

## Create a Model

### Textbook

## Create a Model



### Juan and Elliot's Weather Wonder

Juan and Elliot were in science class learning about weather. Their teacher asked, "How can we study weather patterns without waiting for real storms?"

"We could watch the weather outside," Juan suggested.

"But that would take months," Elliot said. "What if we could make a model?"

"What's a model?" Juan asked.

"It's like a smaller or simpler version of something real," Elliot explained. "We could create a weather model to help us understand how weather works!"

Juan understood. "So a model helps us study things when we can't use the real thing?"

"Exactly!" said Elliot. "We could even make it move to show what happens. That's called a simulation!"

Their teacher added, "You could even create digital models using your coding skills. Sprites could represent clouds, rain, and wind!"

### What Is a Model?

A model is a representation of something real that helps us:

- Understand how things work
- Test ideas safely
- See things we normally can't

- Solve problems
- Make predictions

Types of models:

- **Physical models:** Built with materials (paper, blocks)
- **Digital models:** Created on computers
- **Mathematical models:** Using numbers and patterns
- **Visual models:** Drawings or diagrams

## What Is a Simulation?

A simulation is when we use a model to show how something works over time. It helps us see:

- What might happen
- How things change
- Cause and effect
- Different possibilities

## Digital Models in Coding

We can create models using our coding skills:

- **Weather simulation:** Sprites for sun, clouds, rain
- **Plant growth:** Showing stages with different sprites
- **Traffic patterns:** Cars moving on road backgrounds
- **Solar system:** Planets orbiting the sun

## Creating a Simple Weather Model

Using sprites and code:

1. Choose weather sprites (sun, cloud, water drop)
2. Select backgrounds (clear sky, cloudy, rainy)
3. Code weather changes:
  - Sun sprite → clear weather
  - Cloud sprite appears → cloudy
  - Water drop sprites fall → rain
4. Use scene changes to show progression

# How Models Help Us Learn

Models are useful because they:

- Let us see things too big or small
- Show things that happen too fast or slow
- Help us test without danger
- Allow us to try different options
- Make complex things simpler

## Building Models with Code

Code blocks for simulations:

- **Motion blocks:** Show movement
- **Wait blocks:** Control timing
- **Loops:** Repeat patterns
- **Scene changes:** Show progression
- **Multiple sprites:** Represent different parts

## Examples of Coded Models

Butterfly Life Cycle:

- Scene 1: Egg sprite on leaf
- Scene 2: Caterpillar sprite eating
- Scene 3: Chrysalis sprite hanging
- Scene 4: Butterfly sprite flying

Water Cycle:

- Water drop sprites rise (evaporation)
- Cloud sprites form (condensation)
- Water drops fall (precipitation)
- Repeat with loop

## Testing Your Model

Good models should:

- Show the main idea clearly
- Use accurate representations

- Work consistently
- Help answer questions
- Be simple enough to understand

## Improving Your Model

After testing:

- Does it show what really happens?
- Is anything missing?
- Could it be clearer?
- Does it help solve the problem?
- What would make it better?

## Model Limitations

Remember that models:

- Are simpler than real things
- Can't show everything
- May not be perfectly accurate
- Help us learn but aren't complete
- Should be updated as we learn more

## Real-World Model Examples

Scientists and engineers use models for:

- Weather prediction
- Building design
- Traffic planning
- Medical research
- Space exploration

## Critical Thinking Questions

1. How could a digital model help us understand something too dangerous to study directly?
2. What's the difference between a model and the real thing?
3. How do simulations help us make predictions?

## Sentence Stems

- "Models help us understand (blank space) by (blank space)."
- "My simulation shows (blank space) when (blank space)."
- "I can test (blank space) using (blank space)."

## Questions (5)

### 1. What is a model?

MULTIPLE CHOICE

Choose the correct answer:

- A. A real-life building
- B. A picture of your favorite animal
- C. A smaller version of something real
- D. A toy you play with

### 2. What is a simulation?

MULTIPLE CHOICE

Choose the correct answer:

- A. A coloring book
- B. Acting out what might happen using a model
- C. Watching a video
- D. Telling a story

### 3. Why do we use models?

MULTIPLE CHOICE

Choose the correct answer:

- A. To decorate the classroom
- B. To play games
- C. To learn and test ideas
- D. To read books

#### 4. What is something you could make a model of?

Choose the correct answer:

- A. A computer screen
- B. A volcano
- C. A cookie
- D. A jump rope

#### 5. What does a simulation help us do?

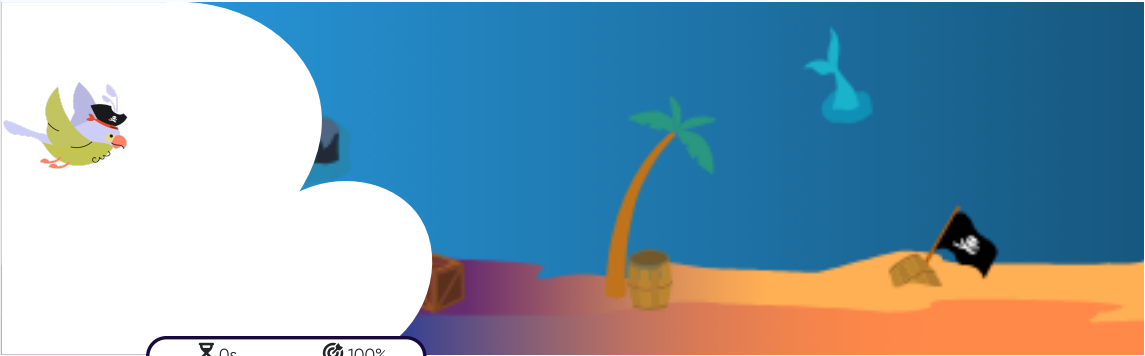
Choose the correct answer:

- A. See what might happen in real life
- B. Turn on the computer
- C. Listen to music
- D. Sleep

## Games (3)

### 1. Create a Model Typing Race

Full Screen Audio Instructions Restart Pause



⌚ 0s 🎯 100%

we use models to learn, t

## 2. Create a Model Matching

Match the model to its simulation

Full Screen

Audio

Instructions

Answer Key

Pause

Clear All

Check Matches

Attempts: 0

Paper rocket

Drawing of a town

LEGO bridge

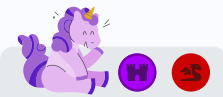
See how wind affects trees in a forest

See how strong a real bridge might be

Test how rockets fly without using a real one

Paper trees in front of a fan

Plan where buildings or roads might go



### 3. Create a Model Categories

Decide if each example is a model or simulation.

Full Screen

Audio

Instructions

Answer Key




Pause

Clear All

Check Order

Attempts: 0

	Model	Simulation
A cardboard solar system		
Using toy cars to practice traffic patterns		
A clay volcano		
Pouring baking soda into a clay volcano to see how it erupts		
A model car		
Blowing on paper houses to test wind strength		





## Blocks Challenges (5)

### 1. Sun and Moon Model



#### Sun and Moon Model

Build an algorithm showing how the sun rises and sets and how the moon rises and sets for day and night.

Explain what your model shows by adding text to the scene.

2 16 2



Submit ↑



### 2. Plant Growth Model



#### Plant Growth Model

Using the seed, sprout, and walnut tree, show the growth of the tree.

1. Start as a seed
2. Sprout up
3. Grow into a tree

You will need to use the hide look block when you move from each stage and the grow look block to show the tree growing larger.

3 4 1



Submit ↑



### 3. Camping Trip

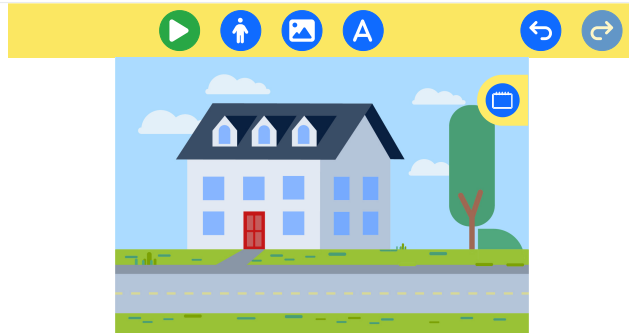


#### Camping Trip

Your sprite is going on a camping trip. Program your sprite leaving the house background and going to the campsite background.

At the campsite background use the campfire sprite, and tent sprite. Program the fire to grow and shrink as the person sprite walks over to it. Use sound blocks for the fire.

2 12 1 2



Submit ↑



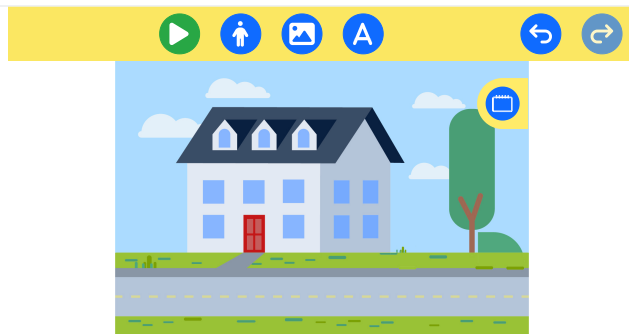
### 4. Adding Up



#### Adding Up

Using the Place Value Chart background and the ones, tens, and hundreds block sprites and model the number 112. Use a person sprite to explain the model using speech bubbles as it moves from each part of the chart.

1 12 3 1



Submit ↑



## 5. Traffic Light



### Traffic Light

Program sprites to look like a traffic light. Using the Red ball, the star, and green rectangle, stack the sprites to look like a traffic light. Then using the repeat loop block to model a traffic light at least 3 times.

Hint: use the hide and show look blocks within each loop. What pattern do you need for each? (One loop will be show, hide, hide.)

2 9 3 3

Submit ↑



## Answer Keys & Solutions

### Questions

#### 1. What is a model?

MULTIPLE CHOICE

**Correct Answer:**

- A. A real-life building ✗ Incorrect
- B. A picture of your favorite animal ✗ Incorrect
- C. A smaller version of something real ✓ Correct
- D. A toy you play with ✗ Incorrect

**Explanation:**

Models help us learn about something without using the real thing.

#### 2. What is a simulation?

MULTIPLE CHOICE

**Correct Answer:**

- A. A coloring book ✗ Incorrect
- B. Acting out what might happen using a model ✓ Correct
- C. Watching a video ✗ Incorrect
- D. Telling a story ✗ Incorrect

**Explanation:**

Simulations help us pretend and test things.

#### 3. Why do we use models?

MULTIPLE CHOICE

**Correct Answer:**

- A. To decorate the classroom ✗ Incorrect

B. To play games

✗ Incorrect

C. To learn and test ideas

✓ Correct

D. To read books

✗ Incorrect

#### Explanation:

Think about how Juan and Elliot used their weather model!

### 4. What is something you could make a model of?

MULTIPLE CHOICE

#### Correct Answer:

A. A computer screen

✗ Incorrect

B. A volcano

✓ Correct

C. A cookie

✗ Incorrect

D. A jump rope

✗ Incorrect

#### Explanation:

Models are often used to show how big things work!

### 5. What does a simulation help us do?

MULTIPLE CHOICE

#### Correct Answer:

A. See what might happen in real life

✓ Correct

B. Turn on the computer

✗ Incorrect

C. Listen to music

✗ Incorrect

D. Sleep

✗ Incorrect

#### Explanation:

Simulations help us prepare and test ideas safely.

### 1. Create a Model Typing Race

*Typing game - no answer key needed. Students practice typing the provided content.*

### 2. Create a Model Matching

**Matching Game Solutions:**

1. →
2. →
3. →
4. →

*Students must drag items from the left to match with corresponding items on the right.*

### 3. Create a Model Categories

**Category Solutions:**

#### Category 1: Model

- A clay volcano
- A model car
- A cardboard solar system

#### Category 2: Simulation

- Pouring baking soda into a clay volcano to see how it erupts
- Blowing on paper houses to test wind strength
- Using toy cars to practice traffic patterns

**Scoring:**

- Gold: 1 attempts or fewer
- Silver: 2 attempts or fewer
- Bronze: 3 attempts or fewer

*Students must sort items into their correct categories.*