

# Grade 8 Design

## Units of Study

<b>UNIT 1:</b>	<b>Cam in Motion</b> (Create a toy that moves using a camshaft)	<b>Start:</b> August	<b>Duration:</b> 10 weeks/ 24 hours
	<ul style="list-style-type: none"><li>● <b>Concepts:</b> Connections, Form and Function</li><li>● <b>Subject Specific Skills:</b> Woodworking, laser cutting, assembly, finishing.</li><li>● <b>Learning Experiences:</b><ul style="list-style-type: none"><li>○ Students investigate cam driven toys and design their own</li><li>○ Students manufacture the parts of their toys using woodworking skills and laser cutters</li><li>○ Students assemble and finish their toys</li></ul></li></ul>		
<b>UNIT 2:</b>	<b>Redesign It</b> (Innovate and redesign a product)	<b>Start:</b> January	<b>Duration:</b> 12 weeks/ 27 hours
	<ul style="list-style-type: none"><li>● <b>Concepts:</b> Communication, Adaptation and Innovation</li><li>● <b>Subject Specific Skills:</b> Sketching, prototyping, assembly, laser cutting, 3D printing</li><li>● <b>Learning Experiences:</b><ul style="list-style-type: none"><li>○ Students sketch design idea</li><li>○ Prototypes are created and assembled using appropriate techniques</li><li>○ Final designs are created using the laser cutter and 3D printers</li></ul></li></ul>		
<b>UNIT 3:</b>	<b>Mini Lamps</b> (Create an Arduino Controlled Lamp)	<b>Start:</b> March	<b>Duration:</b> 9 Weeks / 22 Hours
	<ul style="list-style-type: none"><li>● <b>Concepts:</b> Aesthetics and Function</li><li>● <b>Subject Specific Skills:</b> Digital design, laser cutting, coding, and electronics.</li><li>● <b>Learning Experiences:</b><ul style="list-style-type: none"><li>○ Students design and create lamp that is coded and controlled by an Arduino</li><li>○ The students also design a lamp enclosure</li></ul></li></ul>		

# Grade 8 Design

## Unit 1: Cam in Motion

**Start:** January

**Duration:** 10 Weeks (24 Hours)

**LEARNING EXPERIENCES:** In this unit student design, manufacture, assembly and finish a cam driven crank toy. Students will practice their digital design, laser cutting, woodworking, assembly and finishing skills.

**KEY CONCEPT: Connections**      **Related Concepts:** Form and Function

**STATEMENT OF INQUIRY:**      The connection between the construction of an object and its function must be carefully considered.

<b>INQUIRY QUESTIONS:</b>	
<b>Factual:</b>	What is a cam? How can boxes be constructed?
<b>Conceptual:</b>	What components work best in a cam box?
<b>Debatable:</b>	What materials are the best to simulate motion?

<b>OBJECTIVES AND ASSESSMENT CRITERIA:</b>	
<b>A: Inquiring and Analyzing</b>	i. explain and justify the need for a solution to a problem; ii. construct a research plan, which states and prioritizes the primary and secondary research needed to develop a solution to the problem; iii. analyse a group of similar products that inspire a solution to the problem; iv. develop a design brief, which presents the analysis of relevant research
<b>B: Developing Ideas</b>	i. develop a design specification, which outlines the success criteria for the design of a solution based on the data collected ii. present a range of feasible design ideas, which can be correctly interpreted by others iii. present the chosen design and outline the reasons for its selection iv. develop accurate planning drawings/diagrams and outline requirements for the creation of the chosen solution.
<b>C: Creating the Solution</b>	i. construct a logical plan, which outlines the efficient use of time and resources, sufficient for peers to be able to follow to create the solution ii. demonstrate excellent technical skills when making the solution iii. follow the plan to create the solution, which functions as intended iv. explain changes made to the chosen design and plan when making the solution.
<b>D: Evaluation</b>	i. describe detailed and relevant testing methods, which generate accurate data, to measure the success of the solution ii. explain the success of the solution against the design specification iii. describe how the solution could be improved iv. describe the impact of the solution on the client/target audience.

**ATLs:**      Self-Management and Thinking

**RESOURCES / LITERATURE OPTIONS:**

- Digital designing software (Adobe Illustrator, Inkscape, papermech.com)
- Woodworking equipment, glue and paint
- Plywood, dowels

**SUMMATIVE ASSESSMENT TASKS:**

1. Criterion A: Students explore the design of iconic products. They then explore sketching, and prototyping techniques.
2. Criterion B: Students develop design specification and design ideas for their cam toys.
3. Criterion C: Students document the process of building their cam toys.
3. Criterion D: Students evaluate the success of their cam toy in multiple ways. They also demonstrate the functionality of their cam toys.

# Grade 8 Design

## Unit 2: Redesign It!

**Start:** August

**Duration:** 12 Weeks (27 Hours)

**LEARNING EXPERIENCES:** In this unit students will take an existing product and either modify it or completely redesign it. The students will design, prototype, and build a final version of their projects. These projects will be presented to others in the school.

**KEY CONCEPT:**  
Communication

**Related Concepts:** Adaptation and Innovation

**STATEMENT OF INQUIRY:**

Through innovation, existing products can be adapted to express a personal and cultural aesthetic.

**INQUIRY QUESTIONS:**

**Factual:**

What is innovation?

**Conceptual:**

Are the innovations of the past still innovations today? Which innovations are specific to your culture?

**Debatable:**

What makes a product iconic?

**OBJECTIVES & ASSESSMENT CRITERIA:**

**A: Inquiring and Analyzing**

i. explain and justify the need for a solution to a problem; ii. construct a research plan, which states and prioritizes the primary and secondary research needed to develop a solution to the problem; iii. analyse a group of similar products that inspire a solution to the problem; iv. develop a design brief, which presents the analysis of relevant research

**B: Developing Ideas**

i. develop a design specification, which outlines the success criteria for the design of a solution based on the data collected; ii. present a range of feasible design ideas, which can be correctly interpreted by others; iii. present the chosen design and outline the reasons for its selection; iv. develop accurate planning diagrams and outline requirements for the creation of the chosen solution.

**C: Creating Solution**

i. construct a logical plan, which outlines the efficient use of time and resources, sufficient for peers to be able to follow to create the solution; ii. demonstrate excellent technical skills when making the solution; iii. follow the plan to create the solution, which functions as intended; iv. explain changes made to the chosen design and plan when making the solution.

**D: Evaluating**

i. describe detailed and relevant testing methods, which generate accurate data, to measure the success of the solution; ii. explain the success of the solution against the design specification; iii. describe how the solution could be improved; iv. describe the impact of the solution on the client/target audience.

**ATLs:**

Communication and Research

### RESOURCES / LITERATURE OPTIONS:

- Laser cutter, cardboard, 3D printers, glue, other materials.

### SUMMATIVE ASSESSMENT TASKS:

1. Criterion A: Students explore the design of iconic products. They then explore sketching, and prototyping techniques.
2. Criterion B: Students develop design specification and design ideas for their redesigned products.
3. Criterion C: Students document the process of redesigning a product.
4. Criterion D: Students evaluate the success of their redesigned product in multiple ways. They also assess the effectiveness of their redesigned product.

# Grade 8 Design

## Unit 3: Mini Lamp

**Start:** March

**Duration:** 9 Weeks (22 Hours)

**LEARNING EXPERIENCES:** In this unit, students will design a lamp that will be controlled by an Arduino. They will code the Arduino, wire the electronics and design, cut and join the materials from which the lamp is constructed.

**KEY CONCEPT:** Aesthetics

**Related Concepts:** Function

**STATEMENT OF INQUIRY:**

Light has been an important part of the history of humanity.

**INQUIRY QUESTIONS:**

**Factual:**

What are some different inputs and outputs?

**Conceptual:**

How do I choose the materials?

**Debatable:**

Are some materials better suited to creating a mini lamp than others.?

**OBJECTIVES AND ASSESSMENT CRITERIA:**

For each criterion below summarize **ALL** the assessment strands into 2-3 sentences.

**B: Developing Ideas**

i. develop a design specification, which outlines the success criteria for the design of a solution based on the data collected; ii. present a range of feasible design ideas, which can be correctly interpreted by others; iii. present the chosen design and outline the reasons for its selection; iv. develop accurate planning diagrams and outline requirements for the creation of the chosen solution.

**ATLs:**

Research and Thinking

### RESOURCES / LITERATURE OPTIONS:

- Adobe Illustrator
- Inkscape
- Arduino
- Soldering

### SUMMATIVE ASSESSMENT TASKS:

1. Criterion A: Students explore the designing of a Mini Lamp. They will research sketching, digital design software, coding, wiring and joining.