



Sustainable Solutions: Roads of the Future Challenge

About Academy9

Academy9 is an exciting educational initiative from Transport Scotland, linked specifically to the A9 Dualling programme. It is hoped that it will encourage school pupils on the Perth to Inverness corridor to consider STEM-related careers.

To find out more you can visit our website:
blogs.glowscotland.org.uk/glowblogs/academy9



Sustainable Solutions: Roads of the Future Challenge

The Sustainable Development Goals (SDGs) are a set of targets related to future international development. They were created by the United Nations and promoted as the **Global Goals for Sustainable Development**. There are 17 goals and 169 specific targets for those goals. It is important that the goals are considered when designing and building roads, including the A9 Dualling Programme.

Your challenge is to design and build a model road, using as many of the SDG's below as you can. Read through the SDGs with your teacher/team and the SDG Challenge instructions before you get started.

The goals are listed alongside questions that you will need to think about when designing your ideal road.



1 NO POVERTY



End poverty in all its forms everywhere. How can your road help reduce poverty and help to support access to essential services and facilities, such as hospitals, supermarkets, schools/ universities, banks, doctor surgeries and pharmacies?

What is poverty?

Poverty means not having enough money for basic needs such as food, drinking water, homes, or toiletries. Poverty also includes not having access to school, not being able to see a doctor and not being able to afford fuel or access to transport. In Scotland, out of every 100 people, 20 are considered to be living in relative poverty.

2 ZERO HUNGER



End hunger, achieve food security and improved nutrition and promote sustainable agriculture. How can your road help farmers quickly transport fresh produce to markets? How can improved road access help ensure no one goes hungry?



3 GOOD HEALTH AND WELL-BEING



Encourage everyone, of all ages to have a healthy life. How can your road improve the well-being of local communities and visitors? Think about how your road can facilitate different activities focused around good



4 QUALITY EDUCATION



Ensure inclusive and fair quality education and promote lifelong learning opportunities for all ages. How can your road help to ensure all children have access to good quality education?



5 GENDER EQUALITY



Achieve gender equality and empower all genders. How can your road ensure that the people employed to build and maintain your road are treated fairly, regardless of their gender?

What is gender equality?

Gender equality means that society, such as you and the community in which you live, treat and view all genders in an equal and fair manner. Equality does not mean that all genders will become or act the same, it means that everyone's rights and opportunities, such as access to school or paid work, will not depend on their gender.



6 CLEAN WATER AND SANITATION



Ensure availability and sustainable management of water and sanitation for all. What steps does your road need to take when considering water management? Think about the possible water challenges that you can address, such as controlling flooding by planting more trees to soak up the water or preventing water pollution by making sure there are no fuel leaks during construction that could pollute local rivers.



7 AFFORDABLE AND CLEAN ENERGY



Ensure access to affordable, reliable, sustainable, and modern energy for all. Can renewable energy be used along your road and what will this energy be used for?

For example, electric vehicle charging points on the side of the road. Consider what requires powering along the road such as overhead lights, information signs etc.



8 DECENT WORK AND ECONOMIC GROWTH



How can your road create more jobs and improve the economy? Think about how all the construction workers receiving paid work can have a positive impact on the local economy.

What is economic growth?

Economic growth refers to the increase in the value of goods, such as concrete to build roads, and services, such as construction workers to lay the concrete to build the road, produced by an economy; ultimately, this means an increase in wealth for individuals and communities.



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



Build resilient infrastructure (e.g. roads and bridges) and encourage innovation. How can you ensure your road is going to last into the future and why is that important? Think about how the benefits of innovative technology (drones, virtual reality) can be used to tackle climate change, such as reducing the need to travel to work.



10 REDUCED INEQUALITIES



How can your road help to ensure that everyone has equal opportunities? Think about how you can promote inclusion with consideration given to age, sex, disability, race, ethnicity, origin, religion, or economic or other status. Think about both roadusers and the people building the road.



You don't need to consider all of these.

How can you ensure people working on your road are treated equally and fairly? Think about what you like about your school environment and how that be applied to the workplace.

11 SUSTAINABLE CITIES AND COMMUNITIES



Make cities and communities inclusive, safe, resilient, and sustainable. How can your road bring communities together?

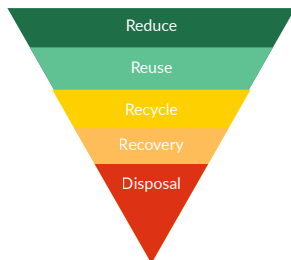


12 RESPONSIBLE CONSUMPTION AND PRODUCTION



How can you use the waste hierarchy to avoid unnecessary waste when building your road? Are there things that can be done to reduce the amount of materials needed when building the road? What types of materials can be recycled or reduced? Use the waste hierarchy when deciding which materials to use for your model. Can you recycle what you already have rather than buying new?

WASTE HIERARCHY



13 CLIMATE ACTION



Take urgent action to fight climate change and its impacts by reducing emissions and creating more renewable energy. Are there methods to reduce carbon emissions on your road during the design and during the construction of the road? E.g. trees absorb carbon, reusing construction materials, electric vehicles + charging points, other modes of transport (cycle paths), public transport. Think about climate change and how your road might need to be adapted to more extreme weather conditions e.g. flooding, drought, snowfall.



14 LIFE BELOW WATER



Conserve and sustainably use the oceans, seas, and marine resources for sustainable development. Even though your road might not be next to the sea, how can your road reduce marine pollution/protect marine environments? For example, installing recycling points could reduce the chances of plastic along the road making its way into the ocean.



15 LIFE ON LAND



Protect and enhance the environment, animals, wildlife, and forests. What types of things can be done to protect and restore the natural environment along your road? E.g. if you chop down a tree could you plant two new trees in its place, include mammal crossings over or under the road, animal warning signs, protect animal habitats.



16 PEACE, JUSTICE AND STRONG INSTITUTIONS



Promote peaceful and inclusive communities. How can you encourage local communities to be involved in the design of your road? How can your road take the views of disadvantaged people and protected groups into account?

Who are disadvantaged and protected groups?

Disadvantaged groups face challenges such as poor living/housing conditions and limited access to basic education, medical facilities, and income. Protected characteristics include age, disability, race, and pregnancy.



17 PARTNERSHIPS FOR THE GOALS



Which other organisations will help you to achieve the other SDGs on your road? E.g. walking and cycling groups, bus operators, local landowners (such as farmers and shop owners), environment/zero waste groups, wildlife trusts, forestry commission, electric vehicle related companies, disability groups, equalities groups.



Your SDG Challenge



Your challenge is to design the best road possible.

Your design should contribute to as many of the SDGs as you can to **benefit people in the local community**, such as reducing air pollution to achieve agreed climate action or encouraging socialising to achieve good health and well-being in communities.

For this challenge you will work in **teams of 4-6**. Think of things wider than just the road itself e.g. lighting, signs, how it connects communities and amenities, etc.

You can work on this challenge for up to **10 hours**. Use the timetable provided to help you plan how to use these hours. It is up to you how you want to present your challenge.

Make use of the learning materials, worksheets, project planner and timetable provided in your kit.

Each school will be allocated an **Industry Mentor** so if you have any questions, you can email them for help. Why don't you run your design by them before you start to create it?

If your school has **more than one team**, you will hold a judging ceremony where you will present your road ideas to judges in your school.

The **top team from each school** will then submit a recording of their presentation, along with their presentation slide deck, to Academy9. Academy9 will then complete a shortlisting of all submissions to decide who will be presented for the final judging.

The judges will be looking for how well you have designed your road, how well you've fulfilled the design criteria, what you have taken into account, how your model looks (if you build one), how well you present your ideas and how well you have worked as a team.

Final Judging Award Categories:

-  Best Overall Primary School Entry
-  Best Overall Secondary School Entry
-  The People's Choice Award

Timetable (10 hours)

1-2 hrs	Read the SDGs and the challenge, get into groups and decide which initial SDGs you'd like to cover on your road. Assign roles in your group e.g. project manager, designer, researcher, note taker etc. Read through the glossary with your teacher for any words you don't understand. Use the 'week 1' worksheet to record any thoughts or decisions on your project so you remember them for the next session. Fill in your team's project planner to help you prepare for the next session.
3-4 hrs	Research your chosen SDGs and how they could relate to your road. Start to think about how you want to present your road to the judges. Think about what materials you need to build the model of your road. Alternatively, you can create a digital model e.g. using PowerPoint or Minecraft Education, as long as you can show how it works and explain how it meet the design criteria and the SDGs. Do you want to keep the role you had last time or change to a new one? Fill in your team's project planner. Contact your Industry Mentor to advise on your design. HINT – if building a physical model try and use and use recyclable materials and not buy anything new for your model.
5-6 hrs	Continue working on your road design, incorporating as many of the SDGs into your road as you can. Remember to fill in your project planner at the end of the each session.
7-8 hrs	Start designing and preparing your presentation for the judges. Continue creating your model. Do you want to write a script of what you're going to say to the judges?
9-10 hrs	Continue working on your models, scripts, notes for the judges etc. and you might want to run through what you're going to say to the judges next week with your teacher, another team or your Sustainability Mentor.
Finish	Submit your entry to the Academy9 team.



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