For a 12th grader can go beyond simply using AI and start understanding how it works, writing code, building models, and even contributing to open-source projects. Here's a comprehensive list, organized by purpose.

1. AI Assistants
These can act as tutors, coding partners, brainstorming tools, and research assistants.

- ChatGPT
- Google Gemini
- Microsoft Copilot
- Claude
- Perplexity

2. Learn Python
Python is the primary programming language used in AI.

- Python.org
- W3Schools Python Tutorial
- freeCodeCamp
- Khan Academy
- Codecademy

3. Programming Environments

- Visual Studio Code
- Visual Studio Code
- Jupyter Notebook
- Project Jupyter
- Google Colab
- Google Colab
- Replit
- Replit

4. Mathematics
Key topics include:

- Algebra
- Functions
- Probability
- Statistics
- Calculus
- Linear algebra

Resources:

- Khan Academy Math
- Paul's Online Math Notes

5. Machine Learning Courses

- Elements of AI
- Elements of AI
- Coursera
- edX
- DeepLearning.AI

- fast.ai

6. Learn AI Libraries

Core Python libraries:

- NumPy
- NumPy
- pandas
- pandas
- Matplotlib
- Matplotlib
- scikit-learn
- scikit-learn
- PyTorch
- PyTorch
- TensorFlow
- TensorFlow

7. Learn Data Science

- Data cleaning
- Visualization
- Exploratory analysis
- Statistics
- Model evaluation

Practice with datasets from:

- Kaggle
- UCI Machine Learning Repository

8. Prompt Engineering

Learn how to communicate effectively with AI systems.

Resources:

- OpenAI API Documentation
- Anthropic Documentation
- Google AI Studio

9. Build AI Apps

Explore:

- Chatbots
- Image classifiers
- Voice assistants
- Recommendation systems
- Summarizers
- AI-powered websites

Useful tools:

- Hugging Face
- GitHub

10. Competitions

- Kaggle Competitions
- Devpost

These help you practice solving real-world problems and building a portfolio.

11. YouTube Channels

- 3Blue1Brown
- DeepLearning.AI
- freeCodeCamp
- Andrew Ng
- StatQuest with Josh Starmer
- Computerphile

12. Books

- Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow
- Python Crash Course
- Deep Learning with Python
- Artificial Intelligence: A Modern Approach (best as a reference after you've built a foundation)

13. Open Source Communities

- GitHub
- Hugging Face Community
- Stack Overflow

14. Portfolio Projects

Build projects such as:

- A chatbot
- An AI study assistant
- A spam detector
- A movie recommendation system
- A handwriting recognizer
- An image classifier
- A resume analyzer
- A speech-to-text app
- A translation app
- An AI-powered note summarizer

15. Ethics and Responsible AI

Learn about:

- Bias in AI
- Fairness
- Privacy
- Security
- Copyright
- AI safety
- Misinformation

Resources:

- Google Responsible AI Resources
- UNESCO AI Ethics