**Script for Game 1 – Constructing the Plane**

**Welcome**

Welcome to the aircraft hangar. In here you will learn about the different materials that go into making a plane. Before you go to the task room, speak to the people here and learn all about their job roles within the industry!

**Job Role NPCs –**

**CAD Designer**

CAD stands for Computer Aided Design and my job is to use two and three-dimensional models to represent projects. These models help engineers and designers to build the safest and most efficient planes. I sometimes develop models of older planes, so we can see the best way to innovate for future designs. I will often develop multiple models so that everybody can see different ideas and different strategies.

Ways in –

Apprenticeship, college qualification in computer aided design.

Relevant school subjects –

Maths, English, Science, Art, Design and Technology, Engineering Technology, Computer Aided Design and Manufacturing

Key skills –

Creativity, attention to detail, IT, numeracy skills.

Habitat –

Office, design studio.

**Manufacturing Engineer**

I am accountable for delivering robust, capable manufacturing process technology as it applies to materials, tooling, part fabrication and assembly.

Ways in –

Apprenticeship, degree in Engineering.

Relevant school subjects –

Maths, Physics, Design and Technology, T Levels.

Key skills –

Excellent communication skills, attention to detail.

Habitat –

Manufacturing plant, office, or laboratory.

**Aerodynamicist**

I am a specific type of engineer who focuses on planning tests and analysing aerophysics. With the results of this analysis, we can explore the suitability of materials and design of aircrafts, aerospace products and support equipment.

Ways in –

Degree in Engineering or Applied Physics, or an apprenticeship.

Relevant school subjects –

Maths, Physics, Design and Technology.

Key skills –

Analytical, problem solver, experimental, communication, research, design.

Habitat –

University, testing facility, laboratory.

**Stress Engineer**

My main role is to determine the stresses and strains in materials and structures when subjected to forces and heavy loads. In the aviation industry, this will mainly relate to aircraft and rocket bodies. In engineering, stress analysis is an important tool in the design process. The stress engineer must ensure that the structure can withstand the pressure from a specific load, if not then the aircraft won’t be safe to fly.

Ways in –

Degree, an apprenticeship, college course in mechanical engineering.

Relevant school subjects –

Maths, Physics, Design and Technology.

Key skills –

Analytical, innovative, IT skills, attention to detail, repair skills.

Habitat –

Laboratory, testing facility.

**Aerospace Engineering Technician**

My occupation is found in the aerospace sector. Aerospace technicians act as enablers for the full lifecycle of an aerospace product. They support the work of Aerospace engineers, following their processes and procedures. They could be as part of the Design, Production, Inspection, Testing, Maintenance process.

Ways in –

Apprenticeship, college course, degree.

Relevant school subjects –

Science, technology, maths.

Key skills –

Thorough, work well with hands, determined, work well with others, IT skills.

Habitat –

Manufacturing Plant, Airports, Hangar, Maintenance Facilities, Remote and Private Airfields, Global.

**Manufacturing Operator**

It is my job to produce physical objects with the help of machines. My role involves planning, sourcing raw materials, turning handles on the machines, inspecting the finished article, and then sending it to the finished goods stores.

Ways in –

Apprenticeship, college course

Relevant school subjects –

Science, Technology, Maths, English, Physics, Design and Technology, T Levels.

Key skills –

Working in a team, following instructions, communication, able to interpret diagrams, health and safety.

Habitat – Manufacturing plant.

**Plane Materials**

In the storage room behind me there are multiple materials. Gather the ones you think go into building a plane. You can test them by the boards. If it’s correct you will be teleported to that section of the plane! When you have tested all the materials head to the office at the end of this room.

**Careers Room**

**Storage Room**

**The Office Final Task**

**Right click to place the block**

**Left click to remove the block**

**Task**

Only 4 of the materials you have collected will match up to these boards. When you have placed the correct material, you will be taken to the plane, and it will change! Once you have completed all of this find the final task NPC in the office.

**Material Boards –**

Fuselage and Wings

Cheap, good electrical conductor, easy to machine, flexible, light, corrosion resistant.

Clue: I am the cheapest material, easy to machine, and a good electrical conductor.

Fact: This material allows designers to build a plane that is as light as possible, can carry heavy loads, uses the least amount of fuel, and it cannot rust.

Nose and Tail

Lightest

Strongest

Very resistant to changing shape with heat

Not magnetic

Clue: I have an excellent strength to weight ratio, and I hold my shape when I heat up.

Fact: This material is a strong, stiff, lightweight material that can used in place of steel.

Wing flaps

Dense

Expensive

High melting point

Corrosion resistant

Strong

Clue: I am the most expensive and the densest material, and I have the highest melting point of the metals here.

Fact: This material does not occur naturally. Rather, it is found in minerals ructile, ilmenite and sphene. These minerals are harvested and then this material is extracted.

Windows

Transparent

Heavy

Scratch resistant

Withstands extreme temperatures

Clue: I am heavy, transparent, and hard to scratch.

Fact: It is possible that quite soon, windows will be replaced with interactive, bendable, lightweight display screens a bit like a television, reducing the weight of the aircraft and maximising space onboard.

**NPCs on the plane –**

**Did you know?**

Click the fact buttons to learn some fun information!

**Fuselage**

Fact 1 - The first powered flight was in December 1903, Orville Wright flew the glider that him and his brother (Wilbur Wright) designed and built in Kitty Hawk, North Carolina, USA.

Fact 2 – Cargo planes rarely have windows because glass is heavy and requires inspection and maintenance. If the plane is not carrying passengers, windows along the fuselage are unnecessary. The plane will be lighter and require less fuel for the journey.

Fact 3 – The fuselage is an aircraft's main body section. It holds crew, passengers, or cargo. The largest commercial passenger aircraft ever built, the Airbus A380 has a maximum take-off weight of 575 Tonnes, has a range of 8,000 Nautical Miles, and could have a maximum seating capacity of 853 seats.

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**Nose and tail**

The cone is shaped like this to control how the wind hits the plane and make it more aerodynamic. On aircrafts the nose cone also protects the weather radar from aerodynamic forces.

The aerospace industry in the U.K is the fourth-largest national aerospace industry in the world, and the third largest in Europe. A great feat of aerospace engineering is the Concorde, a British-French turbojet-powered supersonic passenger airliner that was operated from 1976 until 2003. It had a maximum speed over twice the speed of sound and was the first flown in 1969.

Temperature

The temperature at the altitude that commercial Aircraft fly is approximately - 56.5 Degrees Celsius.

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**Wing Flaps**

The Aerospace industry is at the forefront of the development of 3D printing technologies. It is so advanced that it is now at the point where aircraft parts can be printed from Titanium Powder.

Learn More!

The wings of a fixed-wing aircraft are static planes extending either side of the aircraft. When the aircraft travels forwards, air flows over the wings, which are shaped to create lift. The shape is called an airfoil and is shaped like a bird's wing.

Fun Fact!

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**Windows**

Components for planes are brought in from all around the world, then assembled in Hangars like this. Many parts of planes are assembled here in the U.K, for example a site in Wales assembles and produces over 1,000 wings per year!

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**Final Task**

Once you have completed the game, fill in the feedback survey and watch this walk-through video inside a real hangar and learn how ducks and beluga whales are involved in aircraft construction and testing. Click the button to open the link.

Learn More

NOT FOR TRANSLATION –

Aerospace game 1 ticking area coordinates 351 5 -30

Main room coordinates 260 4 -95

Link for code - <https://makecode.com/_c0rW0YLb3iTD>

Fuselage and Wings (answer = aluminium)

Nose and Tail (answer = carbon fibre)

Wing flaps (answer = titanium)

Windows (answer = glass)