, it's time to put the information you gathered to good use. You know the kind of conditions the octopus likes, and you know what it eats. For this task, design a waterbased trap that could be used by the rescue team to coax the octopus from its hiding place and secure it for transport back to the aquarium. Remember, as big as this creature is, it can squeeze itself through gaps only slightly bigger than its beak, so your trap is going to have to be escape-proof!

When designing your trap, think about how it will be lowered below ground and raised up again, how it will close fast enough to trap the slippery cephalopod, and how it can be transported back to the aquarium safely.

TASK 5:

YOU MADE IT... ALMOST

(LITERACY LINKS - FIRST-PERSON RECOUNT WRITING)

SUCCESS! Your trap worked perfectly - your team managed to capture Long-Arm Larry safely and rescue the worker who, aside from being covered in sucker marks and sewage, was totally fine! Well done!

Now you're riding in the rescue vehicle, with your octopus-filled trap secured in the back. It's late - pitch black - save for the streetlamps and the light coming from the houses that line the roads. Suddenly you hear a massive **BANG!**

...Everything's gone dark. It takes you a second to remember that the dig site where you trapped the octopus and saved the worker was right next to the power station (grid reference (H,5) on the Utilities Exploration Poster). Someone must have knocked out the power! The whole village has gone dark!

Write a journal entry describing your journey back to the aquarium through the pitch-black village. Will you make it without incident? Will the treacherous conditions cause an accident, and might Long-Arm Larry escape again!? Might you wish you could use sonar to find your way in the dark, like the animals in Task 2!?