

Lesson Plan: Machine Learning and Galaxy Classification

Grade Level: 9th Grade Integrated Science - Duration: 1–2 class periods (45–90 minutes)

Objectives:

- Understand the basics of artificial intelligence and machine learning.
- Train and test a machine learning model to classify galaxy images.
- Evaluate how training data and bias influence AI predictions.
- Connect AI image classification to scientific classification methods used in astronomy.

Materials Needed:

- Devices with internet access
- Access to Teachable Machine [Teachable Machine](https://teachablemachine.withgoogle.com) (<https://teachablemachine.withgoogle.com>)
- [Teachable Machine Step by Step Handout.docx](#)
- Pre-sorted folders of galaxy images (spiral, elliptical, irregular)
- Student worksheet [ML Galaxy Classification Student Worksheet \(1\).docx](#)
- Slide deck for instruction: <https://app.chalkie.ai/lessons/9f4bd2bf-1c33-4130-bbc6-083a3e6ac475> (must be logged into Google account or create one)

Vocabulary:

Artificial Intelligence (AI)

Machine Learning (ML)

Training Data

Bias

Galaxy Shapes: Spiral, Elliptical, Irregular

Lesson Procedure:

1. Begin with an introduction to galaxy shapes and ask how we might teach a computer to recognize them.
2. Use the slide deck to explain AI, ML, training data, and image classification.
3. Create galaxy image folders for each galaxy shape (elliptical, spiral, and irregular).

4. Demonstrate how to use Teachable Machine with the galaxy image folders.
5. Have students create their own image classifier using the galaxy images.
6. Students test the model and record predictions and confidence levels.
7. Guide students through reflection and discussion using the student worksheet.

Assessment:

- Observation of student participation during model training and testing.
- Completed student worksheet with reflections.
- Exit ticket response.

Extensions:

- Students compare results from models trained with different numbers or types of images.
- Introduce other astronomy data sets (e.g., Galaxy Zoo) for classification.
- Discuss ethical implications of AI in science and other fields.