

RECOMMENDATIONS

**APEC Meeting on Computational Thinking Curriculum for the Digital Economy:
Synthesis Meeting for Recommendation.
November 18-20, 2019
Thailand**

The following are the key elements to achieve curriculum reform in Computational Thinking for the Digital Economy based on **Big Data** and **Artificial Intelligence (AI)** at the high school, middle school and primary school level :

1. Data Science

Data science is the field of study that combines **domain expertise**, **programming skills**, and **knowledge of math and statistics** to extract meaningful insights from data. Data science practitioners apply machine learning algorithms to numbers, text, images, video, audio, and more to produce artificial intelligence (AI) systems that perform tasks which ordinarily require human intelligence.

2. Machine Learning

Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. It focuses on the development of computer programs that can access data and use it learn for themselves.

3. Programming/Coding

Programming/Coding is the process of creating computer programs using **codes** of instructions.

4. Computational Thinking Skills

Computational thinking (CT) is a problem-solving process that includes the following characteristics:

- Formulating problems in a way that enables us to use a computer and other tools to help solve them
- Logically organizing and analyzing data
- Representing data through abstractions such as models and simulations
- Automating solutions through algorithmic thinking (a series of ordered steps)
- Identifying, analyzing, and implementing possible solutions with the goal of achieving the most efficient and effective combination of steps and resources
- Generalizing and transferring this problem-solving process to a wide variety of problems

5. Statistical Thinking

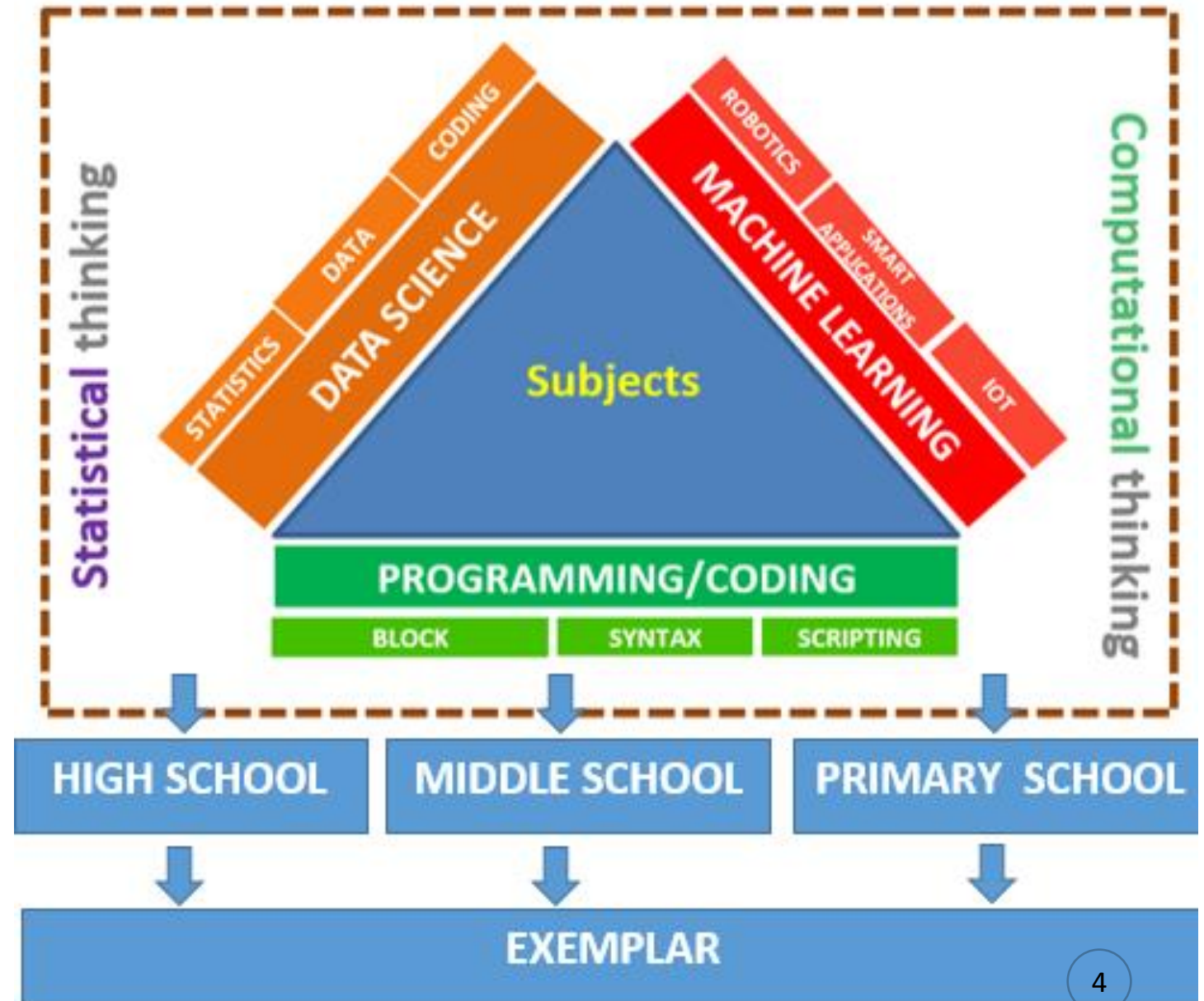
Statistical Thinking (ST) is a way of understanding a complex world based on data. The foundations of statistical thinking come primarily from mathematics and statistics. Therefore, ST is basically applying rational thought and the sciences of statistics to critically assess data and inferences

CURRICULUM REFORM FRAMEWORK

In order to materialised the new curriculum underlying the above said entities, a **Curriculum Reform Framework** model has to be established for the curriculum development process. This model will become the **reference model** in carrying out the design process of curriculum formulation and implementation of the new curriculum proposed in each APEC member economies for high school, middle school and primary school respectively.

CURRICULUM REFORM MODEL FRAMEWORK

The propose curriculum reform framework is based on the following model :



EXEMPLAR IN REALIZING AI AND BIG DATA LEARNING APPROACH

1. Formulate ideas on areas of interest
2. Develop hypothetical questions
3. What/Where/How to get data
4. Download data from data-driven websites ie WHO, UNESCO etc
5. Study and analyse downloaded data
6. Develop Algorithm and Mathematical Model
7. Implement or execute Coding/Programming
8. Display output

