Teacher Guide

girls4tech

Concept

How can we keep important and sensitive data safe and secure? Through the application of security technologies that rely on cryptology. These technologies include symmetric encryption and tokenization.

Help students understand that:

• Encryption keeps data safe and secure.
• Encryption requires a "key."
• These keys are mathematical algorithms.
• Tokenization substitutes data with a worthless token.

Step-By-Step Instructions

Page 1 – Symmetric Encryption

Teacher: *To access this G4T activity, we used the internet. As we work online, we need to make sure that our data is safe. What kinds of data would you want to keep safe online?*

Have students write and share responses.

Teacher: *How can we do that? Take a look at the message. Can we read it? Why not?*

Elicit student comments. Then have one student read the definition of **Encryption** aloud.

Teacher: *One way to protect sensitive information is to hide it with **Encryption.** The pros who use mathematical algorithms to protect our data are called **Cryptologists.***

Point out the padlock and key.

Teacher: *If the same key encodes and decodes the message it is called **Symmetric Encryption.***

Direct student's attention to the heart. Elicit discussion about the meaning of **symmetric** —it is the same on both sides.

Page 2 – Symmetric Encryption

Teacher: *Symmetric Encryption uses the same key to encrypt and decrypt our message. But what is that key?*

Direct students to the ROT 1 Code. Read the description together.

Teacher: *Will this allow us to decode the message?*

Give students the opportunity to decode the message. **(I AM A GIRL 4 TECH)**

Then have students encode their own message to share with the group.

Teacher: *But when someone else has the key, it's pretty easy to decode the message. Does that seem secure?*

Elicit student comment. How might they make encryption safer?

Page 3 – Tokenization

Teacher: *What if the relationship between the original data and the encoded data were randomly generated?*

Direct students to the encoded word.

Teacher: *We have another message. Can we read it? What does it say?*

Elicit student comments. Then have one student read the definition of **Tokenization** aloud.

Teacher: *This word was encoded using tokenization. Tokenization uses a complex algorithm to assign each piece of data a random "token," in this case an emoji. Since it's random, it's nearly impossible to figure out.*

Have students create their own tokens. Then have them encode a message and share with the group.

Teacher: *If we look at **Symmetric Encryption** and **Tokenization,** which form of encryption would you choose to keep your data safe?*

Elicit student comments.

Teacher: *Congratulations! You are now a G4T Cryptologist!*