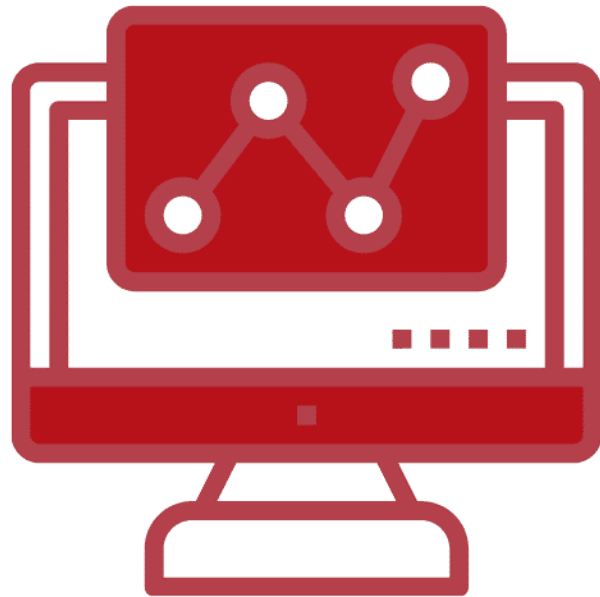## Lesson Planning

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Overview

Four Steps of Computational Thinking

1. Decomposition
2. Pattern Recognition
3. Abstraction
4. Algorithmic Thinking

Four Steps of Computational Thinking

Now that you have learned about each of the four steps of Computational Thinking, let's review strategies to construct your own Computational Thinking lesson plan.

To support you in this process, we've decomposed the lesson planning process into five separate phases that have been designed to be completed sequentially.

- Phase 1: Exploring Lesson Plan Ideas

- Phase 2: Brainstorming Topics

- Phase 3: Aligning to Computational Thinking & Standards

- Phase 4: Constructing a Draft Lesson

Phase 1: Exploring Lesson Plan Ideas

1 Review the lesson ideas provided in this course: CS Activities & Lesson Plan Multi-Age and CS Activities and Lesson Plans PK-3.

2 Identify ways to connect your Computational Thinking ideas to your own content area.

3 Resource: gettingsmart.com-Early Learning Strategies for Developing Computational Thinking Skills

Phase 2: Brainstorming Topics

In the previous phase of this module, you brainstormed some ways to connect preexisting Computational Thinking ideas to your own content area. In this phase, you'll take your initial brainstorm and move a step forward, generating a list of lesson plan ideas---one of which you'll ultimately use to create a fully-developed lesson plan.

1 Brainstorm topics that have the potential to engage students in your licensure area in the four steps of computational thinking.

2 Take Inventory. Spend 15 minutes or more searching the web for more ideas. It is a good idea to include the name of your licensure area in your search. For instance, if you're a social studies teaching candidate, you might type "computational thinking sample activities lessons social studies" into Google or DuckDuckGo. Add topics to your brainstormed list based on your findings.

3 Article Search. Using JSTOR, Google Scholar, or other sources of peer-reviewed journal articles, do a search for computational thinking activities and lesson ideas. For instance, if you're a mathematics teaching candidate, you might type "computational thinking sample activities math" into JSTOR or Google Scholar. Spend some time perusing articles to identify topics. Add topics to your brainstormed list based on your findings.

Phase 3: Aligning to Computational Thinking & Standards

In this phase, you will determine the Ohio Learning Standards that align to three lesson plan ideas from your brainstorming list. Consider how the lesson ideas may be used to engage students in each of the four steps of Computational Thinking.

PDF	**Computer-Science-Standards_Adopted-2018.pdf**	↓
	650.5 KB	

Four Steps of Computational Thinking

1. Decomposition
2. Pattern Recognition
3. Abstraction
4. Algorithmic Thinking
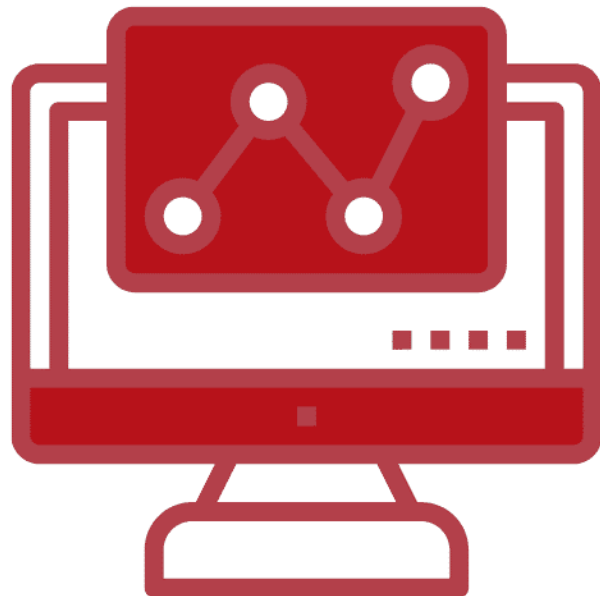
Decomposition: students break down complex problems into smaller, simpler problems.

Pattern Recognition: students make connections between similar problems and experience.

Abstraction: students identify important information while ignoring unrelated or irrelevant details.

Algorithms: students design simple steps to solve problems.

1 Access the Standards. Explore the Ohio learning standards for your licensure area.

2 Align to Standards. Review each topic in your brainstorming list and look for learning standards that would align with your selected topics.

3   Select Topics. Select the most promising topics based on your research. From your list and through careful consideration of the standards, identify your "top three" most promising topics. In particular, consider the number and quality of connections to Ohio learning standards when making your selections.

4   Computational Thinking Support. A good practice is to categorize your "top three" most promising topics. Use a document to creating headings: (1) Decomposition, (2) Pattern Recognition, (3) Abstraction, and (4) Algorithm Construction. Underneath each heading, discuss how the topic could engage students in each of the four phases of computational thinking.

○ **OHIO**

Ohio's Learning Standards

Learning standards explain the knowledge and skills Ohio students in pre-kindergarten through grade 12 need to have. Ohio's Learning Standards emphasize skills like critical thinking and problem solving - qualities most sought by today's employers.

READ MORE OHIO ›

Phase 4: Construct a Draft Lesson

In previous phases of this module, you explored others' lesson ideas, brainstormed lesson ideas, and aligned topics to relevant learning standards. In this phase, you will further develop one of your earlier topics, transforming it from an idea into a fully-developed lesson plan to be implemented at your grade level. Below, we provide details and guidelines.

1   Lesson Title & Summary. Develop a brief summary and overview of the activity.

2   Lesson Focus & Goals. Describe the big idea of the lesson. What will students take away from engaging in the activity?

3   Standards Alignment. What content or licensure area standards does the activity address? List all relevant standards from Ohio's Learning Standards.

4   Materials Needed. Include a list of materials that students need to meaningful engage in the activity. Be mindful of student and teacher accessibility (and cost) when crafting your list.

5   Teaching Procedures. Describe what teachers and students will be doing throughout the class session. Break this activity into clearly delineated parts, with significant teaching details and suggestions provided within each part. A strong procedures section could be taught by a substitute teacher with MINIMAL guesswork. For instance, (a) include a time frame for activities, (b) discuss possible student misconceptions and teacher moves to address these, and (c) describe students engagement with teaching materials during the activity.

6   Student Assessment. Describe how you will determine what students gained as a result of their engagement with the activity, with an emphasis on engagement in Ohio's Learning Standards. Will students take a quiz at the end of the lesson? Complete an

exit slip? Turn in a response to a writing prompt? Submit a lab report? Provide details, including classroom-ready assessment artifacts.

Phase 5: Revision Presentation

In this phase, you should take the time to share your lesson with teachers working in the same discipline and grade level.

1 Ask a peer educator to review your lesson.

2 Ask them to check for student engagement, student misconceptions, computational thinking activities, and other gaps in the lesson.

3 Revise the lesson. You might even practice your lesson using a screen capture tool application like screencast-o-matic.