

014 - Make the Reaction Feel Right

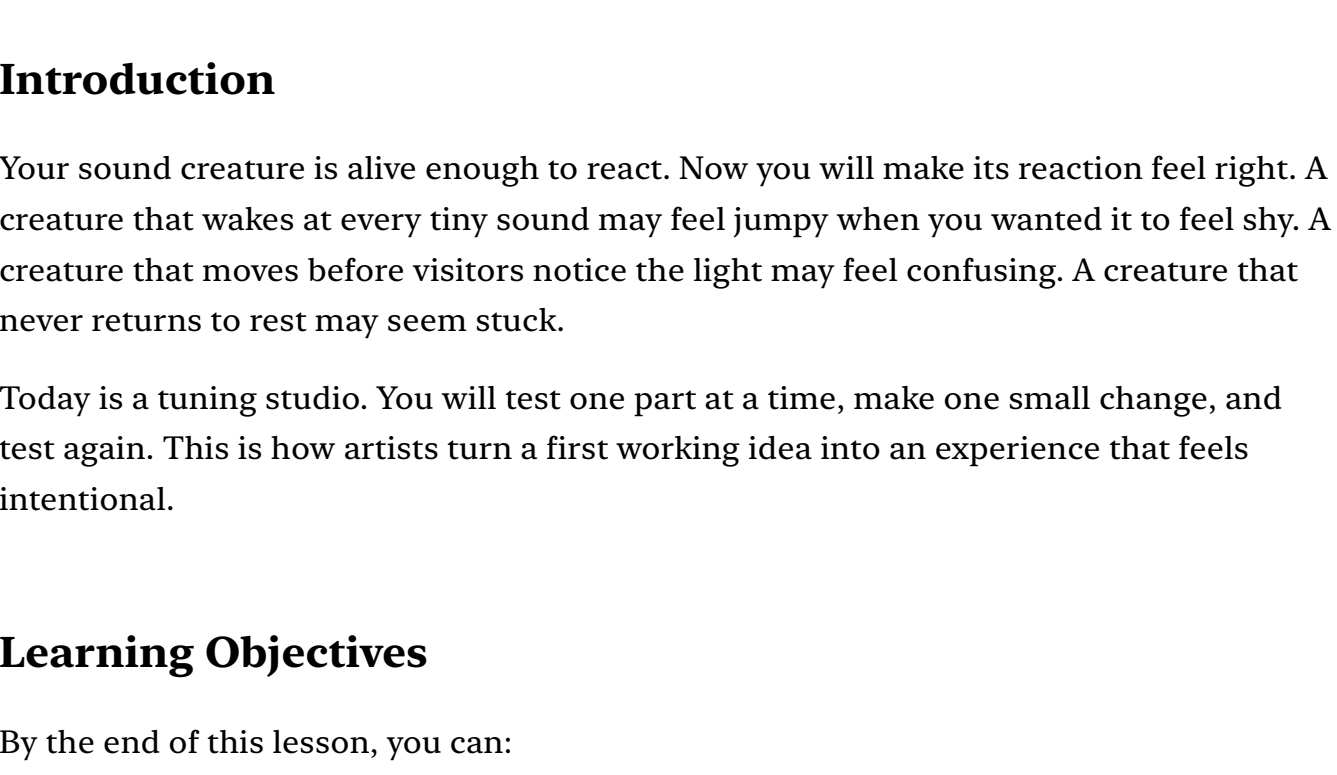
Sound Alive - Developed for Code(313) by Mario Geneau

Test, troubleshoot, and tune the timing and sensitivity of the sound creature.

— Lesson Goal

Learners build a sound-reactive kinetic artwork. They use their prior light and motion experiments to make a piece whose reactions feel intentional rather than random.

— Module Summary



Make the Reaction Feel Right

Introduction

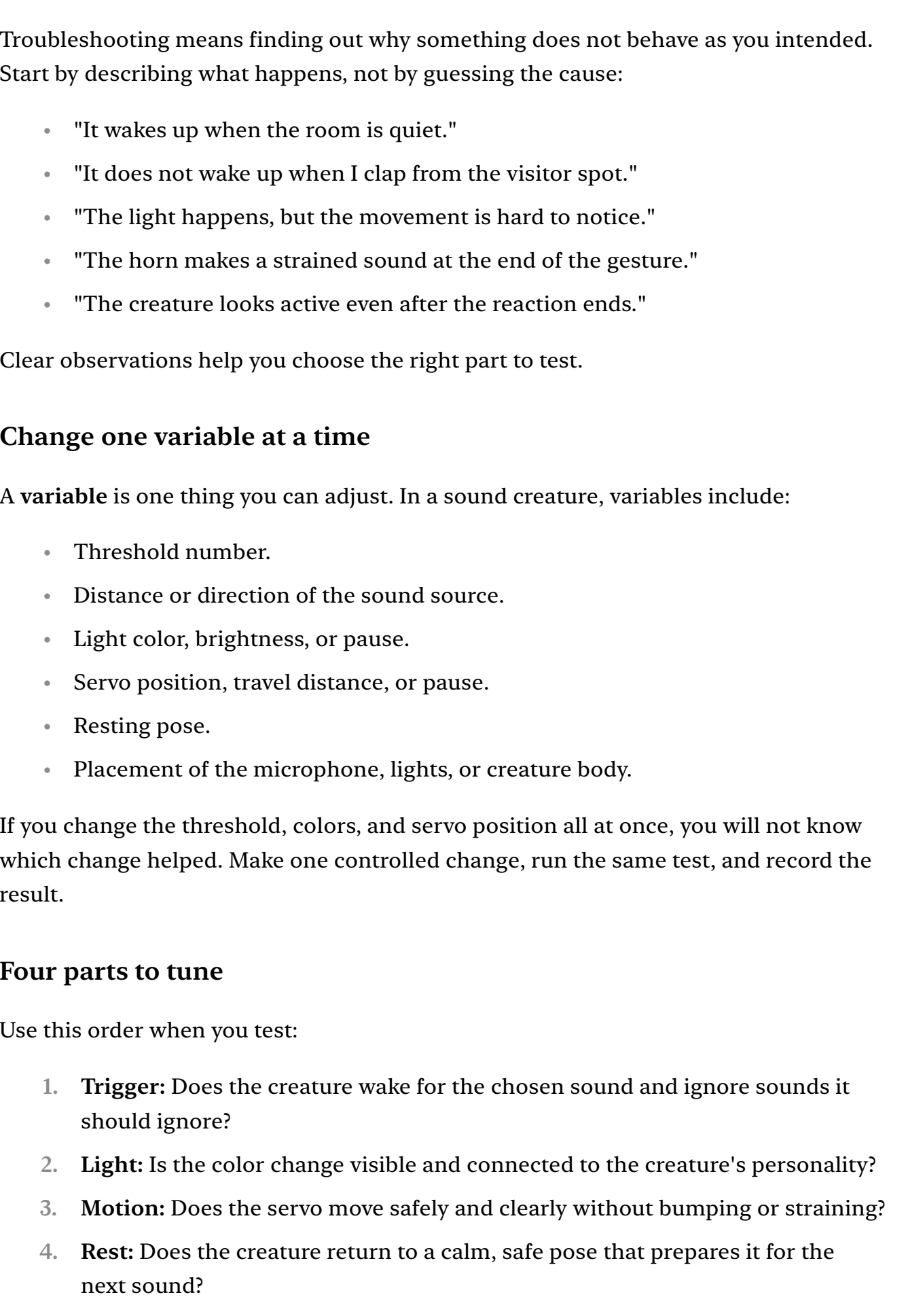
Your sound creature is alive enough to react. Now you will make its reaction feel right. A creature that wakes at every tiny sound may feel jumpy when you wanted it to feel shy. A creature that moves before visitors notice the light may feel confusing. A creature that never returns to rest may seem stuck.

Today is a tuning studio. You will test one part at a time, make one small change, and test again. This is how artists turn a first working idea into an experience that feels intentional.

Learning Objectives

By the end of this lesson, you can:

- Diagnose whether a sound creature has a trigger, light, motion, or rest problem.
- Change one variable at a time while troubleshooting.
- Tune a sound threshold for the actual classroom and visitor position.
- Adjust light timing, servo movement, or rest to improve a creature's personality.
- Document a final behavior rule that explains how the creature should work.



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Concept Explanation

Troubleshooting is careful noticing

Troubleshooting means finding out why something does not behave as you intended. Start by describing what happens, not by guessing the cause:

- "It wakes up when the room is quiet."
- "It does not wake up when I clap from the visitor spot."
- "The light happens, but the movement is hard to notice."
- "The horn makes a strained sound at the end of the gesture."
- "The creature looks active even after the reaction ends."

Clear observations help you choose the right part to test.

Change one variable at a time

A **variable** is one thing you can adjust. In a sound creature, variables include:

- Threshold number.
- Distance or direction of the sound source.
- Light color, brightness, or pause.
- Servo position, travel distance, or pause.
- Resting pose.
- Placement of the microphone, lights, or creature body.

If you change the threshold, colors, and servo position all at once, you will not know which change helped. Make one controlled change, run the same test, and record the result.

Four parts to tune

Use this order when you test:

1. **Trigger:** Does the creature wake for the chosen sound and ignore sounds it should ignore?
2. **Light:** Is the color change visible and connected to the creature's personality?
3. **Motion:** Does the servo move safely and clearly without bumping or straining?
4. **Rest:** Does the creature return to a calm, safe pose that prepares it for the next sound?

Fix the trigger first. A beautiful light and movement sequence cannot work well if the creature wakes at the wrong time.

Examples

Example 1: The creature wakes constantly

- Observation: the creature reacts to ordinary conversation.
- Likely part to tune: trigger.
- Controlled change: raise the threshold a little, then test the same clap and the same conversation again.
- Success looks like: claps still wake the creature, but background talk does not.

Example 2: The movement feels stuck

- Observation: the servo reaches the end of its turn and makes a strained buzzing sound.
- Likely part to tune: motion.
- Controlled change: choose a smaller active position or remove a paper piece that blocks the path.
- Success looks like: the creature makes the gesture smoothly and returns to rest.

Example 3: The creature's mood is unclear

- Observation: visitors call a "calm" creature energetic because its bright flash is too quick.
- Likely part to tune: light and timing.
- Controlled change: lower brightness, use a softer color, or lengthen the gentle glow.
- Success looks like: visitors describe a feeling closer to the artist's intention.

Guided Activity

Materials

- Your completed sound creature from Lesson 013
- Circuit Playground Express, servo, and any instructor-approved strip setup
- Computer with MakeCode
- A tuning log or notebook
- One partner to act as a visitor

Part 1: Write the intended behavior rule

Before changing anything, write exactly what you want your creature to do:

When it hears _____ from _____, my creature should _____ with light and _____ with motion. Then it should rest at _____.

This is your target. Every test will compare what happened with what you intended.

Part 2: Run a baseline test

Do not change the project yet. Test it in four situations and record what actually happens:

Test situation	What should happen?	What actually happened?	Which part needs tuning?
Quiet room			trigger / light / motion / rest
Chosen sound from visitor spot			trigger / light / motion / rest
Unwanted background sound			trigger / light / motion / rest
Three repeated chosen sounds			trigger / light / motion / rest

Choose the first problem that gets in the way of your intended behavior rule.

Part 3: Use the tuning guide

If you notice this...	Try one controlled change...	Then test...
It triggers too often.	Raise the threshold a little.	Quiet room and chosen sound.
It rarely triggers.	Lower the threshold a little.	Chosen sound from visitor spot.
The light is hard to see.	Increase contrast, brightness, or the light pause.	Ask a visitor what they notice first.
The light feels too intense.	Lower brightness, use a softer color, or lengthen the rest.	Ask whether the mood changed.
The servo bumps or strains.	Unplug first; clear the path, reduce travel, or lighten the attachment.	One safe movement with the horn clear.
The servo gesture is hard to notice.	Increase safe travel slightly or lengthen its pause.	Watch from the visitor position.
The creature does not settle.	Add or lengthen the return-to-rest step.	Three repeated triggers.

Make only one change from the table. If you need to change clips, paper attachments, or servo positions, unplug the board first.

Part 4: Run a controlled retest

Repeat the exact test that revealed the problem. Keep the sound source, visitor position, and room setup as similar as possible.

Write:

I changed _____ from _____ to _____. Before, the creature _____. After, the creature _____. The change made the experience feel more _____.

If the result did not improve, return to the baseline observation and choose a different single variable. Do not pile on changes.

Part 5: Check the full creature experience

Ask a partner to experience the creature without coaching. Ask:

- What did you think would wake it up?
- Did it wake up when you expected?
- What did its light and movement make you think or feel?
- Did it seem to return to a resting pose?

Compare their answer with your behavior rule. Make one final small revision only if it clearly improves the visitor experience.

Part 6: Write the final behavior rule

Complete this final version for your project record:

Creature: _____ It listens for: _____ Starting threshold: _____ When triggered, its lights: _____ When triggered, its body: _____ It rests at: _____ I tuned it by: _____

This record will help you recreate or improve the creature later.

Optional text view

The code below shows a clear order: rest state, trigger reaction, then return to rest. Replace the sample values with your own tested settings.

```
TYPESCRIPT

input.setSoundThreshold(SoundThreshold.Loud, 110)
pins.A2.servoWrite(85)
light.setBrightness(35)
light.setAll(0x330066)

input.onSound(DetectedSound.Loud, function () {
  light.setBrightness(170)
  light.setAll(0xffff00)
  pins.A2.servoWrite(108)
  pause(350)
  pins.A2.servoWrite(85)
  light.setBrightness(35)
  light.setAll(0x330066)
})
```

The **110** is only an example. Your threshold should come from tests in your own room with your own sound source.

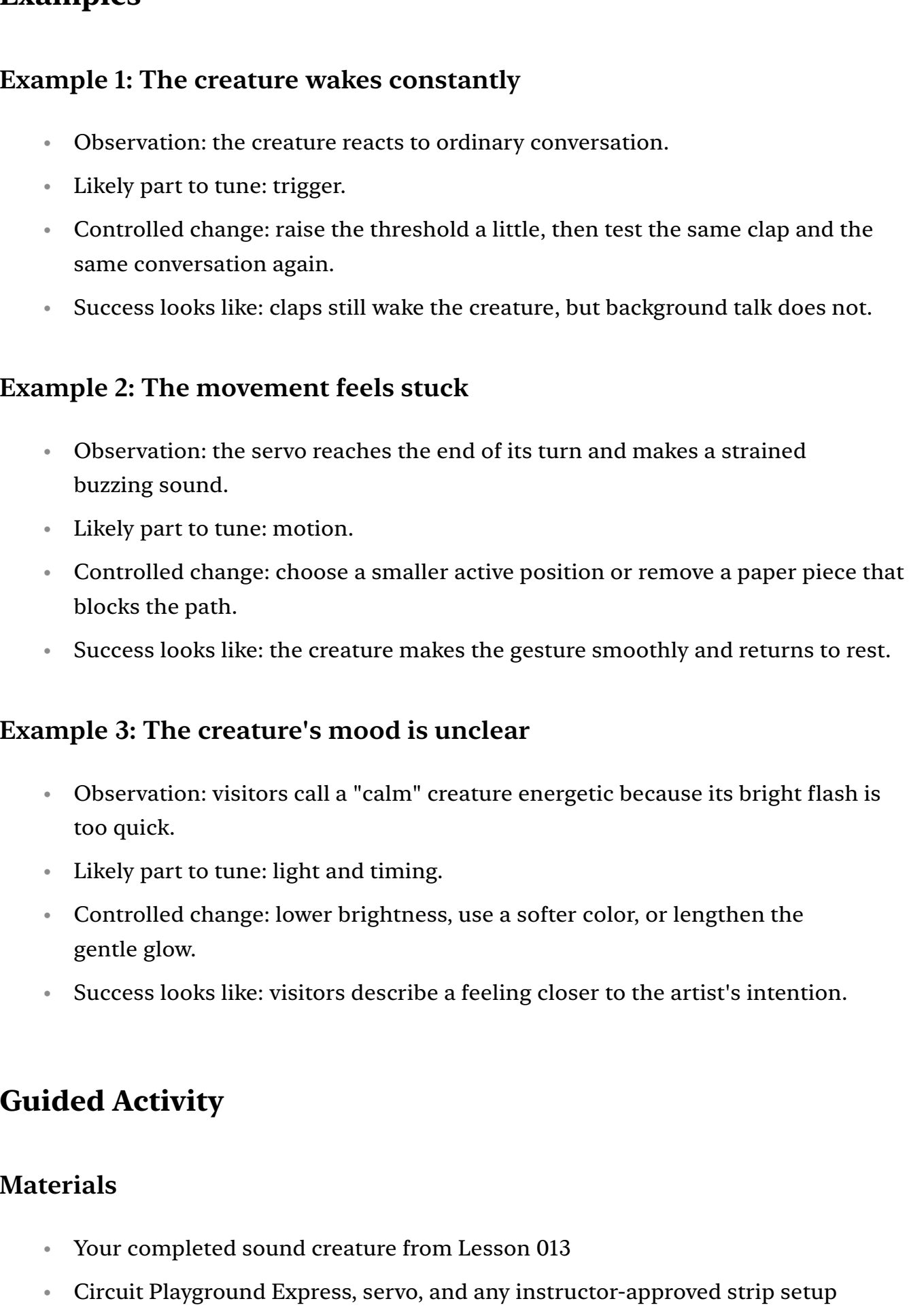
Practice

Run a final reliability test: use the chosen sound five times from the planned visitor position. Make a tally:

Try	Did it trigger?	Was light clear?	Did motion finish safely?	Did it rest?
1				
2				
3				
4				
5				

If the creature has a repeated issue, choose one more controlled adjustment and test again. If it works reliably, do not change it just to add more effects.

Challenge: Make a "quiet version" and an "excited version" of the same creature by changing only threshold, brightness, pause, and safe movement distance. Compare how the behavior rule changes.



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Knowledge Check

1. What is the best first step when a sound creature is not working as intended?
 - A. Describe exactly what happened and identify which part needs tuning.
 - B. Change every block and all materials at once.
 - C. Add more decorations.
 - D. Ignore the problem.
2. If a creature reacts to background conversation, which variable should you try first?
 - A. Raise the threshold a little.
 - B. Make the paper body larger.
 - C. Remove the resting pose.
 - D. Change the creature's name.
3. Why should you make one controlled change at a time?
4. True or false: If a servo strains or bumps into something, you should adjust it while power is still connected.

Answers and Explanations

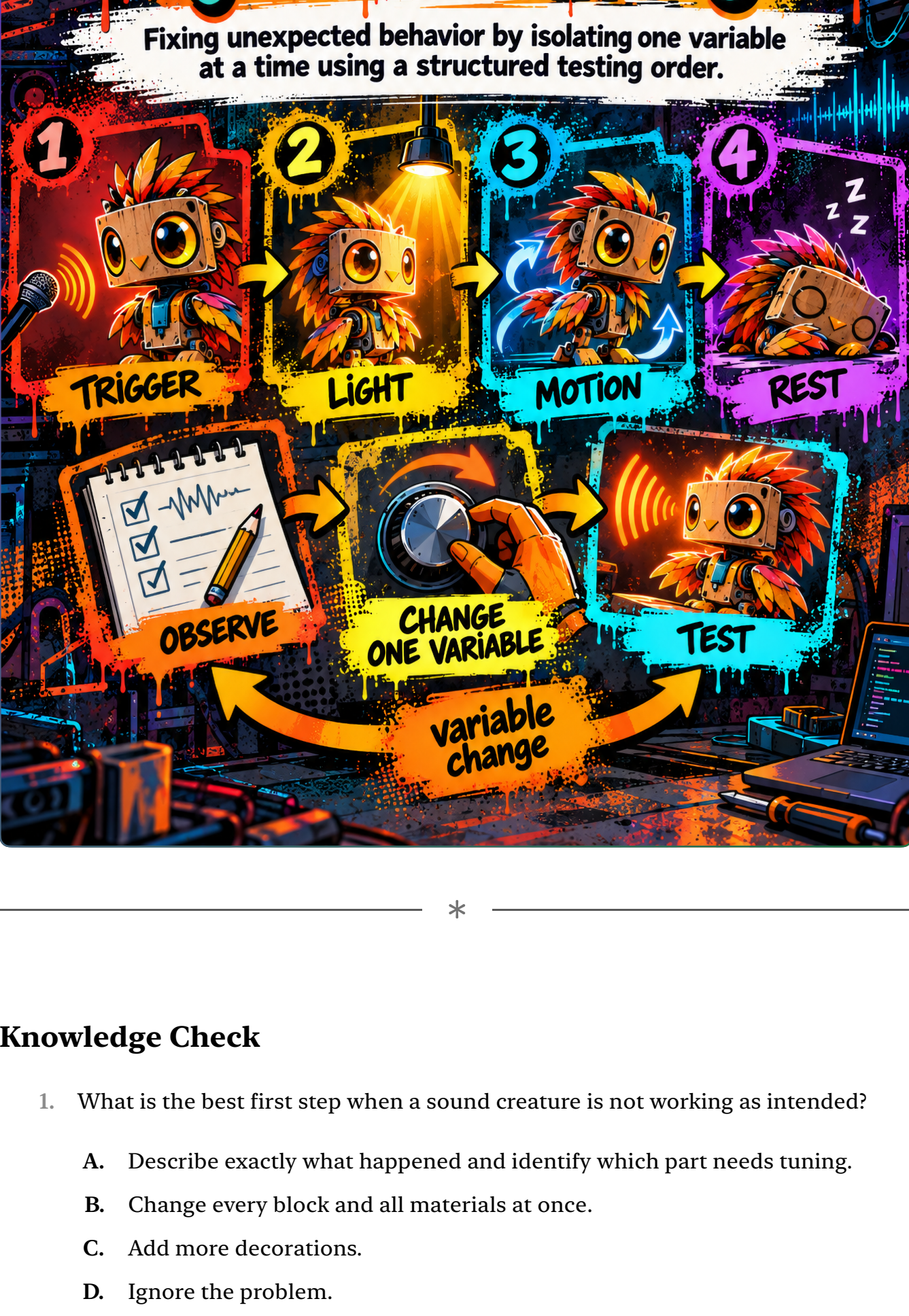
1. **A.** Careful observation helps you choose a useful test instead of guessing.
2. **A.** A slightly higher threshold can help the creature ignore weaker background sounds. Retest both the chosen sound and the unwanted sound afterward.
3. One change at a time lets you see which adjustment caused the result. This makes troubleshooting clearer and safer.
4. **False.** Unplug the board before changing servo clips, clearing its path, or adjusting an attachment.

Key Takeaways

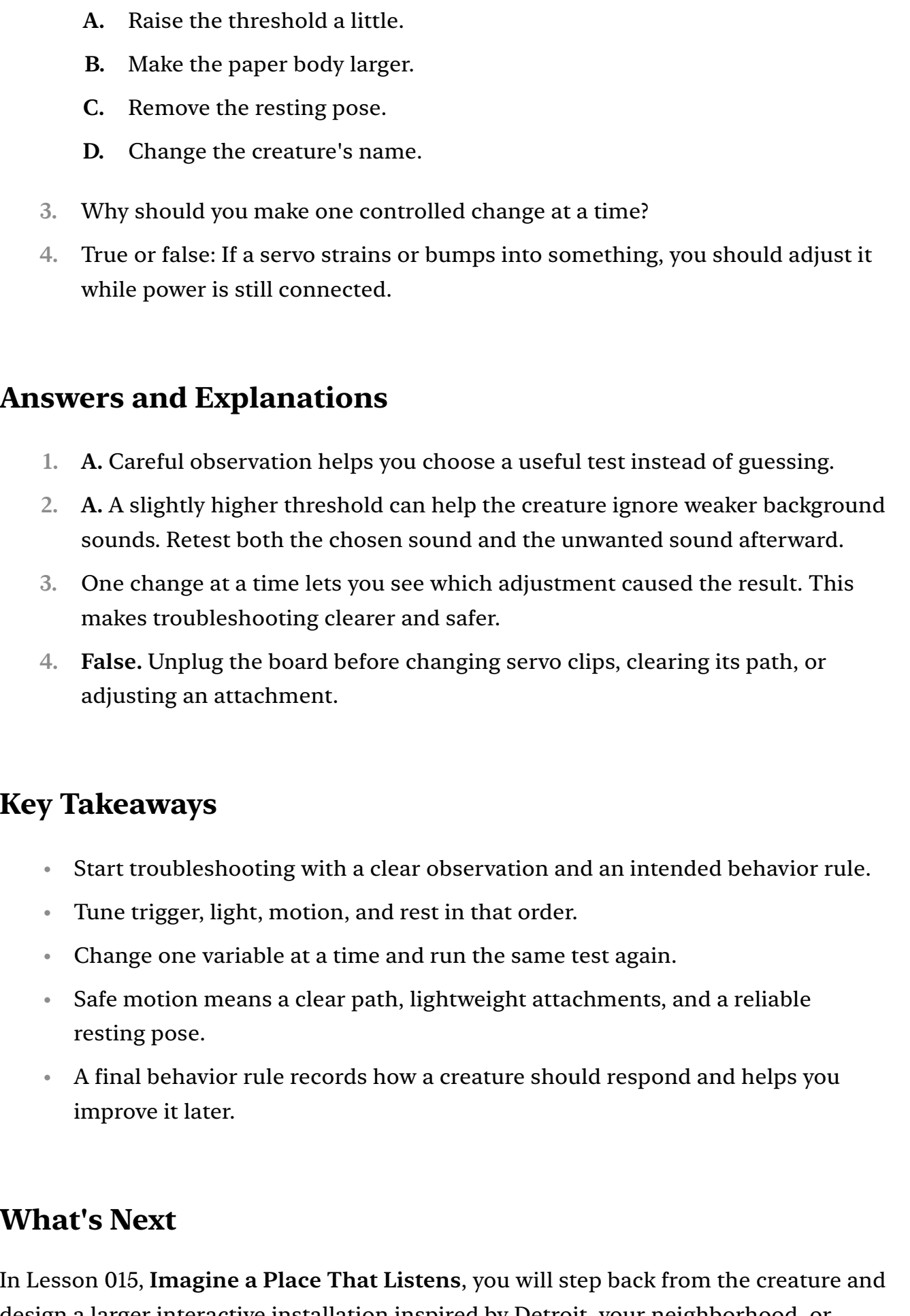
- Start troubleshooting with a clear observation and an intended behavior rule.
- Tune trigger, light, motion, and rest in that order.
- Change one variable at a time and run the same test again.
- Safe motion means a clear path, lightweight attachments, and a reliable resting pose.
- A final behavior rule records how a creature should respond and helps you improve it later.

What's Next

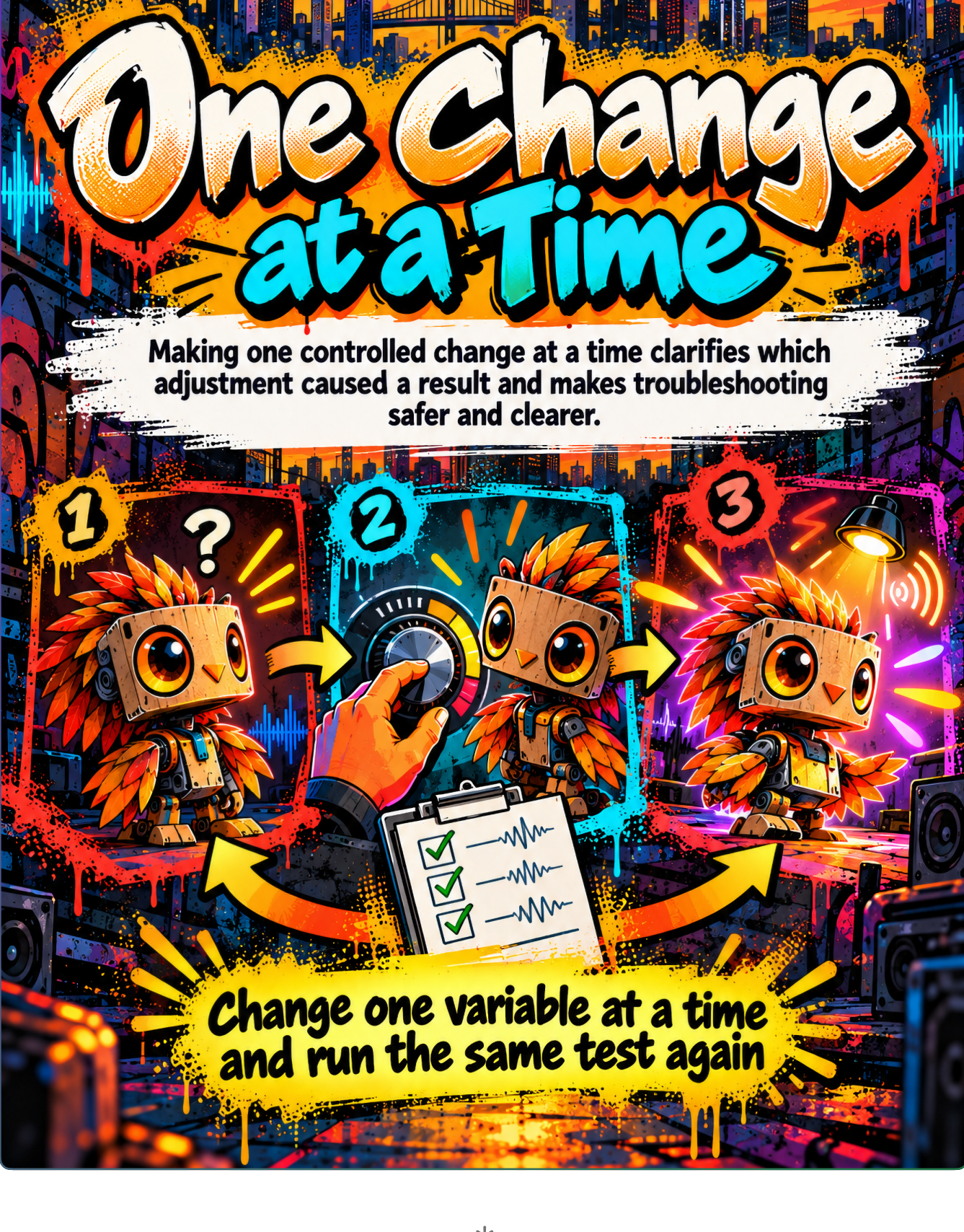
In Lesson 015, *Imagine a Place That Listens*, you will step back from the creature and design a larger interactive installation inspired by Detroit, your neighborhood, or another meaningful place.



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