**Year 9 Term 3 Revision Guide**

**Unit 1: New and Emerging Technologies**

**Assessment: Microsoft forms multiple choice exam**

 **Topic 1: Industry and Enterprise**

**📉 Key Learning Objectives:**

* Understand the impact of **emerging technologies** on tools, equipment, and the workforce
* Understand the difference between **privately-owned businesses** and **not-for-profit organisations**
* Understand the influence of **science and technology parks** and **demographic movement**

**🏢Industry:**

* New and emerging technologies have modernised how products are made and services delivered.
* The **Industrial Revolution** began automation using steam power (e.g. James Watt's steam engine in 1781).
* The **Digital Revolution** brought computing and the Internet, enhancing global communication.
* Difference between **Internet** (network infrastructure) and **World Wide Web** (webpages we access).

**Impacts of Technology:**

* Increased use of **digitisation**, **new materials**, **networking**, and **3D printing** (e.g. NASA uses 3D printers in space).
* Improves **accuracy**, **productivity**, and **safety** in manufacturing.

**🚗 Automation:**

* **Robots** do repetitive, high-accuracy tasks but cannot act beyond their programming.
* Creates high-skill jobs (e.g. engineers, programmers) but may cause job losses in low-skill areas.
* Example: **Formula One teams** rely on support teams just like robots do.

**📆 Workplace Organisation:**

* Technology enables **remote working**, reduces the need for office space.
* Encourages **freelancing** and **flexible job roles**.

**🤝 Employment:**

* Staff must retrain to use new tools and software.
* **Mid-skilled jobs** are declining; low-skilled and high-skilled roles are increasing.

**🏞️ Demographic Movement:**

* Jobs influence where people live (e.g. UAE and the Oil Industry).
* **Automation** may change skill demands, leading to relocations and job role shifts.

**🔬 Science and Technology Parks:**

* Often near universities (e.g. Silicon Valley near Stanford University).
* Lower unemployment in these areas due to influx of talent and jobs.

**🚀 Enterprise:**

* New technologies drive **innovation**.
* Small businesses use the Internet to outsource and access global markets.

**Types of Funding:**

* **Crowd funding**: small investments from many people online.
* **Government funding**: grants and incentives for new start-ups.

**💸 Not-for-Profit Organisations:**

* Aim to benefit society rather than make profits.
* Example: **Fairtrade Foundation**, **The Big Issue Foundation**.

**🌿 Topic 2: Sustainability and the Environment**

**📉 Key Learning Objectives:**

* Learn how technology must be **sustainable**.
* Understand **pollution**, **natural resource use**, and **waste management**.

**♻️ Resource Types:**

* **Finite resources**: non-renewable (e.g. coal, oil).
* **Non-finite resources**: renewable or abundant (e.g. solar, timber, water).

**❄️ Pollution:**

**Atmospheric:**

* From transport, factories, farming.
* Leads to **respiratory illness**, **acid rain**, **global warming**.

**Oceanic:**

* Waste from industry, farming, or domestic sources (e.g. detergents, microbeads).
* Effects: **Eutrophication**, marine death, microplastics in the food chain.

**💧 Natural Resources:**

* Pressure on water due to **biofuels**, **population growth**.

**Farming:**

* **Fertilizers and pesticides** pollute ecosystems.
* **Livestock** emit **methane** and use land and water.

**Mining:**

* Causes **land destruction**, **pollution**, **carbon emissions**.

**Drilling:**

* Extracts oil/gas, but causes **pollution** and **habitat destruction**.

**Deforestation:**

* Trees removed for agriculture and industry.
* **FSC (Forest Stewardship Council) certification** ensures sustainable forestry.

**⚡ Renewable Energy:**

* **Solar, wind, hydro**: help reduce carbon footprint.

**🌍 Responsible Design:**

* Design should consider waste, pollution, energy and water use.
* Example: LEGO switching to **biopolymer plastic**.

**🥚 Packaging and Waste:**

* Reduce use of **non-recyclable** materials.
* Avoid **bubble wrap**, **polystyrene**, **laminated packaging**.

**👥 Topic 3: People, Culture and Society**

**📉 Key Learning Objectives:**

* Understand how technology affects **people**, **culture**, and **work**.

**🧑‍💼 Workforce:**

* Some jobs lost, but new jobs in tech.
* **Cobots**: robots that work with people.
* **Apprenticeships** grow in IT, engineering, and skilled trades.

**📱 Consumers:**

* **Early adopters** fund tech development.
* Consumer choices driven by **ethics**, **safety**, and **sustainability**.

**Children:**

* Toys must meet safety standards (**CE**, **Lion Mark**, **BS EN 71**).

**Disabilities:**

* Tech like **3D-printed prosthetics**.
* Inclusive design examples: **accessible crossings**, **wheelchair-friendly buses**.

**🌍 Culture:**

* Different cultures = different design preferences (e.g. **colour meanings**, **text direction**).

**Examples:**

* Design products with cultural awareness in mind.

**🌐 Migration and Segregation:**

* Migrant workers help fill jobs in building, food and transport industries.
* Tech helps migrants stay connected to home cultures, forming ethnic communities.

**🌆 Modern Work Practices:**

* **Remote working**, **video conferencing** change job dynamics.
* Tech allows **global collaboration** but has downsides like time zone issues.

**Topic 4: Production Techniques and Systems**

**📉 Key Learning Objectives:**

* Learn how products are made efficiently and in various quantities.

**📊 Production Scales:**

**One-off Production:**

* Custom-made, expensive (e.g. tailored suit, Eiffel Tower).
* Requires **high skill** and **labour intensive**.

**Batch Production:**

* Small quantities, more flexible (e.g. themed mugs).
* Uses **jigs**, **patterns**, **templates**.

**Mass Production:**

* Large quantities, automated (e.g. smartphones).
* High set-up cost, but low unit cost.

**Continuous Production:**

* Non-stop production (e.g. paper, oil).
* Needs few staff, high energy, high cost.

**✅ Lean Manufacturing:**

* Reduce waste in 7 areas: **Overproduction**, **Waiting**, **Transport**, **Over-processing**, **Inventory**, **Motion**, **Defects**.

**🚷 Just-in-Time (JIT):**

* Make only what’s needed when it’s needed.
* Saves space but risky if supply fails.

**🔧 Tools:**

* **Jigs** (3D guide), **templates** (2D stencil), **patterns** help consistency.
* Help speed up production and reduce errors.