



25: Decoding Encryptions and Patterns

Learning Objectives

Lesson Overview:

In this lesson, students will learn how computers use patterns and simple codes to store and share information. They will act as "pattern detectives" to decode secret messages and understand that encryption helps keep information safe. This introduction helps students develop skills in pattern recognition, sequencing, and early data encryption. All key ideas in computer science.

Learning Objectives:

- Students will be able to find and describe patterns in letters, numbers, and pictures.
- Students will be able to decode a simple message by following a pattern or rule.

CSTA Standards (5)

- 1A-DA-05: Store, copy, search, retrieve, modify, and delete information using a computing device and define the information stored as data.
- 1A-NI-04: Explain what passwords are and why we use them, and use strong passwords to protect devices and information from unauthorized access.
- 1A-AP-08: Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.
- 1A-AP-09: Model the way programs store and manipulate data by using numbers or other symbols to represent information.

Materials Needed

- Skill Struck platform
- Student computing devices
- Supplemental Materials

Supplemental Materials

- [Decoding Encryptions Slideshow](#)
- [Decoding Encryptions Handout](#)
- [Secret Code Worksheet](#)

Professional Development

View resources in Community Plus



Name	Description
Warm Up 3 min	Warm-up: Quick Pattern Hunt! Students will quickly observe and identify simple repeating patterns in their immediate environment, introducing the concept that patterns are predictable. This sets the stage for understanding how recognizing patterns helps us figure out what comes next. 1. Introduce Patterns & Goal: ◦ Say: Today, we're becoming 'Pattern Detectives'! A pattern is something that <i>repeats</i> in a special way, over and over again. It's like a design or a series of actions that you can guess what's coming next." ◦ "Think about clapping and stomping: <i>clap, stomp, clap, stomp!</i> That's a pattern! We know what comes next because it repeats." ◦ "Today, we're going to quickly find patterns around our classroom. Look for things that repeat!" 2. Quick Hunt & Share: ◦ "Ready, set, go! Look around you right now. On your clothes, on a book, on the floor, on the wall. What do you see that repeats?" ◦ (Give students 30-45 seconds to quickly look around their immediate area.) ◦ "Alright, let's share! Who saw a pattern? Tell us what you found and what makes it a pattern." ◦ As 2-3 students share, quickly sketch or write a simple representation on the board (e.g., Red Blue Red Blue; Circle Square Circle Square). ◦ Ask for each: "What part of it repeats?" 3. Connect to Lesson: "Fantastic job, Pattern Detectives! You found repeating parts, which means you were starting to figure out, or decode, what the pattern was doing." "Computers are super good at finding patterns, too, and they use them to know what to do next. Today, we'll learn more about how we can be like computers and decode patterns!"

Name	Description
Class Activity: Pattern Code Breakers 15 min	Pattern Code Breakers Students will practice identifying and using simple visual patterns to "decode" messages, understanding that codes are a type of pattern where symbols represent information. This activity introduces the basic idea of how computers use patterns to store and understand data, like a secret language. Teacher Script & Activity Flow: 1. Introduce the Idea of Codes as Patterns: ◦ Say: "We just found lots of patterns around our classroom. Patterns help us know what comes next because they repeat. Well, sometimes patterns can also be like secret languages, or codes!" ◦ "A code is a special set of rules that tells us what something means. It's like a secret language that only people (or computers!) who know the rules can understand." ◦ "When we figure out what a code means, we decode it. It's like being a super detective and solving a mystery!" 2. Cracking the Code Together: ◦ Display the "Secret Code Key" prominently. <i>(found in the supplemental materials)</i> ▪ "Look at this special chart. This is our 'Secret Code Key' for today! Each color or shape here is a symbol, and it stands for a letter. This is our pattern rule!" ▪ Example Key to display: ▪  = A ▪  = B ▪  = C ▪  = D ▪  = E ◦ Demonstrate Decoding a Word: ▪ "Let's try to decode a secret message together. My first secret message is:    " ▪ "Let's look at our key. What does the blue circle  stand for?" (Wait for "A"). "That's right! So our first letter is A." ▪ "What about the green circle  ?" (Wait for "C"). "Yes! And the next one is another green circle  , so that's also C." ▪ "So,    decodes to... ACC! Great job!" ◦ Demonstrate a Second Word (Optional, if time allows): ▪ "Let's try one more! How about:    " (Guide them through: D-E-A). "Wonderful! You're becoming expert code breakers!" ◦ Teacher Prompt: "Great job! This is how computers use patterns, too. They have their own secret codes, like a set of rules that tells them what numbers or symbols mean. They 'decode' these patterns to understand what we want them to do or to store information, which we call data." 3. Student Practice – Collaborative Decoding: ◦ Distribute the "Secret Code Worksheet" <i>(found in the supplemental materials)</i> and crayons/markers. Worksheet should have the code key at the top and space for students to write their own coded message and decode a partner's.

Name	Description
	◦ "Now it's your turn to be code makers AND code breakers! First, I want you to use our 'Secret Code Key' to write a short secret message for a friend. Maybe spell your name, or a short word like 'CAT' or 'DOG', using the colors or shapes." ◦ Circulate and Assist: Walk around the room, providing support and checking for understanding as students create their coded messages. Remind them to use the code key. ◦ Partner Activity: "When you finish writing your secret message with colors and shapes, carefully trade your paper with a partner. Now, your job is to decode your partner's message! Use the 'Secret Code Key' to figure out what their secret message says." ◦ Teacher Circles and Support: Continue to circulate, observe, and offer help as needed. Encourage students to help each other by referencing the key. Teacher Prompt during activity or after: • "Wow, you're all doing amazing work decoding! Remember, just like you used a pattern (our code key) to figure out your friend's secret message, computers use their own special patterns and codes to understand all the information, or data, we give them. It's how they 'read' and 'talk' to us, and even how they keep information private and safe!"
Platform: Decoding Encryption and Patterns 15 min	Students will complete this activity on the Skill Struck platform. If your students are ready for more content, or you need to cover this topic in greater depth, consider using this extended lesson: Decoding Encryptions and Patterns Maya's Secret Message One sunny morning, a girl named Maya found a drawing from her friend, Sam. It looked like a jumble of colorful shapes:      . Maya remembered that Sam loved making secret codes. She knew that each shape meant something special. She looked at a little paper Sam had given her before:  meant 'play',  meant 'time', and  meant 'now'. Maya put on her detective hat and looked at the shapes again. "Aha!" she thought. "   ... that means 'play time now!'" Maya decoded Sam's secret message because she knew the pattern! Your Turn to Decode! Just like Maya, you can be a super detective and decode secret messages! Remember our friend, the pattern? It's something that repeats, over and over. Computers love patterns! They use patterns to understand what we want them to do and to keep information safe. This information is called data. Think about our secret codes from earlier! Each color or shape was a symbol that stood for a letter. When you figured out what each symbol meant, you were decoding the message! You were seeing the pattern in the code. On this platform, you will find more patterns and codes. Your job is to look closely, find the repeating parts, and decode what comes next! When you do this, you are telling the computer the rule of the pattern, helping it understand the data. Sometimes, if you pick the wrong piece, it's like finding a bug! But that's okay, because you can try again and use your detective skills to decode the right answer. Ready to play and learn? Let's go!

Name	Description
Wrap Up 5 min	Pattern Pass! 1. Start Pattern Pass: ◦ Have students sit in a circle. ◦ Say: "Let's play 'Pattern Pass!' I'll start a sound and motion pattern, like 'Clap, Clap, Stomp!'. Your job is to remember and pass the same pattern around the circle. No 'bugs!'" ◦ Start a simple pattern, repeating it 2–3 times. 2. Pass the Pattern & Fix "Bugs: ◦ Point to the next student to continue the pattern. ◦ If someone changes it, gently pause. Ask: "Was that a 'bug' in our pattern? How do we fix it? What was the pattern rule?" (Help them recall the pattern). ◦ "Even computers get 'bugs' and need us to decode what went wrong to fix their pattern of instructions." ◦ Restart the pattern. 3. Quick Review: ◦ After a successful round, say: "Great job! You all decoded our pattern to know what to do next. Just like you, computers look for patterns and codes in the information we give them to do their jobs without 'bugs!'" ◦ "You are wonderful Pattern and Code Detectives!" Critical Thinking Questions: 1. What would happen if you made a mistake in the code? Could someone still understand your message? 2. Why are patterns helpful when solving puzzles or problems? 3. Why might a computer or a person want to hide a message using a code?
Life and Culture Connections	Here are some examples of how computer science impacts daily life, both in the United States and internationally: Life Connection: In Mississippi, a girl named Laila made a treasure hunt for her brother. She left little notes with clues like "▲ = T" and "■ = O." He had to use the pattern to solve the message. When he got to the end, he found a big "TOY" box! Just like Laila used a code to hide her surprise, computers use patterns and codes to keep information safe until it's time to share it. Cultural Connection: In Peru, the ancient Inca civilization created a clever system for recording information called Quipu. Instead of writing with letters, they used long ropes with many colorful strings attached, each tied with different kinds of knots. The placement, color, and type of knot could show numbers, tell small stories, or keep track of important information like food supplies or trade. Special record-keepers, called quipucamayocs, were trained to "read" the knots so the information stayed organized and safe. Just like computer code stores and protects information today, the Inca used their smart system of knots to keep their knowledge clear, secure, and easy to share across great distances.

Activities for Further Learning



Name	Description
Extension and Remedial Ideas	• Extension Opportunity: Teachers can provide manipulatives like linking cubes to create physical repeating patterns. A "Human Pattern Chain" activity can be used to pass a physical movement pattern down a line of students. • Remedial Resources: The "Quick Pattern Hunt" simplifies the concept by having students locate familiar visual patterns in their immediate physical environment. The "Secret Code Key" uses highly visual colors and shapes to map to letters, making decoding tangible.
Extra Unplugged Activities	If you have additional time, below are some additional ideas for activities you can do with the class. *Note: These additional activities do not currently have supplemental materials or resources available in the educator portal. • Pattern Building with Blocks/Objects: Provide students with a collection of small manipulatives like linking cubes, LEGO Duplos, or colored beads. Challenge them to create their own repeating patterns (e.g., red, blue, red, blue) and then "read" or "decode" a partner's pattern. They can draw their pattern on paper afterward. • Human Pattern Chain: Have students stand in a line. Start a simple action pattern (e.g., "jump, clap, turn around"). The first student performs the pattern, then the next student performs the same pattern, and so on down the line. This reinforces sequencing and repetition. If a student makes a mistake, the group can help "debug" the pattern by reviewing the sequence.

Print Lesson Plan

