Project Name: Spongebob Squarepants

**1. Identify and clarify problems**

**Spongebob squarepants is a popular cartoon character. So we chose to make a spongebob squarepants toy for appreciation and and make them enjoyable.**

**Design positioning:**

**● Design task: testing the mechanical model**

**● Operating environment: place where toys can be shelved (for appreciation)**

**● Design requirements**

Functions: appreciation, amusement

Technical indicators: Arduino pro mini mainboard, 3D printer (printing material: PLA).

**2. Formulate the design scheme**

1. **Collect information** (conduct research, market situation)

Market demand

How much do people like about different cartoon characters

How to make parts of the toy to move

1. **Design analysis** (factors to be considered)

Whether the materials are environmentally friendly

Whether the work is artistic or not

Whether the work can be promoted

1. **Scheme Conceptions**

Plan A: Design a spongebob squarepants with movable eyebrows

1. Use fusion360 for appearance design and modification, and make sketches.

2. Print the work, polish the work and paint it with pigment

3. Use arduino for programming to enable parts to be automatically movable

Plan B: Design voice-controlled spongebob squarepants

1. Use fusion360 for appearance design and modification, and make sketches.

2. Print the work, polish the work and paint it with pigment

3. Use arduino for programming to enable parts to be movable based on voice command (such as saying hello)

**4. Evaluate and decide design scheme**

Plan A is of higher practical value, would be more popular and convenient.

While plan B is more difficult to make and is not as practical and convenient as plan A.

**5. Detailed design scheme**

1. The body of spongebob squarepants is divided into four parts: head, lower body, feet and eyebrows.

2. Emery paper is used to polish the surface and make it easy to paint with pigment..

3.Make models

**1. Select materials and tools**

Tools: Software *fusion360* (appearance processing)

Emery paper, pigment (appearance beautification)

3D printer (printing tools)

Arduino(programming tool)

Materials: PLA (printing material)

Mainboard (information storage and transmission)

List of materials

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number | Name | Size (unit: mm) | Quantity | Remark |
| **1** | PLA |  | 1 |  |
| **2** |  Arduino mainboard | 38\*39 | 1 |  |
| **3** | Steering gear |  | 2 |  |

2. Processing and making

Cover



Left and right eyebrows



Legs



Print the work



Process the work



**3. Put pieces together**

**4. Process the surface (with pigments)**

4.Test, evaluate and optimize

Through testing, it has been proven that spongebob's eyebrows are able to move.

Optimization scheme: improve the material for surface treatment