Comprehensive Minecraft Bedrock Item Development Guide for Cursor AI

This comprehensive guide contains detailed information from 200+ sources specifically designed to assist AI coding assistants like Cursor in creating professional-quality Minecraft Bedrock items. The guide covers everything from basic item structure to advanced Script API integration, custom components, crafting recipes, and 3D attachable models.

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1. Item Architecture & Core Concepts

What are Items?

Items are interactive objects in Minecraft Bedrock Edition that can be held, used, consumed, and stored in inventories [168][169][^172]. They consist of two main components:

- **Behavior Pack Item**: Defines server-side logic, components, and functionality
- **Resource Pack Assets**: Defines visual appearance, textures, and 3D models

Item File Structure

Behavior Pack Structure

```
behavior_pack/
├── manifest.json                     # Pack metadata
├── items/                           # Item behavior definitions
│   └── custom_item.json            # Main item logic
├── recipes/                         # Crafting recipes
│   ├── shaped/
│   │   └── custom_recipe.json      # Shaped crafting
│   └── shapeless/
│       └── custom_recipe.json      # Shapeless crafting
├── loot_tables/                     # Death drops &amp; rewards
│   └── items/
│       └── custom_item.json        # Loot configuration
└── scripts/                         # Script API files
    └── main.js                      # Custom behaviors
```

Resource Pack Structure

```
resource_pack/
├── manifest.json                    # Pack metadata
├── textures/
│   ├── items/                      # 2D item textures
│   │   └── custom_item.png         # Item icon
│   └── item_texture.json           # Texture mapping
├── attachables/                     # 3D item models
│   └── custom_item.json            # Attachable definition
├── models/
│   └── entity/
│       └── custom_item.geo.json    # 3D geometry
└── animations/
    └── custom_item.json             # Item animations
```

2. Item Components Complete Reference

Essential Components

Based on Microsoft's official documentation [^172] and community wiki [^126], there are **40+ item components** available:

Core Components

- `minecraft:icon`: Determines the item's texture/icon
- `minecraft:display_name`: Sets the item's visible name
- `minecraft:max_stack_size`: Controls stacking (1-64)

- `minecraft:rarity`: Sets name color (common, uncommon, rare, epic)

Interaction Components

```
{
  "minecraft:interact_button": "Use Custom Item",
  "minecraft:liquid_clipped": true,
  "minecraft:can_destroy_in_creative": true,
  "minecraft:tags": {
    "tags": ["custom_tag", "special_item"]
  }
}
```

Tool & Weapon Components

Damage System:

```
{
  "minecraft:damage": 10,
  "minecraft:digger": {
    "use_efficiency": true,
    "destroy_speeds": [
      {
        "block": {
          "tags": "q.any_tag('stone', 'metal')"
        },
        "speed": 6
      }
    ]
  }
}
```

Durability Component [^184]:

```
{
  "minecraft:durability": {
    "damage_chance": {
      "min": 10,
      "max": 50
    },
    "max_durability": 1000
  }
}
```

Repairable Component:

```
{
  "minecraft:repairable": {
    "repair_items": [
      {
        "items": ["minecraft:diamond"],
        "repair_amount": "math.random(1,10)"
      }
    ]
  }
}
```

Consumable Components

Food Component:

```
{
  "minecraft:food": {
    "can_always_eat": true,
    "nutrition": 4,
    "saturation_modifier": 0.8,
    "using_converts_to": "minecraft:bowl"
  },
  "minecraft:use_animation": "eat",
  "minecraft:use_modifiers": {
    "use_duration": 1.6,
    "movement_modifier": 0.35
  }
}
```

Fuel Component:

```
{
  "minecraft:fuel": {
    "duration": 200.0
  }
}
```

Projectile & Throwable Components

Throwable System:

```
{
  "minecraft:throwable": {
    "do_swing_animation": true,
    "launch_power_scale": 1.5,
    "max_draw_duration": 3.0,
    "max_launch_power": 2.0,
    "scale_power_by_draw_duration": true
  },
  "minecraft:projectile": {
    "minimum_critical_power": 1.25,
    "projectile_entity": "minecraft:arrow"
  }
}
```

Shooter System (Bow/Crossbow):

```
{
  "minecraft:shooter": {
    "ammunition": [
      {
        "item": "minecraft:arrow",
        "use_offhand": true,
        "search_inventory": true,
        "use_in_creative": true
      }
    ],
    "max_draw_duration": 1.0,
    "scale_power_by_draw_duration": true,
    "charge_on_draw": false
  }
}
```

Wearable Components

Wearable System [^169]:

```
{
  "minecraft:wearable": {
    "dispensable": true,
    "slot": "slot.armor.head",
    "protection": 3
  },
  "minecraft:damage_absorption": {
    "absorbable_causes": ["all"]
  }
}
```

Available Slots:

- `slot.weapon.offhand`
- `slot.armor.head`
- `slot.armor.chest`
- `slot.armor.legs`
- `slot.armor.feet`

Advanced Components

Enchantable Component:

```
{
  "minecraft:enchantable": {
    "slot": "sword",
    "value": 10
  }
}
```

Cooldown System:

```
{
  "minecraft:cooldown": {
    "category": "custom:special_items",
    "duration": 5.0
  }
}
```

Storage System (Bundles):

```
{
  "minecraft:storage_item": {
    "max_slots": 16,
    "allow_nested_storage_items": false,
    "banned_items": ["minecraft:shulker_box"]
  },
  "minecraft:bundle_interaction": {
    "num_viewable_slots": 12
  }
}
```

3. Script API Integration & Custom Components

ItemStack Class Integration

The Script API provides comprehensive item manipulation through the ItemStack class [^177]:

```
import { world, ItemStack, ItemComponentTypes } from "@minecraft/server";

// Create new item
const customSword = new ItemStack("custom:magic_sword", 1);

// Get durability component
const durability = customSword.getComponent(ItemComponentTypes.Durability);
if (durability) {
    durability.damage = 50; // Set current damage
    console.log(`Max durability: ${durability.maxDurability}`);
}

// Set dynamic properties
customSword.setDynamicProperty("enchant_level", 5);
customSword.setDynamicProperty("last_used", Date.now());

// Add to player inventory
const player = world.getAllPlayers()[^0];
const inventory = player.getComponent("minecraft:inventory");
inventory.container.addItem(customSword);
```

Custom Components System [187][196]

Custom components allow JavaScript-based item behaviors:

Registering Custom Components:

```
import { system } from "@minecraft/server";

/** @type {import("@minecraft/server").ItemCustomComponent} */
const MagicWeaponComponent = {
    onHitEntity(event) {
        const { attackingEntity, hitEntity, itemStack } = event;

        // Lightning strike on critical hit
        const enchantLevel = itemStack.getDynamicProperty("enchant_level") || 0;
        if (Math.random() &lt; 0.1 * enchantLevel) {
            hitEntity.dimension.spawnEntity("minecraft:lightning_bolt", hitEntity.locatio
        }
    },

    onUse(event) {
        const { source, itemStack } = event;

        // Teleport ability
        const lookDirection = source.getViewDirection();
        const newLocation = {
            x: source.location.x + lookDirection.x * 10,
            y: source.location.y + lookDirection.y * 10,
            z: source.location.z + lookDirection.z * 10
        };

        source.teleport(newLocation);
        source.addEffect("minecraft:slow_falling", 60);
    },

    onBeforeDurabilityDamage(event) {
        // Reduced durability loss based on enchantment
        const enchantLevel = event.itemStack.getDynamicProperty("enchant_level") || 0;
        event.durabilityDamage = Math.max(1, event.durabilityDamage - enchantLevel);
    }
};
```

```
system.beforeEvents.startup.subscribe(({ itemComponentRegistry }) =&gt; {
    itemComponentRegistry.registerCustomComponent("custom:magic_weapon", MagicWeaponCompo
});
```

Item JSON Configuration:

```
{
  "format_version": "1.21.110",
  "minecraft:item": {
    "description": {
      "identifier": "custom:magic_sword",
      "menu_category": {
        "category": "equipment",
        "group": "itemGroup.name.sword"
      }
    },
    "components": {
      "minecraft:damage": 8,
      "minecraft:durability": {
        "max_durability": 2000
      },
      "minecraft:hand_equipped": true,
      "minecraft:enchantable": {
        "slot": "sword",
        "value": 15
      },
      "custom:magic_weapon": {}
    }
  }
}
```

Advanced Script Integration [^173]

Item Use Events:

```
import { world, system } from "@minecraft/server";

// Modern item use handling
world.beforeEvents.itemUse.subscribe((event) =&gt; {
    const { source, itemStack } = event;

    if (itemStack.typeId === "custom:teleport_wand") {
        system.run(() =&gt; {
            // Teleport logic
            const viewDirection = source.getViewDirection();
            const teleportLocation = {
                x: source.location.x + viewDirection.x * 20,
                y: source.location.y + viewDirection.y * 20,
                z: source.location.z + viewDirection.z * 20
            };
            source.tryTeleport(teleportLocation);

            // Visual effects
            source.dimension.spawnParticle("minecraft:portal_particle",
                source.location);
            source.playSound("mob.enderman.portal");
        });
    }
});

// Item use on block
world.beforeEvents.itemUseOn.subscribe((event) =&gt; {
    const { source, itemStack, block } = event;

    if (itemStack.typeId === "custom:plant_staff") {
        const aboveBlock = block.above();
        if (aboveBlock?.typeId === "minecraft:air") {
            aboveBlock.setType("minecraft:grass");

            // Spawn growth particles
            source.dimension.spawnParticle("minecraft:crop_growth_emitter",
                aboveBlock.location);
        }
    }
});
```

Inventory Management:

```
// Advanced inventory operations
function giveEnchantedItem(player, itemType, enchantments = {}) {
    const item = new ItemStack(itemType, 1);

    // Apply enchantments via dynamic properties
    for (const [enchant, level] of Object.entries(enchantments)) {
        item.setDynamicProperty(`enchant_${enchant}`, level);
    }

    // Add custom lore
    item.setLore([
        "§6Legendary Weapon",
        `§7Enchanted with ${Object.keys(enchantments).length} effects`,
        "§aCrafted by the gods"
    ]);

    const inventory = player.getComponent("minecraft:inventory");
    inventory.container.addItem(item);
}

// Usage
const player = world.getAllPlayers()[^0];
giveEnchantedItem(player, "custom:magic_sword", {
    "sharpness": 5,
    "fire_aspect": 2,
    "looting": 3
});
```

4. Item Events & Event Handling

Available Item Events [^187]

The item event system provides 7 main event types:

1. Before Durability Damage

```
const UnbreakableComponent = {
    onBeforeDurabilityDamage(event) {
        // event.attackingEntity - Who attacked
        // event.durabilityDamage - Damage amount
        // event.hitEntity - What was hit
        // event.itemStack - The item

        event.durabilityDamage = 0; // Make unbreakable
    }
};
```

2. Complete Use

```
const ChargedItemComponent = {
    onCompleteUse(event) {
        // event.itemStack - Item that completed use
        // event.source - Entity that used the item

        const player = event.source;
        player.addEffect("minecraft:strength", 600, { amplifier: 2 });
        player.sendMessage("§6Power surge activated!");
    }
};
```

3. Consume (Food)

```
const MagicFoodComponent = {
    onConsume(event) {
        // event.itemStack - Food item consumed
        // event.source - Entity that ate the food

        const player = event.source;
        const effects = [
            "minecraft:regeneration",
            "minecraft:resistance",
            "minecraft:absorption"
        ];
        effects.forEach(effect =&gt; {
            player.addEffect(effect, 1200, { amplifier: 1 });
        });
    }
};
```

4. Hit Entity

```
const VampireWeaponComponent = {
    onHitEntity(event) {
        // event.attackingEntity - Attacker
        // event.hadEffect - Whether hit was successful
        // event.hitEntity - Target
        // event.itemStack - Weapon used

        if (event.hadEffect &amp;&amp; event.attackingEntity.typeId === "minecraft:player
            const damage = 4; // Amount of health to steal
            const attacker = event.attackingEntity;

            // Heal attacker
            const health = attacker.getComponent("minecraft:health");
            health.setCurrentValue(Math.min(health.defaultValue,
                health.currentValue + damage));

            // Visual feedback
            attacker.dimension.spawnParticle("minecraft:heart_particle",
                attacker.location);
        }
    }
};
```

5. Mine Block

```
const AutoSmeltComponent = {
    onMineBlock(event) {
        // event.block - Block that was mined
        // event.itemStack - Tool used
        // event.minedBlockPermutation - Block before mining
        // event.source - Entity that mined

        const blockType = event.minedBlockPermutation.type.id;
        const smeltMap = {
            "minecraft:iron_ore": "minecraft:iron_ingot",
            "minecraft:gold_ore": "minecraft:gold_ingot",
            "minecraft:coal_ore": "minecraft:coal"
        };

        if (smeltMap[blockType]) {
            const player = event.source;
            const smelted = new ItemStack(smeltMap[blockType], 1);
            player.dimension.spawnItem(smelted, event.block.location);

            // Spawn fire particles
            player.dimension.spawnParticle("minecraft:basic_flame_particle",
                event.block.location);
        }
    }
};
```

6. Use (Right-click)

```
const TeleportWandComponent = {
    onUse(event) {
        // event.itemStack - Item that was used
        // event.source - Player who used it

        const player = event.source;
        const raycast = player.getBlockFromViewDirection({
            maxDistance: 50,
            includeLiquidBlocks: false
        });

        if (raycast) {
            const teleportLocation = {
                x: raycast.block.location.x,
                y: raycast.block.location.y + 2,
                z: raycast.block.location.z
            };

            player.tryTeleport(teleportLocation);
            player.playSound("mob.enderman.portal");
        }
    }
};
```

7. Use On (Right-click on block)

```
const GrowthStaffComponent = {
    onUseOn(event) {
        // event.source - Entity using the item
        // event.usedOnBlockPermutation - Block that was clicked

        const block = event.block;
        const growthMap = {
            "minecraft:wheat[growth=0]": "minecraft:wheat[growth=7]",
            "minecraft:carrots[growth=0]": "minecraft:carrots[growth=7]",
            "minecraft:potatoes[growth=0]": "minecraft:potatoes[growth=7]"
        };

        const currentState = block.permutation.getAllStates();
        if (currentState.growth !== undefined &amp;&amp; currentState.growth &lt; 7) {
            block.setPermutation(block.permutation.withState("growth", 7));

            // Growth particles
            event.source.dimension.spawnParticle("minecraft:crop_growth_emitter",
                block.location);
        }
    }
};
```

Complete Custom Component Example

```
import { system } from "@minecraft/server";

/** @type {import("@minecraft/server").ItemCustomComponent} */
const MultiToolComponent = {
    onHitEntity(event) {
        // Combat functionality
        const { attackingEntity, hitEntity } = event;
        if (Math.random() &lt; 0.15) {
            hitEntity.addEffect("minecraft:poison", 100);
        }
    },

    onMineBlock(event) {
        // Mining functionality with auto-repair
        const durability = event.itemStack.getComponent("minecraft:durability");
        if (durability &amp;&amp; durability.damage &gt; 0) {
            durability.damage = Math.max(0, durability.damage - 1);
        }
    },

    onUse(event) {
        // Special abilities
        const player = event.source;
        player.addEffect("minecraft:haste", 600, { amplifier: 1 });
        player.sendMessage("§eTool enhanced!");
    },

    onUseOn(event) {
        // Block interaction
        const block = event.block;
        if (block.typeId === "minecraft:stone") {
            block.setType("minecraft:cobblestone");
        }
    },

    onBeforeDurabilityDamage(event) {
        // 25% chance to avoid durability damage
        if (Math.random() &lt; 0.25) {
            event.durabilityDamage = 0;
        }
    }
};

system.beforeEvents.startup.subscribe(({ itemComponentRegistry }) =&gt; {
    itemComponentRegistry.registerCustomComponent("custom:multi_tool", MultiToolComponent
});
```

5. Crafting Recipes & Recipe Systems

Recipe Types [^181]

Minecraft Bedrock supports multiple recipe systems:

Shaped Recipes

```
{
  "format_version": "1.20.10",
  "minecraft:recipe_shaped": {
    "description": {
      "identifier": "custom:magic_sword"
    },
    "tags": ["crafting_table"],
    "pattern": [
      " D ",
      " D ",
      " S "
    ],
    "key": {
      "D": "minecraft:diamond",
      "S": "minecraft:stick"
    },
    "result": {
      "item": "custom:magic_sword",
      "count": 1
    }
  }
}
```

Shapeless Recipes

```
{
  "format_version": "1.20.10",
  "minecraft:recipe_shapeless": {
    "description": {
      "identifier": "custom:healing_potion"
    },
    "tags": ["crafting_table"],
    "ingredients": [
      "minecraft:golden_apple",
      "minecraft:ghast_tear",
      "minecraft:glass_bottle"
    ],
    "result": {
      "item": "custom:healing_potion",
      "count": 3
    }
  }
}
```

Furnace Recipes

```
{
  "format_version": "1.20.10",
  "minecraft:recipe_furnace": {
    "description": {
      "identifier": "custom:steel_ingot"
    },
    "tags": ["furnace", "blast_furnace"],
    "input": "custom:steel_ore",
    "output": {
      "item": "custom:steel_ingot",
      "count": 2
    }
  }
}
```

Advanced Recipe Features

Recipe Unlocking [^181]

```
{
  "unlock": [
    {
      "item": "minecraft:diamond",
      "count": 64
    },
    {
      "context": "PlayerInWater"
    }
  ]
}
```

Multiple Results

```
{
  "result": [
    {
      "item": "custom:main_result",
      "count": 1
    },
    "custom:byproduct_item"
  ]
}
```

Recipe Tags & Custom Blocks

```
{
  "tags": ["crafting_table", "custom:magic_altar"]
}
```

Brewing Recipes

Brewing Mix

```
{
  "format_version": "1.20.10",
  "minecraft:recipe_brewing_mix": {
    "description": {
      "identifier": "custom:strength_brew"
    },
    "tags": ["brewing_stand"],
    "input": "minecraft:awkward_potion",
    "reagent": "custom:dragon_scale",
    "output": "custom:strength_potion"
  }
}
```

Brewing Container

```
{
  "format_version": "1.20.10",
  "minecraft:recipe_brewing_container": {
    "description": {
      "identifier": "custom:magic_transformation"
    },
    "tags": ["brewing_stand"],
    "input": "minecraft:potion",
    "reagent": "custom:mystic_dust",
    "output": "custom:magic_potion"
  }
}
```

Recipe Priority & Overrides

```
{
  "priority": 5,
  "group": "weapons"
}
```

6. Attachables & 3D Item Models

Attachable System [^201]

Attachables render 3D models when items are equipped:

Basic Attachable Structure

```
{
  "format_version": "1.10.0",
  "minecraft:attachable": {
    "description": {
      "identifier": "custom:magic_sword",
      "materials": {
        "default": "entity_alphatest",
        "enchanted": "entity_alphatest_glint"
      },
      "textures": {
        "default": "textures/items/magic_sword",
        "enchanted": "textures/misc/enchanted_item_glint"
      },
      "geometry": {
        "default": "geometry.magic_sword"
      },
      "animations": {
        "hold_first_person": "animation.magic_sword.hold_first_person",
        "hold_third_person": "animation.magic_sword.hold_third_person",
        "attack": "animation.magic_sword.attack"
      },
      "scripts": {
        "animate": [
          {
            "hold_first_person": "context.is_first_person == 1.0"
          },
          {
            "hold_third_person": "context.is_first_person == 0.0"
          },
          {
            "attack": "q.is_delayed_attacking"
          }
        ]
      },
      "render_controllers": ["controller.render.item_default"]
    }
  }
}
```

Blockbench Integration [^199]

Model Creation Workflow:

1. **Create Geometry**: Design 3D model in Blockbench
2. **Bone Structure**: Use proper bone hierarchy
3. **Texturing**: Apply textures to model faces
4. **Export**: Save as .geo.json format
5. **Integration**: Link to attachable definition

Bone Binding [^197]:

```
{
  "name": "root",
  "pivot": [0, 0, 0],
  "binding": "q.item_slot_to_bone_name(context.item_slot)",
  "cubes": [
    {
      "origin": [-1, 0, -1],
      "size": [2, 16, 2],
      "uv": [0, 0]
    }
  ]
}
```

Attachment Methods [^201]

Method 1: Attached to Skeleton

- Copy player skeleton bones
- Parent model to `rightItem` bone
- Position using animations

Method 2: Bound to Bone

- Use model binding system
- More flexible for multiple entities
- Automatic positioning

Animation Examples

First Person Animation

```
{
  "format_version": "1.8.0",
  "animations": {
    "animation.magic_sword.hold_first_person": {
      "loop": true,
      "bones": {
        "rightItem": {
          "position": [4, -2, 1],
          "rotation": [0, 90, 0]
        }
      }
    }
  }
}
```

Attack Animation

```
{
  "animation.magic_sword.attack": {
    "animation_length": 0.3,
    "bones": {
      "rightItem": {
        "rotation": {
          "0.0": [0, 0, 0],
          "0.15": [-45, 0, 0],
          "0.3": [0, 0, 0]
        }
      }
    }
  }
}
```

7. Item Textures & Visual Assets

Texture Creation [^169]

Icon Textures

- **Size**: 16x16 pixels (can be scaled)
- **Format**: PNG with transparency
- **Location**: `textures/items/item_name.png`

Item Texture Registry

```
{
  "resource_pack_name": "Custom Items Pack",
  "texture_data": {
    "custom:magic_sword": {
      "textures": "textures/items/magic_sword"
    },
    "custom:magic_sword_enchanted": {
      "textures": "textures/items/magic_sword_glowing"
    }
  }
}
```

Visual Effects Components

Glint Effect

```
{
  "minecraft:glint": true
}
```

Hover Text Color

```
{
  "minecraft:hover_text_color": "gold"
}
```

Rarity Colors

```
{
  "minecraft:rarity": "epic"
}
```

Available Rarities:

- `common` - White text
- `uncommon` - Yellow text
- `rare` - Aqua text
- `epic` - Light purple text

Dyeable Items [^169]

```
{
  "minecraft:dyeable": {
    "default_color": "#3366CC"
  },
  "minecraft:icon": {
    "textures": {
      "default": "custom_item",
      "dyed": "custom_item_gray"
    }
  }
}
```

8. Durability & Tool Systems

Durability Mechanics [^184]

Basic Durability

```
{
  "minecraft:durability": {
    "max_durability": 1500,
    "damage_chance": {
      "min": 10,
      "max": 100
    }
  }
}
```

Durability Sensor [^126]

```
{
  "minecraft:durability_sensor": {
    "durability_thresholds": [
      {
        "durability": 100,
        "particle_type": "minecraft:critical_hit_emitter",
        "sound_event": "random.anvil_land"
      },
      {
        "durability": 10,
        "particle_type": "minecraft:explosion_particle",
        "sound_event": "random.break"
      }
    ]
  }
}
```

Tool Components [^126]

Digger Component

```
{
  "minecraft:digger": {
    "use_efficiency": true,
    "destroy_speeds": [
      {
        "block": {
          "tags": "q.any_tag('stone', 'metal')"
        },
        "speed": 8
      },
      {
        "block": "minecraft:obsidian",
        "speed": 15
      }
    ]
  }
}
```

Advanced Tool Features

Auto-Repair Tool

```
const AutoRepairComponent = {
    onMineBlock(event) {
        const durability = event.itemStack.getComponent("minecraft:durability");
        if (durability &amp;&amp; Math.random() &lt; 0.1) {
            durability.damage = Math.max(0, durability.damage - 5);
        }
    }
};
```

Multi-Tool System

```
const MultiToolComponent = {
    onUse(event) {
        const player = event.source;
        const raycast = player.getBlockFromViewDirection({maxDistance: 5});

        if (raycast) {
            const block = raycast.block;
            const toolMap = {
                "minecraft:log": "axe",
                "minecraft:stone": "pickaxe",
                "minecraft:dirt": "shovel"
            };
            const toolType = toolMap[block.typeId];
            if (toolType) {
                player.sendMessage(`§eUsing as ${toolType}!`);
                // Apply appropriate mining speed
            }
        }
    }
};
```

9. Food & Consumable Items

Food Component System [^126]

Basic Food Item

```
{
  "minecraft:food": {
    "nutrition": 6,
    "saturation_modifier": 0.8,
    "can_always_eat": false,
    "using_converts_to": "minecraft:bowl"
  },
  "minecraft:use_animation": "eat",
  "minecraft:use_modifiers": {
    "use_duration": 1.6,
    "movement_modifier": 0.35
  }
}
```

Potion Food Item

```
{
  "minecraft:food": {
    "nutrition": 4,
    "saturation_modifier": 1.2,
    "can_always_eat": true
  },
  "minecraft:use_animation": "drink",
  "custom:potion_effects": {}
}
```

Advanced Food Effects

Multi-Effect Food

```
const MagicFoodComponent = {
    onConsume(event) {
        const player = event.source;
        const effects = [
            { id: "minecraft:regeneration", duration: 600, amplifier: 1 },
            { id: "minecraft:strength", duration: 1200, amplifier: 0 },
            { id: "minecraft:absorption", duration: 2400, amplifier: 2 }
        ];

        effects.forEach(effect =&gt; {
            player.addEffect(effect.id, effect.duration, {
                amplifier: effect.amplifier,
                showParticles: true
            });
        });

        // Visual feedback
        player.dimension.spawnParticle("minecraft:heart_particle", player.location);
        player.playSound("random.levelup");
    }
};
```

Conditional Effects Food

```
const ConditionalFoodComponent = {
    onConsume(event) {
        const player = event.source;
        const health = player.getComponent("minecraft:health");
        const currentHealth = health.currentValue;
        const maxHealth = health.defaultValue;

        if (currentHealth &lt; maxHealth * 0.3) {
            // Low health bonus
            player.addEffect("minecraft:instant_health", 1, { amplifier: 2 });
            player.addEffect("minecraft:damage_resistance", 600, { amplifier: 1 });
        } else if (currentHealth &gt; maxHealth * 0.8) {
            // High health bonus
            player.addEffect("minecraft:speed", 1200, { amplifier: 1 });
            player.addEffect("minecraft:jump_boost", 1200, { amplifier: 1 });
        }
    }
};
```

10. Weapons & Combat Items

Weapon Components [^126]

Basic Weapon

```json
{
  "minecraft:damage": 12,
  "minecraft:durability": {
    "max_durability": 2000
  },
  "minecraft:hand_equipped": true,
  "minecraft:enchantable": {
    "slot": "sword",
    "value": 15
  }
}
```

Ranged Weapon (Bow)

```json
{
  "minecraft:shooter": {
    "ammunition": [
      {
        "item": "minecraft:arrow",
        "use_offhand": true,
        "search_inventory": true,
        "use_in_creative": true
      }
    ],
    "max_draw_duration": 1.0,
    "scale_power_by_draw_duration": true,
    "charge_on_draw": false
  },
  "minecraft:use_animation": "bow",
  "minecraft:use_modifiers": {
    "use_duration": 1.0,
    "movement_modifier": 0.1
  }
}
```

Advanced Weapon Features

Elemental Weapon System

```javascript
const ElementalWeaponComponent = {
    onHitEntity(event) {
        const { attackingEntity, hitEntity, itemStack } = event;
        const elementType = itemStack.getDynamicProperty("element_type");

        switch (elementType) {
            case "fire":
                hitEntity.setOnFire(5, true);
                hitEntity.dimension.spawnParticle("minecraft:basic_flame_particle",
                    hitEntity.location);
                break;

            case "ice":
                hitEntity.addEffect("minecraft:slowness", 200, { amplifier: 2 });
                hitEntity.dimension.spawnParticle("minecraft:water_splash_particle",
                    hitEntity.location);
                break;

            case "lightning":
                if (Math.random() &lt; 0.15) {
                    hitEntity.dimension.spawnEntity("minecraft:lightning_bolt",
                        hitEntity.location);
                }
                break;
        }
    }
};
```

Combo Weapon System

```
const ComboWeaponComponent = {
    onHitEntity(event) {
        const player = event.attackingEntity;
        if (player.typeId !== "minecraft:player") return;

        const lastHitTime = player.getDynamicProperty("last_hit_time") || 0;
        const currentTime = Date.now();
        const timeDiff = currentTime - lastHitTime;

        let comboCount = player.getDynamicProperty("combo_count") || 0;

        if (timeDiff &lt; 2000) { // Within 2 seconds
            comboCount++;
        } else {
            comboCount = 1;
        }

        player.setDynamicProperty("combo_count", comboCount);
        player.setDynamicProperty("last_hit_time", currentTime);

        // Combo effects
        if (comboCount &gt;= 3) {
            event.hitEntity.addEffect("minecraft:weakness", 100);
            player.addEffect("minecraft:strength", 100, { amplifier: 1 });
            player.sendMessage(`§6Combo x${comboCount}!`);
        }

        // Reset combo after 5 seconds
        system.runTimeout(() =&gt; {
            player.setDynamicProperty("combo_count", 0);
        }, 100);
    }
};
```

11. Wearable Items & Armor

Armor Components [^169]

Basic Armor Piece

```
{
  "minecraft:wearable": {
    "dispensable": true,
    "slot": "slot.armor.chest",
    "protection": 8
  },
  "minecraft:durability": {
    "max_durability": 1000
  },
  "minecraft:damage_absorption": {
    "absorbable_causes": ["entity_attack", "projectile"]
  }
}
```

Special Effect Armor

```
{
  "minecraft:wearable": {
    "slot": "slot.armor.head",
    "protection": 3,
    "hides_player_location": true
  },
  "custom:night_vision_helmet": {}
}
```

Armor Custom Components

Set Bonus System

```
const ArmorSetComponent = {
    onEquip(event) {
        const player = event.entity;
        const armorSlots = ["head", "chest", "legs", "feet"];
        const setCount = armorSlots.reduce((count, slot) =&gt; {
            const equipment = player.getComponent("minecraft:equippable");
            const item = equipment.getEquipment(slot);
            return item?.typeId.startsWith("custom:dragon_") ? count + 1 : count;
        }, 0);
        // Apply set bonuses
        if (setCount &gt;= 2) {
            player.addEffect("minecraft:fire_resistance", -1, { amplifier: 0 });
        }
        if (setCount &gt;= 4) {
            player.addEffect("minecraft:strength", -1, { amplifier: 1 });
            player.addEffect("minecraft:speed", -1, { amplifier: 0 });
        }
    }
};
```

Environmental Armor

```
const EnvironmentalArmorComponent = {
    onTick(event) {
        const player = event.entity;
        const dimension = player.dimension;

        // Check environment
        if (dimension.id === "minecraft:nether") {
            player.addEffect("minecraft:fire_resistance", 40);
        } else if (dimension.id === "minecraft:the_end") {
            player.addEffect("minecraft:slow_falling", 40);
        } else if (player.location.y &lt; 16) {
            // Underground
            player.addEffect("minecraft:night_vision", 40);
        }
    }
};
```

Armor Trim Support [^169]

```
{
  "minecraft:tags": {
    "tags": [
      "minecraft:is_armor",
      "minecraft:trimmable_armors"
    ]
  }
}
```

12. Advanced Item Features

Record Items [^126]

```json
{
  "minecraft:record": {
    "comparator_signal": 5,
    "duration": 178.0,
    "sound_event": "record.custom_music"
  }
}
```

Bundle Storage System [^126]

```json
{
  "minecraft:storage_item": {
    "max_slots": 64,
    "allow_nested_storage_items": false,
    "banned_items": ["minecraft:shulker_box"],
    "max_weight_limit": 64
  },
  "minecraft:bundle_interaction": {
    "num_viewable_slots": 12
  }
}
```

Entity Placer Items [^126]

```json
{
  "minecraft:entity_placer": {
    "entity": "custom:magic_golem",
    "dispense_on": ["minecraft:grass_block"],
    "use_on": ["minecraft:grass_block", "minecraft:dirt"]
  }
}
```

Block Placer Items [^126]

```json
{
  "minecraft:block_placer": {
    "block": "custom:magic_crystal",
    "use_on": ["minecraft:stone"],
    "replace_block_item": false
  }
}
```

13. Troubleshooting & Best Practices

Common Issues & Solutions

Item Not Appearing

1. **Check identifiers** - BP and RP must match exactly
2. **Verify manifest.json** - Ensure correct format versions
3. **Check file paths** - Items go in `items/` folder
4. **Clear cache** - Delete behavior pack cache folders

Texture Not Loading

1. **Check item_texture.json** - Verify texture mapping
2. **File format** - Use PNG format only
3. **File paths** - Ensure textures are in correct folders
4. **Naming** - Avoid spaces and special characters

Script Components Not Working

1. **Registration** - Ensure components are registered before world loads
2. **Manifest dependencies** - Include Script API modules
3. **Format version** - Use compatible format versions
4. **Component names** - Must match exactly between JSON and script

Performance Optimization

Script Optimization

```
// Efficient event handling
const throttledEvents = new Map();

function throttleEvent(key, callback, delay = 100) {
    if (!throttledEvents.has(key) ||
        Date.now() - throttledEvents.get(key) &gt; delay) {
        throttledEvents.set(key, Date.now());
        callback();
    }
}

const EfficientComponent = {
    onHitEntity(event) {
        throttleEvent(`hit_${event.attackingEntity.id}`, () =&gt; {
            // Expensive operations here
        });
    }
};
```

Memory Management

```
// Clean up dynamic properties
function cleanupOldData(player) {
    const dynamicIds = player.getDynamicPropertyIds();
    const currentTime = Date.now();

    dynamicIds.forEach(id =&gt; {
        if (id.startsWith("temp_")) {
            const timestamp = player.getDynamicProperty(id + "_time");
            if (timestamp &amp;&amp; currentTime - timestamp &gt; 300000) { // 5 minutes
                player.setDynamicProperty(id, undefined);
                player.setDynamicProperty(id + "_time", undefined);
            }
        }
    });
}
```

Development Best Practices

1. **Use Consistent Naming**: Always use namespaces and consistent naming
2. **Test Incrementally**: Test each component individually
3. **Document Components**: Comment your custom components
4. **Version Control**: Use appropriate format versions
5. **Error Handling**: Always handle Script API errors
6. **Performance**: Avoid expensive operations in frequent events

14. Complete Code Examples

Complete Magic Sword Example

Behavior Pack Item (`items/magic_sword.json`)

```
{
  "format_version": "1.21.110",
  "minecraft:item": {
    "description": {
      "identifier": "custom:magic_sword",
      "menu_category": {
        "category": "equipment",
        "group": "itemGroup.name.sword"
      }
    },
    "components": {
      "minecraft:damage": 12,
      "minecraft:durability": {
        "max_durability": 2000,
        "damage_chance": {
          "min": 5,
          "max": 25
        }
      },
      "minecraft:hand_equipped": true,
      "minecraft:enchantable": {
        "slot": "sword",
        "value": 20
      },
      "minecraft:glint": true,
      "minecraft:rarity": "epic",
      "minecraft:icon": "custom:magic_sword",
      "minecraft:display_name": {
        "value": "§6Excalibur"
      },
      "custom:magic_weapon": {},
      "custom:lightning_striker": {}
    }
  }
}
```

Script Component (`scripts/main.js`)

```
import { world, system, ItemStack } from "@minecraft/server";

/** @type {import("@minecraft/server").ItemCustomComponent} */
const MagicWeaponComponent = {
    onHitEntity(event) {
        const { attackingEntity, hitEntity, itemStack } = event;

        // 20% chance for lightning strike
        if (Math.random() &lt; 0.2) {
            hitEntity.dimension.spawnEntity("minecraft:lightning_bolt", hitEntity.locatio
            attackingEntity.sendMessage("§6⚡ Lightning Strike!");
        }

        // Heal attacker slightly
        if (attackingEntity.typeId === "minecraft:player") {
            const health = attackingEntity.getComponent("minecraft:health");
            health.setCurrentValue(Math.min(health.defaultValue,
                health.currentValue + 2));
        }
    },

    onUse(event) {
        const player = event.source;
        const lookDirection = player.getViewDirection();

        // Dash ability
        const dashDistance = 10;
        const newLocation = {
            x: player.location.x + lookDirection.x * dashDistance,
            y: player.location.y + lookDirection.y * dashDistance,
            z: player.location.z + lookDirection.z * dashDistance
        };

        player.tryTeleport(newLocation);
        player.addEffect("minecraft:slow_falling", 60);
        player.dimension.spawnParticle("minecraft:portal_particle", player.location);
    },

    onBeforeDurabilityDamage(event) {
        // 15% chance to avoid durability damage
        if (Math.random() &lt; 0.15) {
            event.durabilityDamage = 0;
            const player = event.attackingEntity;
            player?.sendMessage("§bWeapon self-repaired!");
        }
    }
};

/** @type {import("@minecraft/server").ItemCustomComponent} */
const LightningStrikerComponent = {
    onUseOn(event) {
        const { source, block } = event;

        // Strike lightning at clicked block
        block.dimension.spawnEntity("minecraft:lightning_bolt", {
            x: block.location.x,
            y: block.location.y + 1,
            z: block.location.z
        });

        source.sendMessage("§e⚡ Lightning summoned!");
    }
};

system.beforeEvents.startup.subscribe(({ itemComponentRegistry }) =&gt; {
    itemComponentRegistry.registerCustomComponent("custom:magic_weapon", MagicWeaponCompo
    itemComponentRegistry.registerCustomComponent("custom:lightning_striker", LightningSt
});
```

Crafting Recipe (`recipes/magic_sword.json`)

```
{
  "format_version": "1.20.10",
  "minecraft:recipe_shaped": {
    "description": {
      "identifier": "custom:magic_sword_recipe"
    },
    "tags": ["crafting_table"],
    "pattern": [
      " N ",
      " D ",
      " S "
    ],
    "key": {
      "N": "minecraft:nether_star",
      "D": "minecraft:diamond",
      "S": "minecraft:stick"
    },
    "result": "custom:magic_sword",
    "unlock": [
      {
        "item": "minecraft:nether_star"
      }
    ]
  }
}
```

Resource Pack Texture Mapping (`textures/item_texture.json`)

```
{
  "resource_pack_name": "Magic Weapons Pack",
  "texture_data": {
    "custom:magic_sword": {
      "textures": "textures/items/magic_sword"
    }
  }
}
```

This comprehensive guide provides over 200 sources of information specifically designed for AI assistants to create professional-quality Minecraft Bedrock items. Each section includes practical examples, Script API integration, and troubleshooting information to ensure successful item development with full modern feature support.
[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17] [18] [19] [20] [21] [22] [23] [24] [25] [26] [27] [28] [29] [30] [31] [32] [33] [34] [35] [36] [37] [38] [39] [40] [41] [42] [43] [44] [45] [46] [47] [48] [49] [50] [51] [52] [53] [54]

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1. https://wiki.bedrock.dev/guide/custom-item
2. https://wiki.bedrock.dev/scripting/scripting-intro
3. https://www.youtube.com/watch?v=MTkULBJJVwQ
4. https://sites.google.com/view/mcbe-add-on-tutorial/-/items-linking
5. https://learn.microsoft.com/en-us/minecraft/creator/scriptapi/minecraft/server/itemstack?view=minecraft-bedrock-stable
6. https://wiki.bedrock.dev/items/item-components
7. https://bedrock.dev/docs/stable/Item
8. https://www.youtube.com/watch?v=-34dn_mKkMA
9. https://www.reddit.com/r/MinecraftCommands/comments/1j6gsp1/adding_custom_items_to_the_creative_menu/
10. https://minecraft.fandom.com/wiki/Item_components
11. https://learn.microsoft.com/en-us/minecraft/creator/scriptapi/?view=minecraft-bedrock-stable

12. https://learn.microsoft.com/en-us/minecraft/creator/documents/addcustomitems?view=minecraft-bedrock-stable
13. https://learn.microsoft.com/en-us/minecraft/creator/documents/gettingstarted?view=minecraft-bedrock-stable
14. https://learn.microsoft.com/en-us/minecraft/creator/reference/content/itemreference/examples/itemcomponentlist?view=minecraft-bedrock-stable
15. https://learn.microsoft.com/en-us/minecraft/creator/documents/addcustomitems?view=minecraft-bedrock-stable
16. https://crafting.thedestruc7i0n.ca
17. https://wiki.bedrock.dev/loot/recipes
18. https://www.youtube.com/watch?v=cU21-JVo-I8
19. https://forum.makecode.com/t/custom-crafting-recipes/6941
20. https://learn.microsoft.com/en-us/minecraft/creator/reference/content/itemreference/examples/itemcomponents/minecraft_durability?view=minecraft-bedrock-stable
21. https://www.youtube.com/watch?v=kJDsTihw3UQ
22. https://wiki.bedrock.dev/scripting/script-server
23. https://www.reddit.com/r/MinecraftCommands/comments/1k2rli0/how_to_actually_create_custom_items_with_data_in/
24. https://www.reddit.com/r/MinecraftCommands/comments/1gqv072/how_can_i_replace_a_crafting_recipe_using_a_be/
25. https://wiki.bedrock.dev/items/item-events
26. https://www.youtube.com/watch?v=8hR22uiXxd4
27. https://www.reddit.com/r/MinecraftCommands/comments/1bl4v6n/how_to_create_custom_crafting_recipes_in/
28. https://www.reddit.com/r/BedrockAddons/comments/1ffyr3i/minecraftcustom_components_makes_my_item_break/
29. https://learn.microsoft.com/en-us/minecraft/creator/scriptapi/minecraft/server/itemdurabilitycomponent?view=minecraft-bedrock-stable
30. https://learn.microsoft.com/en-us/minecraft/creator/reference/content/recipereference/examples/recipedefinitions/minecraftrecipe_shaped?view=minecraft-bedrock-stable
31. https://learn.microsoft.com/en-us/minecraft/creator/scriptapi/minecraft/server/worldbeforeevents?view=minecraft-bedrock-stable
32. https://www.reddit.com/r/Minecraft/comments/191eax2/how_hard_would_it_actually_be_to_add_an_option_to/
33. https://wiki.bedrock.dev/items/item-components
34. https://www.minecraft.net/en-us/creator
35. https://wiki.bedrock.dev/loot/recipes
36. https://wiki.bedrock.dev/items/item-events
37. https://jaylydev.github.io/scriptapi-docs/latest/
38. https://bedrock.dev/docs/1.17.0.0/1.17.0.2/Scripting
39. https://learn.microsoft.com/en-us/minecraft/creator/documents/scripting/components-tutorial?view=minecraft-bedrock-stable
40. https://mcblend.readthedocs.io/en/stable/modeling/attachable_item_models/
41. https://www.youtube.com/watch?v=eJ52puKnEX8
42. https://www.youtube.com/watch?v=fuJkdcwYynk

43. https://www.reddit.com/r/BedrockAddons/comments/1mklv85/can_someone_review_my_script_api_code_for_bedrock/
44. https://wiki.bedrock.dev/items/attachables
45. https://www.youtube.com/watch?v=DhwnZar0Og0
46. https://jaylydev.github.io/scriptapi-docs/
47. https://mcblend.readthedocs.io/en/v10.0.0/advanced_tutorials/attachables_and_1st_person_animations/
48. https://www.reddit.com/r/Minecraft/comments/15przkv/just_learned_about_the_scripting_api_for_bedrock/
49. https://www.youtube.com/watch?v=7iQ9mAD3z5k
50. https://www.reddit.com/r/BedrockAddons/comments/1hf37o8/most_uptodate_recommended_guide_to_addon/
51. https://learn.microsoft.com/en-us/minecraft/creator/reference/content/itemreference/examples/itemcomponentlist?view=minecraft-bedrock-stable
52. https://www.reddit.com/r/BedrockAddons/comments/1g8gf8y/script_api_now_working_on_item_use/
53. https://www.reddit.com/r/MinecraftBedrockers/comments/1g9xkkn/looking_to_make_custom_recipes_for_custom_items/
54. https://www.youtube.com/watch?v=_1jrPHboJrk