



## Stage 6 – Designing an Innovative Farming Machine

# Learning Objectives



- Practice the engineering design process.
- Follow the process by which foods are planted, grown, harvested and processed in order to become ingredients we use in cooking/baking.
- Learn about modern farming equipment.
- Discuss/review previous learning of the impact of environment on agriculture (and vice versa).



# Grains

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- Many food products are made from grain plants like the ones we are growing.
- These plants go through different processes so we can eat them.



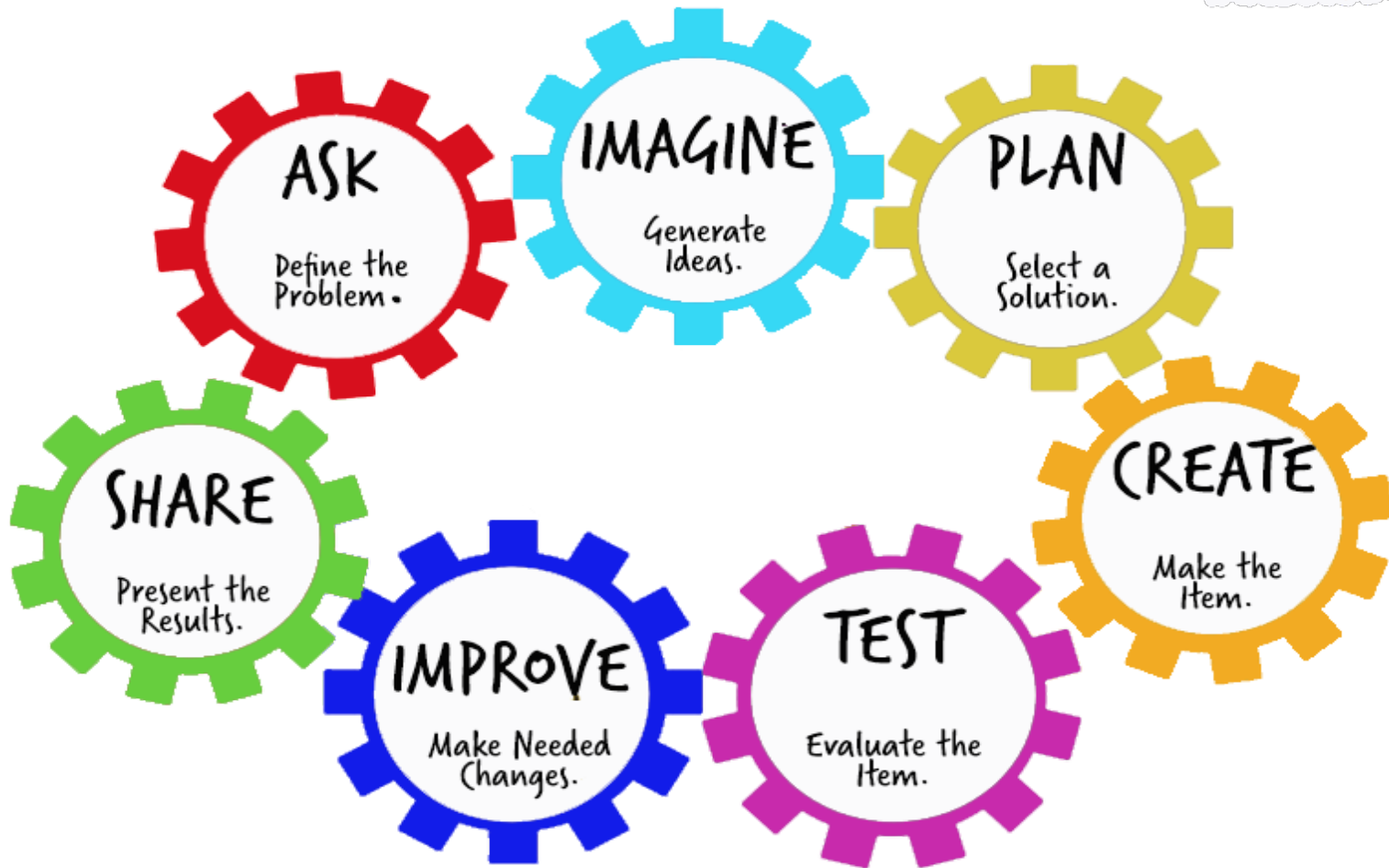


# Grain Game!

Use the matching cards to work out which food products are made from each grain.



# Engineering Design Process



**ASK**

Define the Problem.

**IMAGINE**

Generate Ideas.

**PLAN**

Select a Solution.

**SHARE**

Present the Results.

**IMPROVE**

Make Needed Changes.

**TEST**

Evaluate the Item.

**CREATE**

Make the Item.

## Farm Machinery - Ask

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- Do you remember some of the challenges farmers face when growing crops?



# Research



- There are many types of machines used for harvesting and processing grains. Each group will be allocated a piece of farming machinery to research.
- Areas of research:
  - What does it do?
  - How does it work?
  - What are the advantages of using this machine?
  - What are the disadvantages of using this machine?
- Make notes on your activity sheet.



# Seed Drill



- A farmer uses a seed drill to plant seeds. A tractor pulls the seed drill.
- Some seed drills scrape a small furrow in the soil, plants the seed in the furrow, and covers them with soil.
- An air drill is a type of seed drill that uses air to push the seeds into the ground without digging up the soil.
- All types of seed drills plant seeds at the best depth and with the best spacing for plants to grow.
- This video shows an air drill





# Crop Sprayer

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- Some crops are sprayed with insecticides to kill pests such as insects, worms, or harmful bugs.
- Some crops are sprayed with fungicides to prevent them from growing a disease.
- Some crops are sprayed with herbicides to kill weeds.
- Many people do not know that crop spraying is also used in organic farming.



# Combine Harvester

- A combine harvester cuts the grain plants like corn or wheat and separates the grain from the stalks (straw).
- The grain seeds are stored in the combine before being moved to a tractor trailer. The straw comes out the back of the machine.



# Imagine



- We will learn about some innovative farming technology. Farmers use modern technology to make modern farming more efficient, environmentally friendly, and help produce more food.
- See how robots work on farms by using GPS technology, artificial intelligence for mapping, and even how we could farm in space!



# Plan



- Once you have completed your research, begin planning your planting machine design.
- Think about how your planting machine will work and label your sketch to add detail.
- Think about how you can adapt and improve the machine using what you have learned.
- Even if you are designing a different type of machine, think about the seed planter design you saw in the video. How could students modify the seed planter to plant a larger area of the field at a time, so the farmer could plant a field of grains faster.





## Create

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- Working in your group, build your planting machine out of recycled materials.
- Think about which materials you will use for each part of the machine.



# Test and Improve

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## Test your machine!

- Use the evaluation sheet to make notes on:
  - What went well with your design?
  - What would you like to improve?
- Use these notes to make adjustments to your machine to make it work even better.



# Present

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As a group, present your design to the rest of the class.

- In your presentation you will need to include:
  - How your machine works
  - The farming challenge you are solving with your machine.

