



DT

UPPER KEY STAGE 2

Substantive and Procedural Knowledge

Felt Phone Cases

Lesson 1: Exploring Existing Phone Cases

Substantive knowledge:

Know the purpose of a phone case and the different materials used to make them. Understand basic design features for protection and decoration.

Procedural knowledge:

Examine and evaluate different phone cases for materials, design, and functionality.

Vocabulary:

phone case, protection, material, design, evaluate

Greater depth task:

Research and present on innovative phone case materials or features used in the industry today.

Lesson 2: Designing a Phone Case

Substantive knowledge:

Understand design elements including size, shape, and decoration.

Procedural knowledge:

Create detailed design plans and sketches considering functionality and aesthetics.

Vocabulary:

design, sketch, decorate, size, function

Greater depth task:

Design a phone case that addresses an additional user need (e.g., waterproof, shockproof).

Lesson 3: Selecting Materials and Tools

Substantive knowledge:

Know the properties of different felts and accessories (buttons, thread) and their suitability.

Procedural knowledge:

Choose appropriate materials and tools to create the phone case.

Vocabulary:

felt, thread, button, suitability, tool

Greater depth task:

Compare different felts for durability and appearance; justify material choices.



Lesson 4: Making the Phone Case

Substantive knowledge:

Know basic sewing techniques and how to assemble components.

Procedural knowledge:

Cut felt pieces accurately and sew parts together securely.

Vocabulary:

cut, sew, assemble, stitch, secure

Greater depth task:

Experiment with different stitching techniques to improve strength or aesthetics.

Lesson 5: Evaluating and Improving

Substantive knowledge:

Understand how evaluation informs design improvement.

Procedural knowledge:

Test the finished phone case and suggest improvements.

Vocabulary:

evaluate, test, improve, function, feedback

Greater depth task:

Write instructions for someone else to make your phone case, including tips for improvement.

Automata Animals

Lesson 1: Exploring Automata and Mechanisms

Substantive knowledge:

Understand what automata are and the types of simple mechanisms (e.g., cams, levers) used to create movement.

Procedural knowledge:

Identify and explore different mechanisms through hands-on investigation.

Vocabulary:

automata, mechanism, cam, lever, movement

Greater depth task:

Design a simple automata animal using a mechanism not yet explored.

Lesson 2: Designing an Automata Animal

Substantive knowledge:

Know how to plan a design that incorporates a mechanism to create movement.

Procedural knowledge:

Create detailed sketches and plan the parts needed for the automata.

Vocabulary:

design, plan, mechanism, sketch, parts

Greater depth task:

Incorporate multiple mechanisms into one automata design and explain how they work together.



Lesson 3: Making the Mechanism

Substantive knowledge:

Understand how to construct cams and levers using card, dowels, and other materials.

Procedural knowledge:

Measure, cut, and assemble the mechanism accurately.

Vocabulary:

construct, measure, cut, assemble, mechanism

Greater depth task:

Test different cam shapes and explain how each affects the movement.

Lesson 4: Building the Automata Animal

Substantive knowledge:

Know how to attach the mechanism to the animal design securely.

Procedural knowledge:

Build the animal structure and integrate the mechanism.

Vocabulary:

attach, integrate, structure, secure, mechanism

Greater depth task:

Experiment with different materials to improve the strength or appearance.

Lesson 5: Testing and Evaluating

Substantive knowledge:

Understand the importance of testing and refining a product.

Procedural knowledge:

Test the automata, identify problems, and make improvements.

Vocabulary:

test, evaluate, refine, problem, improve

Greater depth task:

Write a user guide explaining how to operate and maintain your automata animal.

Super Seasonal Cooking

Lesson 1: Understanding Seasonal Foods

Substantive knowledge:

Know what seasonal foods are and why eating seasonally is beneficial for health and the environment.

Procedural knowledge:

Identify seasonal fruits and vegetables using charts or local produce.

Vocabulary:

seasonal, harvest, fruit, vegetable, environment

Greater depth task:

Research and present how seasonal eating differs around the world.



Lesson 2: Planning a Seasonal Recipe

Substantive knowledge:

Know how to create simple recipes using seasonal ingredients.

Procedural knowledge:

Plan a recipe considering taste, nutrition, and seasonality.

Vocabulary:

recipe, ingredients, nutrition, plan, taste

Greater depth task:

Adapt a traditional recipe to include only seasonal ingredients.

Lesson 3: Preparing Ingredients Safely

Substantive knowledge:

Understand hygiene and safety rules for food preparation.

Procedural knowledge:

Demonstrate safe washing, cutting, and handling of ingredients.

Vocabulary:

hygiene, safety, wash, cut, handle

Greater depth task:

Explain why each safety rule is important and what could happen if ignored.

Lesson 4: Cooking and Assembling the Recipe

Substantive knowledge:

Know basic cooking techniques suitable for the recipe.

Procedural knowledge:

Cook and assemble the recipe following the plan safely.

Vocabulary:

cook, assemble, technique, follow, recipe

Greater depth task:

Modify cooking methods to suit dietary needs or preferences.

Lesson 5: Evaluating the Final Product

Substantive knowledge:

Understand how to evaluate food for taste, texture, and appearance.

Procedural knowledge:

Taste and evaluate the recipe, suggesting improvements.

Vocabulary:

evaluate, taste, texture, appearance, improve

Greater depth task:

Write a review of your recipe and suggest how it could be marketed.



Marbulous Structures

Lesson 1: Investigating Marble Runs

Substantive knowledge:

Know how marble runs work and basic physics concepts like gravity and momentum.

Procedural knowledge:

Explore existing marble runs and observe how marbles move through them.

Vocabulary:

marble run, gravity, momentum, structure, pathway

Greater depth task:

Predict how changes in slope affect marble speed and explain why.

Lesson 2: Designing a Marble Run

Substantive knowledge:

Understand the importance of design and planning in creating stable structures.

Procedural knowledge:

Draw detailed designs considering stability and marble movement.

Vocabulary:

design, plan, stability, structure, movement

Greater depth task:

Design a marble run with a specific challenge (e.g., longest path, fastest time).

Lesson 3: Building the Marble Run

Substantive knowledge:

Know materials suitable for building marble runs and their properties.

Procedural knowledge:

Construct the marble run using selected materials, ensuring stability.

Vocabulary:

construct, material, stability, build, assemble

Greater depth task:

Test different materials and explain which works best and why.

Lesson 4: Testing and Modifying

Substantive knowledge:

Understand how testing helps improve designs.

Procedural knowledge:

Test the marble run, observe problems, and make improvements.

Vocabulary:

test, observe, problem, modify, improve

Greater depth task:

Record data on marble speeds and analyse results to optimize the run.

Lesson 5: Evaluating and Presenting

Substantive knowledge:

Know how to evaluate success based on design criteria.



Procedural knowledge:

Evaluate the marble run and present findings clearly.

Vocabulary:

evaluate, criteria, present, success, feedback

Greater depth task:

Create a presentation to explain design choices and results to an audience.

Global Food

Lesson 1: Introduction to Global Foods

Substantive knowledge:

Know what global foods are and understand how different cultures have distinct cuisines, influenced by geography, climate, and tradition.

Procedural knowledge:

Explore and identify foods from different continents or countries.

Use maps or atlases to locate origins of various dishes.

Vocabulary:

global, cuisine, culture, geography, tradition

Greater depth task:

Research the history of a popular global dish and present how it evolved across different countries.

Lesson 2: Ingredients Around the World

Substantive knowledge:

Understand the diversity of ingredients used worldwide and how availability depends on climate and trade.

Procedural knowledge:

Investigate typical ingredients used in different global recipes.

Discuss which ingredients are local or imported.

Vocabulary:

ingredient, local, imported, trade, climate

Greater depth task:

Create a map showing the journey of a key global ingredient from farm to plate, including transport methods and environmental impact.

Lesson 3: Food Preparation Techniques from Different Cultures

Substantive knowledge:

Know common cooking methods used around the world (e.g., steaming, frying, fermenting) and their cultural significance.

Procedural knowledge:

Demonstrate or observe different preparation methods.

Compare how these methods affect flavor and texture.

Vocabulary:

steam, fry, ferment, cuisine, technique



Greater depth task:

Prepare a traditional dish from another culture (with adult support) and reflect on the preparation differences.

Lesson 4: Designing a Global Food Recipe

Substantive knowledge:

Understand how to design a recipe that combines elements from different cuisines or adapts a traditional recipe.

Procedural knowledge:

Create a recipe plan incorporating global ingredients and cooking techniques. Consider nutrition and cultural authenticity.

Vocabulary:

design, recipe, adaptation, nutrition, authenticity

Greater depth task:

Develop two fusion recipes that blend ingredients or techniques from two different cultures. Explain the choice of ingredients.

Lesson 5: Cooking and Sharing a Global Dish

Substantive knowledge:

Know food hygiene and safety rules, especially for unfamiliar ingredients and methods.

Procedural knowledge:

Prepare and cook the designed global recipe.

Share the dish and explain its cultural background.

Vocabulary:

prepare, cook, hygiene, safety, share

Greater depth task:

Organize a tasting session with peers or family, collect feedback, and discuss how global foods can bring people together.

Lesson 6: Evaluating the Global Food Experience

Substantive knowledge:

Understand how to evaluate food on taste, cultural significance, and nutritional value.

Procedural knowledge:

Reflect on the cooking and tasting experience.

Write an evaluation considering taste, texture, appearance, and cultural learning.

Vocabulary:

evaluate, cultural significance, taste, texture, feedback

Greater depth task:

Write a reflective essay on the importance of global foods in promoting cultural understanding and healthy eating.



Programming Adventures

Lesson 1: Introduction to Programming and Algorithms

Substantive knowledge:

Know what programming is and understand the concept of algorithms as step-by-step instructions. Recognise basic programming vocabulary.

Procedural knowledge:

Write simple algorithms to solve problems or perform tasks.

Use flowcharts or pseudocode to plan programs.

Vocabulary:

programming, algorithm, instruction, sequence, code

Greater depth task:

Create an algorithm for a complex real-life process (e.g., making a sandwich) and explain its steps in detail.

Lesson 2: Understanding Programming Environments

Substantive knowledge:

Know different programming environments (e.g., Scratch, Python, block-based vs text-based) and their uses.

Procedural knowledge:

Explore a chosen programming environment.

Identify and use basic commands to create simple programs.

Vocabulary:

environment, command, block-based, text-based, debug

Greater depth task:

Compare two programming environments and present pros and cons for beginners and advanced users.

Lesson 3: Creating Simple Interactive Programs

Substantive knowledge:

Understand how to create interactive programs using inputs, outputs, and control structures like loops and conditionals.

Procedural knowledge:

Design and code a simple interactive program (e.g., a quiz or a basic game) using learned commands.

Vocabulary:

input, output, loop, conditional, event

Greater depth task:

Add complexity to the program by including variables or multiple outcomes based on user input.

Lesson 4: Debugging and Improving Code

Substantive knowledge:

Know the importance of debugging and understand common errors in programming.



Procedural knowledge:

Test and debug programs systematically.
Use debugging tools or techniques to fix errors.

Vocabulary:

debug, error, bug, test, fix

Greater depth task:

Document a debugging process for a challenging problem and explain how each fix improved the program.

Lesson 5: Designing a Programming Project

Substantive knowledge:

Understand how to plan a programming project from concept to completion, including user needs and design constraints.

Procedural knowledge:

Create a detailed project plan including flowcharts, pseudocode, and design goals.

Vocabulary:

design, project, user needs, constraint, flowchart

Greater depth task:

Design a project with multiple features and user interactions, outlining how each feature will be implemented.

Lesson 6: Presenting and Evaluating Programming Projects

Substantive knowledge:

Know how to evaluate a program for usability, functionality, and user experience.

Procedural knowledge:

Present the completed program to others.
Gather feedback and reflect on improvements for future projects.

Vocabulary:

evaluate, usability, functionality, feedback, reflect

Greater depth task:

Write a user guide for your program and suggest advanced features to add in a future version.