# Dancing with AI Day 1 Teacher Script

Teacher Resources

**Slides**: [Dancing With AI - Day 1](https://docs.google.com/presentation/d/14wcuF-48U-JLsaSoc9L1v_hrf494v33W8ROVFNYBSNg/edit?usp=sharing)

**Journal**: [DanceDanceReflection](https://docs.google.com/presentation/d/1ILgv4ImxyDEvrME0M3CViTqjApBKO4nLvuy0VV02XWg/edit#slide=id.p)

**Standards:**

<https://docs.google.com/document/d/15ba3GB6g1GHxJ40YV0NFAYz__GG2kpIs2OBrZXbKgMw/edit?usp=sharing>

questions about their project. Invests can be prompted to inquire about career connections or interests as a result of the project

Schedule

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Activity** | **Learning Goals** | **CSTA Standards** | **Links** | **Time** |
| **Introductions**  Students introduce themselves to their fellow classmates and demonstrate a favorite movement that goes along with their name! |  |  |  | 15 min |
| **Introduction to Unit (Session 1)**  Have students understand context of this workshop by having them name different technologies that they know of that recognize their movement (e.g. Snapchat, Kinect, instagram games, etc…) |  |  |  | 10 min |
| **Project Bazaar (Session 1)**  Students travel to stations set up around the room to check out different examples of projects that utilize their movement to produce something interesting. | 1a, 1b |  | [Slides](https://docs.google.com/presentation/d/15GFzgOhwIjqerOrH1_aMRxCk-dwVLracVnF9hhVf28c/edit?usp=sharing) | 45 min |
| **Charades Activity**  To introduce students to the concept of movement in AI, have them play charades and observe the ‘features’ of each movement in the game. | 2a | 2-DA-07 | [Cards](https://docs.google.com/document/d/1Y9Z44-5NDcS5cumYfeTEAw9xtL2DX0D99-r_h9GBZPY/edit?usp=sharing)  [Website](http://movement-charades.glitch.me/) | 20 min |
| **Examples of Classification in AI (Session 1)**  Have students think critically about the three parts of an AI system. After reviewing examples, have students fill out relevant worksheets. |  | 2-AP-10 | [Worksheet](https://docs.google.com/forms/d/e/1FAIpQLScopqkWIcP4osFG8o2wzT-pLazUil4IZGo6qCDHSJUwiItC0Q/viewform?usp=sf_link) | 45 min |
| **Wrap Up**  Summarize and preview tomorrow’s lesson. |  |  |  | 10 min |

Teacher Guide

**Materials required**:

* Slides
* Journal
* Several laptops on which to set up projects for the Project Bazaar

**[prior to start of class, set up Project Bazaar around the classroom using instructions described in the ‘Project Bazaar Setup’ document]**

*Welcome to the Dancing With AI workshop! Today we’ll be exploring the significance of movement in our daily lives and interactions, introducing what Artificial Intelligence is, and why combining AI with movement can be impactful and fun!*

**[have students introduce themselves to the class and ask them to come up with a movement that they enjoy performing to go along with their name, e.g. “My name is Johnathan and I like to floss”]**

*I know everybody’s excited to try out the cool projects set up all over the room, but first, can someone give me examples of applications and games that you use that recognize your motion?*

**[have students raise hands and give examples of such technologies, e.g. Snapchat filters, Instagram games, Tiktok, etc.]**

**[Slide 3 for more prompts]**

*Let’s check out some fun examples of systems that use your movement to do all sorts of fun things!*

**[Slide 4, Project Bazaar: divide students up into equal sized groups and have them rotate throughout the stations over the course of 45 minutes]**

**[Slide 5: after 45 minutes have elapsed, call students back to their seats and go over questions]**

*As we’ve discussed, movement is part of what we can use to communicate with each other! In this next activity we’re going to try communicating only using our body movement.*

**[Slide 6: Charades]**

**[show students the slides with the GIFs and ask them to name the movement being performed in the GIF]**

**[mime your own movement and have the students guess it]**

**[then, have students raise hands to volunteer to mime their own movement to the class]**

*Who has an idea for a movement they would like to demonstrate to the class?*

**[have their classmates guess what movement they are miming until somebody gets it correct]**

**[reflect using reflection slide questions]**

**[after reflection, start actual game - either print out provided cards and have students draw them from a hat, or use** [**https://movement-charades.glitch.me/**](https://movement-charades.glitch.me/)**]**

*Now we’re going to play a game where you demonstrate a movement and the class tries to guess what it is as fast as possible!*

*Who would like to be our first mime for this game? We will try three rounds!*

*When the timer starts, pull a movement out of the hat. Without saying any words, act out the movement while the rest of the class guesses what it is. If they guess it right, say yes! And take another slip/generate another word with the website. If you don’t know a word or the class is stumped, you get 1 Slip Skip™. At the end of the 30 seconds, we’ll tally up how many of your movements the class guessed. Whoever has the highest score after the 3 rounds wins!*

**[reflect using reflection slide questions]**

**[transition into next section about parts of an AI system]**

*Now we’re going to learn about the three parts of an AI system, and learn about how AI recognizes our movements. Has anybody heard of machine learning? Can you explain it?*

*Machine Learning is a technique to train computer systems to recognize images and motion, much like YOU all did during the game.*

*To train a machine learning model, we feed it a bunch of examples to learn from. This is like when you learn a new word, you have to see a bunch of examples of it to understand what it means.*

*In the example on this slide, imagine we want to create an app that cheers you up when you are sad. To detect whether you are happy or sad, we could train a machine learning model to look at photos of you and recognize your smiles vs. frowns.*

*We would feed in many photos of you smiling, and many photos of you frowning, and let the learning algorithm learn from that.*

*In the end, we can have a Machine Learning System for our app that can tell us whether you are smiling or frowning!*

*In this example, the Input Examples (also known as Input Data) are photos of you smiling or frowning, each with a label of whether the photo is a smile or frown.*

*The learning algorithm takes these input examples, and learns how to predict whether a given photo is a smile or frown. This is like recognizing patterns in a set of examples.*

**[transition slides to show ‘classification’ of the images]**

*When the learning algorithm is trained, we can use it to classify or predict what label ANY photo has. So we can take a new photo, put it into the system, and it will tell us whether it thinks it’s a smile or frown.*

*We will train our OWN machine learning algorithms tomorrow!*

*Let’s break down some of the AI systems that we saw earlier today. Try to identify the input data, what the algorithm is learning, and what the output is for these cool AI applications.*

**[have students review applications that they saw during the Project Bazaar and have them say what they think the input and output are, as well as what they think the algorithm was learning]**

**[transition to slide which shows gif of robot, laptop, and cat]**

*Here’s an example of one machine learning system that we’ve trained to recognize whether it sees a toy robot, small laptop, or Brian’s cat!*

*In this example, the Input Data is photos of these objects plus Labels that say what they are.*

*These then go into the Machine Learning Algorithm so it can learn a Model of the objects.*

*Then you can ask the Model what it sees in a given picture (in the example, it is being asked for every frame of the video). It will tell you the Output Class of your classification input, which in this case, is whether it’s a Robot, Laptop, or Cat.*

*Later in the course we will train our own models, and use these Output Classes in our block-based code to make things happen in our Interactive Apps, like in this example where it changes the illustrations on screen to a robot, laptop, and cat.*

**[switch to next slide with GIF of marshmallow sorter]**

*Here’s an example of an AI system which sorts Marshmallows from other cereal. (Since marshmallows are the best part of cereal). This system includes a Machine Learning Model that has learned to sort marshmallows from “not marshmallows” (other cereal).*

*What might the Training Input Data be for this system’s Machine Learning Model?*

*What would the Labels be that the training data is tied to?*

**[transition to next slide for the answer]**

*The Training Input Data for this system is pictures of marshmallows given the label “Marshmallow”, and pictures of other cereal given the label “Not marshmallow”. This gives the Machine Learning Algorithm enough information to learn how to tell the difference between the marshmallow cereal bits and non-marshmallow cereal bits.*

**[transition to next slide with Learning highlighted]**

*How does a computer know what a marshmallow is?*

*Let’s think about the Learning step where the Machine Learning Algorithm finds patterns between the labeled input data. Ultimately it comes up with a way to differentiate between the two sets of pictures.*

*What are some features (or characteristics) of these two groups of photos that help a computer recognize the difference?*

*HINT (after 1 minute of student answers): All of these are going to be visual characteristics, since the computer can’t feel or taste the cereal (since we’ve only given it photos of the bits)*

*More hints: size, color, texture, shape, background*

**[transition to next slide with answer highlighted]**

*Bonus question: The training data only shows marshmallows that are white. Would the algorithm recognize a pink marshmallow?*

*Answer: It would probably not, because it hasn’t been trained on input data that lets it learn what a pink marshmallow looks like versus other cereal.*

**[this exchange will be brought up in Day 2, when the ethics of AI classification systems are discussed]**

**[transition to next slide which highlights Output]**

*Finally, what are the sorter’s Output Classes?*

*What can the fully-trained Machine Learning Model now tell us about new images of cereal bits?*

*Now that the model has been trained, we can ask the Model what categories it thinks new images are.*

*What might these categories (or Output Classes) be?*

*Hint: Output Classes tend to correspond with the Input Labels.*

**[transition to next slide with answer highlighted]**

*In this case, the Output Classes are: Marshmallow and Not marshmallow. Notice at the bottom of the video it shows the Model’s Confidence level that the current cereal bit is Marshmallow or Not marshmallow.*

**[have students take out their Dance Dance Reflection journals]**

*Now you try! Fill out the “Guess the Training Data” worksheet in your journal.*

**[give students 10-15 minutes to finish their worksheets]**

**[wrap up class with final slide and preview tomorrow’s class]**