

SURVEYING TO BUILD

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traditional methods | modern applications

HEY THERE! I'M **JOHN** THE DIRECTOR OF SURVEY FROM **CONTROL POINT ASSOCIATES, INC.** -- AND I'M IN THE MIDDLE OF A BIG CONSTRUCTION JOB RIGHT IN THE CENTER OF MIDDLETOWN!

YOU CAN SPOT THE SITE ACROSS THE ROAD FROM THE SURVEY TOOLS STORE IN THE **SMART CITIES EXPLORATION POSTER**. IT'S BEEN A TRICKY BUILD SO FAR... AND THAT'S BEFORE AN ALIEN CRASH LANDED ON THE ROOF OF THE BUILDING BEHIND US! IF I TAKE YOU THROUGH THE CONSTRUCTION PROCESS, FROM SURVEY TO BUILD, DO YOU THINK YOU CAN USE WHAT YOU LEARN TO PLAN OUT A NEW, VERY SPECIAL BUILDING? COME ON -- LET'S START OUR JOURNEY!



TASK 1: WALK THE LINE

(GEOGRAPHY OBJECTIVES - GEOGRAPHICAL AND LOCATIONAL KNOWLEDGE / MATH OBJECTIVES - UNITS OF MEASURE)

Before you start building, you've got to know what's yours and what isn't! It's no good building on land you don't own - you'll just end up having to knock it all down again (and you'll be off your neighbour's Christmas card list for sure!). That's why one of the first things a survey team will do is a **boundary survey**. This sorts out where the property or site limits are, and identifies any encroachments (when a property owner puts up a structure that intrudes onto another's land) or easements (a space that cuts through a property area to allow things like footpaths, utilities, or even light to get through) that may

affect the construction. Once the boundary survey is complete, the construction team will know exactly where they are and aren't allowed to build.

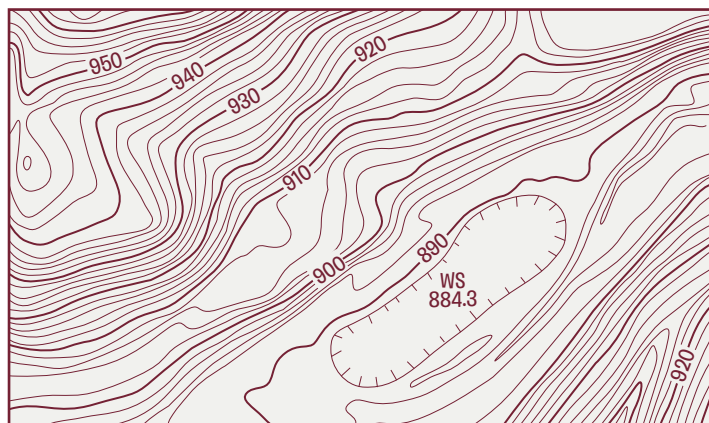
For your first challenge, your job is to complete a boundary survey for your own home! Pace out the periphery of your property - you can use a bird's eye view printout of the plot from Google Maps to add your measurements, or you could sketch your own plan, then add the dimensions once you've collected the data. To be as precise as possible, try walking heel to toe, then measure then length of your shoe and multiply it by the number of steps to get a more accurate measurement!

TASK 2: KNOW THE LEVELS

As well as knowing the boundaries of a building site, construction workers also need to understand the elevation, contours and natural features of the land, such as hills, depressions, trees, and water bodies. If these things aren't taken into account, you can expect wonky buildings, sinking structures, and foliage where your paving flags should be! This is where a **topographic survey** comes in handy. It's like a 3D map of the area, and it shows construction workers details about the shape of the land they're going to work on. Topographic maps are color coded to show the elevation (height and depth) of the terrain - ranging from dark blues for deep water, to light greens for flatter areas, to shades of brown, all the way to white, for higher places.

Can you use the 'Know the Levels' worksheet to practice shading a topographic map to show different elevations in different areas?

Make sure you stick to the colour key so the construction workers can understand your plans!



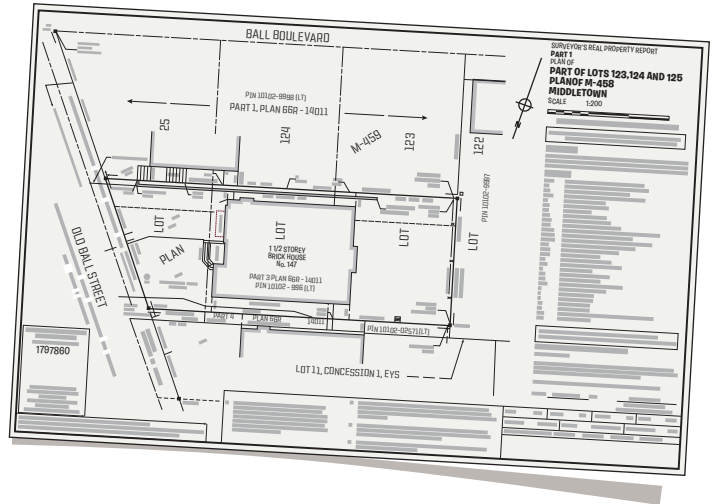
TASK 3: HAVE A PLAN

(GEOGRAPHY OBJECTIVES - GEOGRAPHICAL AND LOCATIONAL KNOWLEDGE/ MATH OBJECTIVES - SHAPE / DESIGN TECHNOLOGY OBJECTIVES - TECHNICAL DRAWING)

Chances are, your new building won't be the only spot on the block! New buildings often have to be integrated into an area full of existing structures that aren't going anywhere. Just take a look back at the Smart Cities Exploration Poster and you'll see that our building site is surrounded by skyscrapers, heritage buildings, busy roads and public parks (not to mention a nearby waterway with a pointy-finned resident, and a subway system running right beneath the floor!) The construction workers need to be aware of all these things and more - which is why a site plan survey is made. It captures the existing features of the site, including buildings, structures and utilities. It provides a detailed overview for designing the building and determining its placement.

Could you lend a hand in producing the site plan survey for our new

building? Use the 'Have a Plan' sheet alongside the Smart Cities Exploration Poster to complete a detailed survey, imagined from above, including all the details that you can see. The more detailed your plan, the clearer the picture for the architects, builders and all the other construction workers!



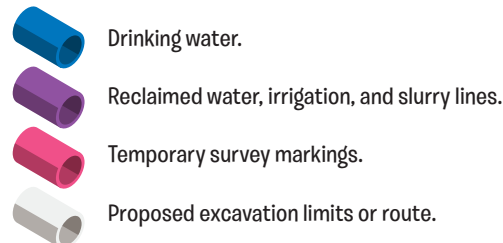
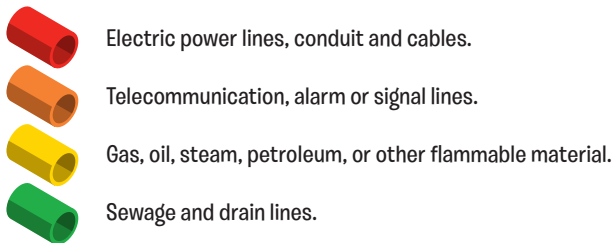
TASK 4: PICK OUT THE PIPES

(GEOGRAPHY OBJECTIVES - LOCATIONAL KNOWLEDGE / SCIENCE OBJECTIVES - ENERGY)

An important part of any building project is getting water and power to the new structure. These are called utilities, and they include things like water lines, gas lines, electrical cables, and sewer lines. Building teams will need to know where the nearby supply lines are, so they can route the necessary utilities to the new building... but they'll also want to avoid damaging the existing lines as they dig and build!

This is why a utility survey takes place before construction starts. It locates underground utilities and ensures that construction utilities avoid damaging these essential services.

There's plenty of reasons to be cautious around utilities; damage could be catastrophic. Can you use the 'Pick Out the Pipes' worksheet to explore the hazards each utility type might present, as well as the color coding system designed to help construction workers to avoid catastrophe!



TASK 5: REBUILD YOUR DREAM HOUSE

(GEOGRAPHY OBJECTIVES - LOCATIONAL KNOWLEDGE / DESIGN TECHNOLOGY OBJECTIVES - DESIGN AND EVALUATE)

Well - from boundary and topographic surveys to site plan and utility surveys, you've helped the Control Point Associates, Inc. construction project immensely! We've got one more survey to complete: a construction layout survey. This one involves setting out the precise location of the building on the site based on architectural plans. It includes reference points, marks boundaries, and guides the construction process. But we've got this one covered! For your final challenge, can you use the survey skills you've been working on to plan a new home - to be constructed on the site of your own house? If you

could build your dream home without having to move, what would it look like? How big could you make it? (while sticking within the boundaries of your property, of course!) How might you use the land differently? Would you alter the topography? (Maybe you'd sink an area to create a pool or pond, or build an area higher to make a BMX ramp!)

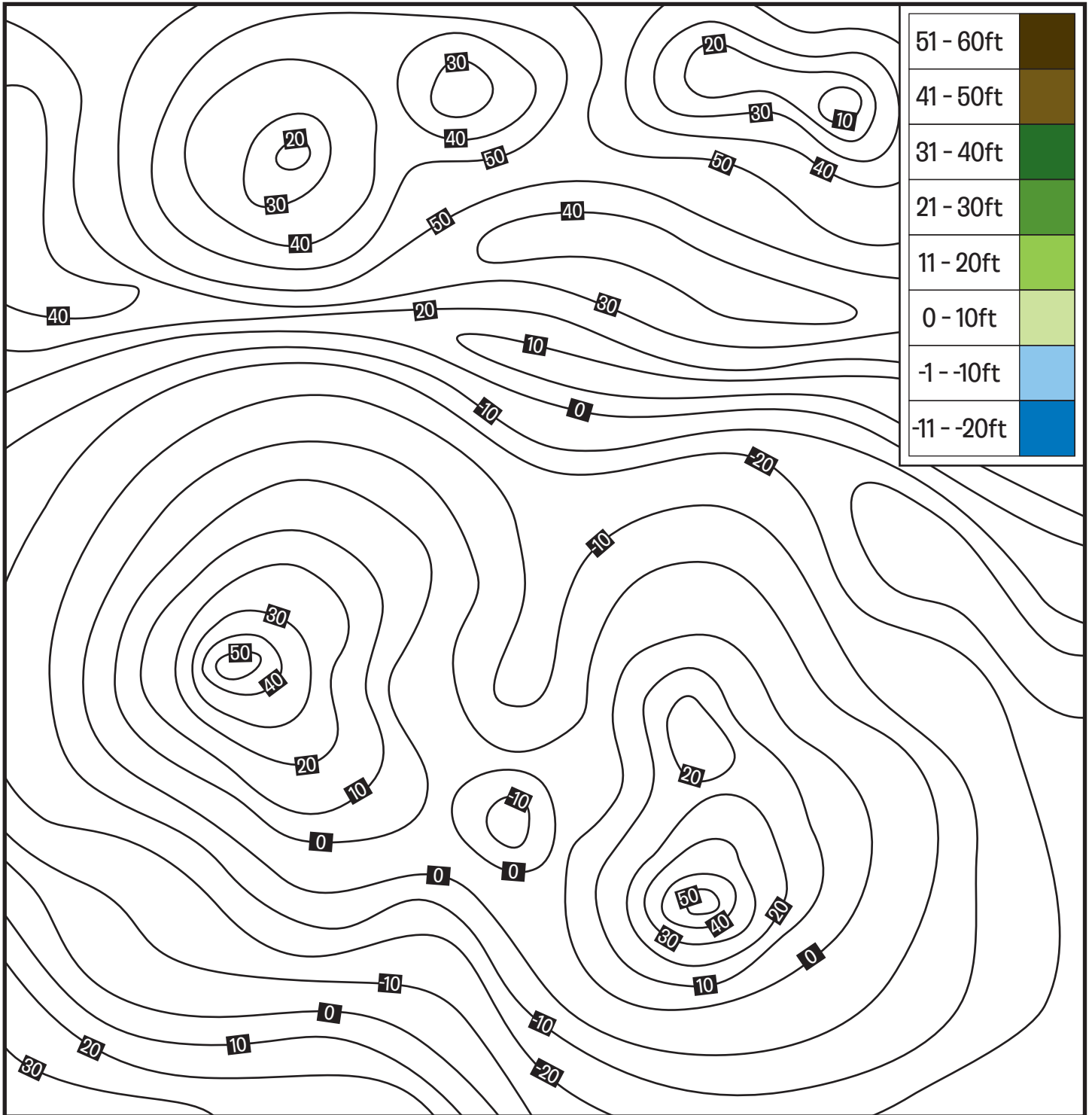
Once you've finished designing your dream home rebuild - including boundary, topographic, site plan and utility information - ask an adult for permission and assistance to email your work to hello@getkidsintosurvey.com, and we'll share your efforts online!

TASK 2:

KNOW THE LEVELS



CAN YOU USE THIS SHEET TO PRACTICE SHADING A TOPOGRAPHIC MAP TO SHOW DIFFERENT ELEVATIONS IN DIFFERENT AREAS? MAKE SURE YOU STICK AS CLOSE AS YOU CAN TO THE COLOR KEY SO THE CONSTRUCTION WORKERS CAN UNDERSTAND YOUR PLANS!



TASK 4:

PICK OUT THE PIPES



CAN YOU USE THIS WORKSHEET TO EXPLORE THE HAZARDS EACH UTILITY TYPE MIGHT PRESENT, AS WELL AS THE COLOR CODING SYSTEM DESIGNED TO HELP CONSTRUCTION WORKERS TO AVOID CATASTROPHE!

MATCH THE TYPE OF UTILITY TO THE HAZARD THAT MIGHT RESULT IF THE PIPE WAS DAMAGED. THE FIRST ONE HAS BEEN DONE FOR YOU.



People would struggle to heat their homes or cook food



People wouldn't be able to watch the news



Waste from toilets would not be taken away safely



All electrical devices would lose power



People would not be able to fill kettles or bathtubs



SEARCH ONLINE TO FIND THE UTILITY COLOUR CODING SYSTEM USED IN YOUR COUNTRY, THEN COLOUR THE UTILITY PIPES BELOW TO CREATE A GUIDE FOR CONSTRUCTION WORKERS TO FOLLOW:



Communication, TV



Electricity



Gas, Oil, Steam, Petroleum



Sewer and Drain Lines



Water

