



**2014 Season
Teacher and Mentor Lesson Guide
Lessons 1 - 6**

Welcome to Technovation! Please read these page outlines independently before presenting each week's PowerPoint slides to your students. The material here is meant as an introduction for you to confidently present our curriculum to its full capacity.

Introduction to the Technovation Curriculum:

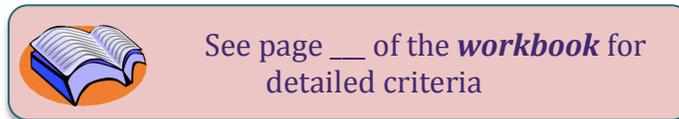
Thank you for joining Technovation and making a meaningful impact on the next generation of female leaders in technology! You are an instrumental part of our program. This introduction will familiarize you with the materials comprising the twelve-week Technovation curriculum so you may confidently lead your team.

In the slide notes of every week's presentation, there is a script that you can feel free to adapt or use directly. Along with the presentation, your students will have access to a workbook with activities and more information that correspond to the presentations. The workbook's table of contents is included below for your perusal and reference.

Student Workbook Table of Contents:

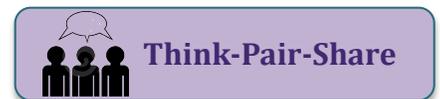
| Lesson | Content | Pages |
|--------|--|---------|
| 1 | Task List for Lessons 1 - 6 | 4 |
| 1 | Judging Rubric | 5 |
| 2 | Activity – Brainstorming App Ideas | 6 |
| 3 | Example Surveys | 7-8 |
| 3 | Activity – Brainstorming Survey Questions | 9 |
| 3 | Activity – Design Survey and Summary | 10 |
| 4 | Activity – Usability Testing of Competitor Apps | 11 |
| 4 | Plan for Completing Prototype | 12 |
| 4 | Activity – Build Your Paper Prototype | 13-16 |
| 5 | Activity – Test Your Paper Prototype with Another Team | 17 |
| 6 | List of Terms | 18 |
| 6 | Business Model | 19 - 20 |

Activities will be marked in the PowerPoint presentation with this image:



Activities have a suggested time listed on the PowerPoint slide. These are meant to actively engage students in the lecture materials. The suggested time length is meant as a tool to keep students engaged on the task at hand.

In addition to activities, each lesson has a “Think-Pair-Share.” These will be marked in the PowerPoint presentation by this image:



Each “Think-Pair-Share” takes place after you have introduced a concept, and it allows students the opportunity to think (or write), silently, for 30 seconds or so, pair with a partner to discuss, and then share out with the class (choose 1 or 2 pairs to share what they discussed). These Think-Pair-Shares are important since they make the lesson more interactive, as each student is engaged in thinking about the material and discussing it with a partner. It also allows students to formulate an answer in their mind before feeling the pressure of speaking it out loud, which is helpful for shy students who might be reluctant to raise their hand. Each “Think-Pair-Share” should take no more than 2-3 minutes. It’s meant to

be a quick activity to gauge everyone's understanding of the material and allow for interactive discussion.

A Tour Through the One-Pagers

One of the first slides in the PowerPoints is titled "Agenda" with an outline of the topics and activities for the lesson. Included in these one-pagers under "Objectives" is the goal (what students should walk away with) of the lesson. Following the "Objectives" section in the one-pagers is the "Content" section. We advise you to read, or skim, this before teaching the week's lesson. It will have some information on the coming lesson and the major points that should be conveyed in presenting the materials to students. "Teaching Tips" is a brief run-through on the activities and think-pair-shares in the coming lesson. The final section is "For Next Week:" this is taken directly from the lesson's PowerPoint and is reiterating what students should be working on before next week's lesson.

Overall, the one-pager is meant to be another form of support to you. Combined with the suggested script in the PowerPoint presentation, and the PowerPoint itself, we hope you feel prepared to lead your team of girls and instill confidence in them as the next generation of technologists and entrepreneurs. You are making an enormous difference in their lives!

Student Task List for Lessons 1 - 6

This is the syllabus for the course, to keep track of what needs to be done and when. Student should begin the tasks for each week in class with you and finished up as “homework,” as long as they are finished by the time you arrive the next week. Determine your class meeting schedule and write the dates in below.

| Lesson | Date | Tasks | ✓ |
|--------|------|---|---|
| 1 | | <input type="checkbox"/> Learn about App Inventor and complete and hack tutorials <input type="checkbox"/> Complete Mole Mash 2 before Lesson 2 | |
| 2 | | <input type="checkbox"/> Brainstorm your app idea with your team. <input type="checkbox"/> Complete the Videowall2 tutorial before Lesson 3 | |
| 3 | | <input type="checkbox"/> Create a survey and ask 20 friends to take it. <input type="checkbox"/> Outline a plan for completing prototype. <input type="checkbox"/> Complete the Colored Dots tutorial before Lesson 4. | |
| 4 | | <input type="checkbox"/> Analyze competition by testing usability of similar apps. <input type="checkbox"/> Finish paper prototype and bring to class next week. | |
| 5 | | <input type="checkbox"/> Test your paper prototype and incorporate feedback from peers. <input type="checkbox"/> Finish skeleton of screens in App Inventor. | |
| 6 | | <input type="checkbox"/> Complete business model worksheet in Student Workbook. <input type="checkbox"/> Continue to work on prototype– implement all transitions in the blocks editor to help the user move from one screen to another. | |

Introduction and Basics of App Inventor

Lesson 1

Objectives:

- By the end of this lesson, students should have a clear understanding of the Technovation Challenge program and what they will be doing for the next 3 months.

Content:

Technovation is a program of Iridescent (a 501©3 nonprofit) in which high school girls are exposed to STEM (science, technology, engineering and math) through designing and programming a mobile app. We aim to inspire girls to enter the field of technology by providing them with role models (you!) and an experience of creating their very own high-tech product.

The students are prompted to brainstorm a community problem and develop a mobile app to solve that problem. They'll use App Inventor, a free tool, to program their app. App Inventor can be accessed through a Gmail account at appinventor.mit.edu. The students should start going through the beginner tutorials here and complete them before Lesson 2.

In addition to designing and programming their app, Technovation teams will learn business strategies. At the end of the program, the team will put together a 4-minute video pitch to describe their idea to VCs and compete for funding. They will also submit their app source code, a business plan, and a PowerPoint presentation. The judges will evaluate the teams based on quality of their app, communication style, demonstration of critical thinking, implementation and strategy.

Agenda:

- Lecture (20 minutes)
- App Inventor Tutorials (time as needed)

Task List:

- Complete Mole Mash 2 before Lesson 2

2014 Final Deliverables

- App prototype- A screenshot of the app
- Presentation slide deck (please use Power Point if possible)
- Pitch Video on YouTube under 4 minutes (+/- a few seconds)
- Demo Video on YouTube under 4 minutes (+/- a few seconds)
- Business plan – typed and in PDF format
- 100-word app description

Judging Rubric

| DIRECTIONS: Evaluate these items objectively to the extent that you can. It is ok for every team to gain the highest score in each of these items. In fact if the team completed the entire Technovation curriculum, they should receive a perfect score on every item in this section. | | | | | |
|---|------------------------------|--|----------------------------|-------------------------------------|--------------|
| Objective items | 0 | 2 | 4 | SCORE | |
| Did the girls identify a real problem in their community? | No | It somewhat, but not fully, addresses a local, real problem | Yes | | |
| Does the app solve the problem that they identified? | No | It somewhat, but not fully, solves the problem | Yes | | |
| Is the prototype they submitted fully functional? (It should contain at least 3 screens with all buttons and links functional and no obvious bugs.) | No, there are major defects. | Mostly, except for a few minor issues. I can still get the general idea. | Yes | | |
| DIRECTIONS: Evaluate these items according to your expert, subjective judgment. These items should be measured relative to the quality of the other apps you judge in your pool. Every team should not be capable of receiving the highest score- these items should rank the different entries from ones that just fulfill the requirements to ones that are truly extraordinary. | | | | | |
| Subjective items | 2 | 4 | 6 | 8 | SCORE |
| Overall Pitch Quality. Is the Pitch compelling, and would you invest resources in this team? | Not at all | Possibly | Compelling, I would invest | Yes! Top of my investment portfolio | |
| | 1 | 2 | 3 | 4 | SCORE |
| Business Plan. Do they have a sound business plan? (thorough market analysis, viable marketing plan, etc.) | Not at all | A little | Quite a lot | Definitely | |
| Future Vision. Do they have a practical vision for extending the capabilities of their app beyond the prototype? | Not at all | A little | Quite a lot | Definitely | |
| Dynamic Functionality. Does the app go beyond static content and include dynamic functionality? | Not at all | A little | Quite a lot | Definitely | |
| User Interface. Is the app's interface intuitive and easy to use? | Not at all | A little | Quite a lot | Definitely | |
| Bonus Points! Does the App include the following? | | | 0 | 2 | SCORE |
| External Data Integration (calls data from an external API) | | | No | Yes | |
| An Especially Creative Design | | | No | Yes | |
| TOTAL SCORE | | | | | |

Objectives:

- Students will go over programming concepts they learned in the beginner tutorials
- Students will be introduced to the Lean Thinking framework and understand the benefit of conducting ample market research before developing a product

Content:

The students will first review concepts learned through the beginner tutorials. We'll use Mole Mash 2 as a specific example of the concepts: loops, variables, image sprites, and timers.

- Loops allow a series of actions to be repeated for a designated number of times.
- Image sprites are moving images that have a direction and speed
- Timers track clock ticks and can be used as triggers for other actions in the program.

Lean Thinking is a term coined by Eric Ries of Lean Startup where entrepreneurs are encouraged to get feedback from their customers before developing a polished finished product. If their target customers do not like the fundamental idea of their app, then the team should pivot. Pivoting means that the product (1) needs to broaden in its scope, (2) a component of the product needs to become to entire product, or (3) the app can be applied to a different target customer. Pivoting early on (based on consumer feedback) will save considerable time and resources, so we encourage them to find out if they need to do this early if they need to do it by conducting market research with their target customers.

Agenda:

- Lecture (20 minutes)
- Think-Pair-Share: Lean Thinking (2 minutes)
- Activity #1: Brainstorm App Ideas! (30 minutes)
 - Use workbook page 6

Task List:

- Students will present their app idea to the larger group.
- Students will complete Videowall 2 tutorial before Lesson 3

Market Research

Lesson 3

Objectives:

- Students will review more programming concepts from Mole Mash 2 and Videowall 2
- By the end of this lesson, students should understand what a market is and have defined the target market for their app
- Students should be able to identify who their customers are and design a survey to find out more about them and their particular needs/problems (which their app aims to solve)

Content:

The students will review conditional statements, variables, and procedures.

- Conditional statements : if-else statements allow a program to take different paths depending on conditions previously set. Can also take the format of if-elseif-else to allow for more than one specific condition and then one general case.
- Variables can take on different values over the course of a program. We'll want to remember certain values over the course of the program, so we track it in a variable.
- Procedures are blocks of code that may be repeated in many parts of a program. The sequence of events may be the same, with variation in the input (even though it's always a certain type).

This lesson supplies students with a framework to consider when creating their app idea. The critical point of this lesson is that even if their product is amazing, it may fail as a business if there aren't any customers who want it, which is why we encourage them to practice Lean Thinking. Asking your target customers as soon as possible for feedback on your product idea allows you to "fail fast" and pivot or change course before losing precious time and resources.

Customer development is another perspective for students to consider when designing their app. For example, Cindy Alvarez helps companies build better products through intensely understanding their customers. Customer development is seeking to understand what the customers need, how they work, where their pain points and highest priorities are. Students should find out more about their customer needs by surveying them– either through Twitter, Facebook, email, or in person.

Agenda

- Lecture (2 minutes)
- Check-in: App Idea (3 minutes per group)
- Resume lecture (2 minutes)

- Think-Pair-Share: Who is your market? (5 minutes)
- Resume lecture (5 minutes)
- Activity #1: Brainstorm questions for customers (10 minutes)
 - In the workbook on page 9
- Activity #2: Create a survey (10 minutes)
 - In the workbook on page 10
- Work on task list (all remaining time)

Task List

- By next week, students should have finished creating their survey and distributed it to at least 20 people for market research.
- Outline a plan for completing their prototype
- Complete the Colored Dots tutorial before Lesson 4

User-Centered Design

Objectives:

- Students will review programming concepts from the Colored Dots Tutorial
- Students will conceptualize how to design their app for its user.
- The Prototyping Lifecycle gives students the framework to think about their app prototype requirements and goal
- Students will understand usability testing and think about how current apps on the market are designed to be user-friendly

Content:

Students will review multiple screens, lists, and logic.

- Multiple screens can be linked via buttons. This allows for better organization of information.
- Lists allow for organization of information that may be ordered or similar.
- Logic words such as “and,” “or,” and “not” allow programmers to manipulate conditionals further. They can negate or combine several conditions into one.

User-centered design means that the design of your app serves the user, not the designer. To reiterate this point with students, use the example of crash dummies. Originally, crash dummies were developed only in the form of adult men (since they were designed by adult men engineers). As a result of not designing with the user in mind, women and children were injured at higher rates. Additionally, when automatic faucets were first introduced they could only recognize white hands, since they were designed by an all-white engineering team. Products are frequently designed without the user in mind– ask the girls to think of more examples.

Interface means the common boundary or link between two things. User interface is the link between the person and thing. The desktop of a computer is the interface between the user and the computer. User Interface Design is designing things while taking into account the people who use them and understanding how that user will experience the product. On the slide, there is the example of the Sony PSP that is designed to maximize the screen space of the gamer and the keys are placed to be convenient for the gamer. If the keys were too close together or too far apart, this would impede the gamer's playing ability. There is also a second video to show students about usability testing:

<http://www.youtube.com/watch?v=GrV2SZuRPvO&feature=related>

Agenda

- Lecture (1 minute)
- Check-in: survey (2 minutes per group)
- Resume lecture (10 minutes)
- Think-Pair-Share: Usability Testing (2 minutes)
- Activity #1: Usability testing of competitor apps (15 minutes)
 - In the workbook on page 12
- Resume lecture (2 minutes)
- Activity #2: Create your paper prototype (30 minutes)
 - In the workbook on pages 12 – 15
- Work on task list (all remaining time)

Task List

- Students plan out how to complete their prototype.
- Students complete their paper prototype of their app idea.
- Students finish collecting 20 responses to their survey to measure the market size for their app.

Incorporating Feedback

Objectives:

- Students will learn how to use a database
- At this point, students should have:
 - Gathered results from at least 20 surveys to understand their market
 - Completed their paper prototype
- After this lesson, students will better understand the importance of giving and incorporating others' feedback into their paper prototype.

Content:

Students will review the different types of databases available to them in App Inventor. Data bases offer a more organized way of storing information. You can create direct “key” and “value” pairs. The “key” is the phrase used to identify the type of information stored and the “value” is the specific information being tracked.

- TinyDB – stores information on the phone. Can't be accessed by other phones.
- TinyWebDB – stores information on a web database so it can be accessed by other phones and applications

Incorporating feedback is necessary for a student designing their app. In the app's early stage, incorporating feedback increases the quality and usability of their app. The more people available to test the user interface of the app, the more the kinks can be worked out to maximize the usability of it.

This lesson is great for students' professional development. Beyond the Technovation Challenge, a goal of this lesson is to be able to incorporate feedback and criticism, which will help them in their school life, college career, and professional career. By being able to handle constructive criticism and remove an emotional reaction to other's feedback, students will be able to grow.

Agenda

- Lecture (15 minutes)
- Activity #1: Test your paper prototype with another team (30 minutes)
 - In the workbook on page 17
- Work on task list (all remaining time)

Task List

- Finish incorporating feedback into a final paper prototype
- Begin building App Inventor prototype, create a skeleton of screens

Entrepreneurship

Objectives:

- By the end of this lesson, students should have a better idea what being an entrepreneur entails and be familiar with famous entrepreneurs who they may not have recognized as entrepreneurs (both male and female)
- By the end of this lesson, students will have a framework to understand how their app can generate profit from two main factors:
 - Market size
 - Revenue Streams
- Students will understand the concepts covered through a case study of Angry Birds

Content:

This lesson reinforces Technovation's mission and vision. Technovation aims to promote women in technology by giving girls confidence and expose them early to skills they need to succeed in computer science and entrepreneurship. We want to empower every girl with the confidence to enter a career in technology and entrepreneurship. The first component of this lecture is meant for students to speak frankly about their perceptions of entrepreneurs and success. In the discussion portion of this presentation, we want to have girls think about the personal characteristics of these vastly successful people and see that although they are famous, they also share characteristics that the students have. We want girls to see that being an entrepreneur is possible if one has the drive and vision.

This lesson covers some of the basics in the business world. Following the discussion on entrepreneurship, students will then learn about value propositions, market size, revenue streams, cost structure, and distribution channels. Revenue streams and distribution channels are different in that revenue streams produce profit and distribution channels help the app reach its market. Distribution channels would ideally produce revenue as a result of accessing them.

Agenda

- Lecture (10 minutes)
- Think-Pair-Share #1: What does it take to be an entrepreneur? (5 minutes)
- Resume lecture (15 minutes)