Alexa Skills Inventor - Lesson 1: Intro to Voice AI

How does voice artificial intelligence (like Amazon Alexa) work?

Lesson Overview:

This lesson is for US students ages 14+. Students are introduced to the world of AI with a hands-on coding project. First, students learn the impact AI has in everyday life and uncover the basics of how voice AI works. Then, students embark on two coding missions - students code Alexa to say “Hello, Moon!” and create a Space Trivia Generator. At the end, students dive deep into Alexa’s AI systems through an interview with Amazon’s Chief Alexa Evangelist. The lesson concludes with a class discussion and final survey.

Objectives:

After this lesson, students will be able to:

- ☐ Explain the basics of how voice AI works.
- ☐ Program an Alexa skill that says, "Hello, Moon!" using voice AI,
- ☐ Program an Alexa skill that can recite random space facts using voice AI.
- ☐ Explain how Alexa uses AI to determine what users really mean by their commands (or ***utterances)*.**

Agenda:

1. AI Introduction Slides (7 minutes)
2. Voice AI Basics and Definitions (8 min)
3. Coding Mission 1: Hello, Moon! (15 min)
4. Coding Mission 2: Fact Generator (15 min)
5. Understanding the AI in Alexa Video (10 min)
6. Closing Discussion (5 min)

Total: 60 minutes. *If short on time, split the lesson into two days or skip the final video - Understanding the AI in Alexa.*

Key Learnings:

- **Artificial Intelligence (AI):** The development of computer systems to perform tasks that normally require human intelligence.
- **Voice AI:** technology that recognizes human voices, interprets their meaning, and offers a response in return
- Voice AI devices (like Alexa) begin listening when someone “wakes it up” by saying a preprogrammed **wake word**. The Alexa device then listens to what the user says (their **utterance)** and uses AI to determine what the user wants the device to say/do in response (the user’s **intent).**
  - **Wake Word**: a pre-programmed word that triggers a voice AI device
  - **Utterance:** a question or command a user makes to a voice AI
  - **Intent:** the desired response to a question or command made to a voice AI

Wake Words	Utterances Things You Might Say	Intent Your Desired Response
“Alexa” “Amazon” “Computer” “Echo” “Ziggy”	*“What time is it?”*	*“The time is 3:45pm”*
	“What’s the hour?”	
	“You got the time?”	

- To program an Alexa skill, you will need to use **computer science**, including the following concepts:

- **Function:** a block of reusable code used to perform an action
- **String:** a series of characters like letters or numbers
- **Variable:** a value that can change

This lesson is based on the Five Big Ideas of AI from AI4K12.

Lesson Preparation:

1. Create an MIT App Inventor Account to access the Alexa Skills Inventor program here.
2. Review your two options for creating student accounts in the Teacher Portal.
    a. Option 1: Unique Class URL - All students go to this site and are automatically assigned a username and password. (*Recommended)*
    b. Option 2: Create and print out randomized student logins. Cut and hand these out in class..
3. Review the Lesson Slides and complete the activities using the Student Worksheet.
4. Rehearse, gather any needed materials, and get ready to have fun!

Materials needed:

For Teachers:

- An MIT App Inventor account for the Alexa Skills Inventor program (create it here).
- Unique Class URL or Printouts of Student Logins - Select your method inside the Teacher Portal.
- Lesson Slides with videos
- This lesson plan as your guide

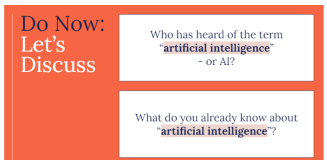
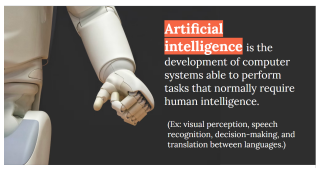
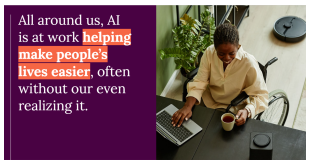
For each student:

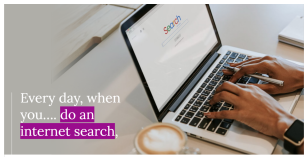
- A chromebook/computer with internet
- Headphones (optional)
- Student Worksheet (optional)

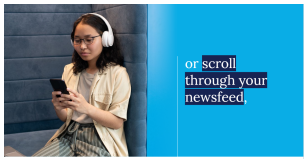
Lesson Flow:

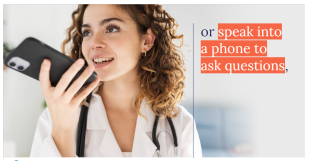
Use the Lesson Slides to facilitate. A suggested script is provided in "Notes" and in the guide below.

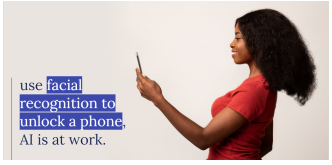
Introduction (7 minutes)

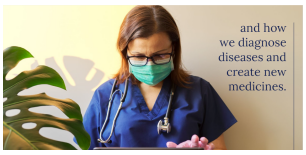
1		"Hi everyone! Today, we are going to have some fun! Has anyone here used an Alexa device before? (students raise hands. Feel free to have students share what commands they've tried.) - Awesome! After today, you'll know all about how AI works and will code two of your own Alexa Skills!"
2		"Today, we'll explore the world of artificial intelligence and then you'll get to build two of your own Alexa skills! Let's watch this quick video to help us get started!" Play video (30 seconds).
3		"Here's a quick overview of today's lesson. First, we'll talk about WHY we are learning AI. Then, we'll learn the basics of how voice AI works. After that, you'll have 2 missions to code 2 different space-themed Alexa skills. Finally, we'll wrap up with a deep dive into Alexa's AI system by watching a video with an Amazon expert."
4		"First, I'd love to know what you already know. What do you already know about artificial intelligence? What comes to mind?" Call on students to share out (2 minutes)
5		"Awesome, you already know a lot! For those of you that aren't so sure… Artificial intelligence is the development of computer systems able to perform tasks that normally require human intelligence."
6 - 14		Read slides (go FAST through slides 6-14). These are only meant to set context for students about the breadth of AI applications.











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"But today, we will be focusing on one type of AI - voice AI with Amazon Alexa!"

Voice AI Basics (8 minutes)

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"To start off, let's learn some AI basics."

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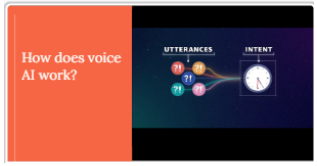

"How does voice AI work? I'm going to a play a video. While it plays, please record the key vocabulary on your worksheet. We will review these together after the video."

Play video (3 minutes)

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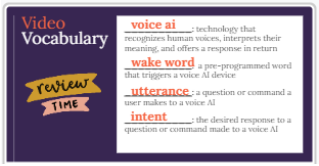

"Let's review. Can someone fill in the blank for each of these key terms?"

Call on students and reveal one word at a time.

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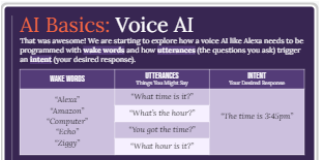

"Great work. Yes, to recap there are three big components to voice AI - wake words, utterances, and intents. The wake word tells Alexa to listen, the utterances are the different ways you might ask Alexa to do something, and the intent is the desired response. Alexa is amazing because it needs to be ready for the countless ways we might ask for a single intent and it needs to respond correctly. Later today, you'll learn more about how AI helps make that happen."

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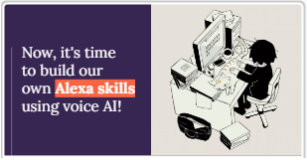

"But for now, it's time to build your first skill!"

Coding Mission 1: Hello, Moon! (15 minutes)

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"Mission 1: Hello, Moon!"

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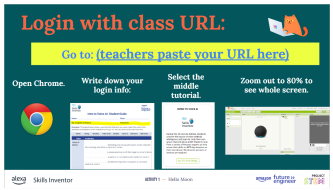

OR

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Use Slide 22 if using the Unique URL login method. Use Slide 23 if using the student print outs.

Slide 22 - Unique URL: "Before we get started, I want you to log into MIT App Inventor - where we will be coding today. Has anyone used MIT App Inventor before? No worries if not, we will walk you through everything you need to know. First, open up Google Chrome - App Inventor works best on Chrome. Second, go to our unique Class URL by typing in this address (read the URL address). Third, once you get there, it will show you your assigned username and password. Write these down on your worksheet so you can access your projects later! Once you are in, select the Alexa tutorial (in the middle). Also, PRO TIP: we recommend zooming out so that you can see the entire App inventor screen. Sometimes zooming out to 80% can really help see the whole platform. Go ahead and give me a thumbs-up once you are good to go."

Slide 23 - Student PDF Cards: "Before we get started, I want you to log into MIT App Inventor - where we will be coding today. Has anyone used MIT App Inventor before? No worries if not, we will walk you through everything you need to know. First, open up Google Chrome - App Inventor works best on Chrome. Second, use the account card to log into your account. You'll go to alexaskills.appinventor.mit.edu to get started and enter the credentials on your card. Write these down on your worksheet so you can access your projects later! Once you are in, select the Alexa tutorial (in the middle). Also, PRO TIP: we recommend zooming out so that you can see the entire App inventor screen. Sometimes zooming out to 80% can really help see the whole platform. Go ahead and give me a thumbs-up once you are good to go."

Give students 2 minutes to log in.

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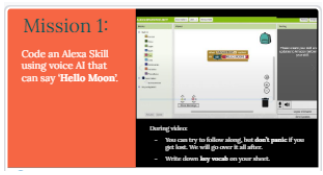

"Your first mission today is to code Alexa to say "Hello, Moon" when you ask it to. I'm going to play a video that walks us through the steps. During the video, you can try to follow along on Alexa Skills Inventor if you want - but don't panic if you get lost! We will go through all steps together after - some students just find it fun to do it while they watch. Also, be sure to write down key vocabulary from the video - you'll learn two new words during this one. We will review the vocab and code the first skill together after this video - unless you figure it out first!"

Play video (6 minutes). Students should record vocabulary onto their worksheet and can follow along on their computer if they'd like.

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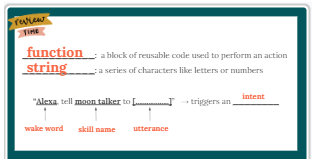
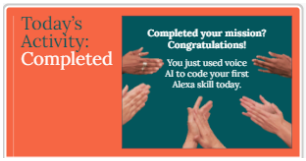
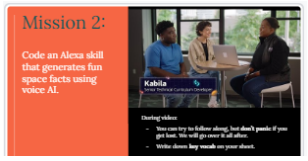
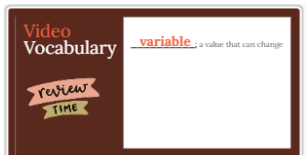
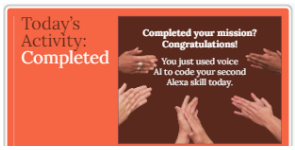
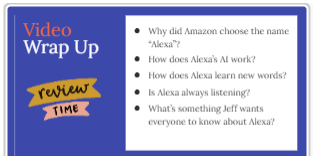
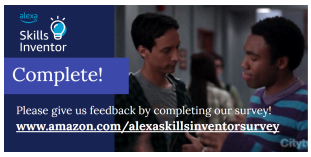


"Before we get to the code, let's review our key vocabulary words."

Call on students to fill in each one.

26		"Awesome work! Now it's time to code! Use your worksheet to guide you. I've got the final code on the screen to help you. I'll also walk through the steps together with you now. We'll simply read each direction outloud and do it together!" Students try it on their own using the worksheet or model on the screen. (5 minutes)
27		"Fantastic job, everyone! Mission 1 is complete!"
28		"It's now time to level up with another challenge."
Coding Mission 2: Space Fact Generator (15 minutes)		
29		"Mission 2: Space Fact Generator"
20		"Your second mission today is to code Alexa to become a space fact generator. When you ask it, Alexa should give you a random fact about space from a list that you have programmed. I'm going to play a video that walks us through the steps. Remember that you can try to follow along on App Inventor while the video plays - but don't panic if you get lost! We will go through all steps together after. Also, be sure to write down key vocabulary from the video - you'll learn one new word during this one. We will review the vocab and code the skill together after this video !" Play the video (7 minutes) while students try to follow along on their computer and record key vocabulary.
31		"Before we get to the code, let's review our key vocabulary words." Call on students to fill it in.
32		"Awesome work! Now it's time to code! Use your worksheet to guide you. I've got the final code on the screen to help you. I'll also walk through the steps together with you now. We'll simply read each direction outloud and do it together!" You can have students try it on their own or model how to do Mission 2 on the screen. (7 minutes)

33		"Great job! Mission 2 is complete!"
Understanding the AI in Alexa (10 minutes)		
34		"So, how does voice AI know how to respond and interpret human speech when it is so unpredictable? Let's find out!"
35		"In this 7 minute video, we will take a deeper dive into how Alexa's AI works. On the back side of your worksheet, you can take notes on the key idea/answer from each of the big questions covered in the video. At the end, we will recap together." Play video while students take notes. (7 minutes)
36		"So, let's review!" Go over one question at a time, and have students share what they learned and/or other questions they may have.
Closing (5 minutes)		
37		"Alright everyone! That concludes our lesson for today. As we close out, I'd love to hear your answer to the following questions - "What's something you learned that you didn't know before? What surprised you the most about today's lesson? What would you like to learn more about?" Call on students to share out.
38		"Thanks so much, everyone! It was a blast learning with you today. Please take a minute to complete the following survey and let Amazon know how you liked today's lesson. Thank you so much! Students should head to www.amazon.com/alexaskillsinventorsurvey to give their feedback on the experience.