

## TEACHER DIRECTED LESSON PLAN

### LESSON 5: Research

#### LESSON OVERVIEW

In this multi-day lesson, students will understand the problems they hope to solve, researching their problem and researching their solution to discover whether it already exists. If it does, they must innovate on the solution by making it better in some way. Researching inventions includes internet searches, as well as reading journals/magazines pertinent to their invention, speaking with people to obtain feedback, and talking to industry experts will allow students to speak to how their invention is either a brand new idea or an innovation on an invention already on the market.

#### OBJECTIVE

Students will be able to use library resources, internet search engines and speak with people to research their problem and products on the market and receive feedback on their ideas/designs. Students will analyze research and feedback to determine if their invention is original. They will modify their invention if there are similar products on the market.

#### MATERIALS

##### Resources For the Teacher:

- Slide Deck: Research (*optional*)
- Script: Research (*accompanies slide deck, optional*)
- Worksheet: My Invention Research (*copy also found in YIP Inventor's Journal*)
- Worksheet: YIP Suggested Research Websites (*optional*)

##### Materials For Students:

- Pens/pencils
- Notebook or other paper for writing and drawing
- YIP Inventor's Journal (or other logbook)
- My Invention Research worksheet (*copy also found in YIP Inventor's Journal*)
- YIP Suggested Research Websites worksheet (*optional*)

#### INSTRUCTION & ACTIVITIES

**Teacher may lead the following lesson plan with flexibility to adapt as needed to fit technology and class format:**

*Note: This is a multi-day lesson that requires teacher guidance as well as independent work time. Teacher should give clear and specific instructions to assign students independent work to be done at home and should request that students submit progress and completed work in the desired format in order to check-in and track student progress.*

*Note: Teacher may differentiate instruction on research practices to align with content supported by other curriculum used by the school. Teacher may also adjust instruction to meet grade level standards and expectations. For example, students in Grades K-3 may receive help in writing their research findings and may limit their research to internet shopping and basic background information. For students in Grades 4-8, teachers may require more in-depth coverage and written reporting to match content requirements across other disciplines.*

### **Teacher Instruction:**

1. *Teacher may use slides and script to explain Research and how to research for an invention project. Or lead instruction and discussion on their own.*

Teacher will share Slide Deck: Research with the class and use script as needed.

Teacher will explain that research is gathering facts and information to help approach a subject with as much knowledge as possible in order to understand it. Students have identified problems they wish to solve, and today, they will begin to research these problems and their possible solutions as they narrow down the focus of their invention project.

2. Teacher will ask students to brainstorm ideas as to how they can find out more about their problem(s). How can they find answers to these questions?
  - How can we find out more about our inventions?
  - How do we find out who is affected by a problem?
  - How do we find out how many people are affected by this problem?
  - How would we know where these people are who are affected?
3. Teacher will ask students to describe their invention using keywords. Ask students to list 5 key words they would use to describe their invention. These words can be used when students begin their own research of their invention idea on the internet. Next, teachers encourage students to consider ways they can begin their internet research. Teacher may offer suggestions for reliable websites and sources for research. *(See list of YIP Suggested Research Websites).* Teacher may use example on slides: A pencil. What 5 words can be used to describe a pencil? Use these words to begin an internet search together to model an approach to research.
4. Teacher will lead students through a research session as a model, using the pencil as an example. Teacher will explain that this is a way students may do their research on their own following the lesson.
  - a) Teacher will type in “Something **wooden** that has **lead** that is used to **write** and **erase**”.
  - b) Teacher will then go through the search and research with students, guiding them to pieces of information that they should record as they do their own research. Important pieces of information to record include:
    - Website name and address
    - Names of experts who provided information in the information found
    - Facts about the problem and/or the solution idea

- What similar ideas exist- how is student's idea the same and how is it different
5. Finally, teacher will encourage students to research their problem independently at home. Teacher may specify requirements such as students must find 2 internet resources and 1 other resource (library, interview with a professional about the topic, a book from home, etc.) Teacher should suggest an amount of time to be spent on at home research, for example 30 or 60 minutes. Teachers may assign the My Invention Research worksheet to be completed and submitted in the format of the teacher's choice. *(Note: This worksheet is also found in the YIP Inventor's Journal, students may complete it directly in their journal).* Students may need help in class or from adults at home.

### **Student Proving Behaviors:**

Recommendations for In-Class Learning (select one or all of the following):

1. Think-Pair-Share: With a partner, have students consider 5 key words they will use to describe their invention to use in their research searches. Ask pairs to share these words with each other and offer suggestions to better find relevant information.
2. Partner Interviews: In pairs, ask students to come up with at least 3 questions that they may ask an expert in the field of their invention idea (*example, a vet, a doctor, a business owner, a farmer*) and practice asking these questions with each other. Allow the pair a few minutes to think of and write down their questions. Then give each partner 3-5 minutes to ask questions so that each student has ample time to practice interviewing skills.

*Ideas for Virtual Instruction:*

1. Ask students to make a list to examples of professionals in the field related to their invention idea that they may interview (*example, a vet, a doctor, a business owner, a farmer*).
2. Ask students to list the key words they used to describe their inventions and post them on a class notes page or a class blog for peer sharing.
3. Allow students to work in pairs or small groups using a Zoom Breakout room or Google Classroom, to share ideas about key words to describe their inventions.

### **Activity: Research At Home**

***This activity is already set-up to be done at home by the student or it may be modified to be done in-class, in pairs or small groups.***

***Students will need:*** Pen or pencil, My Invention Research worksheet (found in YIP Inventors' Journal), or notebook paper for recording research findings and documenting sources used.

1. Teacher will distribute the My Invention Research worksheet (or instruct students to use the worksheet found in the YIP Inventors' Journal) and assign students to complete in a series of work sessions. Teachers may choose to ask students to submit their worksheets following the assignment to check-in on progress, provide feedback and evaluation.

*Ideas for Virtual Instruction:*

1. *Students may submit their worksheets by taking a photo of them, scanning them, or completing the worksheet included in the Virtual YIP Inventor's Journal.*
2. *Create a sharing space for students to share their research findings. Possible problems to solve and to work together to narrow down ideas and possible solutions.*
3. *Host a teacher "office hours" for students to ask specific questions, share research and discuss road blocks.*

#### **CHECK FOR UNDERSTANDING**

#### ***Teacher may wish to do the following to check for understanding:***

1. In the format of the teacher's choice, ask students to list 2 internet resources and 1 other resource (library, interview with a professional about the topic, etc., a book from home, etc.) they will use as they research the problem they want to solve and their invention idea.