

# Extraterrestrial Investigations

## THE SHARED-SPACE INVADER

HI! I'M KWAME FROM THE GEOSQUAD, AND I'M GLAD YOU'RE HERE! THERE'S A HUGE TO-DO HAPPENING ON THE HIGH STREET; WITNESSES REPORT THAT A STRANGE OBJECT CRASHED THROUGH THE PAVEMENT, LEAVING A LARGE CRATER THAT LEADS TO A DARK AND SCARY TUNNEL. NO-ONE WANTS TO GO DOWN THERE, AND I CAN'T BLAME THEM! COULD YOU HELP?



### TASK 1:

#### U.F.OHH DEAR!

(LITERACY LINKS - FIRST-PERSON RECOUNT WRITING)

There's plenty going on in this scene, but to the people above ground, what lurks below is still a mystery! Select one of the people on the street and imagine you are them, coming across this strange spectacle for the first time. You could be part of the first response team (the police and CSI investigators), one of the mysterious black-suited, sunglasses-wearing agents, or anyone else you can see on the street. Describe what you can see, what you can hear, and even what you can smell. Most importantly, explain your character's own personal reason for not wanting to enter that eerie tunnel!

### TASK 2:

#### DISCOVER THE DANGERS

(GEOGRAPHY OBJECTIVES - HUMAN AND PHYSICAL GEOGRAPHY / SCIENCE OBJECTIVE TOPICS - ROCKS (Y3), ELECTRICITY (Y4/Y6) PROPERTIES OF MATERIALS (Y5))

The surveyor next to the police van is getting some weird results on her GPR (Ground Penetrating Radar) device. There's something under the ground. The CSI surveyor scanning the crater has also noticed some hazardous damage to the underground utility pipes. But you can see more than anyone. Make a list of all the hazards you can identify below ground, and when you've got as many as you can find, use what you've spotted to answer this question:

**Is it safe for a **person** to enter that tunnel?**

(Remember to explain your answer by including the potential consequences of each of the dangers you've spotted!)



## TASK 3:

### SELECT YOUR SURVEY TECH

(GEOGRAPHY OBJECTIVES - GEOGRAPHICAL KNOWLEDGE AND FIELDWORK)

Hopefully your answer to Task 2 was a big, fat, NO! There are broken water and electricity pipes (and we know water and electricity don't mix), crumbling tunnel walls, and the alien's ship has caught fire, sending potentially toxic gases floating through the cavity. It's certainly no place for a human! So, how will the surveyors find out what's beyond the entrance to the tunnel? Use the Get Kids into Survey Mining Exploration Poster to find out what kind of technology surveyors use to explore underground spaces safely. (The answers to questions 3 and 5 will be a big help!)



## TASK 4:

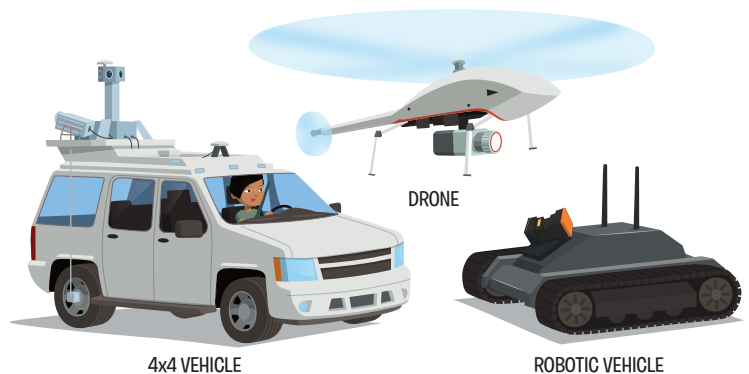
### SELECT YOUR SURVEY EQUIPMENT

(GEOGRAPHY OBJECTIVES - GEOGRAPHICAL KNOWLEDGE AND FIELDWORK)

Surveyors use LiDAR technology to scan underground spaces. LiDAR works by sending out a thin beam of very bright light, which hits an object then bounces back. The device measures the time it takes for the light to return, and uses that data to work out a precise measurement. Millions of these measurements are combined by surveyors to create 3D computer models and maps of objects and environments.

When a LiDAR device is mounted to something that can move, it becomes a mobile LiDAR system. The moving thing could be as

high-tech as a drone or an automated robot, or as low-tech as a backpack! You could find a LiDAR scanner on the top of a car or a boat, or on the belly of an aeroplane or submarine. But which vehicle would be best for exploring the tunnel? Make a table with pros and cons for each of these mobile LiDAR systems:



## TASK 5:

### DESIGN YOUR DELIVERY VEHICLE

(GEOGRAPHY OBJECTIVES - GEOGRAPHICAL KNOWLEDGE AND FIELDWORK / D&T OBJECTIVES - DESIGN, MAKE, EVALUATE AND TECHNICAL KNOWLEDGE)

In the Get Kids into Survey Mining Exploration Poster, the surveyors attach their LiDAR scanner to a remote-controlled robotic vehicle called a Zeb Revo. Considering that it would be difficult to pilot a drone through an underground tunnel, and the 4X4 vehicle is too big

(and would have to be driven by a person, which is still too dangerous), the robotic vehicle seems to be the best way to explore what lies beyond the crater. Your final task is to design your own robotic vehicle, which you could pilot via remote control, to explore the tunnel and find what made that massive crater. Think about the terrain it needs to cover, the hazards it needs to be able to overcome, and the protection it needs to give to the LiDAR device. Sketch your design and label its important features first, then have a go at making a prototype! You could build one from Lego, or you could modify an old toy with arts and crafts materials. You could even do a digital design on your computer or tablet!

**Finally, jump back into character as a super surveyor and write an account of what you and your specially designed mobile LiDAR system find inside the crater tunnel...**